DELIBERAZIONE N. 92

CONSIGLIO N. 11 DI DATA 21.12.2022

CONSIGLIO DI AMMINISTRAZIONE

OGGETTO: **RATIFICA DELLA DETERMINAZIONE D'URGENZA DELLA PRESIDENTE DEL 14 DICEMBRE 2022, N. 14, RECANTE "PROGETTO "PATHOGEN READINESS PLATFORM FOR CERIC-ERIC UPGRADE" (PRP@CERIC): RECEPIMENTO DEGLI ESITI DELLA NEGOZIAZIONE, SOTTOSCRIZIONE DELL'ATTO D'OBBLIGO CON IL MINISTERO DELL'UNIVERSITÀ E DELLA RICERCA E SOTTOSCRIZIONE DI UN NUOVO ACCORDO DI PARTENARIATO PER LA GESTIONE DEL FINANZIAMENTO".**

		PRESENTI ALLA VOTAZIONE	ASSENTI ALLA VOTAZIONE
	Aventi diritto di voto:		
1.	Caterina Petrillo	X	
2.	Sabrina Strolego	X	
3.	Alberto Aloisio	X	
	Senza diritto di voto:		
	REVISORI DEI CONTI		
1.	Nazzareno Cerini	X	
2.	Antonio Musella		X
3.	Rodolfo Fiocchi		X
	CORTE DEI CONTI		
1.	Tiziano Tessaro	X	
	IL DIRETTORE GENERALE		
1.	Anna Sirica	X	

SEGRETARIO: Diego Arocchi

In ordine all'oggetto sopra indicato il Consiglio di Amministrazione ha discusso e deliberato quanto di seguito riportato:

IL CONSIGLIO DI AMMINISTRAZIONE

VISTA la determinazione della Presidente di data 14 dicembre 2022, n. 14, recante "Progetto "Pathogen Readiness Platform for CERIC-ERIC UPGRADE" (PRP@CERIC): recepimento degli esiti della negoziazione, sottoscrizione dell'atto d'obbligo con il Ministero dell'Università e della Ricerca e sottoscrizione di un nuovo accordo di partenariato per la gestione del finanziamento";

CONSIDERATE le motivazioni contenute nel provvedimento in parola in merito all'urgenza e ritenuto di condividerle;

DATO ATTO che la documentazione richiesta è stata effettivamente presentata entro i termini assegnati dal Ministero finanziatore;

ATTESA la necessità di ratificare il provvedimento assunto dalla Presidente, ai sensi dell'articolo 14, comma 4, dello Statuto;

SU PROPOSTA della Presidente;

CON VOTO unanime;

DELIBERA

di ratificare, in base alle motivazioni espresse in premessa, la determinazione della Presidente di data 14 dicembre 2022, n. 14, recante "Progetto "Pathogen Readiness Platform for CERIC-ERIC UPGRADE" (PRP@CERIC): recepimento degli esiti della negoziazione, sottoscrizione dell'atto d'obbligo con il Ministero dell'Università e della Ricerca e sottoscrizione di un nuovo accordo di partenariato per la gestione del finanziamento", allegata alla presente deliberazione per farne parte integrante e sostanziale.

IL SEGRETARIO

Diego Arocchi

DIEGO AROCCHI Firmato digitalmente da DIEGO AROCCHI

LA PRESIDENTE

Caterina Petrillo

Firmato digitalmente da PETRILLO CATERINA
C=IT

DETERMINAZIONE DEL PRESIDENTE

N. 14

DI DATA 14.12.2022

OGGETTO: PROGETTO "PATHOGEN READINESS PLATFORM FOR CERIC-ERIC UPGRADE" (PRP@CERIC): RECEPIMENTO DEGLI ESITI DELLA NEGOZIAZIONE, SOTTOSCRIZIONE DELL'ATTO D'OBBLIGO CON IL MINISTERO DELL'UNIVERSITÀ E DELLA RICERCA E SOTTOSCRIZIONE DI UN NUOVO ACCORDO DI PARTENARIATO PER LA GESTIONE DEL FINANZIAMENTO.

LA PRESIDENTE

VISTI:

- l'art. 17, comma 1, n. 24), del vigente Statuto dell'Ente, che rimette alla competenza del Consiglio di Amministrazione "l'approvazione di iniziative e programmi di attività aventi un valore economico complessivo superiore a quello fissato nel regolamento di amministrazione, finanza e contabilità";
- l'art. 61, comma 3, del Regolamento di amministrazione, finanza e contabilità, emanato con determinazione del Presidente di data 29 gennaio 2020, n. 3, che in attuazione del citato art. 17 ha stabilito che è rimessa alla competenza del Consiglio di Amministrazione l'approvazione di iniziative e programmi di attività di importo superiore a 80.000,00 euro;
- l'art. 17, comma 1, n. 25), del vigente Statuto dell'Ente, che rimette alla competenza del Consiglio di Amministrazione "l'approvazione delle convenzioni e degli accordi con Università e con soggetti pubblici o privati, nazionali o internazionali";

RICHIAMATA la deliberazione del Consiglio di Amministrazione n. 6 di data 22 febbraio 2022, con la quale si approva:

- di autorizzare la presentazione della proposta progettuale intitolata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), in risposta all'Avviso pubblico del MUR n. 3264 del 28 dicembre 2021 per la presentazione di proposte progettuali per "Rafforzamento e creazione di Infrastrutture di Ricerca" da finanziare nell'ambito del PNRR;
- di adottare i testi dello schema di "Accordo ai sensi dell'art. 15 Legge 7 agosto 1990 n. 241 per la gestione di finanziamento finalizzato al potenziamento di Infrastruttura di Ricerca presente nel Piano Nazionale Infrastrutture di Ricerca 2021-2027 a priorità alta denominata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC)" e delle lettere di intenti indirizzate ai soggetti realizzatori Elettra e ICGEB, allegati alla deliberazione per farne parte integrante e sostanziale;

– di dare atto che l'Accordo e le lettere di intenti saranno sottoscritte dalla Presidente dell'Ente, prof. Caterina Petrillo, alla quale è altresì conferito mandato di apportare eventuali modifiche o integrazioni che si rendessero necessarie entro i limiti della deliberazione;

ATTESO che:

– in data 23 febbraio 2022 l'Ente e i *partner* progettuali hanno stipulato, in ottemperanza all'art. 4, comma 2, dell'Avviso e ai sensi dell'art. 15 Legge 7 agosto 1990, n. 241, l'Accordo per la gestione di finanziamento finalizzato al potenziamento di infrastruttura di ricerca presente nel piano nazionale infrastrutture di ricerca 2021-2027 a priorità alta denominata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), dando mandato ad Area Science Park di presentare la proposta progettuale in oggetto;

– la suddetta proposta progettuale, presentata il 28 febbraio 2022, si è classificata in posizione utile nella graduatoria unica definitiva degli ulteriori progetti ammessi e finanziabili a valere sui fondi di cui al Decreto Direttoriale n. 245 del 10 agosto 2022 e al Decreto Direttoriale n. 326 del 30 agosto 2022;

– con nota del 25 agosto 2022, il MUR ha comunicato che la proposta IR000028 – PRP@CERIC è stata ammessa con riserva alla fase negoziale dei progetti e ha convocato Area Science Park a tale fase, a seguito della quale i soggetti partecipanti hanno rimodulato il progetto, ridefinendo *budget*, attività, *milestone* e *target*;

– come concordato con il MUR nel corso della negoziazione, il progetto rimodulato è stato sottomesso il 3 ottobre 2022, con un budget complessivo di euro 40.990.516,69;

– con nota prot. 10463 del 2 novembre 2022, il MUR ha comunicato che la proposta progettuale IR0000028 - PRP@CERIC, valutata e approvata ai sensi dell'art. 10 dell'Avviso, si è collocata utilmente in graduatoria definitiva, come da Decreto Direttoriale n. 371 dell'11 ottobre 2022, ed è stata pertanto ammessa al finanziamento;

– con nota prot. 12716 del 2 dicembre 2022, il MUR ha trasmesso ad Area Science Park il Decreto di concessione del finanziamento n. 455 del 15 novembre 2022, richiedendo alla stessa di accettarlo formalmente mediante sottoscrizione dell'atto d'obbligo e invitando i soggetti partecipanti a stipulare un nuovo accordo ex art. 15 Legge 7 agosto 1990, n. 241, in virtù della conclusione delle attività di negoziazione e dell'aggiornamento della scheda tecnica definitiva della proposta progettuale, nel rispetto dei requisiti di forma e di sostanza, nonché delle condizioni previste dall'art. 4 dell'Avviso;

– il termine fissato dal MUR per la trasmissione dell'Atto d'obbligo e del nuovo Accordo sottoscritto da tutti i *partner* è il 16 dicembre 2022;

PRESA VISIONE:

- della documentazione progettuale: Full Proposal template contenente scheda tecnica; Economic and financial plan; Gantt Chart; Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi;
- dell'Atto d'obbligo connesso all'accettazione del finanziamento concesso per il progetto "Pathogen Readiness Platform for CERIC ERIC Upgrade";
- dello schema di Accordo di partenariato ai sensi dell'art. 15 della legge 7 agosto 1990 n. 241 per la gestione di finanziamento rielaborato dai competenti uffici di Area Science Park, allegato alla presenta deliberazione per farne parte integrante e sostanziale;

PRESO ATTO che la prossima seduta del Consiglio di Amministrazione dell'Ente avrà luogo in data 21 dicembre 2022, quindi successivamente alla data prevista quale termine per la trasmissione dell'atto d'obbligo e dell'accordo;

CONSIDERATA l'urgenza di recepire l'esito della negoziazione, di sottoscrivere l'Atto d'obbligo e di approvare lo schema del nuovo Accordo al fine di trasmetterli entro la scadenza indicata dal MUR;

RICHIAMATO l'art. 14, comma 4, del vigente Statuto dell'Ente, il quale prevede la possibilità, per il Presidente, di adottare, nell'ambito delle competenze rimesse dall'art. 17 al Consiglio di Amministrazione, "i provvedimenti di urgenza che devono essere ratificati dall'organo competente nella prima riunione successiva";

RITENUTO di:

- recepire gli esiti della negoziazione intercorsa con il MUR;
- approvare la documentazione progettuale predisposta a seguito della negoziazione; Full Proposal template contenente scheda tecnica; Economic and financial plan; Gantt Chart; Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi;
- aderire all'Atto d'obbligo connesso all'accettazione del finanziamento per il progetto;
- adottare lo schema dell'Accordo di partenariato con l'Università di Salerno, l'Università del Salento, l'Università di Napoli Federico II e il Consiglio Nazionale delle Ricerche - CNR;
- di procedere alla tempestiva sottoscrizione degli atti indicati;
- di portare a ratifica la presente determinazione nella prima seduta utile del Consiglio di Amministrazione;

DETERMINA

- di recepire gli esiti della negoziazione intercorsa con il MUR a seguito della valutazione del progetto "Pathogen Readiness Platform for CERIC ERIC Upgrade" (PRP@CERIC), presentato in risposta all'Avviso pubblico del MUR n. 3264 del 28 dicembre 2021 per la presentazione di

proposte progettuali per “Rafforzamento e creazione di Infrastrutture di Ricerca” da finanziare nell’ambito del PNRR;

- di approvare la documentazione progettuale predisposta a seguito della negoziazione; Full Proposal template contenente scheda tecnica; Economic and financial plan; Gantt Chart; Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi;
- di aderire all’Atto d’obbligo connesso all’accettazione del finanziamento per il progetto;
- di adottare lo schema dell’Accordo di partenariato con l’Università di Salerno, l’Università del Salento, l’Università di Napoli Federico II e il Consiglio Nazionale delle Ricerche - CNR;
- di procedere alla tempestiva sottoscrizione degli atti indicati;
- di portare a ratifica la presente determinazione nella prima seduta utile del Consiglio di Amministrazione.

IL SEGRETARIO	LA PRESIDENTE
Diego Arocchi	Caterina Petrillo
DIEGO AROCCHI Firmato digitalmente da DIEGO AROCCHI	Firmato digitalmente da PETRILLO CATERINA C=IT

Finanziato dall'Unione europea
NextGenerationEU

MUR
Ministero dell'Università e della Ricerca

PIANO NAZIONALE DI RIPRESA E RESILIENZA (PNRR)
MISSIONE 4, COMPONENTE 2, INVESTIMENTO 3.1
"Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione"

ATTO D'OBBLIGO CONNESSO ALL'ACCETTAZIONE DEL FINANZIAMENTO CONCESSO PER IL PROGETTO *"Pathogen Readiness Platform for CERIC ERIC Upgrade"* CUP J97G22000400006

VISTO

- il Regolamento (UE) 12 febbraio 2021, n. 2021/241, che istituisce il dispositivo per la ripresa e la resilienza;
- il Piano Nazionale di Ripresa e Resilienza (PNRR) approvato con Decisione del Consiglio ECOFIN del 13 luglio 2021 e notificata all'Italia dal Segretariato generale del Consiglio con nota LT161/21, del 14 luglio 2021;
- la Missione 4, Componente 2, Investimento 3.1 del PNRR che prevede la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione;
- il Regolamento (UE) 2018/1046 del 18 luglio 2018, che stabilisce le regole finanziarie applicabili al bilancio generale dell'Unione, che modifica i Regolamenti (UE) n. 1296/2013, n. 1301/2013, n. 1303/2013, n. 1304/2013, n. 1309/2013, n. 1316/2013, n. 223/2014, n. 283/2014 e la decisione n. 541/2014/UE e abroga il regolamento (UE, Euratom) n. 966/2012;
- il decreto-legge del 31 maggio 2021, n. 77, convertito con modificazioni alla legge 29 luglio 2021, n. 108, recante "Governance del Piano nazionale di ripresa e resilienza e prime misure di rafforzamento delle strutture amministrative e di accelerazione e snellimento delle procedure";
- il Decreto Interministeriale MUR-MEF n. 1137 del 1° ottobre 2021, con il quale è stata istituita, ai sensi dell'art. 8, comma 1, del decreto-legge 31 maggio 2021, n. 77, convertito, con modificazioni, dalla legge 29 luglio 2021, n. 108, l'Unità di missione di livello dirigenziale generale per l'attuazione degli interventi del Piano nazionale di Ripresa e Resilienza (PNRR), presso il Segretariato generale del Ministero dell'università e della ricerca;
- il decreto-legge 9 giugno 2021, n. 80, convertito con modificazioni, dalla legge 6 agosto 2021, n. 113, recante "Misure urgenti per il rafforzamento della capacità amministrativa delle pubbliche amministrazioni funzionale all'attuazione del Piano nazionale di ripresa e resilienza (PNRR) e per l'efficienza della giustizia";
- il decreto-legge 6 novembre 2021, n. 152, convertito, con modificazioni, dalla legge 29 dicembre 2021, n. 233, recante "Disposizioni urgenti per l'attuazione del Piano nazionale di ripresa e resilienza (PNRR) e per la prevenzione delle infiltrazioni mafiose";
- il decreto-legge 30 aprile 2022, n. 36, convertito, con modificazioni, dalla legge 29 giugno 2022, n. 79, recante ulteriori misure urgenti per l'attuazione del Piano nazionale di ripresa e resilienza (PNRR);
- la legge 16 gennaio 2003, n. 3, recante "Disposizioni ordinamentali in materia di pubblica amministrazione" e, in particolare, l'articolo 11, comma 2-bis, ai sensi del quale "Gli atti

amministrativi anche di natura regolamentare adottati dalle Amministrazioni di cui all'articolo 1, comma 2, del decreto legislativo 30 marzo 2001, n. 165, che dispongono il finanziamento pubblico o autorizzano l'esecuzione di progetti di investimento pubblico, sono nulli in assenza dei corrispondenti codici di cui al comma 1 che costituiscono elemento essenziale dell'atto stesso;

- il decreto del Ministro dell'economia e delle finanze del 6 agosto 2021 relativo all'assegnazione delle risorse in favore di ciascuna Amministrazione titolare degli interventi PNRR e corrispondenti milestone e target, e la successiva rettifica del 23 novembre 2021;
- l'articolo 1, comma 1042 della legge 30 dicembre 2020, n. 178 ai sensi del quale con uno o più decreti del Ministro dell'economia e delle finanze sono stabilite le procedure amministrativo - contabili per la gestione delle risorse di cui ai commi da 1037 a 1050, nonché le modalità di rendicontazione della gestione del Fondo di cui al comma 1037;
- l'articolo 1, comma 1043, secondo periodo della legge 30 dicembre 2020, n. 178, ai sensi del quale al fine di supportare le attività di gestione, di monitoraggio, di rendicontazione e di controllo delle componenti del Next Generation EU, il Ministero dell'economia e delle finanze - Dipartimento della Ragioneria generale dello Stato sviluppa e rende disponibile un apposito sistema informatico;
- l'articolo 17 Regolamento UE 2020/852 che definisce gli obiettivi ambientali, tra cui il principio di non arrecare un danno significativo (DNSH, "*Do no significant harm*"), e la Comunicazione della Commissione UE 2021/C 58/01 recante "Orientamenti tecnici sull'applicazione del principio «non arrecare un danno significativo» a norma del regolamento sul dispositivo per la ripresa e la resilienza";
- il regolamento delegato (UE) 2021/2105 della Commissione del 28 settembre 2021 che integra il regolamento (UE) 2021/241 del Parlamento europeo e del Consiglio, che istituisce il dispositivo per la ripresa e la resilienza, definendo una metodologia per la rendicontazione della spesa sociale;
- il regolamento delegato (UE) 2021/2106 della Commissione del 28 settembre 2021 che integra il regolamento (UE) 2021/241 del Parlamento europeo e del Consiglio, che istituisce il dispositivo per la ripresa e la resilienza, stabilendo gli indicatori comuni e gli elementi dettagliati del quadro di valutazione della ripresa e della resilienza;
- i principi trasversali previsti dal PNRR, quali, tra l'altro, il principio del contributo all'obiettivo climatico e digitale (c.d. *tagging*), il principio di parità di genere e l'obbligo di protezione e valorizzazione dei giovani;
- gli obblighi di assicurare il conseguimento di target e milestone e degli obiettivi finanziari stabiliti nel PNRR;
- la Circolare n. 21 del Ministero dell'Economia e delle Finanze del 14 ottobre 2021 avente ad oggetto "Piano Nazionale di Ripresa e Resilienza (PNRR) - Trasmissione delle Istruzioni Tecniche per la selezione dei progetti PNRR";
- le Istruzioni tecniche per la selezione dei progetti PNRR allegate alla Circolare MEF del 14 ottobre 2021, n. 21;
- la Circolare n. 25 del 29 ottobre 2021, del Ministero dell'economia e delle finanze recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Rilevazione periodica avvisi, bandi e altre procedure di attivazione degli investimenti";

- la Circolare n. 4 del 18 gennaio 2022, del Ministero dell'economia e delle finanze, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – articolo 1, comma 1, del decreto-legge n. 80 del 2021 - Indicazioni attuative";
- la nota del Ministero dell'Economia e delle Finanze – Servizio centrale per il PNRR del 7 marzo 2022, n. 3609;
- la Circolare n. 6 del 24 gennaio 2022, del Ministero dell'economia e delle finanze, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Servizi di assistenza tecnica per le Amministrazioni titolari di interventi e soggetti attuatori del PNRR";
- la Circolare del Ministero dell'Economia e delle Finanze n. 9 del 10 febbraio 2022, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Trasmissione delle Istruzioni tecniche per la redazione dei sistemi di gestione e controllo delle amministrazioni centrali titolari di interventi del PNRR";
- la Circolare del Ministero dell'Economia e delle Finanze n. 31 del 14 dicembre 2021, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Rendicontazione PNRR al 31.12.2021 - Trasmissione dichiarazione di gestione e check-list relativa a milestone e target";
- la Circolare del Ministero dell'Economia e delle Finanze n. 33 del 31 dicembre 2021, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Nota di chiarimento sulla Circolare del 14 ottobre 2021, n. 21 - Trasmissione delle Istruzioni Tecniche per la selezione dei progetti PNRR – Addizionalità, finanziamento complementare e obbligo di assenza del c.d. doppio finanziamento";
- la Circolare del Ministero dell'Economia e delle Finanze n. 27 del 21 giugno 2022, recante "Piano Nazionale di Ripresa e Resilienza (PNRR) – Monitoraggio delle misure PNRR";
- il Decreto Direttoriale n. 3264 del 28 dicembre 2021, recante la presentazione di Proposte progettuali per "Rafforzamento e creazione di Infrastrutture di Ricerca" da finanziare nell'ambito del PNRR;
- il Decreto Direttoriale prot. 5989 del 7 aprile 2022 e il Decreto Direttoriale prot. 732 del 28 aprile 2022, con cui sono stati nominati i membri dei Panel di valutazione;
- il Decreto di approvazione della graduatoria provvisoria del Panel PSE, Decreto Direttoriale n. 38 del 5 maggio 2022;
- il Decreto del Ministro dell'università e della ricerca n. 33 del 27 maggio 2022, con il quale è stata nominata la Commissione negoziale prevista dall'art. 10, comma 3, del Decreto Direttoriale n. 3264 del 28 dicembre 2021;
- il Decreto Direttoriale n. 104 del 20 giugno 2022, recante la "Graduatoria definitiva dei progetti ammessi e finanziabili – Panel PSE - D.D. 3264/2021";
- il Decreto Direttoriale n. 245 del 10 agosto 2022, recante "Destinazione economie disponibili all'avviso pubblico per la presentazione di proposte progettuali per "rafforzamento e creazione di infrastrutture di ricerca" e il successivo decreto di rettifica D.D. 326 del 30 agosto 2022;
- il Decreto Direttoriale n. 371 del 11 ottobre 2022, recante la "Graduatoria unica definitiva ulteriori progetti ammessi e finanziabili a valere sui fondi di cui ai D.D. prot. n. 245 del 10 agosto 2022 e D.D. 326 del 30 agosto 2022;
- il decreto di concessione del finanziamento n. 455 del 15 novembre 2022;

CONSIDERATA la necessità di perfezionare l'atto di assegnazione delle risorse con un atto d'obbligo da parte del Soggetto attuatore;

TUTTO CIO' PREMESSO E RITENUTO

Area Science Park, in persona del Legale Rappresentante, prof. Caterina Petrillo, nato a Venticano il 06/08/1960, CF PTRCRN60M46L739B, quale Soggetto attuatore

DICHIARA SOTTO LA PROPRIA RESPONSABILITÀ QUANTO SEGUE

ART. 1
Oggetto

1. Il Soggetto attuatore dichiara di aver preso visione del decreto di concessione del finanziamento – Decreto Direttoriale n. 455 del 15 novembre 2022 e di accettare espressamente e integralmente tutti i termini, gli obblighi e le condizioni ivi previste.
2. Dichiara altresì, di accettare, in qualità di Soggetto beneficiario, il finanziamento concesso a valere sul PNRR Missione 4, Componente 2, Investimento 3.1 "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione", per un importo pari a quello stabilito all'art. 1, comma 2, del decreto di concessione del finanziamento prot. n. 455 del 15 novembre 2022, destinato alla copertura dei costi così come declinati e dettagliati nel medesimo decreto.
3. Dichiara di impegnarsi a svolgere quanto indicato nel Decreto Direttoriale n. 455 del 15 novembre 2022 e nei relativi allegati, nei tempi e nei modi ivi indicati.

ART. 2
Termini di attuazione del progetto, durata e importo

1. Le attività, indicate dettagliatamente nel progetto, dovranno essere avviate dal Soggetto attuatore a partire dal 1dicembre 2022.
2. Le azioni del progetto dovranno essere realizzate secondo le tempistiche contenute nell'Allegato D ("Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi") al decreto di concessione del finanziamento n. 455 del 15 novembre 2022.
3. Per la realizzazione delle attività, l'importo finanziato è indicato all'art. 1, comma 2 del decreto di concessione del finanziamento n. 455 del 15 novembre 2022, ed eventualmente riprogrammato con le medesime modalità di cui all'art. 6 del presente atto.

ART. 3
Obblighi del Soggetto attuatore

1. Il Soggetto attuatore dichiara:
    a) di aver preso visione del Decreto Direttoriale n. 3264 del 28 dicembre 2021 e dei rispettivi allegati e altresì di accettare espressamente ed integralmente tutti i termini, gli obblighi e le condizioni ivi previste;
    b) di aver preso visione del decreto di concessione del finanziamento prot. n. 455 del 15 novembre 2022 e dei rispettivi allegati e altresì di accettare espressamente ed integralmente tutti i termini, gli obblighi e le condizioni ivi previste;

c) di aver preso visione dell'Allegato E - "Disciplinare" e di accettarne espressamente ed integralmente tutti i termini, gli obblighi e le condizioni ivi previste;
d) di accettare, per l'effetto, in qualità di Soggetto attuatore, il finanziamento disposto con decreto di concessione prot. n. 455 del 15 novembre 2022;
e) di assicurare che non beneficia e non beneficerà per le medesime spese rendicontate nell'ambito del progetto oggetto di finanziamento, di altre misure di sostegno finanziario regionale, nazionale o eurounionale, inclusi i meccanismi di natura fiscale quali il credito di imposta, fatto salvo il principio di addizionalità del sostegno dell'Unione europea in ottemperanza a quanto previsto dall'articolo 9 del Regolamento (UE) 2021/241 e ss.mm.ii.;
f) di aver fornito o di fornire in allegato al presente Atto adeguata evidenza documentale del possesso dei necessari poteri di rappresentanza e firma e di attestare che alla data di sottoscrizione del presente Atto, il firmatario detiene tutt'ora i poteri di rappresentanza e firma del presente Atto.

ART. 4
Procedura di rendicontazione della spesa e dell'avanzamento verso milestone e target

1. Il Soggetto attuatore, secondo le indicazioni fornite dal Ministero dell'università e della ricerca, deve registrare i dati di avanzamento finanziario nel sistema informativo adottato per il PNRR (ReGiS) e implementare tale sistema con la documentazione specifica relativa a ciascuna procedura di affidamento e a ciascun atto giustificativo di spesa e di pagamento, al fine di consentire l'espletamento dei controlli amministrativo-contabili a norma dell'art. 22 del Reg. (UE) 2021/241.
2. Il Soggetto attuatore, pertanto, dovrà inoltrare periodicamente tramite il sistema informatico, la Richiesta di pagamento al Ministero dell'università e della ricerca comprensiva dell'elenco di tutte le spese effettivamente sostenute nel periodo di riferimento, e la documentazione che comprova gli avanzamenti relativi agli indicatori di progetto con specifico riferimento ai milestone e target del PNRR. Tale richiesta dovrà essere corredata dalla documentazione specificatamente indicata nelle procedure in essere del Ministero dell'università e della ricerca e nella relativa manualistica allegata.
3. Le spese incluse nelle domande di rimborso del Soggetto attuatore, se afferenti ad operazioni estratte a campione, sono sottoposte, per il tramite del Sistema Informatico, alle verifiche, se del caso anche in loco da parte delle strutture deputate al controllo del Ministero dell'università e della ricerca.
4. Nello specifico, le strutture coinvolte a diversi livelli di controllo del Ministero dell'università e della ricerca eseguono le verifiche sulle procedure, sulle spese e sui target in conformità con quanto stabilito dall'art. 22 del Regolamento (UE) 2021/241 al fine di garantire la tutela degli interessi finanziari dell'Unione, la prevenzione, individuazione e rettifica di frodi, di casi di corruzione e di conflitti di interessi, nonché il recupero di somme erroneamente versate o utilizzate in modo non corretto.

ART. 5
Procedura di pagamento al Soggetto attuatore

1. Il Soggetto attuatore dichiara di voler ricevere gli accrediti relativi all'erogazione delle agevolazioni sul conto corrente di Tesoreria, IBAN IT 96 L 01000 03245 231300163042, acceso presso BANCA D'ITALIA, intestato a AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE – AREA SCIENCE PARK nel rispetto del principio di sana gestione finanziaria di cui all'art. 2, comma, 1 lettera f), dell'Allegato E ("Disciplinare") al decreto di concessione. n. 455 del 15 novembre 2022;
2. I pagamenti al Soggetto attuatore, nella misura indicata dall'art. 1, comma 2 del decreto di concessione. n. 455 del 15 novembre 2022, sono effettuati nel rispetto della normativa vigente e delle disposizioni previste dal D.M. 14 dicembre 2021, n. 1314 e s.m.i., e in base al piano delle erogazioni incluso nella "Full Proposal template contenente scheda tecnica" di cui all'Allegato A del suddetto decreto.

ART. 6
Variazioni del progetto

1. Il Soggetto attuatore può proporre variazioni alla scheda progetto secondo le modalità e nei limiti illustrati all'art. 6 dell'Allegato E ("Disciplinare") al decreto di concessione del finanziamento n. 455 del 15 novembre 2022.

ART. 7
Disimpegno delle risorse

1. L'eventuale disimpegno delle risorse del Piano, previsto dall'articolo 24 del Reg. 2021/241 e dall'articolo 8 della legge n. 77 del 31/05/2021, come modificato dalla legge di conversione 29 luglio 2021, n. 108, comporta la riduzione o revoca delle risorse relative ai progetti che non hanno raggiunto gli obiettivi previsti, nel rispetto di quanto previsto decreto di concessione del finanziamento n. 455 del 15 novembre 2022.

ART. 8
Rettifiche finanziarie

1. Ogni difformità rilevata nella regolarità della spesa, prima o dopo l'erogazione del contributo pubblico in favore del Soggetto attuatore, dovrà essere immediatamente rettificata e gli importi eventualmente corrisposti dovranno essere recuperati secondo quanto previsto dall'articolo 22 del Regolamento (UE) n. 2021/241.
2. A tal fine, il Soggetto attuatore si impegna, conformemente a quanto disposto dall'Allegato E ("Disciplinare") al decreto di concessione del finanziamento n. 455 del 15 novembre 2022, a recuperare le somme indebitamente corrisposte. Il Soggetto attuatore è obbligato a fornire tempestivamente ogni informazione in merito ad errori o omissioni che possano dar luogo a riduzione o revoca del contributo.

ART. 9
Risoluzione di controversie

1. Il presente Atto è regolato dalla legge italiana. Il Soggetto beneficiario accetta che qualsiasi controversia, in merito all'interpretazione, esecuzione, validità o efficacia, è di competenza esclusiva del Foro di Roma.

ART. 10
Tutela della privacy

1. Al fine di consentire il corretto svolgimento delle attività previste dal progetto, il Soggetto attuatore, in considerazione degli adempimenti previsti dal Decreto Legislativo n. 196 del 30 giugno 2003 e ss.mm.ii., nonché del Regolamento (UE) 2016/679 e delle disposizioni contenute nell'art. 22 del Regolamento (UE) 2021/241, consente il trattamento dei propri dati personali e del soggetto che rappresenta.

ART. 10
Comunicazioni e scambio di informazioni

1. Ai fini della digitalizzazione dell'intero ciclo di vita del progetto, tutte le comunicazioni con il Ministero dell'università e della ricerca devono avvenire per posta elettronica istituzionale o posta elettronica certificata, ai sensi del d.lgs. n. 82/2005, o altre modalità telematiche successivamente indicate dal MUR.

ART. 11
Efficacia

1. L'efficacia del presente Atto decorre dalla data di acquisizione da parte del Ministero dell'università e della ricerca a seguito della sottoscrizione da parte del Soggetto attuatore.
2. Il Soggetto attuatore, ai sensi e per gli effetti degli artt. 1341-1342 c.c., dichiara di approvare specificamente le clausole del presente Atto d'obbligo, artt. da 1 a 11, e di accettazione del decreto di concessione, nonché le clausole presenti nell'Allegato E ("Disciplinare") al decreto di concessione del finanziamento n. 455 del 15 novembre 2022.

Per il Soggetto attuatore

Il Presidente

ACCORDO AI SENSI DELL'ART. 15 DELLA LEGGE 7 AGOSTO 1990 N. 241

PER LA GESTIONE DI FINANZIAMENTO FINALIZZATO AL POTENZIAMENTO DI

INFRASTRUTTURA DI RICERCA PRESENTE NEL PIANO NAZIONALE

INFRASTRUTTURE DI RICERCA 2021-2027 A PRIORITÀ ALTA DENOMINATA

"PATHOGEN READINESS PLATFORM FOR CERIC-ERIC UPGRADE"

(PRP@CERIC)

TRA

AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE – AREA SCIENCE PARK (di seguito e per brevità denominata "**Area Science Park**" o **"Soggetto proponente"**), rappresentata dalla Presidente prof.ssa Caterina Petrillo, la quale interviene non in proprio, ma in qualità di rappresentante legale, domiciliata per la sua carica presso la sede legale dell'Ente, in Località Padriciano, 99 – Trieste

E

CONSIGLIO NAZIONALE DELLE RICERCHE (di seguito e per brevità denominato **"CNR"** o **"Soggetto co-proponente"**), rappresentato dalla Presidente prof.ssa Maria Chiara Carrozza, la quale interviene non in proprio, ma in qualità di rappresentante legale in virtù di Decreto di nomina del Ministro dell'Università e della Ricerca protocollo n. 0000368 del 12.04.2021, domiciliata per la sua carica presso la sede legale dell'Ente, in Piazzale Aldo Moro, 7 - Roma

E

UNIVERSITÀ DEGLI STUDI DI SALERNO (di seguito e per brevità denominata "**UNISA**" o "**Soggetto co-proponente**"), rappresentata dal Rettore prof. Vincenzo Loia, il quale interviene non in proprio, ma in qualità di rappresentante legale domiciliato per la sua carica presso la sede legale dell'Ateneo, in Via Giovanni Paolo II, 132 - Fisciano (SA)

E

UNIVERSITÀ DEL SALENTO (di seguito e per brevità denominata "**UNISALENTO**" o "**Soggetto co-proponente**"), rappresentata dal Rettore prof. Fabio Pollice, il quale interviene non in proprio, ma in qualità di rappresentante legale domiciliato per la sua carica presso la sede legale dell'Ateneo, in Piazza Tancredi, 7 - Lecce

NONCHÉ

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II (di seguito e per brevità denominata "**UNINA**" o "**Soggetto co-proponente**"), rappresentata dal Rettore prof. Matteo Lorito , il quale interviene non in proprio, ma in qualità di rappresentante legale domiciliato per la sua carica presso la sede legale dell'Ateneo, in Corso Umberto I, 40 - Napoli

di seguito denominate anche "**Parte**" o "**Soggetto attuatore**" individualmente, "**Parti**" o "**Soggetti attuatori**" congiuntamente ovvero "**Compagine di progetto**" collettivamente

PREMESSO CHE

- il 19 febbraio 2021 è entrato in vigore il Regolamento del Parlamento Europeo e del Consiglio 12 febbraio 2021 n. 2021/241/UE che istituisce il dispositivo per la ripresa e la resilienza (pubblicato sulla GUUE Serie L 57 del 18 febbraio 2021);
- il suddetto dispositivo è il principale strumento di intervento di NextGenerationEU e metterà a disposizione degli Stati Membri prestiti e sovvenzioni per un ammontare di 672,5 miliardi di euro per supportare le riforme e gli investimenti di tutti gli Stati Membri, allo scopo di mitigare l'impatto economico e sociale della pandemia da Coronavirus, rendendo l'economia e la società europea più sostenibile, resiliente e più preparata alle sfide e alle opportunità della transizione verde e digitale;

- il summenzionato dispositivo è articolato su sei pilastri (transizione verde; trasformazione *digital*; crescita intelligente, sostenibile e inclusiva; coesione sociale e territoriale; salute e resilienza economica, sociale e istituzionale; politiche per la prossima generazione) ed è alla base dei Piani Nazionali di Ripresa e Resilienza presentati dagli Stati Membri ai sensi dell'art. 18 del citato Regolamento n. 2021/241/UE per essere valutati e approvati dalle istituzioni competenti;
- il Piano Nazionale di Ripresa e Resilienza italiano (di seguito e per brevità indicato come "PNRR") è stato positivamente valutato dalla Commissione Europea il 22 giugno 2021 e approvato dal Consiglio Economia e Finanza (Ecofin) il 13 luglio 2021, con decisione di esecuzione adottata sulla base della proposta della Commissione e notificata all'Italia dal Segretariato generale del Consiglio stesso con nota LT161/21 del 14 luglio 2021;
- il PNRR:
  - si sviluppa intorno a tre assi strategici condivisi a livello europeo: i) digitalizzazione e innovazione; ii) transizione ecologica; iii) inclusione sociale;
  - si articola in sei Missioni, corrispondenti alle principali aree tematiche di intervento, individuate in piena coerenza con i sei pilastri del NextGenerationEU: i) digitalizzazione, innovazione, competitività, cultura e turismo; ii) rivoluzione verde e transizione ecologica; iii) infrastrutture per una mobilità sostenibile; iv) istruzione e ricerca; v) inclusione e coesione; vi) salute;
  - comprende sedici Componenti, raggruppate nelle suddette Missioni, ossia elementi costitutivi o parti che riflettono riforme e priorità di investimento correlate a un'area di intervento, a un settore, a un ambito, a un'attività, allo

scopo di affrontare sfide specifiche, a loro volta articolate in una o più Misure, intese come specifici investimenti realizzati attraverso l'attuazione di interventi/progetti finanziati;

- la Missione 4 ("Istruzione e ricerca") del PNRR, in particolare, mira a rafforzare le condizioni per lo sviluppo di un'economia ad alta intensità di conoscenza, di competitività e di resilienza, partendo dal riconoscimento delle criticità del sistema nazionale di istruzione, formazione e ricerca;
- la suddetta Missione 4 si basa su una strategia che poggia, tra gli altri, sugli assi portanti del rafforzamento della ricerca e della diffusione di modelli innovativi per la ricerca di base e applicata condotta in sinergia tra Università e imprese, del sostegno ai processi di innovazione e trasferimento tecnologico e del potenziamento delle condizioni di supporto alla ricerca e all'innovazione, che ne costituiscono al tempo stesso gli ambiti di intervento;
- la summenzionata Missione 4 si articola in due Componenti: la seconda, denominata "Dalla ricerca all'impresa", mira a innalzare il potenziale di crescita del sistema economico, favorendo la transizione verso un modello di sviluppo fondato sulla conoscenza e conferendo carattere di resilienza e sostenibilità alla crescita, e persegue, sotto il profilo delle ricadute attese, un significativo aumento del volume della spesa in R&S e un più efficace livello di collaborazione tra la ricerca pubblica e il mondo imprenditoriale;
- uno dei tre ambiti di intervento della suddetta Componente 2, in particolare, mira al rafforzamento delle condizioni abilitanti allo sviluppo delle attività di ricerca e innovazione, mediante un'azione sulla dotazione infrastrutturale, anche favorendo l'apertura delle infrastrutture di ricerca all'utilizzo da parte del mondo produttivo;

- al fine di conseguire il suddetto obiettivo, il PNRR ha, in particolare, previsto che il Ministero dell'Università e della Ricerca (di seguito e per brevità denominato "MUR") implementi, quale misura di investimento, il "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione", avente lo scopo di facilitare l'osmosi tra la conoscenza scientifica generata in infrastrutture di ricerca di alta qualità e il settore economico, favorendo l'innovazione, attraverso il sostegno alla creazione di infrastrutture di ricerca e innovazione che colleghino il settore industriale con quello accademico;
- il suddetto Fondo andrà ad aggiungersi al "Fondo per l'edilizia e le infrastrutture di ricerca", destinato a finanziare la creazione o il rafforzamento, su base competitiva, di infrastrutture di ricerca di rilevanza pan-europea e infrastrutture di innovazione dedicate, promuovendo la combinazione di investimenti pubblici e privati;
- con Decreto del Direttore Generale della Direzione generale dell'internazionalizzazione e della comunicazione del MUR, è stato approvato l'avviso n. 3264 del 28 dicembre 2021 (di seguito e per brevità indicato come "Avviso") per la presentazione di proposte progettuali per "*Rafforzamento e creazione di Infrastrutture di Ricerca*" da finanziare nell'ambito del PNRR (Missione 4 "Istruzione e Ricerca" - Componente 2 "Dalla ricerca all'impresa" - Linea di investimento 3.1 "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione", finanziato dall'Unione europea – NextGenerationEU);
- l'Avviso intende, in particolare, dare attuazione al PNRR con riferimento all'azione 3.1.1 "Creazione di nuove IR o potenziamento di quelle esistenti che concorrono agli obiettivi di Eccellenza Scientifica di Horizon Europe e

costituzione di reti", di cui al D.M. 7 ottobre 2021, n. 1141, e si rivolge alle Infrastrutture di Ricerca aventi priorità alta e media, così come individuate dal MUR nel Piano Nazionale Infrastrutture di Ricerca 2021-2027 (di seguito e per brevità indicato come "PNIR");

- al fine di garantire il raggiungimento dei target fissati dal PNRR, la suddetta azione specifica 3.1.1 mira a finanziare almeno venti progetti e prevede una dotazione finanziaria pari a 1.080 milioni di euro;
- l'art. 5, comma 3, dell'Avviso dispone che le proposte relative ai suddetti progetti debbano riguardare una delle seguenti tipologie di intervento:
  i. potenziamento di infrastruttura di ricerca (di seguito e per brevità indicata come "IR") presente nel PNIR a priorità alta;
  ii. creazione di nuova IR presente nel PNIR a priorità alta e media;
  iii. creazione di reti tematiche o multidisciplinari di IR esistenti, presenti nel PNIR a priorità alta e media, con indicazione del tema o del tema prevalente per reti multidisciplinari, tra le Aree ESFRI;
- l'art. 4 dell'Avviso indica, al comma 1, quali soggetti ammessi alla presentazione delle suddette proposte progettuali gli enti pubblici di ricerca di cui all'art. 1 del D.Lgs. n. 218/2016, le Università e le istituzioni universitarie italiane statali, comunque denominate (ivi comprese le scuole superiori ad ordinamento speciale), che siano stati altresì individuati nel PNIR quali capofila di IR, e prevede, al comma 2, che per ciascuna proposta progettuale il soggetto proponente possa partecipare da solo o, in compagine, con uno o più soggetti co-proponenti;
- con riferimento alle succitate previsioni dell'Avviso, Area Science Park, CNR, UNISA, UNISALENTO e UNINA hanno raggiunto un'intesa in ordine alla presentazione di una proposta progettuale per la prima tipologia di intervento

indicata nell'Avviso medesimo, relativa al potenziamento di IR presente nel PNIR a priorità alta;

- più precisamente, le Parti hanno convenuto che, in risposta all'Avviso, Area Science Park presentasse, in qualità di soggetto proponente, in compagine con CNR, UNISA, UNISALENTO e UNINA, quali soggetti co-proponenti, una proposta progettuale avente a oggetto il potenziamento della IR denominata *Central European Research Infrastructure Consortium*, costituita in ERIC con Decisione di esecuzione della Commissione europea 2014/392/UE del 24 giugno 2014 (di seguito e per brevità indicata come "CERIC-ERIC"), attraverso la realizzazione di una IR distribuita interoperabile denominata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC);
- il citato art. 4, comma 2, dell'Avviso prescrive che tutti i soggetti partecipanti alla realizzazione del progetto in compagine debbano stipulare tra loro un accordo ex art. 15 Legge 7 agosto 1990, n. 241, recante "Accordi fra pubbliche amministrazioni", al fine di disciplinare la gestione comune del finanziamento pubblico e di definire i ruoli e le responsabilità di ciascun componente della compagine;
- in data 23 febbraio 2022 le Parti hanno stipulato, in ottemperanza al citato art. 4, comma 2, dell'Avviso e ai sensi del menzionato art. 15 Legge 7 agosto 1990, n. 241, l'Accordo per la gestione di finanziamento finalizzato al potenziamento di infrastruttura di ricerca presente nel piano nazionale infrastrutture di ricerca 2021-2027 a priorità alta denominata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), dando mandato ad Area Science Park di presentare la proposta progettuale in oggetto;
- la suddetta proposta progettuale, presentata il 28 febbraio 2022, si è classificata

in posizione utile nella graduatoria unica definitiva degli ulteriori progetti ammessi e finanziabili a valere sui fondi di cui al Decreto Direttoriale prot. n. 245 del 10 agosto 2022 e al Decreto Direttoriale n. 326 del 30 agosto 2022;

- con nota del 25 agosto 2022, il MUR ha comunicato che la proposta IR000028 – PRP@CERIC è stata ammessa con riserva alla fase negoziale dei progetti e ha convocato Area Science Park a tale fase, a seguito della quale i soggetti partecipanti hanno rimodulato il progetto, ridefinendo budget progettuale, attività, *milestone* e target;
- come concordato con il MUR nel corso della negoziazione, il progetto rimodulato è stato sottomesso il 3 ottobre 2022;
- con nota prot. 10463 del 2 novembre 2022, il MUR ha comunicato che la proposta progettuale IR0000028 - PRP@CERIC, valutata e approvata ai sensi dell'art. 10 dell'Avviso, si è collocata utilmente in graduatoria definitiva, come da D.D. n. 371 dell'11 ottobre 2022, ed è stata pertanto ammessa al finanziamento;
- con nota prot. 12716 del 2 dicembre 2022, il MUR ha trasmesso ad Area Science Park il Decreto di concessione del finanziamento prot. 455 del 15 novembre 2022, invitando i soggetti partecipanti a stipulare un nuovo accordo ex art. 15 Legge 7 agosto 1990, n. 241, in virtù della conclusione delle attività di negoziazione e dell'aggiornamento della scheda tecnica definitiva della proposta progettuale, nel rispetto dei requisiti di forma e di sostanza, nonché delle condizioni previste dall'art. 4 dell'Avviso;
- ottemperando alla richiesta formulata dal MUR in sede di concessione del finanziamento, con la stipula del presente Accordo le Parti intendono, pertanto, confermare, tra i soggetti partecipanti, l'intesa raggiunta sulla proposta progettuale definitiva a valle della fase negoziale dei progetti prevista dall'art.

10, comma 3, dell'Avviso, regolamentando ai sensi del citato art. 15 Legge 7 agosto 1990, n. 241 i rispettivi obblighi in relazione alla gestione comune del finanziamento pubblico e all'avvio, all'attuazione e alla funzionalità del progetto, definendo i ruoli e le responsabilità di ciascuna, nonché gli impegni destinati ad aggiungersi a quelli contenuti nel Disciplinare di concessione del finanziamento e all'Atto d'obbligo connesso all'accettazione del finanziamento concesso per il progetto "Pathogen Readiness Platform for CERIC ERIC Upgrade" CUP J97G22000400006;

- le Parti sono in possesso e, con la stipula del presente Accordo, lo dichiarano assumendone a ogni effetto di legge la piena responsabilità:
  - della capacità operativa e amministrativa, al fine di assicurare la realizzazione del progetto nelle modalità e termini previsti;
  - dei requisiti minimi tali da garantire il rispetto del Regolamento finanziario 2018/1046/UE (Euratom);
  - dei requisiti minimi e delle relative misure atte a garantire quanto previsto dall'art. 22 del Regolamento 2021/241/UE, in materia di sana gestione finanziaria, prevenzione di frodi e corruzione e assenza di conflitti di interessi;

TUTTO CIÒ PREMESSO, LE PARTI CONVENGONO QUANTO DI SEGUITO

ARTICOLO 1

PREMESSE E ALLEGATI, DEFINIZIONI E PRINCIPI INTERPRETATIVI

1. Le premesse sopra indicate costituiscono parte integrante e sostanziale del presente Accordo.
2. Formano, altresì, parte integrante e sostanziale del presente accordo, ancorché non materialmente allegati:

- l'Avviso;
- il Decreto di concessione del finanziamento n. 455 del 15 novembre 2022;
- la Scheda Tecnica della proposta progettuale definitiva, presentata il 3 ottobre 2022 alla conclusione della fase negoziale, completa degli allegati "*Economic and financial plan for the operation of the infrastructure"* e "*Gantt Chart and interrelation with other WP's"*, i cui contenuti possono essere eventualmente variati concordemente dalle Parti nel rispetto di quanto previsto dall'art. 15 dello stesso Avviso;
- il Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi;
- la presa d'atto del Codice di Comportamento di cui al D.P.R. 16 aprile 2013, n. 62 sottoscritta dal Soggetto proponente;
- il Disciplinare di concessione del finanziamento sottoscritto dal Soggetto proponente;
- l'autodichiarazione relativa al rispetto dei principi previsti per gli interventi del PNRR;
- l'Atto d'obbligo connesso all'accettazione del finanziamento concesso per il progetto "Pathogen Readiness Platform for CERIC ERIC Upgrade" CUP J97G22000400006;

che le Parti dichiarano di conoscere e accettare integralmente.

3. Ai fini del presente Accordo, i termini indicati con lettera iniziale maiuscola nel corpo del testo andranno intesi secondo le definizioni contenute nell'art. 1 dell'Avviso, che si intendono qui integralmente richiamate.
4. Il presente Accordo dovrà essere interpretato sulla base della comune intenzione delle Parti, la quale dovrà essere ricostruita tenendo conto dell'Accordo nel suo complesso e del principio di conservazione del medesimo.

ARTICOLO 2

OGGETTO E FINALITÀ DELL'ACCORDO

1. Il presente Accordo ha a oggetto il potenziamento della IR CERIC-ERIC, attraverso la realizzazione di una IR distribuita interoperabile denominata "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), nell'ambito dell'Intervento 3 ("Potenziamento delle condizioni di supporto alla ricerca e all'innovazione") della Componente 2 ("Dalla ricerca all'impresa") della Missione 4 ("Istruzione e ricerca") del PNRR, avvalendosi delle risorse del "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione" (Investimento 3.1), come meglio specificato in premessa e nella Scheda Tecnica della proposta progettuale alla quale si rinvia.
2. Per realizzare le finalità previste da missione, investimento e linea di riferimento del PNRR, la proposta progettuale di cui in premessa ha, in particolare, l'Obiettivo Generale di potenziare la IR CERIC-ERIC, affinché venga completata da una struttura digitale integrata per lo studio dei patogeni e dei loro effetti sull'ospite, in grado di fornire agli utenti scientifici e industriali gli strumenti per affrontare in maniera tempestiva ed efficace le emergenze sanitarie presenti e futuribili causate da nuovi patogeni pericolosi per l'uomo, gli animali e le piante.
3. L'Obiettivo Generale di cui al comma 2 del presente articolo appare raggiungibile attraverso il rafforzamento strumentale dell'infrastruttura nella direzione della biologia strutturale e delle tecniche di caratterizzazione multi-omica, funzionale e iper-spettrale, integrato con laboratori a livello di biosicurezza adeguato per la manipolazione degli agenti patogeni e la decontaminazione innovativa dei campioni a essi associati, così da poter essere analizzati attraverso un ampio ventaglio di strumenti analitici e tecniche biofisiche che consentano una ricerca

scientifica di base e applicata all'avanguardia nel campo delle malattie infettive e delle scienze della vita. L'aggiornamento della IR si avvale di piattaforme di ricerca consolidate all'interfaccia fra la biologia, la biochimica, la chimica, la fisica, la bioelettronica, le scienze computazionali e la tecnologia dell'informazione, unite in una rete interdisciplinare unica di conoscenze, metodologie e strumenti in grado di offrire una IR integrata per effettuare ricerche allo stato dell'arte sui patogeni nei campi della diagnostica, della patogenesi, della progettazione di farmaci e dello screening farmacologico, della sicurezza e dell'ambiente (S&H). PRP@CERIC intende creare un ecosistema digitale che combini l'accesso fisico con quello remoto e quello virtuale, i servizi avanzati di gestione dei dati FAIR, rafforzando ulteriormente l'offerta all'avanguardia di metodi, strumenti e competenze sperimentali e computazionali, rendendola così attraente non solo per la comunità scientifica, ma anche per il mondo industriale e consentendone in tal modo la sostenibilità economica futura.

4. Con il presente Accordo le Parti confermano l'intenzione di instaurare un rapporto di collaborazione teso alla realizzazione congiunta del progetto di cui in premessa, denominato "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), e intendono disciplinare la gestione comune del finanziamento pubblico di cui al comma 1 del presente articolo, definire i ruoli e le responsabilità di ciascuna di esse nella realizzazione del progetto stesso, nonché assumere l'impegno di gestire la IR anche dopo la conclusione del progetto medesimo, per dieci anni decorrenti dal pagamento finale, secondo quanto previsto all'art. 9 del presente Accordo.
5. Con la sottoscrizione del presente Accordo le Parti convengono di considerare consensualmente risolto l'Accordo stipulato in data 23 febbraio 2022, di cui in

premessa.

ARTICOLO 3

DURATA DELL'ACCORDO, TERMINI DI ATTUAZIONE DEL PROGETTO E DI PRESENTAZIONE DELLE DOMANDE DI RIMBORSO

1. Il presente Accordo ha validità a partire dalla data della sottoscrizione apposta dall'ultimo firmatario e, nel rispetto della previsione dell'art. 4, comma 7, dell'Avviso, fino allo scadere di dieci anni decorrenti dall'ultimo pagamento al Soggetto attuatore, così da assicurare per lo stesso termine la sostenibilità economico-finanziaria della IR realizzata.
2. Nell'eventualità della revoca del provvedimento di concessione del finanziamento da parte del MUR, ai sensi e per gli effetti dell'art. 18 dell'Avviso, il presente Accordo si risolverà. È fatta salva l'efficacia delle disposizioni di cui al comma 3 del presente articolo.
3. Nell'ipotesi di cui al comma 2 del presente articolo o di cessazione del presente Accordo per qualsivoglia altra causa intervenuta, l'efficacia dell'Accordo stesso verrà meno automaticamente nei confronti di tutte e di ciascuna delle Parti, fatte salve le disposizioni contenute negli artt. 9 (Gestione dell'infrastruttura di ricerca), 11 (Riservatezza), 12 (Disciplina della proprietà intellettuale e utilizzo dei risultati), 13 (Iniziative di comunicazione, pubblicazioni e disseminazione), 14 (Trattamento dei dati personali), 15 (Coperture Assicurative), 16 (Sicurezza sul Lavoro) e 19 (Foro competente) e nel presente comma, che sopravvivranno e rimarranno efficaci anche successivamente al venir meno dell'Accordo stesso.
4. Nel rispetto di quanto previsto all'art. 7, comma 3, dell'Avviso la durata massima del progetto sarà coerente con le tempistiche di realizzazione previste per la Componente 2 "Dalla ricerca all'impresa" - Linea di investimento 3.1 "Fondo per

la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione" del PNRR e non supererà, comunque, i 30 (trenta) mesi, decorrenti dalla data di avvio del progetto comunicata al MUR a mezzo PEC in data 7 novembre 2022, ossia dalla data del 1° dicembre 2022, salvo concessione dell'unica proroga ammessa e concedibile dal MUR stesso, ai sensi dell'art. 7, comma 4, dell'Avviso.

5. Le Parti danno atto di essere rese edotte che:
   - la presentazione dell'eventuale richiesta di anticipo e delle domande di rimborso di cui all'art. 13 dell'Avviso dovrà avvenire a cura del Soggetto proponente, anche per conto dei Soggetti co-proponenti, nel rispetto delle modalità e dei termini ivi previsti e disciplinati;
   - ai sensi dell'art. 15, comma 7, dell'Avviso, posta l'invarianza dell'importo complessivo del finanziamento concesso, nella fase di attuazione del progetto sarà possibile rimodulare i costi ammessi di cui all'art. 8 dell'Avviso, ma tali variazioni al piano dei costi non potranno in ogni caso superare, in termini cumulati, il limite del 15% rispetto al totale dei costi ammessi al finanziamento, fermo restando il rispetto dei limiti percentuali, ove presenti, per ciascuna tipologia.

ARTICOLO 4

RUOLI E RESPONSABILITÀ DELLE PARTI

1. In relazione a quanto indicato all'art. 4, comma 5, dell'Avviso e ai fini della semplificazione dei rapporti istruttori con il MUR, limitatamente alle attività realizzative del progetto, con la sottoscrizione del presente Accordo i Soggetti co-proponenti confermano di autorizzare Area Science Park, in qualità di Soggetto proponente, a:
   a) rappresentare le altre Parti nei rapporti con il MUR;

b) sottoscrivere, in nome e per conto di tutti i Soggetti co-proponenti l'Atto d'obbligo connesso all'accettazione del finanziamento concesso per il progetto "Pathogen Readiness Platform for CERIC ERIC Upgrade" CUP J97G22000400006 e gli eventuali allegati;

c) presentare, ai fini del mantenimento delle agevolazioni, in nome e per conto di tutti i Soggetti co-proponenti le eventuali variazioni del progetto;

d) sottoscrivere qualsiasi altro atto predisposto dal MUR, contenente le regole e le modalità per la corretta gestione del rapporto concessorio;

e) registrare i dati di avanzamento finanziario nel sistema informativo adottato per il PNRR (ReGiS) e implementare tale sistema con la documentazione specifica relativa a ciascuna procedura di affidamento e a ciascun atto giustificativo di spesa e di pagamento, al fine di consentire l'espletamento dei controlli amministrativo-contabili a norma dell'art. 22 del citato Regolamento n. 2021/241/UE;

f) inoltrare periodicamente tramite il sistema informatico, la richiesta di pagamento al MUR, comprensiva dell'elenco di tutte le spese effettivamente sostenute nel periodo di riferimento e corredata dalla documentazione specificatamente indicata nelle procedure in essere del MUR e nella relativa manualistica allegata, nonché la documentazione comprovante gli avanzamenti relativi agli indicatori di progetto con specifico riferimento a milestone e target del PNRR;

g) acquisire le erogazioni per l'intera Compagine di progetto e disporre il trasferimento ai Soggetti co-proponenti delle quote di spettanza di ciascuna nei tempi e nei termini indicati all'art. 7 del presente Accordo.

2. Con riferimento a quanto indicato all'art. 4, comma 3, lett. a) dell'Avviso, con la

sottoscrizione del presente Accordo Area Science Park, in qualità di Soggetto proponente, conferma l'assunzione della responsabilità nei confronti del MUR in ordine al coordinamento delle attività progettuali e all'attuazione del progetto, nonché tutte le responsabilità finanziarie a questo connesse.

3. Con riferimento a quanto indicato all'art. 4, comma 3, lett. b) dell'Avviso e relativamente alla realizzazione del progetto, le Parti convengono di ripartire tra esse le attività e le correlate responsabilità, tenendo conto delle rispettive qualità di Soggetto proponente e di Soggetti co-proponenti, come rappresentato nella Scheda Tecnica della proposta progettuale, i cui contenuti potranno essere eventualmente variati concordemente dalle Parti nel rispetto di quanto previsto dall'art. 15 dello stesso Avviso.
4. Le Parti assumono l'impegno di collaborare nella realizzazione del progetto, secondo le rispettive normative interne e per quanto di competenza, e di eseguire le attività assegnate a ciascuna di esse, nell'ambito del progetto, nel rispetto della normativa eurounionale e nazionale applicabile, del presente Accordo e del Disciplinare per la concessione del finanziamento, con la diligenza e professionalità necessarie al raggiungimento degli obiettivi di cui in premessa, meglio illustrati nella Scheda Tecnica della proposta progettuale, coinvolgendo le risorse umane e le strutture più idonee al loro conseguimento. In nessun caso i Soggetti co-proponenti possono richiedere al Soggetto proponente maggiori finanziamenti per incrementi di costo o altri oneri derivanti dall'esecuzione delle attività a loro assegnate nell'ambito del progetto rispetto a quanto previsto e autorizzato con la proposta progettuale approvata.
5. Ciascuna Parte, in qualità di Soggetto attuatore, si impegna in particolare a:
   a) avviare tempestivamente le attività progettuali per non incorrere in ritardi

attuativi;

b) svolgere il progetto in coerenza con i risultati attesi e nel rispetto della tempistica di realizzazione delle attività progettuali, tenuto conto dei cronoprogrammi di spesa, di quelli procedurali e dei vincoli temporali di individuazione dei Soggetti Realizzatori, così come specificati nell'Avviso;

c) concludere il progetto nella forma, nei modi e nei tempi previsti nella Scheda Tecnica della proposta progettuale, eventualmente modificata nel rispetto di quanto previsto dall'art. 15 dell'Avviso;

d) produrre quanto necessario per soddisfare gli obblighi di rendicontazione e di monitoraggio previsti dalla vigente normativa e dall'Avviso e, nel caso dei Soggetti co-proponenti, metterlo a disposizione del Soggetto proponente in tempo utile perché questi possa, a sua volta, soddisfare gli adempimenti di legge e dell'Avviso.

6. Ciascun Soggetto attuatore si impegna, inoltre, ad adempiere le obbligazioni di cui all'art. 2, comma 1, lett. da a) a x) del Disciplinare per la concessione del finanziamento; il Soggetto proponente, in qualità di Soggetto attuatore, si obbliga, altresì, a quanto previsto dall'art. 2, comma 2, lett. da a) a j) del Disciplinare medesimo.

7. Con specifico riferimento a quanto previsto dal presente articolo, le Parti assumono i seguenti impegni:

- osservare gli obblighi di cui al D.P.R. 16 aprile 2013, n. 62, "Regolamento recante codice di comportamento dei dipendenti pubblici, a norma dell'art. 54 del decreto legislativo 30 marzo 2001, n. 165" (Pubbl. G.U.R.I. n. 129 del 4 giugno 2013), e alla presa d'atto sottoscritta dal Soggetto proponente per conto di tutti i partecipanti alla Compagine di progetto e allegata alla

domanda, ai sensi dell'art. 4, comma 3, lett. h) e i) dell'Avviso;

- garantire ex art. art. 11 dell'Avviso il rispetto della soglia massima del 20% dell'eventuale attività economica svolta ai sensi del pt. 20 della Comunicazione 2014/C 198/01 della Commissione;
- tenere una contabilità separata relativamente alle attività economiche e non economiche, garantendo che i due tipi di attività, i loro costi, finanziamenti e ricavi siano chiaramente separati mediante appositi sistemi contabili, sia a livello singolo che aggregato, allo scopo di monitorare costantemente il rispetto dell'impegno assunto e consentirne l'agevole verifica.

8. Ciascuna Parte si impegna, altresì, a:
   a) manlevare le altre Parti in relazione a eventuali danni che queste ultime, i loro aventi causa o i terzi venissero a subire per fatto a essa imputabile, riconducibile all'esecuzione delle attività progettuali e conseguente alla violazione degli impegni assunti con la sottoscrizione del presente Accordo ;
   b) non assumere obbligazioni per conto delle altre Parti, non fare dichiarazioni o fornire garanzie, a nome di altre Parti, diverse da quelle previste, autorizzate e/o concordate;
   c) comunicare tempestivamente alle altre Parti qualsiasi informazione significativa, fatto, problema o ritardo che possa influire sulla realizzazione del progetto;
   d) fornire tempestivamente le informazioni e i dati richiesti da una o più delle altre Parti per svolgere le proprie attività, garantendone l'esattezza.
9. Fermo restando l'obbligo previsto dall'art. 2, comma 1, lett. t) del Disciplinare per la concessione del finanziamento, secondo cui ciascun Soggetto attuatore deve individuare entro il 31 dicembre 2023, ai sensi del decreto legislativo 18

aprile 2016, n. 50, del decreto-legge 31 maggio 2021, n. 77, nonché di tutte le altre norme eurounionali e nazionali di settore applicabili (a esempio, in materia di appalti pubblici), i Soggetti realizzatori o esecutori a vario titolo coinvolti nella realizzazione del progetto (a esempio, fornitori di beni e servizi o esecutori di lavori), è in facoltà delle Parti, qualora reputato necessario, fare ricorso diretto a esperti esterni, in conformità alla pertinente disciplina eurounionale e nazionale, nonché alle eventuali specifiche circolari e ai disciplinari che potranno essere adottati dal MUR.

10. Con la sottoscrizione del presente Accordo le Parti sanciscono che ciascuna di esse, nei casi di inadempimento relativo alle attività di progetto, sia responsabile in relazione alle attività di spettanza. Qualora il Soggetto attuatore si avvalga della facoltà prevista dal comma 9 del presente articolo e ricorra a Soggetti realizzatori o esecutori o esperti esterni per l'esecuzione delle attività previste dalla Scheda Tecnica o di altre prestazioni strumentali o connesse a queste ultime, sulla base di qualsivoglia contratto e a qualsiasi titolo (gratuito od oneroso), rimane responsabile della corretta esecuzione delle attività a suo carico, dovendo garantire che il coinvolgimento di terzi non pregiudichi gli interessi delle altre Parti e la realizzazione del progetto. Le Parti assumono, pertanto, i rischi derivanti dalle attività realizzate da sé o da terzi sotto il proprio controllo per l'esecuzione delle attività progettuali, nonché per tutti i danni diretti e indiretti che dovessero derivare dal proprio operato a una o più delle altre Parti o a terzi.

11. Ciascuna Parte, ove responsabile della mancata esecuzione delle attività progettuali ovvero del mancato adempimento degli obblighi assunti per effetto della sottoscrizione del presente Accordo, si impegna a manlevare le altre Parti

da eventuali contestazioni, riserve e pretese, azioni di risarcimento da chiunque avanzate in relazione alla suddetta mancata esecuzione ovvero al mancato adempimento.

ARTICOLO 5

INADEMPIMENTO E POTERI SOSTITUTIVI

1. Con riferimento all'art. 4, comma 3, lett. d) dell'Avviso, le Parti prendono atto ed espressamente convengono che, nel caso di inadempimento degli obblighi previsti dal presente Accordo, dall'Avviso, dal Disciplinare di concessione del finanziamento e/o da qualsiasi altro atto predisposto dal MUR in relazione al progetto, consistenti anche nella mancata adozione di atti e provvedimenti necessari all'avvio degli interventi, ovvero nel ritardo, inerzia o difformità nell'esecuzione delle attività previste dal Progetto, il Soggetto proponente ha diritto di ricorrere ai poteri sostitutivi previsti dall'art. 12 del decreto-legge 31 maggio 2021, n. 77, con facoltà di rivalersi nei confronti del soggetto parzialmente o totalmente inadempiente per il risarcimento di tutti i danni subiti e subendi, direttamente e indirettamente connessi all'inadempimento.
2. Resta inteso che, al fine di garantire comunque l'attuazione del progetto e l'adempimento degli obblighi assunti dalla Compagine di progetto, nel superiore interesse pubblico al conseguimento degli obiettivi di innovazione e sviluppo perseguiti con l'iniziativa e fatta salva comunque la responsabilità della Parte inadempiente ai sensi del comma 1 del presente articolo:
   a) nel caso di mancato rispetto del cronoprogramma e/o degli obiettivi intermedi e/o dei *deliverable* assegnati, la Parte inadempiente deve porre rimedio all'inadempimento entro il termine di 30 (trenta) giorni dalla ricezione di una comunicazione scritta della/e Parte/i adempiente/i,

contenente la descrizione dell'inadempimento contestato e la richiesta di porvi rimedio entro il suddetto termine;

b) nel caso di inottemperanza al termine di cui alla lett. a) del presente comma o ai termini del presente Accordo, la Parte inadempiente può essere estromessa dalla Compagine di progetto e il presente Accordo può essere risolto nei suoi confronti; in ogni caso le Parti non inadempienti, laddove in possesso delle necessarie competenze, con il coordinamento del Soggetto proponente provvedono a sostituirsi alla Parte inadempiente, ripartendo all'interno della Compagine di progetto i compiti non eseguiti da quest'ultima, con una tempistica di esecuzione congruente con l'obiettivo di garantire il rispetto complessivo delle obbligazioni assunte dalla Compagine stessa nei confronti del MUR e/o dei terzi;

c) eventualmente, laddove le attività assegnate alla Parte inadempiente non potessero essere svolte, per carenza delle relative competenze, dalle altre Parti, la Parte inadempiente, previo assenso del MUR, può essere sostituita da altro Ente o altra Università in possesso dei medesimi requisiti e competenze, che abbia accettato di aderire all'Accordo facendone propri tutti i termini e le condizioni; nel caso in cui non sia stato possibile individuare un altro Ente o un'altra Università subentrante nell'Accordo, il Soggetto proponente, ove possibile, individua, nel rispetto delle disposizioni di legge, uno o più soggetti terzi ai quali affidare lo svolgimento degli specifici compiti non ottemperati dalla Parte inadempiente.

3. In ogni caso, al verificarsi di una qualsiasi delle fattispecie di cui al precedente comma 2, la Parte inadempiente non ha diritto ad alcun rimborso afferente alle attività svolte dal sostituto, deve restituire, del tutto o in parte, le somme già

erogate e deve farsi carico, oltre che del ristoro del maggior danno, di tutti i costi che ciascuna altra Parte della Compagine di progetto abbia sostenuto per rimediare all'inadempimento.

ARTICOLO 6

REFERENTI DELL'ACCORDO E REFERENTI PER IL PROGETTO

1. Ai fini dell'attuazione del presente Accordo le Parti designano quali referenti:
   - per Area Science Park: Stefano Cozzini (stefano.cozzini@areasciencepark.it) ed Eva Vessel (eva.vessel@areasciencepark.it);
   - per CNR: Alberto Cassetta (cassetta@ic.cnr.it) e Martina Centazzo (centazzo@iom.cnr.it);
   - per UNISA: Pietro Campiglia (pcampiglia@unisa.it) e Chiara Turco (cturco@unisa.it);
   - per UNISALENTO: Rosaria Rinaldi (ross.rinaldi@unisalento.it) e Antonia Romano (e-mail: tonia.romano@unisalento.it);
   - per UNINA: Alessandro Pezzella (alessandro.pezzella@unina.it) e Salvatore Verdoliva (salvatore.verdoliva@unina.it).
2. I referenti hanno il compito di definire congiuntamente le operazioni necessarie a garantire l'adempimento degli impegni assunti con il presente Accordo, attivandosi tempestivamente per risolvere eventuali criticità che dovessero manifestarsi nel corso della loro esecuzione, verificandone periodicamente la realizzazione e mantenendo informata la struttura di appartenenza sul loro andamento. I referenti svolgono, in particolare, le seguenti macro- attività: verifica della coerenza con il cronoprogramma procedurale e di spesa, come disposto all'art. 6 dell'Avviso, del raggiungimento degli obiettivi, presentazione dei *deliverable* e monitoraggio delle spese.

3. Le Parti convengono, inoltre, di individuare quali referenti per il progetto di cui all'Avviso i seguenti:

   - Coordinatore Scientifico: Stefano Cozzini, Direttore dell'Istituto Ricerca per l'Innovazione Tecnologica – Struttura Ricerca e Innovazione di Area Science Park;
   - Responsabile Amministrativo: Eva Vessel, tecnologo assegnato alla Struttura Ricerca e Innovazione di Area Science Park.

ARTICOLO 7

RIPARTIZIONE DELLE RISORSE E FLUSSI FINANZIARI TRA LE PARTI

1. Ai sensi dell'art. 4, comma 3, lett. c) dell'Avviso e al fine di disciplinare l'impiego delle risorse disponibili, ammontanti a un totale stimato di euro 40.990.516,69, con la sottoscrizione del presente Accordo le Parti convengono di determinare la ripartizione del budget tra il Soggetto proponente e i Soggetti co-proponenti come segue:

	a. Personale dedicato alla o alle infrastruttura/e	b. Strumentazione scientifica e impianti tecnologici	C. Open Access, TNA, Fairness	D. Impianti, inclusa edilizia …	E. Costi Generali (max 7%)	f. Attività di formazione	Totale complessivo
Area	1.969.572,00 €	14.532.886,04 €			1.176.172,06 €	300.000,00 €	17.978.630,10 €
CNR	476.784,00 €	5.895.040,00 €			467.027,68 €	300.000,00 €	7.138.851,68 €
UniNapoli	232.500,00 €	834.068,99 €			95.659,83 €	300.000,00 €	1.462.228,82 €
UniSalento	232.500,00 €	4.451.292,00 €		380.640,00 €	375.510,24 €	300.000,00 €	5.739.942,24 €
UniSalerno	697.500,00 €	6.862.111,06 €		244.000,00 €	567.252,78 €	300.000,00 €	8.670.863,84 €
Totale complessivo	3.608.856,00 €	32.575.398,09 €	0,00 €	624.640,00 €	2.681.622,60 €	1.500.000,00 €	40.990.516,69 €

2. In base a quanto previsto dall'art. 13 dell'Avviso, le risorse finanziarie di cui al comma 1 sono erogate dal MUR esclusivamente ad Area Science Park, in qualità di Soggetto proponente, alle condizioni e nei termini disciplinati dall'articolo citato, sia a titolo di anticipazione che a titolo di rimborso.

3. Ai sensi dell'art. 4, comma 3, lett. f) dell'Avviso, Area Science Park provvede a ripartire il contributo ricevuto dal MUR e a trasferirlo ai Soggetti co-proponenti mediante bonifico bancario, a spese del beneficiario, entro 5 (cinque) giorni lavorativi dal suo ricevimento, previa verifica del pieno conseguimento degli obiettivi e dei *deliverable* assegnati nell'ambito del progetto a ciascuno dei Soggetti co-proponenti.
4. Ciascun Soggetto co-proponente deve inviare ad Area Science Park tempestivamente e, in ogni caso, non oltre i 10 (dieci) giorni lavorativi precedenti le scadenze di sottomissione fissate dal MUR i dati di avanzamento finanziario e la documentazione specifica necessaria per le operazioni di registrazione e di inoltro di cui all'art. 4, comma 1, lett. e) ed f) del presente Accordo.
5. Ai fini degli adempimenti di spettanza del Soggetto proponente di cui all'art. 13 dell'Avviso, la rendicontazione finanziaria deve essere comprensiva dell'elenco di tutte le spese ammissibili ed effettivamente sostenute nel periodo di riferimento e dei relativi giustificativi di spesa e di pagamento, onde consentire il monitoraggio e i controlli in base a quanto previsto dal MUR.
6. Ciascun Soggetto co-proponente deve trasmettere ad Area Science Park entro 10 (dieci) giorni lavorativi dalla conclusione del Progetto la propria Relazione Tecnica finale. Il Soggetto proponente è tenuto a produrre, congiuntamente alla domanda di rimborso relativa al saldo finale, la Relazione tecnica finale, comprovante l'avvenuto conseguimento dell'Obiettivo Generale previsto dalla Scheda Tecnica della proposta progettuale, così come approvata.
7. In ogni caso, i trasferimenti delle risorse tra le Parti avvengono unicamente a titolo di rimborso di spese e di costi dalle medesime sostenute, senza margini di guadagno e senza che gli stessi costituiscano alcuna forma di corrispettivo per

l'attività svolta, essendo il presente Accordo esclusivamente ispirato alla collaborazione istituzionale e non configurabile in alcun modo quale contratto a prestazioni corrispettive.

8. Preso atto delle finalità istituzionali del presente Accordo e poiché trattasi di trasferimento di risorse nell'ambito di accordo di collaborazione fra pubbliche amministrazioni, l'operazione è considerata fuori campo IVA, ai sensi degli artt. 1 e 4 del D.P.R. n. 633/1972 e, pertanto, non è prevista emissione di fattura.
9. Le erogazioni in favore dei Soggetti attuatori sono subordinate e condizionate all'effettiva erogazione delle risorse finanziarie da parte del Servizio centrale per il PNRR in favore del MUR e da parte di quest'ultimo in favore di Area Science Park.

ARTICOLO 8

DISIMPEGNO DELLE RISORSE E RESPONSABILITÀ FINANZIARIE

1. Le Parti danno atto di essere edotte che:
   a) l'eventuale disimpegno delle risorse del PNRR, previsto dall'art. 24 del citato Regolamento n. 2021/241/UE e dall'art. 8 del citato decreto-legge 31 maggio 2021, n. 77, come modificato dalla legge di conversione 29 luglio 2021, n. 108, comporta la riduzione o revoca delle risorse relative ai progetti che non hanno raggiunto gli obiettivi previsti, nel rispetto di quanto previsto dal Decreto di concessione del finanziamento n. 455 del 15 novembre 2022;
   b) il MUR può procedere alla revoca, parziale o totale, del finanziamento concesso con conseguente obbligo di restituzione degli importi eventualmente già versati, nei seguenti casi:
      I. mancato rispetto della durata massima del progetto prevista dall'art. 7, comma 4 dell'Avviso e dall'art. 3 del presente Accordo, salvo la

concessione di proroga approvata dal MUR ai sensi dell'art. 7, comma 4, dell'Avviso;

II. mancato rispetto da parte dei Soggetti attuatori della soglia del 20% dell'eventuale attività economica svolta dalla IR, ai sensi del pt. 20 della Comunicazione 2014/C 198/01 della Commissione;

III. mancata realizzazione di attività progettuali che impattino sul raggiungimento dell'Obiettivo Generale di cui in premessa e alla Scheda Tecnica della proposta progettuale;

IV. mancata trasmissione della Domanda di Rimborso finale e della relativa Relazione Tecnica Finale nei termini prescritti, salvo deroghe;

V. mancato rispetto del principio DNSH e dei principi trasversali previsti dal PNRR, con particolare riguardo al principio del contributo all'obiettivo climatico e digitale (c.d. *tagging*), al principio di parità di genere e all'obbligo di protezione e valorizzazione dei giovani;

VI. perdita sopravvenuta di uno o più requisiti di ammissibilità, ovvero irregolarità della documentazione non sanabile oppure non sanata entro 10 (dieci) giorni naturali e consecutivi dalla richiesta;

VII. irregolarità essenziali non sanabili oppure in violazioni di leggi, regolamenti e disposizioni amministrative vigenti;

VIII. in tutti gli altri casi di inadempienza degli obblighi assunti;

IX. in presenza di ogni altro atto o fatto idoneo a compromettere il regolare svolgimento del progetto.

2. Ferma restando la responsabilità del Soggetto proponente nei confronti del MUR in relazione all'attuazione della progettualità, come previsto dall'art. 4, comma

2, del presente Accordo, nel caso di irregolarità o inosservanza di uno o più obblighi posti a carico dei Soggetti attuatori, che comporti riduzione o revoca del finanziamento ai sensi dell'art. 18 dell'Avviso, ciascuna Parte risponde per le proprie quote di attività e il budget a essa spettante, nei termini di riportati nei commi 3 e seguenti del presente articolo, fatto salvo l'obbligo di risarcimento di tutti i danni conseguenti.

3. Il Soggetto attuatore, al quale sia imputabile l'inadempimento o l'irregolarità all'origine del provvedimento di riduzione del finanziamento del MUR, deve restituire, del tutto o in parte, le somme già erogate, in particolare in caso di:

   a) mancato rispetto del cronoprogramma procedurale di cui alla Scheda Tecnica della proposta progettuale, salvo la concessione di proroga approvata dal MUR ai sensi dell'art. 7, comma 4, dell'Avviso;

   b) mancato rispetto della soglia del 20% dell'eventuale attività economica svolta dalla IR, ai sensi del pt. 20 della Comunicazione 2014/C 198/01 della Commissione;

   c) mancato rispetto del principio DNSH e dei principi trasversali previsti dal PNRR, con particolare riguardo al principio del contributo all'obiettivo climatico e digitale (c.d. *tagging*), al principio di parità di genere e all'obbligo di protezione e valorizzazione dei giovani;

   d) perdita sopravvenuta di uno o più requisiti di ammissibilità, ovvero irregolarità della documentazione non sanabile oppure non sanata entro 10 (dieci) giorni naturali e consecutivi dalla richiesta del MUR;

   e) irregolarità essenziali non sanabili oppure violazioni di leggi, regolamenti e disposizioni amministrative vigenti;

   f) qualsiasi inadempienza degli obblighi assunti;

g) ogni altro atto o fatto idoneo a compromettere il regolare svolgimento del progetto.

4. Sull'importo di cui al comma 3 del presente articolo sono dovuti gli interessi legali dalla data di ricevimento dell'importo fino alla data di restituzione dello stesso. Le spese bancarie derivanti dal rimborso delle somme dovute sono interamente a carico del soggetto al quale sia imputabile l'inadempimento o l'irregolarità all'origine del provvedimento di revoca parziale o totale del finanziamento.

5. Qualora il MUR accerti errori e/o inadempimenti sanabili, alla Parte alla quale siano imputabili è richiesto di fornire chiarimenti e/o integrazioni atti a sanare le criticità riscontrate, entro un termine perentorio, con l'avvertimento che il suo mancato rispetto potrebbe comportare la decurtazione degli importi oggetto di rilievo da parte del MUR, nonché l'adozione di provvedimenti alternativi che, nei casi più gravi, potrebbero comportare anche la revoca del finanziamento e il recupero delle somme già erogate, con conseguente applicazione di quanto previsto ai commi che precedono.

6. Il MUR provvede ai recuperi delle somme dovute, a seguito dell'adozione di uno degli atti di cui ai commi precedenti, agendo preventivamente sul soggetto inadempiente cui è imputabile il provvedimento sanzionatorio, e in via residuale, ovvero nell'ipotesi di incapienza, nei confronti del Soggetto proponente; il recupero avviene anche operando, ove possibile, mediante compensazioni a valere su altri trasferimenti/contributi del MUR (FOE, FFO o progettuali) riconosciuti al Soggetto proponente e/o ai Soggetti co-proponenti. Medesima modalità viene adottata nel caso di recupero dell'anticipo nell'ipotesi di non sana gestione dello stesso.

7. Con la sottoscrizione del presente Accordo le Parti pattuiscono di riconoscere ad

Area Science Park la facoltà di rivalersi nei confronti di uno o più dei Soggetti co-proponenti in caso di mancato adempimento a esso e/o a essi imputabile degli obblighi previsti nel presente Accordo e/o dall'Avviso e/o dal Disciplinare allegato alla domanda recante la proposta progettuale.

ARTICOLO 9

GESTIONE DELL'INFRASTRUTTURA DI RICERCA

1. Ai sensi dell'art. 4, comma 3, lett. e) dell'Avviso, la Compagine di progetto si impegna a gestire la IR "Pathogen Readiness Platform for CERIC-ERIC upgrade" (PRP@CERIC), garantendone la sostenibilità economico–finanziaria indipendentemente dal mercato, anche dopo la conclusione del progetto, per almeno 10 (dieci) anni decorrenti dal pagamento finale e a non dismettere i singoli beni prima che abbiano completato il normale ciclo di ammortamento, senza una preventiva autorizzazione del MUR, assicurando la stabilità del progetto entro i limiti di cui alla normativa eurounionale.
2. In ottemperanza all'art. 8, comma 2, del Disciplinare, a norma del quale "l'infrastruttura deve essere in grado di offrire i suoi servizi, trasferendo conoscenze e metodi di impatto diretto per l'innovazione; essa inoltre deve permettere accesso strutturato ed aperto ai dati scientifici e tecnologici, per amplificarne l'impatto e il ritorno sulla società e sull'economia, sia a livello globale che a livello locale", e affinché la IR di cui al comma 1 risponda, in concreto, alle necessità di comunità scientifiche, anche interdisciplinari, e rappresenti un elemento di competitività della ricerca nazionale ed europea, le Parti convengono di:
   a) gestire la IR secondo un modello organizzativo improntato al coinvolgimento di infrastrutture distribuite, che gestiscano in modo concertato più laboratori

collocati in diversi siti geografici, coordinando, attraverso un unico centro, le procedure di accesso alle risorse, ossia ai laboratori e ai dati e relativi servizi di analisi e gestione dei dati FAIR, anche in modalità remota, e avvalendosi di personale dedicato;

b) regolare l'accesso alla IR distribuita e selezionare le richieste dell'utenza secondo procedure internazionalmente consolidate, basate esclusivamente sia sulla verifica della fattibilità tecnica del progetto dell'utenza stessa sia sul merito scientifico stabilito da comitati internazionali di pari, ai sensi della mappatura predisposta nel Programma Nazionale per le Infrastrutture e Ricerca (PNIR 2021-2027), assicurando l'allineamento agli standard internazionali di cui all'*European Charter for Access to Research Infrastructures* e il rispetto di criteri predeterminati dalle Parti.

ARTICOLO 10

VARIAZIONI DI NATURA SOGGETTIVA E OGGETTIVA

1. Le Parti danno atto di essere edotte che:

a) ai sensi dell'art. 15, comma 1, dell'Avviso, in accordo con le linee guida del PNRR e al fine di garantire una maggiore trasparenza, efficacia ed efficienza della spesa, nonché certezza dei tempi di realizzazione delle iniziative finanziate, è auspicabile ridurre al minimo qualsiasi variazione rispetto al progetto originario ammesso a finanziamento;

b) il MUR non riconosce le spese relative ad attività del progetto oggetto di variazione non autorizzata;

c) il MUR si riserva comunque la facoltà di apportare qualsiasi variazione e/o modifica d'ufficio al progetto, necessaria al fine del raggiungimento degli obiettivi previsti dal progetto, previa comunicazione ai Soggetti attuatori.

2. Fermo quanto previsto al comma 1 del presente articolo, la Compagine di progetto può proporre variazioni alla Scheda Tecnica del progetto, che Area Science Park presenta al MUR esclusivamente tramite modalità telematica, nei limiti di quanto specificato ai successivi commi del presente articolo. Tali variazioni possono essere autorizzate dal MUR entro, di norma, 20 (venti) giorni, acquisita la valutazione dell'esperto tecnico-scientifico della fase *in itinere* al fine di verificare il rispetto di quanto di seguito specificato:

- le variazioni di natura soggettiva sono consentite solo nelle ipotesi di fusioni e/o incorporazioni o altri fenomeni successori derivanti da sopraggiunte modifiche legislative o regolamentari e, in tale ipotesi, la Compagine ridefinita deve garantire il raggiungimento degli obiettivi del progetto, sempre in accordo con i criteri di cui al pt. 20 della Comunicazione 2014/C 198/01 della Commissione;
- le variazioni di natura oggettiva non sono consentite, ma, posta l'invarianza dell'importo complessivo del finanziamento concesso, è fatta salva la possibilità di rimodulare, nella fase di attuazione del progetto, i costi ammessi di cui all'art. 8 dell'Avviso, senza superare, in termini cumulati, il limite del 15% rispetto al totale dei costi ammessi al finanziamento, fermo restando il rispetto dei limiti percentuali, ove presenti, per ciascuna tipologia;
- l'obiettivo generale, gli obiettivi specifici, gli obiettivi intermedi, il cronoprogramma di spesa e procedurale del progetto, salva l'ipotesi in quest'ultimo caso di proroga concessa ai sensi dell'art. 7, comma 4, dell'Avviso, non possono essere oggetto di variazione.

3. Ciascun Soggetto attuatore e la Compagine di progetto si impegnano, pertanto,

a non apportare autonomamente alcuna variazione senza previa sottoposizione alla valutazione del MUR a mezzo di apposita richiesta, avanzata dal Soggetto proponente, che ne evidenzi le necessità e le motivazioni, il cui accoglimento o motivato rigetto sarà oggetto di apposito provvedimento ministeriale comunicato alla Compagine stessa.

4. Le Parti convengono che, a fronte di esigenze e/o circostanze sopravvenute, l'aggiornamento e/o la revisione delle attività progettuali, nel limite di quanto consentito dall'Avviso e dal provvedimento di finanziamento del progetto, debbano essere convenute tra le Parti e che le conseguenti modifiche alla Scheda Tecnica della proposta progettuale non comportino alcuna revisione del presente Accordo.

ARTICOLO 11

RISERVATEZZA

1. Nell'espletamento delle attività attuative del presente Accordo e delle attività progettuali, ciascuna Parte deve mantenere la riservatezza su tutte le informazioni, le idee di ricerca, gli approcci, le metodologie, i *tool*, le analisi, i rapporti, gli studi, il *know-how*, i documenti e i dati di natura tecnica, scientifica e organizzativa relativi alle altre Parti, che siano qualificati come confidenziali o che ragionevolmente possano essere identificati come tali (di seguito indicati per brevità come "Informazioni Riservate").
2. Ciascuna della Parti si impegna altresì a non riprodurre e utilizzare per fini diversi da quelli previsti dal presente Accordo le Informazioni Riservate che le siano state fornite e/o rivelate da una o più delle altre Parti o che abbia comunque acquisito nell'esecuzione delle attività attuative del presente Accordo e delle attività progettuali.

3. Le Parti si impegnano, in particolare, a:

- non rivelare a terzi, né in tutto né in parte, direttamente o indirettamente, in qualsivoglia forma, qualsiasi Informazione Riservata trasmessa loro da un'altra Parte, senza il preventivo consenso scritto della Parte titolare delle informazioni stesse, fatta eccezione per le informazioni, le decisioni, le notizie e i dati di pubblico dominio o per i quali la legge o un provvedimento amministrativo o giudiziario imponga un obbligo di comunicazione;
- non utilizzare né in tutto né in parte, direttamente o indirettamente, in qualsivoglia forma, qualsiasi Informazione Riservata trasmessa da un'altra Parte, per fini diversi da quanto previsto dal presente Accordo, senza il preventivo consenso scritto della Parte titolare delle informazioni stesse;
- conservare con la massima cura e diligenza le Informazioni Riservate, limitando il numero dei soggetti che possono avervi accesso al personale direttamente coinvolto nelle attività attuative del presente Accordo e nelle attività progettuali (detti soggetti dovranno essere previamente informati del carattere confidenziale delle informazioni e impegnarsi a rispettare, nelle forme che verranno meglio definite da ciascuna Parte, gli obblighi di riservatezza previsti dal presente Accordo);
- astenersi dal copiare, duplicare, riprodurre o registrare in qualsiasi forma e con qualsiasi mezzo le Informazioni Riservate, salvo che nella misura strettamente necessaria ai fini delle attività attuative del presente Accordo.

4. Su richiesta di ciascuna Parte, le altre Parti restituiranno immediatamente tutti i documenti contenenti le Informazioni Riservate ovvero, sempre su richiesta, ne distruggeranno qualsiasi copia o riproduzione.
5. Resta inteso che le Informazioni Riservate rimarranno di esclusiva proprietà della

Parte che le fornisce e che nessuna disposizione del presente Accordo o altra dichiarazione formulata nell'espletamento delle attività attuative di esso potrà essere interpretata come concessione di licenza o qualsivoglia altro diritto sulle informazioni stesse.

6. Gli obblighi di cui al presente articolo sopravviveranno alla cessazione del presente Accordo, per qualsiasi ragione intervenuta, e dovranno essere rispettati per un periodo di ulteriori 5 (cinque) anni.
7. Qualora un'eventuale violazione degli impegni di riservatezza a opera di una della Parti sia valutata rilevante dalla Parte o dalle Parti titolari delle informazioni rivelate, alla stessa potrà conseguire la risoluzione del presente Accordo nei confronti della Parte inadempiente. In tal caso, il Soggetto proponente dovrà darne comunicazione scritta, a mezzo PEC, alla Parte inadempiente e l'Accordo si considererà risolto al ricevimento della comunicazione. È fatto salvo quanto previsto dal comma 4 del presente articolo.
8. Le Parti si danno reciprocamente atto che in nessun caso possono essere considerate Informazioni Riservate quelle informazioni per le quali possa essere fornita prova che al momento della comunicazione siano generalmente note o facilmente accessibili agli esperti e agli operatori del settore, o lo diventino successivamente per scelta del titolare senza che la Parte che ne è venuta a conoscenza abbia violato il presente Accordo.

ARTICOLO 12

DISCIPLINA DELLA PROPRIETÀ INTELLETTUALE E UTILIZZO DEI RISULTATI

1. Le conoscenze pregresse di una Parte (*background*) sono e restano di titolarità e proprietà della Parte medesima, così come i diritti di proprietà intellettuale che non siano stati generati come risultato delle attività attuative del presente

Accordo (*sideground*) rimarranno di esclusiva proprietà della Parte che li ha generati. Il presente Accordo non attribuisce dunque ad alcuna delle Parti alcun diritto in merito ai titoli di proprietà intellettuale delle altre Parti.

2. Fermi restando i diritti riconosciuti dalla legge agli autori o inventori, i risultati delle attività attuative del presente Accordo, intesi come i diritti di proprietà intellettuale generati da ciascun Soggetto attuatore come risultato delle attività progettuali, siano essi idee, approcci, metodi, *tool*, informazioni, *software* e altri dati concepiti, attuati, sviluppati o ridotti in pratica nell'ambito delle attività progettuali, ove brevettabili o comunque tutelabili attraverso altri titoli di proprietà intellettuale, saranno di titolarità del Soggetto attuatore che li ha conseguiti nell'ambito del progetto. In base all'art. 10 del Disciplinare di concessione del finanziamento, tale Soggetto attuatore si impegna sin da ora a promuovere tali risultati prioritariamente nel territorio dell'Unione europea; in difetto il MUR avrà facoltà di revocare il finanziamento con le conseguenze di cui all'art. 8 del presente Accordo, in punto, revoca parziale o totale del finanziamento.

3. I risultati delle attività attuative del presente Accordo, come meglio definiti al comma 2 del presente articolo, ove non brevettabili o comunque tutelabili attraverso altri titoli di proprietà intellettuale, potranno essere utilizzati da tutte e da ciascuna delle Parti, nei rispettivi ambiti di competenza, in osservanza delle regole di riferimento per ogni singolo progetto o iniziativa condivisi.

4. Il personale di ciascuna delle Parti avrà il diritto di utilizzo di qualsivoglia risultato della progettualità per il proseguimento della ricerca in ambito istituzionale, tenendone debitamente informate le altre Parti.

5. Salvo quanto previsto ai commi precedenti, nulla di quanto contenuto nel

presente Accordo potrà limitare l'uso di idee, concetti, *know-how* o tecniche che le Parti sviluppassero individualmente in esecuzione e nel corso della durata del presente Accordo.

6. Le Parti, si impegnano, ciascuna per i propri rapporti di competenza, ad assicurare che tutti i soggetti coinvolti nelle iniziative attuative del presente Accordo dichiarino espressamente l'esistenza di esso nelle pubblicazioni scientifiche e ne diano adeguato risalto in tutte le comunicazioni verso l'esterno, in particolare attraverso pubblicazioni scientifiche congiunte, partecipazioni congressuali e azioni divulgative e di formazione risultanti da tali attività.
7. Ciascuna delle Parti garantisce che quanto sarà reso disponibile o consegnato a una o ad altre Parti, in esecuzione delle attività attuative del presente Accordo, non viola alcuna esclusiva o diritto di proprietà intellettuale o industriale o altri diritti di terzi, assumendosi ogni responsabilità al riguardo e obbligandosi a manlevare le altre Parti da qualsiasi conseguenza per la violazione di quanto garantito.
8. Ciascuna Parte non potrà utilizzare i marchi e gli altri segni distintivi delle altre Parti senza il preventivo consenso scritto delle stesse. L'eventuale autorizzazione all'utilizzo dei segni distintivi concessa all'altra Parte non potrà in alcun modo essere intesa come licenza o concessione di alcun diritto sui segni distintivi medesimi.

ARTICOLO 13

INIZIATIVE DI COMUNICAZIONE, PUBBLICAZIONI E DISSEMINAZIONE

1. Fermi restando gli obblighi di informazione e pubblicità di cui all'art. 3 del Disciplinare di concessione del finanziamento, discendenti dall'art. 34 del Regolamento 2021/241/UE, le Parti concordano di garantire un'adeguata

visibilità al presente Accordo e di realizzare iniziative di comunicazione, promozionali o pubblicitarie di esso e delle attività intraprese o attuate sulla base di esso nel rispetto delle indicazioni contenute nei commi 2 e 3 del citato art. 3 del Disciplinare medesimo.

2. Le iniziative di cui al comma 1 devono essere previamente concordate dalle Parti e in ogni opera o scritto, nel materiale e nelle attività di comunicazione riguardanti le azioni attuative del presente Accordo deve essere menzionato l'intervento di tutte le Parti e fatto uso dei relativi loghi e segni distintivi.
3. Le Parti riconoscono che i ricercatori e/o i tecnologi coinvolti nelle attività attuative del presente Accordo possano pubblicare i risultati scientifici raggiunti nell'ambito di esse. In ogni caso i dati oggetto di pubblicazione devono essere preventivamente concordati tra le Parti, al fine di stabilire in maniera congiunta gli ambiti di competenza e il riconoscimento della titolarità dei lavori pubblicati.
4. Le Parti si impegnano, all'esito della disamina delle bozze della pubblicazione e della verifica dell'assenza di violazioni degli impegni di riservatezza assunti ai sensi dell'art. 11 del presente Accordo, a non impedire né ostacolare la pubblicazione dei suddetti risultati senza giustificato motivo.
5. Le Parti si impegnano ad adottare protocolli per la produzione e la gestione di dati FAIR (*Findable, Accessible, Interoperable, Reusable*) e *Open* certificati di qualità, al fine di contribuire al successo e all'impatto dello *European Open Science Cloud*, rafforzando così la capacità del sistema integrato di servire l'utenza. Le Parti convengono, altresì, di recepire i suddetti protocolli nella Data Policy della IR distribuita e nel proprio Piano di Gestione dei Dati, che sarà articolato su una base comune con eventuali documenti specifici (*Data Management Plan* – DMP) laddove necessario o opportuno.

ARTICOLO 14

TRATTAMENTO DEI DATI PERSONALI

1. Ai sensi e per gli effetti di quanto disposto dal *General Data Protection Regulation* (GDPR) - Regolamento 2016/679/UE - con la sottoscrizione del presente Accordo ciascuna Parte si impegna, informando le altre Parti in base all'art. 13 del citato GDPR, a far sì che tutti i dati personali e di contatto dei titolari di organi, dipendenti, ricercatori, collaboratori, consulenti e/o incaricati propri e delle altre Parti e comunque tutti i dati personali di cui entrerà in possesso nelle fasi di stipulazione e di attuazione del presente Accordo siano oggetto di trattamento, automatizzato e non, unicamente allo scopo di concludere e di dare esecuzione a esso, nonché per adempiere agli obblighi previsti da leggi, regolamenti e/o ordini di pubbliche autorità.
2. Il conferimento dei dati – che non necessita di specifico consenso – è necessario per l'assolvimento delle predette finalità e, in difetto, non sarà possibile realizzarle in tutto o in parte.
3. Ciascuna Parte si impegna a utilizzare i dati solo con le modalità e le procedure necessarie al perseguimento delle finalità indicate, applicando tutte le misure tecnologiche e organizzative di sicurezza adeguate e improntando il trattamento dei dati ai principi di correttezza, liceità e trasparenza nel pieno rispetto della legislazione nazionale ed eurounionale vigente in materia di protezione dei dati personali (ivi inclusi gli ulteriori provvedimenti, comunicati ufficiali, autorizzazioni generali, pronunce in genere emessi dall'Autorità Garante per la protezione dei dati personali).
4. I dati di cui al comma 1 del presente articolo potranno essere comunicati a soggetti a vario titolo coinvolti nelle attività di ciascuna Parte, sia in Italia che

all'estero (sia in Paesi UE che extra UE), per il conseguimento delle finalità sopra indicate e in conformità alla vigente normativa. Tale trasferimento di dati potrà avvenire solo verso Paesi che garantiscano un livello di sicurezza e di protezione adeguato, adottando tutte le misure degli artt. 44 e ss. del GDPR. In particolare, in caso di trasferimento dei dati verso un Paese terzo in relazione al quale la Commissione Europea non abbia emanato una decisione di adeguatezza, il Titolare dovrà utilizzare uno dei meccanismi indicati dagli artt. 46 e ss. del GDPR, e in particolare le clausole tipo per il trasferimento di dati personali verso Paesi terzi modificate dalla Commissione Europea il 4 giugno 2021 e ss.mm.ii. (cd. "*Standard Contractual Clauses*").

5. Notizie, fotografie e immagini filmate relative alle attività realizzative del presente Accordo potrebbero essere diffuse, con il consenso espresso degli interessati, ove necessario, a mezzo stampa o materiale promozionale delle attività di ciascuna delle Parti, nonché attraverso altre pubblicazioni, siti web e portali "dedicati", televisione, radio, social media e altri mezzi di comunicazione.
6. I dati verranno conservati fino al completamento delle attività di cui al presente Accordo e successivamente nel rispetto dei termini prescritti e/o consentiti.
7. Gli interessati possono esercitare tutti i diritti elencati agli artt. da 15 a 21 del GDPR.
8. I Responsabili della protezione dei dati (DPO) delle Parti sono contattabili agli indirizzi di seguito riportati:
   - Area Science Park: rpd@areasciencepark.it;
   - CNR: rpd@cnr.it oppure dpo@cnr.it e rpd@pec.cnr.it;
   - UNISA: protezionedati@unisa.it e protezionedati@pec.unisa.it;
   - UNISALENTO: dpo@unisalento.it;

- UNINA: rpd@unina.it e rpd@pec.unina.it.

9. Con riferimento alle attività di trattamento effettuate al fine di stipulare e attuare il presente Accordo, ciascuna Parte, si impegna a mantenere indenne e manlevare le altre Parti da ogni contestazione, azione e/o pretesa avanzate nei confronti di una o più di esse da parte degli interessati e/o di qualsiasi altro soggetto e/o Autorità a seguito di eventuali violazioni della normativa citata non ascrivibili alla Parte o alle Parti che devono essere tenute indenni.
10. Qualora la realizzazione delle attività attuative del presente Accordo comporti il trattamento da parte di una o più delle Parti di dati personali di interessati di cui è Titolare un'altra Parte ovvero di dati personali raccolti da tutte o alcune delle Parti, queste ultime determineranno con separato atto le rispettive responsabilità in merito all'osservanza degli obblighi derivanti dalla normativa vigente, in qualità di titolari autonomi, responsabili ovvero contitolari.

ARTICOLO 15

COPERTURE ASSICURATIVE

1. Le Parti garantiscono la copertura assicurativa sia a garanzia della responsabilità civile verso terzi (RCT) per danni a persone e cose, dei quali siano eventualmente tenute a rispondere, sia a garanzia del rischio per infortuni dei dipendenti, collaboratori e personale dedicato alla realizzazione delle attività attuative del presente Accordo.
2. In caso di infortunio o di danni a terzi durante lo svolgimento delle attività attuative del presente Accordo, le Parti si impegnano a segnalare tempestivamente l'una all'altra l'evento, affinché possano avviarsi le procedure assicurative presso gli istituti competenti (denuncia di infortunio o di sinistro).

ARTICOLO 16

SICUREZZA SUL LAVORO

1. Le Parti danno atto di considerare la tutela della salute e della sicurezza dei lavoratori che saranno occupati nelle attività attuative del presente Accordo come condizioni imprescindibili e prioritarie per la stipula del medesimo. Si impegnano pertanto fin d'ora a cooperare e a coordinare le attività di prevenzione e protezione dai rischi nel rispetto della normativa vigente (D.Lgs. n. 81/2008 e ss.mm.ii.) a favore del proprio personale impegnato nelle attività attuative del presente Accordo. Ai fini del presente articolo e secondo la normativa vigente il personale di una Parte è indicato come "lavoratore" o "lavoratori".
2. Le attività attuative del presente Accordo contemplano la possibilità che il personale dipendente, collaboratore e in formazione di una Parte acceda alla/e Sede/i dell'altra o delle altre, anche per il compimento di parte delle prestazioni di studio, indagine ed elaborazione.
3. Nel caso in cui i lavoratori di una Parte accedano ai locali di un'altra in veste di ospiti o comunque come prestatori d'opera, la Parte ospitante si farà carico di informare i lavoratori della Parte ospitata in merito alle misure e regole di sicurezza ivi adottate (piano di emergenza, procedure di evacuazione, ecc.).
4. I lavoratori di tutte le Parti sono tenuti a uniformarsi ai regolamenti sulla sicurezza in vigore nelle sedi di esecuzione delle attività attuative del presente Accordo, nel rispetto della normativa per la sicurezza dei lavoratori di cui al citato D.Lgs. n. 81/2008.
5. Ferma restando la responsabilità del Datore di Lavoro e dei Responsabili della struttura di volta in volta ospitante in merito alla conformità degli edifici e dei singoli locali alle normative vigenti, ciascuna Parte risulta singolarmente ed

esclusivamente responsabile dei rischi derivanti dall'attività svolta dai propri lavoratori e delle conseguenti misure di prevenzione e tutela della salute e della sicurezza, secondo quanto previsto dal citato D.Lgs. n. 81/2008, nonché delle seguenti attività:

a) valutazione dei rischi per le rispettive attività;

b) sorveglianza sanitaria dei propri lavoratori;

c) informazione, formazione e addestramento dei propri lavoratori;

d) fornitura e corretto impiego dei dispositivi di protezione individuale ai propri lavoratori.

6. Nel caso in cui l'accesso di lavoratori di una Parte nei locali di un'altra li esponga a rischi specifici per la propria salute e/o sicurezza, le Parti si impegnano a redigere congiuntamente un apposito documento di cooperazione e coordinamento, contenente le informazioni sui rischi e quant'altro ritenuto necessario ai fini del rispetto degli obblighi di legge in materia. La Parte ospitante si impegna, inoltre, ad addestrare i lavoratori della Parte ospitata all'uso delle strumentazioni che utilizzeranno presso le proprie sedi.

ARTICOLO 17

NULLITÀ PARZIALE

1. Qualora qualsivoglia clausola del presente Accordo sia riconosciuta non valida o di impossibile attuazione ovvero sia successivamente diventata totalmente e/o parzialmente, non valida o di impossibile attuazione, ciò non inficia la validità delle rimanenti pattuizioni del presente Accordo, fatto salvo quanto previsto dall'art. 1419 del c.c..

1. Nel caso in cui si verifichi quanto previsto al comma 1 del presente articolo, le Parti provvederanno a concordare una valida clausola sostitutiva che sia più

vicina possibile allo scopo della clausola non valida e/o di impossibile attuazione, al fine di superare la situazione che ne ha determinato l'invalidità e/o l'impossibilità di attuazione.

ARTICOLO 18

RINUNCIA AL PROGETTO E CESSIONE DELL'ACCORDO

1. Le Parti prendono atto che l'Avviso non prevede la rinuncia al progetto di alcuna delle Parti, che pertanto deve ritenersi non ammessa.
2. Il presente Accordo non può essere ceduto, neppure parzialmente, a terzi, rimanendo comunque sempre obbligate le sole Parti indicate in epigrafe.

ARTICOLO 19

FORO COMPETENTE

1. Per quanto non previsto dal presente Accordo si rinvia all'Avviso, al Disciplinare per la concessione del finanziamento, nonché a quanto stabilito dalla vigente normativa eurounionale e nazionale, con particolare riferimento a quanto previsto dal Reg. 2021/241/UE e dal decreto - legge 31 maggio 2021, n. 77, come modificato dalla legge 29 luglio 2021, n. 108.
2. Ciascun Soggetto attuatore è tenuto a osservare la normativa nazionale ed eurounionale in materia fiscale, di tutela e sicurezza del lavoro, previdenziale e assistenziale, di impatto ambientale e parità di trattamento in materia di lavoro, nonché in materia di informazione e pubblicità e di appalti pubblici di servizi e forniture.
2. Ogni eventuale controversia tra le Parti relativa all'interpretazione, esecuzione, validità o efficacia del presente Accordo, che non si sia potuta definire in via stragiudiziale, sarà devoluta alla giurisdizione esclusiva del giudice amministrativo ai sensi dell'art. 133, comma 1, lett. a), pt. 2 del D.Lgs. n.

104/2010.

ARTICOLO 20

COMUNICAZIONI E SCAMBIO DI INFORMAZIONI

1. Ai fini della digitalizzazione dell'intero ciclo di vita della progettualità, tutte le comunicazioni tra le Parti e con il MUR devono avvenire per posta elettronica istituzionale o posta elettronica certificata, ai sensi del D.Lgs. n. 82/2005 ai seguenti indirizzi:
   - Area Science Park: protocollo@pec.areasciencepark.it;
   - CNR: protocollo.iom@pec.cnr.it e protocollo-ammcen@pec.cnr.it;
   - UNISA: ammicent@pec.unisa.it;
   - UNISALENTO: amministrazione.centrale@cert-unile.it;
   - UNINA ateneo@pec.unina.it.

ARTICOLO 21

SPESE DI REGISTRAZIONE E DI BOLLO

1. Il presente atto è soggetto a registrazione in caso d'uso ai sensi del D.P.R. 26 aprile 1986, n. 131, Tariffa parte II, art. 4; le spese di bollo sono a carico di ciascuna delle Parti in eguale misura e le eventuali spese di registrazione saranno sostenute a cura della Parte che ne farà richiesta.
2. L'imposta di bollo verrà assolta in modo virtuale secondo le disposizioni di legge.

Letto, approvato e sottoscritto digitalmente

Per Area di Ricerca Scientifica e Tecnologica di Trieste – Area Science Park

La Presidente prof.ssa Caterina Petrillo

Per Consiglio Nazionale delle Ricerche

La Presidente prof.ssa Maria Chiara Carrozza

	Per Università degli Studi di Salerno	
	Il Rettore prof. Vincenzo Loia	
	Per Università del Salento	
	Il Rettore prof. Fabio Pollice	
	Per Università degli Studi di Napoli Federico II	
	Il Rettore prof. Matteo Lorito	

Finanziato dall'Unione europea
NextGenerationEU

MUR

Ministero dell'Università e della Ricerca
Direzione generale dell'internazionalizzazione e della comunicazione

Avviso pubblico per la presentazione di proposte progettuali per *"Rafforzamento e creazione di Infrastrutture di Ricerca"* da finanziare nell'ambito del PNRR

Missione 4, *"Istruzione e Ricerca"* - Componente 2, *"Dalla ricerca all'impresa"* -
Linea di investimento 3.1, *"Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione",*
finanziato dall'Unione europea - NextGenerationEU

REFORMS AND INVESTMENTS UNDER THE RECOVERY AND RESILIENCE PLAN
NextGenerationEU

Call for proposals

Intervention field 6: Investment in digital capacities and deployment of advanced technologies
DESI dimension 4: Integration of digital technologies + ad hoc data collections
055 - Other types of ICT infrastructure (including large-scale computer resources/equipment, data centres, sensors and other wireless equipment)

Mission 4 – "Education and Research"
Component 2: from research to business
Investment 3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures
Action 3.1.1 "Creation of new research infrastructures strengthening of existing ones and their networking for Scientific Excellence under Horizon Europe

Annex B

Full Proposal template for 2022CALL_PNRR:M4/C2/L3.1.1 (technical annex), pursuant to Article 9 paragraph 10 of the call for proposals

(To be provided in English only)

Annex B

All information that are requested in this part of this document must be provided ONLY online (https://www.gea.mur.gov.it/Bandi/IR)

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

1 Legal name; Tax code; VAT number, Legal address

Legal Name	*Area Science Park*	Tax code	*00531590321*
VAT number	*00531590321*	Legal address	*Padriciano, 99 99, 34149 TRIESTE TS*

2 Legal representative: personal data and contacts

First Name	*Caterina*	Last Name	*Petrillo*
Gender	*Female*	TAX Code	*PTRCRN60M46L739B*
Birth date	*06/08/1960*	Birth place	*VENTICANO*
Phone number	*0403755202*	e-mail	*presidente.petrillo@areasciencepark.it*

3 Management and reasearch structure

Area Science Park is a public national research organization under the Italian Ministry for Universities and Research and absolute majority shareholder of Elettra Sincrotrone Trieste, the Italian Representing Entity in the European Research Infrastructure Consortium CERIC-ERIC, an "Analytical Research Infrastructure" in the ESFRI Roadmap. Area manages the largest and longest established science park in Italy which hosts a number of national and international research organisations. Area provides open access to its research infrastructures to promote both excellent research and industrial applications and actively collaborates on research projects with other public and private sector partners. Area is at the centre of an ecosystem which favours technological research and innovation and serves as a link between the world of research and industry, transferring research findings to the market, and supporting the creation of new innovative companies providing numerous technical services including: researcher mobility, technology transfer, patent research and advanced training. Cutting-edge equipment and facilities for scientific and industrial research include a laboratory for Genomics and Epigenomics and a state-of-the-art HPC facility devoted to bio-informatic and data science.
Area's President and legal representative, currently Prof. Caterina Petrillo, develops the long-term vision and the strategy to achieve it through identified objectives that are shared with the Scientific and Technical Advisory Board and the Executive Board which approves all initiatives. The General Director, currently Dr. Anna Sirica, oversees all technical, administrative, and financial management and ensures the implementation of the decisions and plans approved by the board. Area has a UNI EN ISO 9001: 2015 certification and is committed to rationalizing procedures and improving information management tools, while ensuring transparency and equal opportunities and preventing corruption.

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

4 Financial Management System

Cost accounting: Area has an analytical accounting system structured at single project level; by appropriate coding all revenues and expenses are assigned to projects, thus enabling financial tracing of the project both in the budget and in the final balance. Furthermore, all transactions (contracts, invoices, payments etc) are marked with codes mandatory for projects (CUP) and tenders (CIG), tracking all financials related to the operation

State Aid

Area has adopted an evaluation procedure of potential State aid within new initiatives that makes possible to classify correctly economic and non-economic activities. All projects are classified as institutional / commercial. In this way economic and non-economic activities are separated allowing separate accounting between activities. This tracking system will be developed also for the new infrastructure, enabling monitoring of costs and revenues referred to economic and non-economic activities.

Document management

Area has digitalised all administrative procedures by setting up information systems for document filing, conservation and sharing. We will develop a specific site for the project where documents and financial data will be collected and stored, with adequate access permissions.

Monitoring and control

The project management site developed as explained above will be shared with the partners and will collect data relevant to monitor procedural, physical and financial progress of the project. On the basis of specific check-lists controls will be carried out on procurement procedures and costs to be reported.

Fraud prevention

Area has adopted a Code of conduct regarding the prevention, detection and correction of fraud, corruption and conflicts of interests which applies to all parties operating within or for Area. Furthermore, there is a triennial Plan regarding prevention of corruption and transparency; specific roles and responsibilities are identified for planning and implementing prevention of corruption

5 Specific skills of the applicant with respect to this proposal

Area is a unique example of multidisciplinary environment for science and innovation services with a rich diversity of expertise, from biotechnology and omic sciences to material science for energy applications. Area has a long standing cooperation with Elettra, FERMI and the ICGEB, framed under the OpenLab project to support research and industrial innovation activities. Area coordinates the national BIO Open Lab project, funded under the PON-Infrastructure scheme and aimed at widening the CERIC-ERIC services and scientific offer by providing integrated access to unique experimental facilities for characterization of bio-materials. With the PRP@CERIC proposal, Area aims at equipping CERIC-ERIC with a highly specialized upgraded platform to offer the scientific community access to a fully digital research infrastructure. The skills of Area specific for a successful managing and implementation of PRP@CERIC proposal are solidly routed into the three years running of BOL project together with a significant number of other initiatives to strengthen the competences in genomics, bio-informatics and data science. A remarkable investment in equipment to complement the BOL project was carried out by Area to expand the potential of the Genomic Lab and the associated Data Center ORFEO. Both the facilities have a robust track record of users, with measurable scientific outcome of their access to the RI and a

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

ORFEO. Both the facilities have a robust track record of users, with measurable scientific outcome of their access to the RI and a demonstrated industrial usage of them. A medium-term plan for maintaining the Area facilities at competitive level by investing in instrumentation, IT capacity and development of novel advanced services is in place. Area is also creating a specialized team to to make the usage of the instrumentation fully digital.
The proven experience of Area in managing technological platforms will help defining a Cooperation Agreement among the partners to ensure long term sustainability of PRP@CERIC for the 10 years following the closing of the project.
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a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

6 Operating Unit(s) (OU(s)) directly involved in the project

6.1 OU [1] - Name, location, and contact person

General Information

OU Short Name	*Padriciano*	OU Name	*Area campus Padriciano*
OU Type	*Centre*		

Address

Region	*Friuli Venezia Giulia*	Province	*TRIESTE*
Municipality	*TRIESTE*	ZIP Code	*34149*
Address	*Padriciano*	Street Number	*99*

Contact Person

First Name	*Stefano*	Last Name	*Cozzini*
Phone number	*393669393969*	e-mail	*stefano.cozzini@areasciencepark.it*

6.2 OU Area campus Padriciano - Scientific-technological expertise and experience

Padriciano campus is the headquarter of Area and contributes to the project providing expertise and competence on knowledge and technology transfer and scientific data management.
Indeed, over the years Area has developed and applied technology transfer and open innovation schemes to several projects and initiatives, which led to a stage-gate approach to open Research Infrastructures to industry, so allowing companies to take full advantage of highly specialised skills and exploit research laboratories to conduct experiments to test or develop their products. Area also has a long long-standing experience in managing intellectual property, with its Patent Information Center (PatLib), which is recognized by the Patent and Trademark Office of the Ministry of Economic Development since 1999. Moreover, Area achieved a considerable experience in European projects' management, often as a coordinator in charge of managing very large and complex partnerships, which allowed the project teams to gain considerable experience in operational and financial management of international initiatives.

Area recently established the Ricerca e Tecnologie (RET) Institute with the mission of developing robust plan to set up and manage Technological and Research Platforms in a fully digital approach. The Platforms are integrated with the RI on the campus and offer access and services to industrial and academic researchers and act as hubs to link

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

the RI on the campus and offer access and services to industrial and academic researchers and act as hubs to link with and to support SMEs and larger companies' innovation programmes.
The RET staff has diverse expertise in several areas of advanced research: data science, data management, NGS and bioinformatics. Research projects are developed in collaboration with partners such as SISSA, ICTP, University of Trieste, several IRCCS andinnovative companies with an excellence track record in AI.
AI research is focused on:
1)inference of structure/function of biological molecules
2)protein design
3)optimization of scientific instruments, in a FAIR-by-design approach.
Moreover, RET manages and makes available to the scientific community several data services, including:
1.dsquared – sharing platform for large data exchange, cybersecurity proofed
2.dcubed – repository for publications and datasets, embedded with a DOI generation service;
3.easydmp – service to prepare Data Management Plans step by step, increasing at the same time awareness and competences of users.
Padriciano Campus also hosts ICGEB, the International Centre for Genetic Engineering and Biotechnology an international, intergovernmental Organization conceived as a centre of excellence for research, training and technology transfer to industry in the field of biotechnology to promote sustainable global development. ICGEB conducts innovative research in life sciences, pharmaceutical and environmental sciences. In 1998 ICGEB realized, at the Padriciano Campus, a Biosafety Level 3 (BSL3) laboratory for the study of infectious pathogen followed in 2008 by the set-up of the first academic laboratory for drug discovery with cutting edge high throughput screening (HTS) instruments. ICGEB makes possible accessing high-end infrastructure and instrumentation for the analysis of infectious pathogens in the most native conformation in their target cell or tissue. The integration of the upgraded BSL3 lab with the ICGEB-HTS laboratory for drug discovery and the implementation of inactivation protocols preserving pathogen biological properties, would represent an asset for PRP@CERIC, being of paramount importance for confronting an emerging epidemic caused by pathogens of unknown impact. A Letter of Intent has been signed between AREA and the ICGEB on the scientific collaboration within PRP@CERIC (see the uploaded document
PRP_Lettera-Intenti-Area-ICGEB-signed)

6 Operating Unit(s) (OU(s)) directly involved in the project

6.1 OU [2] - Name, location, and contact person

General Information

OU Short Name	*Area SUD*	OU Name	*Sede Area Sud c/o Universita' di Salerno*

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

			di Salerno
OU Type	*Centre*		
Address			
Region	*Campania*	Province	*SALERNO*
Municipality	*FISCIANO*	ZIP Code	*84084*
Address	*Via Giovanni Paolo II*	Street Number	*132*
Contact Person			
First Name	*Danilo*	Last Name	*Licastro*
Phone number	*3669393969*	e-mail	*danilo.licastro@areasciencepark.it*

6.2 OU Sede Area Sud c/o Universita' di Salerno - Scientific-technological expertise and experience

In 2019 Area established an Operative Unit in Salerno hosted by the University of Salerno to fulfill the objectives of the BOL project. The initially developed outpost represents now a strategic investment for the upgrade of the CERIC-ERIC by the PRP@CERIC platform. Indeed, a robust plan for upgrading the omics lab in collaboration with the University of Salerno, while integrating the upgraded lab within the data infrastructure, is under development. The proposed upgrade of the Area Unit in Salerno will optimally serve the purposes of the project PRP@CERIC providing an integrated offer of services to the users. It will also represent a reference outpost to consolidate and expand CERIC ERIC RI profile in Southern Italy, contributing to community building on the territory, facilitating user access to European RIs and creating more opportunities for collaborations in international context and European research groups and performing as an attractor site for young researchers. The investment designed for the RI upgrade will secure the Area Operative Unit at Salerno making the returns from the initial BOL-driven asset stable, with a reliable perspective to attain an increase in value over time by a detailed activity plan to be implement during the facility operation phase (over more than 10 years from the present installations).
The reasons behind the chosen instrumental upgrade for the U.O. actually stem from the analysis of the major drawbacks of the existing genomics platform, namely the lack of integration of different automatization steps and a separate handling of omics workflows. Considering the already available installations and competences in metabolomics and proteomics that are present in Salerno, the most promising location to deploy a fully automated robotized system able to integrate multiomics is Salerno University where the labs integration and the upgrade to a Multi-Omics facility will positively affect both sequencing and proteomics workflows. The upgrade will improve the flexibility of the facility toward multiomics preparation capabilities to process different sample matrix with

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

guaranteed library preparation and a high throughput quality control of the results. A multipurpose common workflow will allow the user to integrate Multi-Omics request on the same sample, still allowing the use of the available NGS Platform as readout. Digitalization and remote monitoring of the process will be fundamental for the correct coordination of the AREA SUD and Basovizza OUs to create a common flow and data format.

6 Operating Unit(s) (OU(s)) directly involved in the project

6.1 OU [3] - Name, location, and contact person

General Information

OU Short Name	*Basovizza*	OU Name	*Area campus Basovizza*
OU Type	*Centre*		

Address

Region	*Friuli Venezia Giulia*	Province	*TRIESTE*
Municipality	*TRIESTE*	ZIP Code	*34149*
Address	*Strada Statale 14 - Km 163,5 Basovizza*	Street Number	*145*

Contact Person

First Name	*Danilo*	Last Name	*Licastro*
Phone number	*040375702*	e-mail	*danilo.licastro@areasciencepark.it*

6.2 OU Area campus Basovizza - Scientific-technological expertise and experience

The Basovizza Campus hosts several labs that brings competences and experiences to the project, specifically
a) management of data and HPC infrastructure;
b) genomics and epigenomics lab;
c) Elettra Synchrotron Lab.

AREA maintains the computational infrastructure named ORFEO (Open Research Facility for Epigenomics and Other). ORFEO provides both advanced storage and HPC services; the system is characterized by high flexibility and reconfigurability, which make it efficient in a range of computational applications and artificial intelligence. The

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

and reconfigurability, which make it efficient in a range of computational applications and artificial intelligence. The infrastructure comprise both multicore nodes with high memory and latest generation processors and multigpu machines dedicated to AI/HPC intensive loads. The number of cores is around 2000. The internal connectivity is based on 25Gbit redundant network and 100Gbit InfiniBand network. Total storage capacity is close to 4 Petabytes (PB). The infrastructure is managed by an experienced team that guarantees all advanced IT services.
The Genomics and Epigenomics Platform LAGE organises, integrates and optimises in a single facility the resources, knowledge and experience as a reference centre of national relevance in the field of genomics and epigenomics, promoting synergies between regional, national and international players. The laboratory houses 20 workstations equipped with the necessary tools to prepare and handle samples during sequence processing, like:

- Illumina NovaSeq 6000: flexible, ultra-high throughput DNA sequencing system capable of sequencing up to 20 billion reads per run.
- MiSeqDX: bench parallel sequencing platform to be used both in certified IVD (In Vitro Diagnostic) and RUO (Research Use Only) small throughput analysis
- Oxford nanopore PromethION 24: direct, real-time DNA and RNA sequencing platform for long readings of single molecules
- I7 Beckman automatization for automatic Nucleic acid extraction with onboard spectrophotometer
- I7 Beckman library preparation automatization with onboard thermal cycler and spectrophotometer for a complete automatization of library preparation
- Semi-automated TECAN EVO apparatus for parallel processing of 384 samples for the Infinium.

The laboratory personal is certified as Illumina Propel-Certified Service Provider for Infinium genotyping and for MiSeqDX.
Elettra Sincrotrone Trieste is an international multidisciplinary research center of excellence, founded on the synchrotron and free electron laser facilities for material and life sciences applications. Its mission is to promote cultural, social and economic growth through basic and applied research, technical, scientifical and management education as well as technology and know-how transfer. Elettra received the ISO 9001 and BS OHSAS 18001 certification for the Quality and Safety management System. The analytical tools offered by Elettra in the Life Sciences field range from protein production, purification and crystallization to X-ray diffraction for structure determination, advanced microscopies (AFM, IR, UV and X-Ray), spectroscopies and X-ray microtomography. Users can rely on a wide spectrum of techniques and tools at the Elettra laboratory. Out of the 500 experiments performed at the Elettra facility every year, nearly 30% belong to the Life Sciences area, namely Protein and Macromolecular Crystallography, Life and Medical Sciences and will contribute to the project. For the purpose of PRP@CERIC project, an integrated upgrade of the Structural biology Laboratory, of the NanoInnovation Laboratory for AFM analyses, of the IR beamline SISSI-Bio and of the UVRR beamline IUVS are planned, as well as their expected integration with micro-XRF and micro-XRD beamlines planned in the framework of the of the upgrade of Elettra facility to Elettra 2.0 Diffraction limited Storage Ring. A LoI has been signed between AREA and Elettra on the scientific collaboration within PRP@CERIC (see the uploaded document: PRP_Lettera-Intenti-Area-

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

Elettra on the scientific collaboration within PRP@CERIC (see the uploaded document: PRP_Lettera-Intenti-Area-Elettra-signed)

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

7 National and international collaboration

Open Lab Support Structure (Innovative Materials Open Lab) and Open Lab – A system of Open Research facilities (Biomaterials Open Lab) are two MIUR funded initiatives led by Area in collaboration with CNR, to integrate the technological offer available at Area's major laboratories (Elettra, FEL FERMI, CNR-IOM nanoscience and nanotechnology laboratories, CNR-IC structural biology laboratory) to provide companies with a system of expertise and facilities dedicated to the application of imaging techniques, structural analysis and chemical characterization and with a dedicated channel to submit technical issues or innovation needs.
Area coordinates BIO Open Lab, a MIUR funded project (Action II.1 - National Operative Programme – Research and Innovation 2014-2020) aimed at extending CERIC-ERIC research infrastructure with facilities dedicated to investigations in the field of biological and biomedical research plus a powerful Data Center offering the necessary support for storage, processing and integration of data. The facilities are located by Area (Data Center), University of Salerno (Mass Spectrometry Facility and Data Center) and University of Salento (Holographic Electronic Microscopy – Holo-TEM).

Elettra has a considerable track-record of participation in national and European Projects. At national level an AIRC Grant dedicated to understanding the RecQ4 protein role in cancer development and progression is running. At European level, the EXSCALATE4CoV H2020 project, aimed at identifying active compounds to treat COVID-19 by combining the best supercomputing resources and artificial intelligence with state of the art experimental facilities up through clinical validation, was recently completed. Elettra is also partner of the ISIDORe H2020 project, devoted to control SARS-CoV2 in particular, and epidemic prone pathogens in general, by providing fast access to cutting-edge resources and services in an integrated way.

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

8 Scientific coordinator of project

8.1 Personal data and contacts

First Name	*Stefano*	Last name	*Cozzini*
Gender	*Male*	TAX Code	*czzsfn66d24l378y*
Birth date	*24/04/1966*	Birth place	*TRENTO*
Phone number	*393669393969*	e-mail	*stefano.cozzini@areasciencepark.it*

8.2 Digitally signed CV

(See documents attached)

8.3 Appointment letter as scientific coordinator of the project

(See documents attached)

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

9 Financial Officer in charge of the project

9.1 Personal data and contacts

First Name	*Eva*	Last name	*Vessel*
Gender	*Female*	TAX Code	*VSSVEA63R47L424S*
Birth date	*07/10/1963*	Birth place	*TRIESTE*
Phone number	*040375274*	e-mail	*eva.vessel@areasciencepark.it*

9.2 Digitally signed CV

(See documents attached)

9.3 Appointment letter as scientific coordinator of the project

(See documents attached)

a) APPLICANT

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

10 Manager of the infrastructure as per Article 1 of the call for proposals, provide

10.1 Duties, expected profile and specific requirements

The Infrastructure Manager is responsible for managing the project to successfully accomplish the upgrade of the whole RI. She/he oversees the evolving status of the project and monitors the regular development of the activities planned in WPs, in close cooperation with the Scientific Coordinator and the Units scientific responsible. She/he is responsible of the compliant and timely execution of all the Deliverable, by checking for their preparation and quality. She/he is responsible of the attainment of the intermediate Objectives and she/he is expected to identify technical and managerial problems as early as possible and, in case, to implement the risk mitigation actions foreseen. She/he oversees the organisation financial performance, also proposing and implementing the most appropriate management tools to keep track of all activities and to efficiently coordinate the partners contributions. In cooperation with the financial officer, she/he monitors the accounting procedures and promotes use of coordinated procedures for equipment purchases.
The Infrastructure Manager executes the infrastructure strategy, coordinates the Project Management Board and reports to the Steering Board. The expected profile is a senior manager with proven experience in managing complex infrastructures and systems, control ability of the operational aspects of a high-tech laboratory network integrated and operated within a distributed Research Infrastructure. Specific knowledge and expertise directly related the nature of research being conducted in the facility is an asset. The candidate should have strong leadership and excellent interpersonal skills.

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

11 Legal name; Tax code; VAT number, Legal address

Legal Name	*Consiglio Nazionale per le Ricerche*	Tax code	*80054330586*
VAT number	*02118311006*		

Legal address

Region	*Lazio*	Province	*ROMA*
Municipality	*ROMA*	ZIP Code	*00185*
Address	*Piazzale Aldo Moro*	Street number	*7*

12 Legal representative: personal data and contacts

First name	*Maria Chiara*	Last name	*Carrozza*
Gender	*Female*	TAX Code	*CRRMCH65P56G702V*
Birth date	*16/09/1965*	Birth place	*PISA*
Phone number	*0649933200*	e-mail	*presidenza@cnr.it*

13 Management and research structure

The National Research Council (CNR) is the largest public research institution in Italy, with multidisciplinary competences, acting under the Ministry of University and Research and having legal public-law status as well as scientific, financial, organizational, patrimonial and accounting autonomy. CNR mission is to carry out, promote, transfer, encourage and enhance research in order to apply the results for the scientific, cultural, technological, economic and social development of Italy. It is the first research institution for number of researchers: the staff counts more than 8.000 researchers, technologists, technicians and administrators. CNR structure includes a central administration, 7 scientific Departments and 88 Institutes with specific leading expertise in science/technology sectors, with more than 220 secondary sites and laboratories in Italy and abroad. The Departments are structured in macro-thematic areas, whose task is to be the interface between the CNR' offer and the research demand within the whole Italian economic system and to coordinate the Institutes in the process of expanding their research activities. In some cities Institutes are aggregated within research areas, offering support services and representing a scientific and cultural attraction pole. CNR operates on the basis of its own 3-year activity plan, that sets general guidelines and establishes objectives, priorities, and resources for the entire period, consistent with the National Research Program and with EU research programs. Over the last years and under the coordination of one or more Departments, CNR has consolidated its position, as the

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

research programs. Over the last years and under the coordination of one or more Departments, CNR has consolidated its position, as the main public research organization participating, at national level, in the largest number of Research Infrastructures of national and European interest, included in the ESFRI Roadmap or in the National Research Infrastructure Program, both as lead organization and as participant

14 Financial Management System

From an accounting-administrative point of view, CNR is equipped with a computerized recording and storage system of accounting data through which it is possible to obtain both prints and data extractions: SIGLA is an Integrated System for the Accounting Management that allows the management control (including the flow) of financial resources and aligns the internal accounting management with the reporting criteria of research projects to which CNR participates.
Moreover, in line with the European system and in order to improve the connection within the Public Administration's accounts, CNR adopts in its financial statement the integrated chart of accounts consistent with the provisions of the D.P.R. 4/10/13 n.132. General directives and provisions of Law 6 November 2012 n. 190 are published within the institutional website section "Amministrazione Trasparente", currently being updated to incorporate the changes introduced by Legislative Decree 25 May 2016 n. 97 (GU General Series N. 132 of 08/06/2016). In the specific sub-section "Bandi di gara e contratti", in compliance with the provisions of the law, there are published tender notices and summary tables - made freely available in an open standard digital format - relating to tender award procedures. With regard to the compliance with obligations set out in the Data Protection Regulation 679/2016, CNR has prepared a compliance plan to the law through the appointment of the Data Protection Officer - as well as the creation of register of the Data Controller of data processing activities

15 Specific skills of the applicant with respect to this proposal

The units of CNR that participate to PRP@CERIC, IOM and IC, both with operative units in Trieste, have a long-term experience in the managing of research infrastructures across the fields of physics, material science and biology.
IC shares the management of a synchrotron beam-line dedicated to the structural characterization of matter at many different levels, having a broad application in science and technology. Moreover, IC has runs important biophysical laboratories off-line, which are available to external users.
IOM is the CNR institute that more than any other is dedicated to the creation, development and management of national and international infrastructures open to academic and industrial users. With 7 synchrotron beam lines operated autonomously at Elettra, one beam line at ESRF and two beamlines at ILL, more than 50% of CNR researchers and technologists of IC and IOM deal daily with external users and know how to treat several fundamental issues which range from managing an efficient activity scheduling, keeping the instrumentation operational for the user access, perform the user training, manage the safety regulation and so on. Beside the large scale facility system, several other national and international access project, are running, such as the NFFA project, the Interreg ITA-SLO project nanoregion, the Area Science Park project Open-lab, in which academic and industrial users may request access the off-line

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

laboratory, with a more relaxed schedule and the opportunity of longer collaboration.
Finally, IOM runs several projects in collaboration with private companies, with an interaction ranging from simple service to the joint development of new, jointly patented, technologies. Here the attitude of IC and IOM scientists to deal with the delicate issues of the IP in a professional manner that preserves both the rights of the company and those of CNR is usually highly appreciated

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

16.1 OU [1] - Name, location, and contact person

General Information

OU Short Name	*CNR-IC*	OU Name	*Istituto di Cristallografia – Sede Secondaria di Trieste*
OU Type	*Institute*		

Address

Region	*Friuli Venezia Giulia*	Province	*TRIESTE*
Municipality	*TRIESTE*	Address	*Strada Statale 14 – Km 163,5 Basovizza*
ZIP Code	*34149*	Street Number	-

Contact Person

First name	*Alberto*	Last name	*Cassetta*
Phone number	*0403757525*	e-mail	*alberto.cassetta@ic.cnr.it*

16.2 OU Istituto di Cristallografia – Sede Secondaria di Trieste - Scientific-technological expertise and experience

The Institute of Crystallography (IC) is articulated in four branches located at Bari, Montelibretti (RM), Catania and Trieste with 51 units of personnel devoted to research activities and 24 units of Technical/Administrative personnel. Its main research activities are focused on advanced crystallographic methodology and computing, structural chemistry and biology, study of materials of technological interest such as nano-crystals and quasi-crystals, synthesis and development of molecules of therapeutic interest, development of biosensors for health and agri-food.
The Trieste unit of IC includes five researchers and two technical/administrative personnel and carries out studies in diverse research fields: chemistry, biology and physics. IC research activities are mainly focused on the study of the structure-function relationship by means of different techniques, mostly based on synchrotron radiation, ranging from high resolution single crystal X-ray diffractometry applied to small-molecule as well as biological macromolecules and SAXS analysis of biomacromolecules in solution, but also X-ray grazing incidence and powders diffraction applied to organic and inorganic materials. Due to its specific features, IC includes different expertise and multidisciplinary skills addressed to areas such as nanomedicine, biosciences, structural chemistry and biology, material science, with great potential in terms of both basic and applied science.
IC is a 50% partner, with Elettra - Sincrotrone Trieste, of the XRD1 diffraction beamline for applications in

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

crystallography of biological macromolecules, in structural chemistry and in material science. IC contributes to the technological development of XRD1 and assists users for the realization of numerous national and international projects.
A laboratory for the expression and purification of biological macromolecules is active at IC. The laboratory includes all the facilities for heterologous protein expression in E. coli (PCR, incubators, centrifuges), as well as an Akta PURE FPLC system for protein purification. The activity of the laboratory also includes biochemical and biophysical characterization of macromolecules of biological interest, strongly linked to IC activities in structural biology. A biophysical laboratory is also present, aimed at the accurate and quantitative study of interactions between macromolecules and ligands, to complement the structural information obtained by X-ray diffraction, NMR and SAXS. The laboratory is equipped with an innovative instrument, based on Grating-Coupled Interferometry (Wave, Creoptix) for the accurate determination of both affinities and kinetics of targets-ligands interactions. Furthermore, an Isothermal Titration Calorimeter (ITC200, Malvern) is in use for the accurate determination of the stoichiometry and thermodynamics of the target-ligand interactions. Recently, a plate-reader (Spark, Tecan) has been acquired for the study of protein-ligand interactions by means of fluorescence in a higher throughput perspective. The activity of the laboratory is aimed at both basic and applied science with a special interest on the development of novel therapeutic drugs. In collaboration with Area Science Park, Elettra-Sincrotrone Trieste and CNR-IOM, the laboratory has been active in the context of the OpenLab2 project. In strong collaboration with Univeristà di Trieste, IC is also involved in the synthesis, characterization and development of antimicrobic peptides with potentials in antibacterial therapy.

16.1 OU [2] - Name, location, and contact person

General Information

OU Short Name	*CNR-IOM*	OU Name	*Istituto Officina dei Materiali del CNR*
OU Type	*Institute*		

Address

Region	*Friuli Venezia Giulia*	Province	*TRIESTE*
Municipality	*TRIESTE*	Address	*Strada Statale 14 – Km 163,5 Basovizza*
ZIP Code	*34149*	Street Number	-

Contact Person

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

First name	*Marco*	Last name	*Lazzarino*
Phone number	*0403756434*	e-mail	*lazzarino@iom.cnr.it*

16.2 OU Istituto Officina dei Materiali del CNR - Scientific-technological expertise and experience

CNR-IOM contributes to the PRP@CERIC proposal in WP4 and it is in charge of the installation and management of the CryoEM . CNR-IOM actually runs a TEM for materials, two SEM, one of which dedicated to electron beam lithography, and one FIB/SEM system recently equipped with a cryogenic station for plunge freezing, sample transfer and cryogenic operation. Finally, 6 fluorescence microscopes, some coupled with AFM, optical tweezer or live cell imaging, are currently operated at CNR-IOM. The optical/AFM microscopy lab and the Cryo-FIB/SEM area part of the Area science park open -lab system and are therefore open to the external users. 5 scientists and one technician perform biophysical investigation using a combined biophysics/microscopy/ nanotechnology and nanofabrication based approach. Several medical issues have been tackled in recent years, in collaboration with medical partners and hospitals, Burlo Garofalo, Cro-Aviano and Ospedale di Udine among others. A particularly important partner in the field of pathogens is Alifax S.r.l., a multinational company world leader in the field in diagnostic devices for bacterial and viral infections. Together with Alifax CNR-IOM investigated and patented innovative methodology to identify and enumerate the pathogens responsible of severe infections in the body fluids, blood and urine among others, and we are studying alternative strategies to selectively inactivate viruses of the corona family.
Finally the microscopy activities have been offered to the local entrepreneurial system through the Interreg ITA-SLO project "nanoregion", a project aimed at opening the research centers to the SME located in the project program area, to foster their technological transition and supporting their growth, with a significant success witnessed by more than 30 activities already concluded or planned in the next months.

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

17 National and International collaboration

Extra-EU

University of Colorado Denver | Anschutz Medical Campus, Division of Cardiology, USA

ICGEB Regional Research Centre, China Medical City, Taizhou, China

Molecular Foundry, Imaging and Manipulation of Nanostructures Berkeley, USA

Molecular Foundry, Nanofabrication Facility, Berkeley, USA

University of Rochester Medical, Center, NY, USA

Europe

National Chemistry Institute, Department of Biomolecular Structure, Ljubliana, SLO

University of Ljubliana, Faculty of Medicine, Department of Biochemistry, SLO

Institute Jozef Stefan, Ljubliana, SLO

University of Nova Gorica, Material Research Laboratory, SLO

University of Maribor, Institute of Material Technology, SLO

University of Rjieka, Department of Biotechnology, HR

Helsinki University, Department of Food and Nutrition, SF

Hungarian Academy of Sciences, Biological Research Center, Szeged, HU

TU-Graz, Institute of Solid State Physics, AT

University of Bristol, Bristol Medical School, UK

University of Zurich, departmen of Physics, CH

Max Planck Institute for Medical Research, Heidelberg, DE

Center for Genomic Regulation, Barcelona, Spain

Institute for Research in Biomedicine, Bellinzona, CH

EPFL, Institut des sciences et ingénierie chimiques, Lausanne, CH

TU Munich, Department of Chemistry, DE

EMBL, Grenoble, FR

Italy

Fondazione EBRI "Rita Levi-Montalcini", Roma

Scuola Normale Superiore, Laboratorio di Biologia, Pisa

Scuola Normale Superiore, Laboratorio NEST, Pisa

Università di Udine, Dipartimento di Scienze agroalimentari, ambientali e animali

Università di Udine, Istituto di Anatomia Patologica

IRCSS Burlo Garofalo, Trieste

IRCSS CRO, Aviano, Pordenone

CNR-Nanotec, S.Li.M Lab@Rome, Roma

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

Fondazione Santa Lucia IRCCS, Roma
CNR- SCITEC - Istituto di scienze e tecnologie chimiche "Giulio Natta", Roma
SISSA, neurobiology department, Trieste
University of Florence, Dipartimento di Biologia
Università di Pavia e Ospedale San Matteo di Pavia
IRCSS, Istituto Nazionale dei Tumori

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

18 Principal investigator for the co-applicant

18.1 Personal data and contacts

First Name	*Marco*	Last name	*Lazzarino*
Gender	*Male*	TAX Code	*LZZMRC66D18I480S*
Birth date	*18/04/1966*	Birth place	*SAVONA*
Phone number	*0403756434*	e-mail	*lazzarino@iom.cnr.it*

18.2 Digitally signed CV

(See documents uploaded)

18.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Consiglio Nazionale per le Ricerche

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

19 Administrative contact for the co-applicant

19.1 Personal data and contacts

First Name	*Martina*	Last name	*Centazzo*
Gender	*Female*	TAX Code	*CNTMTN69T53L424W*
Birth date	*13/12/1969*	Birth place	*TRIESTE*
Phone number	*0403756447*	e-mail	*martina.centazzo@cnr.it*

19.2 Digitally signed CV

(See documents uploaded)

19.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

11 Legal name; Tax code; VAT number, Legal address

Legal Name	*Università degli Studi di Salerno*	Tax code	*80018670655*
VAT number	*0851300657*		

Legal address

Region	*Campania*	Province	*SALERNO*
Municipality	*FISCIANO*	ZIP Code	*84084*
Address	*Via Via Giovanni Paolo II*	Street number	*132*

12 Legal representative: personal data and contacts

First name	*Vincenzo*	Last name	*Loia*
Gender	*Male*	TAX Code	*LOIVCN61T16G902Y*
Birth date	*16/12/1961*	Birth place	*PORTICI*
Phone number	*089966239*	e-mail	*rettore@unisa.it*

13 Management and research structure

The administration of the University of Salerno has a functional structure, based on the division of work for competence in specialized offices. The central administration offices are grouped in homogenous areas headed by general direction. As support to the department, for each of the 17 departments, there are corresponding offices for didactics and post-academic formation. For the support to research and economic areas the departments are joined in six districts that are guided by relative research office for contracts and accounting. All the offices that belong to departments are functionally linked to the general direction. Starting from the project proposal, the general direction will guide all the offices involved in the project, if approved.

The research structures involved in the current project will be the DIFARMA (Pharmacy) department and DIEM – Department of Information and Electrical engineering and Applied Mathematics.
The DIFARMA department promotes and carries out basic and applied research in all disciplines aimed at discovering and developing new drugs, innovative therapeutic and diagnostic strategies for numerous pathologies, with advanced approaches such as omic-based.
The DIEM department has a strong multidisciplinary characterization, where experiences and skills in basic, methodological and

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

The DIEM department has a strong multidisciplinary characterization, where experiences and skills in basic, methodological and application sectors converge in engineering contexts oriented towards analysis, modelling, design simulation, realization and optimization of complex components and systems, aimed at applications in the fields of information and knowledge technologies.

14 Financial Management System

The management activity of the projects will be guided by the central administration by adopting an organization model which will not change the existing setup. The roles and functions will be independently guided by the relative competence areas. The administrative role is to introduce the element of flexibility for the project management by promoting target sharing and by facilitating the relationship and communication between different resources. The responsibility of control is of mixed type: single representatives for each area (central administration and scientific OU referent), administrative referent, scientific referent for the project implementation and for the contacts with the leading partner. The management structure foresees, aside to scientific referents of OU, the referents for: special projects, legal and contracts, business and budget, technological and patrimony. The expertise of the academia coming from multiple years in the management of projects of infrastructural expansion, with EU funds, are in line with the project expectations.

15 Specific skills of the applicant with respect to this proposal

DIFARMA research lines based on omics sciences are demonstrated by the papers and patents of the participants. DIFARMA has both skills and facilities to perform multi-omic analyses, with a specific expertise in the field of LC-MS and GC-MS techniques, which led to a close relationship with the industry, resulting in the development of a GC-MS method for the early diagnosis of endometrial carcinoma (Troisi, J., Scala, G., Campiglia, P., Zullo, F., Guide, M.: WO2016135119 (A1) - METHOD FOR THE DIAGNOSIS OF ENDOMETRIAL CARCINOMA), which is currently in the final phase of clinical validation in collaboration with the IRCCS National Cancer Institute "Fondazione G. Pascale" of Naples. DIFARMA comprises a large group of researchers that collaborate with companies through research contracts, consultancy and third-party services. DIFARMA researchers participates in 3 spin-offs: Immunepharma (http://www.immunepharma.it/), LGV1-Longevity One (http://www.lgv1.bio/4/), and Theoreo (http://www.theoreosrl.com/). The usability of the upgraded infrastructure will be guaranteed through the assignment of personnel coming from the DIFARMA organizational chart.

The research group that will be involved in the project work from more than 30 years in the area of artificial intelligence and its application for image analysis especially medical ones like ultrasound, PET, TAC, RMI, radiography. We developed new AI models for classification and interpretation of HEP2 cells images, mammography for breast cancer identification, for covid-19 variant and primer

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

identification from whole DNA sequence. The research group involved in PRP@CERIC have also organized two international challenges (context) for benchmarking AI solutions for automatic HEP2 cells classification.

The DIEM, has recently created AI4Health srl spin-off and in 2010 the AITech srl company, that in 2018, has been awarded by InsightSuccess among the most 10 innovative Artificial Intelligence solutions provider.

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

16.1 OU [1] - Name, location, and contact person

General Information

OU Short Name	*DIFARMA*	OU Name	*Department of Pharmacy (DIFARMA)*
OU Type	*Department*		

Address

Region	*Campania*	Province	*SALERNO*
Municipality	*FISCIANO*	Address	*Via Giovanni Paolo II*
ZIP Code	*84084*	Street Number	*132*

Contact Person

First name	*Pietro*	Last name	*Campiglia*
Phone number	*089969398*	e-mail	*pcampiglia@unisa.it*

16.2 OU Department of Pharmacy (DIFARMA) - Scientific-technological expertise and experience

The scientific-technological expertise of DIFARMA-UNISA is based on a widespread structure dedicated to research and development. The expertise is attested with a portfolio of knowledge, experience, instrumentation and qualified personell, together with excellence centres that belong to life science and thanks to previous involvment in similar R&S projects. During the last 10 years, the members of the proposing group have coordinated several projects involving more than 250 researchers from both Academia and Industrial partners. Such projects have led to a concreate advance in terms of know-how acquired by the participating researches, with particular reference to the project such as EU and Italian competitive calls:

- POR FESR CAMPANIA 2014/2020 "Fighting Cancer resistance: Multidisciplinary

integrated Platform for a technological Innvovative Approach to Oncotherapies

(Campania Oncotherapies)" (> 15.800 K€). Multipartner Project, Number of Partner: 23 Number of researchers 45.

- POR FESR CAMPANIA 2014/2020 "Precision Medine Infrastructure for Oncology

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

(PREMIO)" (> 20 K€). Multipartner Project, Number of Partner: 23.

- PON 2014-2020: BIO OPEN LAB (https://www.areasciencepark.it/projects/bio-open-lab/).

DIFARMA-UNISA will make available to the project the following skills: 1) Omics-based diagnostics and prognostics activity, supported by a state of the art 200 m2 multi-laboratory (Bio Open Lab MSI) infrastructure with a specific expertise in mass spectrometry (LC-MS, MALDI-MSI, GC-MS) based multi-omics, 2) Omics-driven drug-discovery and advanced pharmacokinetics (ADMET) capabilities. The lab is equipped with state-of-the-art instrumentation which allows to analyze polar metabolites, lipids, proteins (both bottom-up and top-down) as well as spatial metabolomics by MALDI-Imaging, together with a complete sample preparation platform for multi-omics. The available instrumentation is: Thermo Scientific Orbitrap Fusion Lumos, with nanoLC and Proteome discoverer software, Bruker TIMS-TOFpro with UHPLC and Metaboscape software for metabolomics and lipidomics analysis, Bruker Tissuetyper (MALDI-TOF-TOF) with SCILS software, Shimadzu LCMS-8050 (QqQ) with UHPLC, Agilent 5977b GCMS (Q). The platform is capable to perform multi-omics analyses on cell, biofluids and tissues with a current capability of 20.000 samples/year. In addition, DIFARMA possesses other cutting-edge MS platofrm such aBruker SolariX XR FT-ICR ESI/MALDI, Thermo Q-Exactive with UHPLC and nanoLC, SCIEX QTRAP6500 with UHPLC, Shimadzu LCMS8050 with UHPLC.

16.1 OU [2] - Name, location, and contact person

General Information

OU Short Name	*DIEM*	OU Name	*Department of Information and Electrical engineering and Applied Mathematics (DIEM*
OU Type	*Department*		

Address

Region	*Campania*	Province	*SALERNO*
Municipality	*FISCIANO*	Address	*Via Giovanni Paolo II*
ZIP Code	*84084*	Street Number	*132*

Contact Person

First name	*Pierluigi*	Last name	*Ritrovato*

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

Phone number *089964289* e-mail *pritrovato@unisa.it*

16.2 OU Department of Information and Electrical engineering and Applied Mathematics (DIEM - Scientific-technological expertise and experience

The researchers involved in the project have more than 30 years of experience in the AI field, with active participation in several national and international associations such as the IAPR – International Association of Pattern Recognition, AIIA -Associazione Italiana di Intelligenza Artificiale. Moreover, DIEM is the coordinator of the UNISA CINI laboratory of Artificial Intelligence and intelligent systems.
The members of the research group involved in the project have a strong experience in managing and collaborate in research projects. Among the most relevant projects we can mention:
Innovative Care with Intelligent Ambient (I-CARE.ME)", funded by MUR under the PNR 2015-2020 call, specialisation area 12 technologies for life, grant number ARS01_00707.
FELICE- FlExible assembLy manufacturIng with human-robot Collaboration and digital twin modEls, Funded by EU in the area of Artificial Intelligence for Robotics, Grant agreement ID: 101017151;
MIUR PRIN 2017 Project 20172BH297 002, entitled: I-MALL: improving the customer experience in stores by intelligent computer vision.
PERMEDNET - "PERSONALIZED MEDICINE FOR INNOVATIVE STRATEGIES IN NEUROPSYCHIATRIC AND VASCULAR DISEASES", funded by MUR under the PNR 2015-2020 call, specialisation area Health;
RarePlatNet - Diagnostic and therapeutic innovations for rare neuroendocrine, endocrine tumors and glioblastoma by an integrated technological platform of clinical, molecular, genomic, ICT, pharmacological and pharmaceutical expertise, funded by Regione Campania, under the competitive call for the Technology Platform for fighting tumors.

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

17 National and International collaboration

DIFARMA has numerous collaborations with both Academia and industrial partners. In particular several PhD exchange with centers of excellence in the omic sciences have been activated such as with Max Planck institute of Biochemistry, Munich Germany (Prof. M. Mann), Department of Pharmaceutical Biosciences, Research; Medical Mass Spectrometry, University of Uppsala, Sweden (Prof. P.E. Andren); Institute de Biologie Moleculaire des Plants (IBMP-CNRS) Strasbourg, France (Prof. Dimitri Heintz).

Several projects with different Universities are active such as: University of Turku- Finland, "Optimisation of nano-encapsulation of microalgae oil for food fortification: Encapsulation efficiency, oxidative stability and sensory"; Universidad de Santiago de Compostela – Spain Departamento de Farmacología, Farmacia y Tecnología Farmacéutica, USC, ERASMUS ISCED 727, Project "3D-printing of biodegradable polymers for scaffolds production and drug delivery systems"; "Development of joint Projects on aerogels for Life Science"; University Claude Bernard Lyon 1 – France, "Design and development of novel drug delivery nanosystems to overcome physiological barriers for the treatment of various diseases"; CA18125 - Advanced Engineering and Research of aeroGels for Environment and Life Sciences (AERoGELS); MP1404 - Simulation and pharmaceutical technologies for advanced patient-tailored inhaled medicines (SimInhale); CA15135 - Multi-target paradigm for innovative ligand identification in the drug discovery process (MuTaLig); CA15126 - Between Atom and Cell: Integrating Molecular Biophysics Approaches for Biology and Healthcare (MOBIEU);

DIEM has several international collaborations in the area of AI for image and medical/clinical data analysis and interpretation as the prestigious Ensicaen engineering schools, Wien University, Universitat Rovira i Virgili in Taragona, University of Groningen, Universitat Politecnica de Catalunia, university of Queensland - Australia.

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

18 Principal investigator for the co-applicant

18.1 Personal data and contacts

First Name	*Pietro*	Last name	*Campiglia*
Gender	*Male*	TAX Code	*CMPPTR75P09G793V*
Birth date	*09/09/1975*	Birth place	*POLLA*
Phone number	*089969398*	e-mail	*pcampiglia@unisa.it*

18.2 Digitally signed CV

(See documents uploaded)

18.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi di Salerno

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

19 Administrative contact for the co-applicant

19.1 Personal data and contacts

First Name	*Chiara*	Last name	*Turco*
Gender	*Female*	TAX Code	*TRCCHR62C70A509G*
Birth date	*30/03/1962*	Birth place	*AVELLINO*
Phone number	*3989966040*	e-mail	*cturco@unisa.it*

19.2 Digitally signed CV

(See documents uploaded)

19.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

11 Legal name; Tax code; VAT number, Legal address

Legal Name	*Università degli Studi del Salento*	Tax code	*80008870752*
VAT number	*00646640755*		

Legal address

Region	*Puglia*	Province	*LECCE*
Municipality	*LECCE*	ZIP Code	*73100*
Address	*Piazza Tancredi*	Street number	*7*

12 Legal representative: personal data and contacts

First name	*Fabio*	Last name	*Pollice*
Gender	*Male*	TAX Code	*PLLFBA66S23F839J*
Birth date	*23/11/1966*	Birth place	*NAPOLI*
Phone number	*0832292205*	e-mail	*rettore@unisalento.it*

13 Management and research structure

The University of Salento is a research university that aims to develop both basic and applied research. The research activity is managed by the departments, consortia and technological districts in which the University of Salento is involved. The University of Salento has set up an office called "Fund Raising and Valorisation of Research" which is responsible for identifying funding opportunities from public or private funds and for organising partnerships for participation in national and international calls for proposals. It supports users in improving intellectual property by assessing and indicating the best strategy for protecting inventive results. The research and development structure supporting this project consists of a network of research laboratories located on the Science and Technology Campus. The project activities will be carried out in synergy between different research groups and laboratories belonging to the Department of Mathematics and Physics (MATFIS) "Ennio De Giorgi" as co-proponent unit. The infrastructure will be located at the Department of Mathematics and Physics "Ennio De Giorgi". The Department is engaged in numerous collaborations with national and international universities and research centres, with national and local companies, multinationals and with consortia of the University of Salento. Particularly relevant are the relationships that the Department has been able to establish with local authorities and with the productive system of the territory, succeeding in providing scientific and technological solutions to concrete needs for innovation, technology transfer and services in different

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

succeeding in providing scientific and technological solutions to concrete needs for innovation, technology transfer and services in different application sectors

14 Financial Management System

The financial management of project will be allocated to the MATFIS Department Administration with the management support of the Project Management and Fund Raising Area of the UniSalento and the administrative personnel of Fund Raising and Research Enhancement Office.
The chosen management structure is suitable to respond to the specific requirements of the call and the project specifications as the offices and skills of involved personnel have many years of experience in the field of project management financed by the European Union and Italian Ministry of Research (MUR), in particular those related to infrastructure development, traditionally managed within the central administration.
The Financial Management System has already collaborated with the project applicant management system in a collaborative and fruitful operational pipeline, solving complex administrative procedural questions and issues.
In particular, the administration will support the scientific managers in the management and reporting of the project, taking care in particular of :
-performance, transparency and anti-corruption requirements;
-the preparation of tender procedures for the project
- relations with the National Anti-Corruption Authority in relation to the request for the CIG (Tender Identification Code) and the checks provided for by the regulations in force.
The management structure makes use of the single University information system for the management and reporting of all types of UniSalento projects.
In the framework of PNRR and Italian MUR related calls, University of Salento has appointed a general manager to supervise all the projects submission and implementation procedures.

15 Specific skills of the applicant with respect to this proposal

Two research groups will support the project activities, the Quantum & Bio Technology Group (QuBiT-Group) with the Laboratory of Nanomedicine, Nanobioelectronics and Nanobiotechnology (NNN) (Prof. R. Rinaldi) and the Applied Physics Group (APG) with CEDAD (CEnter of Applied Physics) laboratories (Prof. L. Calcagnile).
Specific skills of the NNN Laboratory are: 1)Nanolithography, soft lithography and surface functionalisation 2) Design and development of new prototypes of molecular and biomolecular electronic devices, Nanobiosensors, Lab-on-chips; 3) Scanning probe microscopy and spectroscopy of single molecules, cells and molecular monolayers and crystals; 4) Intelligent drug delivery and targeted therapy; 5) Design and bioengineering of polymeric scaffolds for tissue engineering and regenerative medicine; 6) Fluorescence, phosphorescence, Raman and micro-nano-fluorescence studies of biological species; 7) Study of linear and non-linear optical properties of

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

fluorescent molecules, polymers and nanocrystals and 8) new methods for studying structural, chemical, electronic and magnetic properties of matter by optical and electron microscopy.

The CEDAD laboratories will support the research activities of the project by providing expertise and technological know-how for the analysis of materials for biological and life science applications. The APG has a well-established expertise in the field of ultrasensitive isotope mass spectrometry, accelerator physics and technology, accelerator-based analytical techniques, electron microscopy, applications to biomedicine, development of theoretical models for medical and biological sciences, synthesis of functionalized plasmon resonance nanostructures, development of biomarkers optical sensors for the detection of disease states in cellular systems, study of lipid and polymer-based nanocarriers for the controlled release of drugs, structural and spectroscopical analysis of supramolecular architecture of bacterial membranes.

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

16.1 OU [1] - Name, location, and contact person

General Information

OU Short Name	*UniSalento*	OU Name	*Department of Mathematics and Physics "Ennio De Giorgi"*
OU Type	*Department*		

Address

Region	*Puglia*	Province	*LECCE*
Municipality	*LECCE*	Address	*Via per Arnesano*
ZIP Code	*73100*	Street Number	-

Contact Person

First name	*Tonia*	Last name	*Romano*
Phone number	*0832297463*	e-mail	*tonia.romano@unisalento.it*

16.2 OU Department of Mathematics and Physics "Ennio De Giorgi" - Scientific-technological expertise and experience

The Laboratory of Nanomedicine, Nanobioelectronics and Nanobiotechnology consists of an interdisciplinary structure with NanoTechnology and NanoScience competences for research and technology at the nanoscale applied to life sciences, medicine and food and environmental safety. The Laboratory's mission is focused on the implementation and management of research activities and projects that exploit the synergy between new materials and nanotechnologies and nanobioelectronic devices and systems with the field of human health. In addition, the Laboratory is the seat of the Regional "Facility" Network of Laboratories "NaBiDiT - Nano- Biotechnological methods for innovative Diagnostics and Therapy", under the scientific direction of Prof. Rinaldi. The Laboratory has managed several industrial R&D projects for the implementation of functional and intelligent nano-devices for biomedical applications and advanced diagnostics.

The centre currently has about 250 sq.m. of laboratories, aiming at developing new concepts and new nano-systems, exploiting both bottom-up (self-assembly and molecular engineering for hybrid organic/inorganic systems) and top-down approaches (state-of-the-art lithography techniques applied to organic and inorganic nanostructures). Great attention is devoted to the technological and applicative potential of the research carried out on new materials, processes, devices, architectures and instrumentation.

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

The Applied Physics Group, group leader prof. Lucio Calcagnile, carries out researches in the field of Physics applied to Biology, Environmental Sciences and Medicine. The APG coordinates the activities of different laboratories of CEDAD, the Centre for Applied Physics and Diagnostics which consists of 10 laboratories including the Tandetron accelerator laboratory, the chemical laboratories for accelerator mass spectrometry and isotope analysis, the electron microscopy laboratories, the laboratory of biomedical physics and environment. The CEDAD laboratories occupies a total area of 1800 sq.m. The AMS facility at CEDAD is a well-established research infrastructure at the national and international level. The facility hosts also the chemical processing laboratories where several classes of biological materials are routinely prepared to be submitted to isotope analyses. The facility is also equipped with a new type of hybrid ion source which, connected to an IRMS and the AMS system, allows the simultaneous determination of both radioactive and stable carbon isotopes in samples of mass as low as microgram. The APG has expertise in morphological and structural characterization by TEM/SEM, has developed nanoscale characterization methodologies such as nano-scattering for studying the structure of organic and inorganic materials, high-resolution imaging. Researchers have expertise in investigation methods through the combined use of microscopy and molecular spectroscopy techniques aimed at understanding the processes of interaction between membrane proteins and metal ions in neoplastic alterations. The APG is involved in research programs aimed at identifying protein patterns or individual peptides as biomarkers for early diagnosis.

In 2019 the two groups had funding form Italian MUR, in the framework of PON Research 2014-2020 , for the implementation of an infrastructure called BIO OPEN LAB. The implemented infrastructure is located in a 200 square meter lab and is composed by a CRYO_TEM Jeol NEOARM JEM-ARM200F. The facility intends to develop a system to support basic life science studies and investigation, ideally encompassing the pathway to knowledge of the individual molecular actor (protein or metabolite), starting from its structural analysis by means of structural biology and cellular biology experiments with a plethora of electron microscopy and spectroscopy techniques in cross-correlation the state of the art methodologies for nano-optical spectroscopy and morpho-mechanical single cell investigation

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

17 National and International collaboration

Both the research groups at the University of Salento have consolidated and well established connections and research collaborations with different institutes and groups both at the National and International levels on their respective expertise areas, among which the Institute for Materials Science and Max Bergmann Centre of Biomaterials, Prof. Giovanni Cuniberti - Dresden University of Technology (Germany), the Institute for Biophysics, Department of Nanobiotechnology, Prof J.L Toca Herrera, University of Natural Resources and Life Sciences (BOKU), Vienna (Austria), the Institute for Bioengineering of Catalonia (IBEC)- Molecular Bionics group - Prof Giuseppe Battaglia, Barcelona (Spain), the Department of Cell Biology and Histology, Faculty of Biology, Regional Campus of International Excellence "Campus Mare Nostrum", University of Murcia, Murcia (Spain), the Laboratory of Ion Beam Physics- ETH-Swiss Federal Institute of Technology, Zurich (CH), the Institute of Nuclear Research of the Hungarian Academy of Sciences (ATOMKI), Debrecen (Hungary), the Lebniz Laboratory for Isotope analyses, University of Kiel(Germany), and the High Voltage Engineering Europa BV, Amersfoort (The Netherlands).
Different collaborations within research projects and joint experiments have been established for several years with Universities and public and private research centres at National levels, as evidenced by the scientific publications of the two groups

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

18 Principal investigator for the co-applicant

18.1 Personal data and contacts

First Name	*Rosaria*	Last name	*Rinaldi*
Gender	*Female*	TAX Code	*RNLRSR68C68L049F*
Birth date	*28/03/1968*	Birth place	*TARANTO*
Phone number	*393385723293*	e-mail	*ross.rinaldi@unisalento.it*

18.2 Digitally signed CV

(See documents uploaded)

18.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi del Salento

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

19 Administrative contact for the co-applicant

19.1 Personal data and contacts

First Name	*Patrizia*	Last name	*Villani*
Gender	*Female*	TAX Code	*VLLPRZ70A43I950H*
Birth date	*03/01/1970*	Birth place	*STERNATIA*
Phone number	*0832297936*	e-mail	*patrizia.villani@unisalento.it*

19.2 Digitally signed CV

(See documents uploaded)

19.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

11 Legal name; Tax code; VAT number, Legal address

Legal Name	*Università degli Studi di Napoli Federico II*	Tax code	*00876220633*
VAT number	*00876220633*		

Legal address

Region	*Campania*	Province	*NAPOLI*
Municipality	*NAPOLI*	ZIP Code	*80138*
Address	*Corso Umberto I*	Street number	*40*

12 Legal representative: personal data and contacts

First name	*Matteo*	Last name	*Lorito*
Gender	*Male*	TAX Code	*LRTMTT61C08H703V*
Birth date	*08/03/1961*	Birth place	*SALERNO*
Phone number	*390812537003*	e-mail	*rettore@unina.it*

13 Management and research structure

The University is articulated in 4 Schools and 26 Departments, the latter mainly responsible for organizing and supporting the research activity. It also has 23 interdepartmental centers and 17 inter-university centers, useful for enhancing collaborations and interdisciplinarity.

Chief executive of the University is the Rector, who promotes all the main policies of the University, including the research policies, and is responsible for their actual implementation. The regulation and ultimate decision power is vested in the Academic Senate and the Board of Governors, two collegial bodies which elaborate the development strategies of the University, including in the area of research. The Rector also appointed a group of research delegates and a coordinating delegate for research, who are charged with supporting the Rector in his duties in the area of research, in close collaboration with the administrative structures responsible for the delegated matters.

Other research-related bodies are the University "Task Forces", which coordinate and promote interdisciplinary research collaborations to achieve interdepartmental synergies.

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

achieve interdepartmental synergies.

At the Department level, a key role in the management of research is that of the Department Directors, who promote and coordinate research and teaching activities of all groups and faculty members, while respecting the academic freedom of all individuals and their right to seeking direct access to research funding.

14 Financial Management System

The University Director-General, the Board of Auditors and the Board of Governors are the main University bodies responsible for the financial management of the University. While the Director-General is the chief administration officer, responsible for the overall management of all services, instrumental resources and administrative technical personnel, the other bodies collaborate to ensure effective economic and financial management. The Board of Auditors, in particular, is responsible for compliance to National financial regulations, while the Board of Governors has ultimate decision-making responsibility.

The current financial management system complies with the relevant European legislation. In particular, it is pursuant to the provisions set out in point 20 of the Communication from the Commission 2014/C198/01 and the provisions of Article 71 of Regulation (EU) no. 1303/2013, and with the inter-ministerial Decree No. 18/2012 and Ministerial Decree 19/2014.

Using the current financial management system, the University of Naples Federico II will maintain a separate accounting system for all transactions relating to the financed activity and will make all documents available for inspection. The University will provide information on the onset and completion of operations and all data required for the purpose of monitoring activities.

The University of Naples Federico II manages assets, income and expenses using the Cineca Consortium's Information-Technology support. In fact, Cineca provides software applications to manage the financial management process reducing accounting errors, maintaining audit trails and ensuring compliance with applicable accounting standards.

15 Specific skills of the applicant with respect to this proposal

The Bioelectronics task force at Federico II collects 12 Departments of the University in the area of basic science, engineering, biology, veterinary, agriculture and medicine. These areas carry different expertise in analytical, functional and biomedical research areas allowing a full coverage of those activity required by the contribution of the co-proponent to the proposal. In detail Thermal Analysis Laboratory (DSC, TGA); 1) X-ray Diffraction Laboratory (diffractometer for single crystals, diffractometers for polymer fibers, high angle diffractometer for powder and low angle diffractometer); Laboratory of Nuclear Magnetic Resonance Spectroscopy (NMR); 4) Electronic Paramagnetic Resonance Spectroscopy (EPR) Laboratory; Optical Spectroscopy Laboratory; Raman Spectroscopy and Infrared Spectroscopy (FTIR) laboratory; Microscopy Laboratory (Optical Microscopy and Atomic Force Microscopy - AFM); Mass

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

Spectrometry Laboratory; Laboratory of Molecular Characterization of Polymers (Viscosimetry, GPC, Fractionation of Polymers) Laboratory of Characterization of Mechanical Properties of Materials; Surface and Nanostructures Engineering Laboratory; Pest control applications; OLED equipped greenhouses; medical laboratory at biosafety level 1;
The activities in the field of bioelectronics and organic electronics produced high rated papers (Impact of Eumelanin-PEDOT Blending: Increased PEDOT Crystalline Order and Packing-Conductivity Relationship in Ternary PEDOT:PSS:Eumelanin Thin Films, Advanced Electronic Materials 2019-03-03;
DOI: 10.1002/aelm.201800585; Stem cell-compatible eumelanin biointerface fabricated by chemically controlled solid state polymerization Materials Horizons, 2015 DOI: 10.1039/c4mh00097h) and patents M.V. Volpe; A. Cimmino; A. Pezzella; A. Palma; US Patent (US7842826-2010)
Collaboration with top companies in the field such as ST-microelectronics, FOSgroup, GVS, are carried on by several researchers within the Task Force.

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

16.1 OU [1] - Name, location, and contact person

General Information

OU Short Name	*UniNapoli*	OU Name	*Bioelectronics Task Force at University of Naples Federico II*
OU Type	*Laboratory*		

Address

Region	*Campania*	Province	*NAPOLI*
Municipality	*NAPOLI*	Address	*Corso Umberto I*
ZIP Code	*80138*	Street Number	*40*

Contact Person

First name	*Alessandro*	Last name	*Pezzella*
Phone number	*081674130*	e-mail	*alessandro.pezzella@unina.it*

16.2 OU Bioelectronics Task Force at University of Naples Federico II - Scientific-technological expertise and experience

The Laboratory of Bioelectronics consists of a collection of interdisciplinary facilities integrating material characterization tools and biomedical equipments. The development, fabrication and functional tests of new materials focusing on biocompatibility and sustainability are carried out integrating resource form the nuclear magnetic resonance laboratory, electron microscopy facilities, LC and MALDi mass spectrometry. Biointerfaces and devices are produced using standard spin coating tools, as well as electrospinning equipments and tested in working condition using ad hoc modified confocal microscope. Recently achievements allowed to gain Italian and international funding under thas listed below:

• 2010-2013; MISE peer reviewed grant n. E10/000798/02/X (cost:640 K€, MISE funded 320 K€) for design and production of heparin requesting nanostructured devices for biomedical applications.

• 2016-2018 MISE peer reviewed grant n. F/050380/01-02-03/X (cost 760 K€, MISE funded 360 K€) for the desgin and fabrication of smart blood transfusion filters.

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

• 2019-2021 Italian National Agency for New Technologies, Energy and Sustainable Economic Development peer reviewed grant n. 11047 del 22.05.2020, (90 K€ funded) for the design and experimentation of innovative deposition / forming processes of new organic thermoelectric materials ".

• 2013- 2016 Novel conducting polymer composites for applications in medicine. MARIE CURIE FP7 People Programme (IRSES) PIRSES-GA-2013-612538 "Polymed". Local coordinator for the University of Naples Federico II - Leading institution Imperial College (121.8 K€ funded).

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

17 National and International collaboration

Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA);

CNR-IPCB, SPIN, ISASI;

Lund Laser Centre (LLC) Lund (Se) Dr. Alice Corani, Prof. Annemarie Huijser Dr. Magdalena Gauden Prof V. Sunstrom;

ESF program Ultrafast Structural Dynamics in Physics, Chemistry, Biology and Material Science (DYNA);

Daresbury Synchrotron Laboratory of CCRC (Council for the Central Laboratory of the Research Councils, UK) Dr. Ruth Edge, Dr. Suppiah Navaratnam, prof. E. J. Land;

École Polytechnique de Montréal, CAN Prof. Clara Santato;

The University of California, Santa Cruz, US,Prof. Marco Rolandi

Linkoping University, Linkoping, SE., Prof. Eric Glowacki

Institut National de la Recherche Scientifique, Montréal, CAN, Dr. Federico Rosei

University of Liverpool, Liverpool, UK, Prof. Alessandro Troisi

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

18 Principal investigator for the co-applicant

18.1 Personal data and contacts

First Name	*Alberto*	Last name	*Aloisio*
Gender	*Male*	TAX Code	*LSALRT63M29D086R*
Birth date	*29/08/1963*	Birth place	*COSENZA*
Phone number	*081676305*	e-mail	*alberto.aloisio@unina.it*

18.2 Digitally signed CV

(See documents uploaded)

18.3 Appointment letter as principal investigator

(See documents uploaded)

b) CO-APPLICANT - Università degli Studi di Napoli Federico II

(The information provided in this section will be evaluated with reference to criteria A.3 and A.5)

19 Administrative contact for the co-applicant

19.1 Personal data and contacts

First Name	*Salvatore*	Last name	*Verdoliva*
Gender	*Male*	TAX Code	*VRDSVT69S07G813L*
Birth date	*07/11/1969*	Birth place	*POMPEI*
Phone number	*081676286*	e-mail	*salvatore.verdoliva@unina.it*

19.2 Digitally signed CV

(See documents uploaded)

19.3 Appointment letter as principal investigator

(See documents uploaded)

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

20 Project title and acronym

Project title	*Pathogen Readiness Platform for CERIC ERIC Upgrade*	Project acronym	*PRP@CERIC*

21 Duration of the project (in month)

Project duration	*30*

22 Project type

(i) Strengthening of an existing RI among those listed in NPRI with high priority

23 Research Infrastructure(s) targeted by the project

RI : CERIC-ERIC - Central European Research Infrastructure Consortium

ESFRI domain	*PSE*	Capofila	*Area Sci. Park*
RI Type	*Phisical Sciences and Engineering*	RI priority	*IR a priorità alta*

24 Proposal ESFRI domain

PSE

26 Free Keyword(s)

Fair Data, CryoEM, structural biology, multiplexing phenotyping, CERIC-ERIC, Integrated Omics, Pathogen Research, Hyperspectral Imaging, Bioelectronics, Electron Microscopy

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

27 Publishable project abstract

The aim of the "Pathogen Readiness Platform for CERIC-ERIC Upgrade" (PRP@CERIC) is the upgrade of CERIC-ERIC Research Infrastructure with the integration of a digital facility for the study of pathogens, providing academic and industrial users with the instruments to tackle emerging human, animal and vegetal pathogens of health, security and economic concern, to enhance preparedness and response strategies against future outbreaks in compliance with the DNSH principle for environmental sustainability. The goal will be achieved by integrating laboratories in support of users and state-of-the-art complementary analytical facilities with biophysical methodologies. This approach will foster scientific advances in both fundamental and applied research in life science-infectious diseases, through the development of dedicated strategies for infectious sample handling and manipulation. The PRP@CERIC will build on established platforms at the intersection of biology, biochemistry, chemistry, structural biology, physics, bio-electronics, computational science and information technology to assemble a unique interdisciplinary network of knowledge, methodologies and instruments capable of exploring the boundaries of pathogens' research in the fields of diagnostics, pathogenesis, drug-discovery, safety & environment. PRP@CERIC is conceived as a digital ecosystem built on the FAIR guiding principles for scientific data management and stewardship to further strengthen the state-of-the-art analytical and computational offer which makes PRP@CERIC appealing not only to the scientific community but also to the industrial world, thus enabling a sustainable pathway for technology transfer as a guarantee for long-term sustainability of the initiative. Sustainability is also the target of PRP@CERIC educational model, that proposes a master course for graduated students, aimed at training next EU generation of RI users and scientists.

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

28 Extended abstract

A key lesson we learned from COVID-19 pandemic is that investing in preparedness is more cost effective than investing in response and that successful pandemic management and preparedness need to be based on international collaboration, driven by the central values of cooperation and solidarity – understood as practices and institutions of mutual support among the European Members and beyond, with particular attention to the needs of the most vulnerable subjects. Indeed, during these COVID-19 pandemic years the world population clearly realized the inter-dependency of people and other species in terms of mutual vulnerabilities and the need for shared responsibilities based on solid scientific bases. The World Health Organization (WHO) maintains the so-called "disease X" in the priority list of diseases, which represents the understanding that a serious international epidemic could be caused by a pathogen currently unknown. Infective disease readiness is therefore a "must have" for reducing the human, social and economic impact of possible future pandemic outbreaks, which has to be transferred to the world's new generations.

Despite the tremendous collective efforts put in COVID-19 research, the still-present pandemic undoubtedly highlighted the responsiveness limits against infectious disease suffered by the consolidated drug-discovery and, partially, vaccine-development pipelines, defining the clear need to implement more holistic and integrated basic research and intervention strategies set at the intersection between medicine, biology, biochemistry, chemistry, physics, engineering and bio-electronics.

RIs of the Physical Sciences and Engineering (PSE) domain may play a pivotal role in understanding the key aspect of pathogenicity and contribute to the effective development of prevention and care strategies. Cutting-edge instruments and technologies at diverse and mutually integrated scales (from individual molecules to entire organisms) and space domains (from static frames to system dynamics) have the potential to meet sensitivity and selectivity requirements for the study of intrinsically complex biological systems, shedding new light on host-pathogen interaction mechanisms. CERIC-ERIC, immediately understood its potential to face the present COVID-19 pandemic outbreak, as proven by the timely activation of a dedicated COVID-19 Fast Track Access Program (https://www.ceric-eric.eu/2020/03/10/covid-19-fast-track-access/). Nevertheless, when dealing with pathogens, access to the analytical instruments of the PSE RIs has been often limited by the infectivity of the sample themselves: only a restricted class of experiments, mostly associated to the structural determination of the key-mediator macromolecules, could be performed at synchrotron and cryoEM facilities worldwide, and could efficiently contribute to the fight against the pandemic. Indeed, scientific research in the field of host-pathogen interaction is presently mostly confined to laboratories with a biosafety level (BSL) 3 or 4, considerably limiting the significant input that PSE RIs may play in the study of host-pathogen interaction mechanisms. On the other hand, structural biology platforms that integrate multiple structural determination approaches are still too scarce, poorly interconnected and with limited throughput to meet the user's demand, especially pressing during health crisis.

The General Objective of "Pathogen Readiness Platform for CERIC ERIC Upgrade" (PRP@CERIC) is to overcome the present limitations and to upgrade CERIC-ERIC RI with the addition of a geographically-distributed and scientifically-integrated digital ecosystem for the study of infective diseases, providing to academic and industrial users interconnected instruments and competences for tackling emerging human, animal and vegetal pathogens of health and economic concern in order to establish enhanced preparedness and response strategies against future outbreaks.

CERIC-ERIC is a distributed PSE research infrastructure, as defined by the European Strategy Forum for Research Infrastructures (ESFRI), established in the legal form of an ERIC to facilitate the birth and the joint working of research infrastructures of

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(ESFRI), established in the legal form of an ERIC to facilitate the birth and the joint working of research infrastructures of European interest (European Research Infrastructure Consortium, Council Regulation n.723/2009). Organizationally, the eight Member States partners of CERIC-ERIC participate through a "Representing Entity" which provides a "Partner Facility", the service activities of which are contributed in-kind by Member States to CERIC-ERIC users. Elettra Sincrotrone Trieste is the Italian Representing Entity of CERIC-ERIC, and supports the RI mission with a selection of beamlines at the synchrotron light source Elettra. CERIC-ERIC provides, in an integrated and international way, access to the Partner facilities instruments, supporting scientific advances and technology transfer in materials, biomaterials and nanotechnology fields, with a focus on energy materials and life sciences. The recently approved Bio Open Lab – BOL -project (PON Ricerca e Innovazione 2014-2020), aimed at expanding and reinforcing the role of CERIC-ERIC in the field of bio-medical research, supports the strategic vision of the PSE RIs in the life science area. For the BOL implementation, new instruments were added to the CERIC-ERIC Italian offer, namely the Next Generation Sequencing facility (in Area Science Park), the Holographic Electron Microscopy facility (at Università del Salento), the Mass Spectrometry and the Scientific Computing facilities (at Università degli Studi di Salerno).

PRP@CERIC project insists on the BOL direction and will upgrade CERIC-ERIC to provide a world's first and unique PSE RI fully open to infectious disease studies. To this aim, the CERIC-ERIC Italian offer will be further widened in terms of instruments as well as competences and complementarity. PRP@CERIC project for CERIC-ERIC Upgrade is proposed by Area Science Park, the CERIC-ERIC lead Institution, in partnership with the co-proposers CNR, Università di Salerno (UniSalerno), Università del Salento (UniSalento) and Università Federico II Napoli (UniNapoli). Each co-proponent participates in the project with one or more Operative Unit (O.U.), as detailed in the a) section of the B Annex, each comprising one or more facilities, defined as a set of experimental stations, laboratories, tools and services made available to CERIC-ERIC users. In particular, Area participates to PRP@CERIC with three O.U.s: Area campus Padriciano (Headquarters, RET facility and ICGEB facility), Area campus Basovizza (ORFEO data center, LAGE genomic/ epigenomic platform and Elettra synchrotron facility, with a selection of beamlines and laboratories) and Area SUD (high throughput multi-omics automation facility). CNR and UniSalerno participate to PRP@CERIC with two O.U.s each: CNR-IOM, Istituto Officina Materiali (Cryo-microscopy facility and Nanofabrication facility) and CNR-IC, Istituto di Cristallografia (Biophysical Laboratory and XRD1 beamline@Elettra), DIFARMA (Mass spectrometry multi-omics facility) and DIEM (AI/HPC facility). Finally, UniSalento (NNN facility for Nanomedicine, Nanobioelectronics and Nanobiotechnology, CEDAD, Center of Applied Physics, Dating and Diagnostics) and UniNapoli (Bioelectronic Task Force facility) participate each with a single O.U.. In the PRP@CERIC project framework, experimental stations and laboratories (station from here on) of each facility are defined as a set of instruments and ancillary tools and services the user can ask to individually access. An experimental station may or may not correspond to a single instrument, defined as an equipment or a service functional to the user experimental proposal execution.

Pathogen Readiness Platform for CERIC ERIC Upgrade will be operated by both establishing additional facilities and upgrading instruments and services of already established facilities, and interconnecting them into a network of interoperable thematic platforms and macro-platforms; each platform is conceived as a set of stations belonging to one or more facilities that tackle the scientific question from the same perspective with different methods, approaches, targets and scientific competences, and is described under a dedicated WP. The PRP@CERIC breakdown structure is presented at a glance in Figure 1 in Annex 1 (Annex-PRP_at_glance.pdf) , and

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briefly summarized below to highlight the innovative landscape of the project.
The strategic PRP@CERIC vision is to fully exploit the contribution of the most advanced PSE analytical instruments and provide the combined momentum for biomedical pipeline innovation, that synergically integrates structure-based and phenotypic screening in early drug discovery for infectious disease, establishing a model for opening PSE RIs to infective pathogen research (PRP@CERIC Scientific ambition). To achieve the goal the proposed strategy functionally integrates the following elements:

1.The creation of the "Pathogen enabling platform" (WP2), to enable Pathogen research at CERIC-ERIC also for the instruments that do not operate at BSL3 level, defining innovative end-to-end workflows based on novel chemo-physical decontamination strategies of cells, tissues and tissue models, not impacting on the biological-structural-chemical-biophysical properties to be assessed by the "Integrated macro-platform of biophysics and structural biology" (WPs 3-4) and the "Integrative multi-technique phenotyping macro-platform" (WPs 5-8). The Pathogen enabling platform will take full advantage of scientific excellence and laboratories of the ICGEB in Area campus Padriciano, and will be realized upgrading the present BSL3 and BSL2 laboratories to support CERIC-ERIC user community and PRP@CERIC research with innovative High Throughput drug Screening (HTS) stations.

2.The creation of the "Integrated macro-platform of biophysics and structural biology", that merges and harmonizes two platforms: a- the "Integrated structural biology platform", geographically located at the Trieste node, that integrates established X-rays synchrotron based structural characterization tools with a newly established cryo-microscopy facility to be synergically operated with latest generation microXRD MX beamline planned in the framework of the upgrade of Elettra to Elettra2.0 Diffraction Limited Storage Ring (WP4). The cryo-microscopy facility will be set by CNR-IOM and equipped with a state-of-the-art cryoEM station, integrating advanced sample preparation and characterization tools; b- The "Sample preparation and characterization platform" (WP3), that will offer to users the most advanced preparation, purification and biochemical-biophysical characterization tools for the purposes of large-scale high-purity sample production, integrated with a highly automated crystallization station and high-throughput small molecules synthesis laboratory.

3.The establishment of a delocalized "Integrative multi-technique phenotyping macro-platform" targeted to the identification of the fingerprints of the cellular metabolic pathways perturbed by infection and drug-response through a multiplexing approach on diverse classes of samples, ranging from individual macromolecules to cells, tissues and tissue models, to holistically tackle biomedical research questions. The integrative platform is made by the following interconnected elements: a- The "Multimodal hyperspectral imaging platform" at Elettra facility (WP5), that exploits probing photons from hard X-rays to Far-Infrared (FIR)-THz radiation to provide a set of integrated markers based on organic molecules-biomacromolecules and inorganic trace elements, with lateral resolution ranging from macro- to nano-scale. The upgrade will strengthen the instrumental capabilities and performances of a selection of Elettra beamlines, with special reference to IR and UV beamlines; b- The "Multi-functional and dynamic platform" (WP6) that will be distributed among UniSalento and Area campus Basovizza and will integrate correlative electron, photon and force microscopies for capturing sample morpho-mechanical biophysical details at tissue, cellular and sub-cellular level; c- The "Multi-omics platform" (WP7) covering all the aspect of the omics-cascade, from genomics to metabolomics, by a combination of mass spectrometry (MS) and

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next generation sequencing (NGS) techniques, integrated with portable photon-based approaches, for deciphering key molecular changes following host-pathogen interaction, disease progression, and drug treatment; d- The "Interplaying bioelectronic platform " (WP8), localized at the UniNapoli node, that brings upgraded facilities and expertise to develop, characterize, and "in-the-field" test bioelectronic devices, to exploit their potential in pathogen screening, diagnostic and therapeutic in real-case scenarios, bridging the gap between fundamental and applied science, also addressing medical and industrial compartments.

4.The installation of the "AI and Simulations-augmented Platform" (WP9), tailored to integrate with the forthcoming instrumental facilities of PRP@CERIC for providing the users immediate access not just to raw data but also to advanced post processing statistical analysis, transversal to PRP@CERIC platforms, as well as to simulation and deep-learning techniques dedicated to in-silico modelling.

5.The pursuit of the digital integration objective. The implementation of "FAIR data approaches and advanced management services" (WP11) will provide advanced IT solutions for a profitable interaction with users and managers of the distributed PRP@CERIC ecosystem through a FAIR-by-design approach, making research data fully digital, transparent, efficient and interoperable with the EOSC services.

6.The coexistence of the institutional and collaborative research activities of the O.U.s with the well-established CERIC-ERIC peer-review user access model and with the actions oriented to industrial users, ranging from providing direct support with services to stimulating innovation-driven research on pre-competitive challenges, will lead PRP@CERIC to full operation and synergically contribute to its long-term sustainability (WP10).

7.The activation of an original training program, in addition to the classic ones, aimed to educate the next generation of scientist to the full exploitation of RI capabilities and instrument management, thus contributing to medium and long term PRP@CERIC sustainability and its refreshing by inputs of new ideas and management strategies (WP12).

The focus on the project rationale, its Specific Objectives, interconnections among the WPs and expected results will be expanded in section 29 of the present Annex B, "Objective and ambition". At this stage it is necessary to state that the mutual integration of the diverse thematic platforms, conceived as comprehensive tools able to address the scientific target of host-pathogen interaction from different perspective with different viewing angles, represents the most powerful risk-mitigation strategy on which the project rational has been conceived and will be actuated.
Being able to respond faster and better to future pandemic events, through the definition of effective prevention and therapeutic strategies in suitable times, is the key strategy for reducing the human, social and economic impact of pandemic outbreak induced by infective pathogens. All in all, the project scientific impact directly translates into human, social and economic impact, as detailed in section 30 of the present Annex B, "Project framework and main expected impact", with an overall contribution to the compliance with DNSH principles.

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29 Objectives and ambition

The General Objective of PRP@CERIC is to upgrade CERIC-ERIC as a world scientific leading PSE RI enabled for pathogen research. Investing in preparedness, ensured by forefront scientific research, will improve infectious disease readiness and the ability to respond faster and better to future pandemic events. PRP@CERIC project scientific rational reads as follows: the "Integrative multi-technique phenotyping macro-platform" (WPs 5-8) is a pathogen phenotyping platform where multiple morphological, chemical (omics and hyperspectral), biophysical, functional and dynamic observables may be related to the pathogen genome. Nevertheless, the genome encodes not just one but ensembles of protein conformations, as determined exploiting the "Integrated macro-platform of biophysical and structural biology" (WPs 3-4), that may play diverse functions and, consequently, diverse host-pathogen cellular pathways and drug-response. Being able to link genetic changes with the observable morpho-chemical-biophysical-functional-dynamic characteristics ultimately impacts on the predictive output of the "Integrated macro-platform of biophysical and structural biology", and contributes to the PRP@CERIC General Objective, laying the foundation for a more innovative biomedical pipelines, that synergically integrate structure-based and phenotypic screening in early drug discovery for infectious diseases (PRP@CERIC Scientific ambition).
The PRP@CERIC scientific goal will be achieved by tuned instrumental-upgrades and cutting-edge research programs aimed at increasing the cross-talk of diverse analytical approaches and their mutual synergisms, maximizing interconnections among them. Every project's element is functional to the scope and contributes to it with Specific Scientific (SO1-3), Digital (SO4), Educational (SO5), and Innovation (SO6) Objectives that can be summarized as follows:
1.Specific Objective 1 (SO1): To enable pathogen research at CERIC-ERIC. The goal will be achieved through the establishment of the "Pathogen Enabling Platform" (WP2), and will result in the widening of the CERIC-ERIC user community and the promotion of new science at the intersection of biology, biochemistry, chemistry, physics, bio-electronics, computational science and Information Technology.
2.Specific Objective 2 (SO2): To widen and advance the CERIC-ERIC offer for structural biology. The goal will be achieved through the establishment of the "Integrated macro-platform of biophysics and structural biology" (WPs3-4). The attainment of SO2 results in the improved attraction potential for national and international users of the structural biology sector, a community constantly growing and evolving, that will fund not only state-of-the-art instruments but also pre- and post-beamtime scientific and technical support, overall determining a clear improvement of user proposal outcome joined with a better usage of the allocated instrument-time.
3.Specific Objective 3 (SO3): To widen and advance the CERIC-ERIC offer with fully integrated state-of-the-art analytical instruments for host-pathogen interaction phenotyping. The goal will be achieved through the set-up of the "Integrative multi-technique phenotyping macro-platform" that will create a link between genetic changes and the observable morpho-chemical-biological-biophysical-functional characteristics of the host (WPs 5-8), thanks to the interconnected setting of each constituting platforms in the direction of information complementarity, spatial matching and improved throughput. The attainment of SO3 results in the increased attractiveness of the RI and the promotion of user project excellence due to the multiplexing capabilities of the macro-platform.
4.Specific Objective 4 (SO4): To provide a digital approach to the RI implying increased user satisfaction, high-quality open data, and promotion of open science. The goal will be achieved through the establishment of a Digital ECOSystem (DECOS) and of an AI and simulation-augmented platform (WP9, 11). Their combined action will simplify the access to the RI, increasing the number of proposals, and it will rise the publication rate of RI users by both favoring the creation of open FAIR datasets and reducing the

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proposals, and it will rise the publication rate of RI users by both favoring the creation of open FAIR datasets and reducing the bottleneck of data analysis through the implementation of state-of-the-art open-source suites.

5.Specific Objective 5 (SO5): To promote education and training for a new class of scientists. The goal will be achieved through a dedicated training Master program on RI for graduate students to educate a new EU generation on the opportunities of RIs, who may become the user and management base of the future.

6.Specific Objective 6 (SO6): To promote Innovation and R&D. The broad range of PRP@CERIC competences and skills could act as supply side of new knowledge and as effective testbeds of innovative technologies for industry, providing direct support with services, testing and proving technology and stimulating innovation-driven research on pre-competitive challenges, overall contributing to the long-term sustainability of the RI.

The achievement of the identified objectives is ensured by the tight interconnections among the project WPs, as briefly summarized below and better highlighted throughout the WP's description. The "Pathogen enabling platform", as set in WP2 will allow pathogen research not only in BSL3 environment but also in all the CERIC-ERIC facilities defining innovative end-to-end workflows and providing suitable models for fingerprinting cellular metabolic pathways perturbed by the infection by exploitation of all the instruments of the "Integrative multi-technique phenotyping macro-platform", as well as cryoEM in WP4. Human and animal models will be integrated with vegetal ones, thanks to the facilities of WP8. Production of pure and well characterized proteins and macromolecular complexes (WP3) is an important prerequisite for the successful determination of their structure as well as for the understanding of their molecular function and the set up of assays for drug discovery (WP4). In addition, all those features that can be observed only in physiological conditions, and thus cannot be investigated in WP4, will be obtained by complementary approaches provided by the aforementioned WPs. WP5-WP7 are clearly interconnected into the "Integrative multi-technique phenotyping platform". A vast literature exists on the synergic complementarity of MS and NGS as well as MS-Imaging (WP7) and FTIR imaging (WP5), where the superior lateral resolution and relative inexpensiveness of the latter may be propaedeutic for omics imaging, fully exploiting its sensitivity, up to the genomic landscape. Sub-micrometric chemical-sensitive hyperspectral approaches (WP5) ideally complement WP6 approaches, while the chemical sensitivity at the nanoscale of IR nanoscopies (WP5) matches with the mechanobiology and dynamic perspective of AFM techniques (WP6). Finally, the "Interplaying bioelectronics platform" (WP8) will translate results into device-based pathogen handling actions, contributing to create a bridge with the Innovation actions promoted in WP10. Transversal to all the WPs, WP9 and WP11 will target the Digital Transition objective, fostering convergence toward standards and providing the necessary hardware and software capabilities to meet the demand for relevant open access and quality data, carrying out dynamic and timely scientific analysis and taking informed policy actions quickly, as requested during a pandemic event. WP12 will assure a high-quality user-base to face future challenges with renewed confidence.

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30 Project framework and main expected impact

As the Specific Scientific (SO1-3), Digital (SO4), Educational (SO5), and Innovation (SO6) Objectives of PRP@CERIC are all functional to reach PRP@CERIC General Objective, their mutual synergisms will have impacts going far beyond the production of scientific results and knowledge.

For instance, Scientific Impact with societal value can be observed in the areas of education, training and knowledge exchange and in the development of technological solutions that could benefit society, e.g. responding to health challenges. This is actually the case for the General Objective of the project: to improve infectious disease readiness by reducing risks and costs of possible future infective disease outbreak.

The broader impacts of PRP@CERIC on society are obviously difficult to measure and may include aspects like raising public awareness and enhancing the positive image of science. Anyway, the impact of open science and open data is quantifiable with some level of confidence: the value of the open data market in 2019 was estimated to be about 184 billion euros, a figure expected to be doubled by 2025 (source: https://data.europa.eu/sites/default/files/the-economic-impact-of-open-data.pdf).

Also, education and training can be mentioned among the wider social impacts, since PRP@CERIC will provide an innovative master program, acting as an attractor to retain or draw talented students, offering them opportunities in research and labor market as well.

Indeed, direct and indirect economic impacts are typically longer lasting during the operation phase (after M30) and they may include easier job hunting for scientists, technicians, administrative and support personnel working for PRP@CERIC, purchase and consumption of goods and services, maintenance and upgrading, with further multiplier effects on the local economy and the relevant global supply chains.

PRP@CERIC impact will be assessed both qualitatively and quantitively (through KPIs) for the short and medium term, while a narrative approach will be used for long-term impact evaluation. The KPIs focusing on short (M1-M30) and medium terms (M30+M24) are listed and described in the relevant WPs, while the following set of Scientific, Technological, Economic, Social and Societal Indicators will be used to assess PRP@CERIC Scientific and Socio-Economic long-term effects.

Scientific Indicators (SI)

SI 1. Number of upgraded/new stations/laboratories available for CERIC-ERIC users

PRP@CERIC will widen and improve the instrumental offer of CERIC-ERIC, setting interconnected platforms fitting the needs of pathogen-related research. A further extension of the PRP@CERIC integrated digital ecosystem, in terms of additional correlated instruments and methodologies, is foreseen also in the long term, thanks to the support of grants and collaborative research as in SI 5.

SI 2. Number of proposals submitted through CERIC-ERIC Open Access Procedures

PRP@CERIC is expected to have a relevant impact on the CERIC-ERIC user community. PRP@CERIC will contribute first to the diversification of the user base and consequently also to its widening towards the entire Life Science community and beyond.

SI 3. Number of allocated proposals through CERIC-ERIC Open Access Procedures

Through the creation/upgrade of the installations, the improved level of their automation and the support for sample optimization, CERIC-ERIC efficiency in terms of allocable users is expected to increase in the short and medium term. In the long term, the KPI will remain stable according to maximum usage time.

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will remain stable according to maximum usage time.

SI 4. Number of Scientific Publications

Considering the scientific ambition of the project, in the long-term PRP@CERIC is expected to continue supporting the creation and diffusion of high quality fundamental and applied research, assessed by:

•Number of Scientific Papers deriving from the scientific commissioning of the facility (in-house research/collaborative research), acknowledging PRP@CERIC project;

•Number of Scientific papers published by users acknowledging PRP@CERIC project;

•Number of the above mentioned Publications published in high IF journals. Considering the novelty of the type of research proposed for a PSE RI, forefront science is expected to be published in high rank journals of the analytical, physical, biophysical, biochemical, biological and medical domains.

SI 5. Number of scientific projects granted exploiting PRP@CERIC

In the long term PRP@CERIC, with its ecosystem of integrated facilities enabling state-of-the-art experimental research, could raise thecompetitiveness of fundamental and applied research projects and be attractive for bundling further international collaborations.

SI 6. Number of Dataset Published

As a part of the normal workflow of PRP@CERIC, a large number of high-quality datasets will be created, curated and made compliant with the FAIR principles), amplifying their value. This KPI is expected to grow at a stable linear rate after project conclusion.

Technological Indicators (TI)

TI 1. Number of applications submitted through EPIRO (Entry Portal for Industrial Research explOitation)

Once digitally implemented, EPIRO will allow companies to continuously submit technical problems or innovation needs to be solved by PRP@CERIC.

TI 2. Number of R&D contracts with business partners

If the abovementioned requests are feasible, companies and PRP@CERIC scientists will work together on structured R&D working plans leading to relevant contracts.

TI 3. Number of business partners establishing medium- and long-term R&D collaborations

Stable and long-lasting relationships with business partners can really support PRP@CERIC sustainability. Moreover, they are more likely to lead to effective research collaborations rather than service providing.

TI 4. Number of new products and services by business partners to which PRP@CERIC has contributed

In the long term PRP@CERIC could support the development of new products and services both testing and proving third parties' technologies and co-developing solutions for pre-competitive challenges.

Economic Indicators (EI)

EI 1. Number of new job positions

PRP@CERIC will lead to new jobs for managers, scientists and technicians, which, after M30, thanks to the competences acquired, can easily find opportunities from science to industry or services.

EI 2. Revenues by exploiting PRP@CERIC facilities

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Commercial revenues from R&D contracts with business partners and grants by competitive projects can support PRP@CERIC long term sustainability and its future growth (also in terms of its further extension).

EI 3. Number of PRP@CERIC suppliers

PRP@CERIC operation implies purchase and consumption of goods and services, maintenance and upgrading, with further multiplier effects on the relevant global supply chains.

Social and Societal Indicators (SSI)

SSI 1. Number of students trained within PRP@CERIC

PRP@CERIC will provide a Master course for about 25 graduated students and will play an important role in higher education activities at several levels (bachelor, master and PhD) thanks to Institutional programs. The number of MA and PhD thesis based on knowledge and skills gained at PRP@CERIC can be used as indicator, too.

SSI 2. Number of PRP@CERIC recurrences in the media

PRP@CERIC appearances on printed, electronic and online local, regional, national and international media, as well as at events like open days for the general public can be used to assess the raising of public awareness towards science.

SSI 3. Number of new or improved products, services, or solutions stemming from PRP@CERIC results

SSI3 is the most difficult impact to measure and, needless to say, the potentially most pervasive, since the results developed at and by PRP@CERIC could directly benefit society, as related to the main goal of the project: to improve infectious disease readiness, reducing risks and costs of possible future infective disease outbreaks.

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31 Compliance/consistency with NRRP rules and constrains

31.1 Sustainability of the initiative

31.1.1 Awareness of project timing

PRP@CERIC envisages a complex and huge upgrade of the CERIC ERIC RI. The complexity follows from the acquisition of a relatively large number of experimental stations, the interconnected upgrade plan of a distributed RI, and the hiring of several fixed-term positions in a relatively short period. A further, rather challenging, aspect is the required digital implementation of the whole infrastructure. The project management is aware of these critical issues and has devised a specific strategy to properly deal with them: three different working groups will operate from the very beginning to address the three main actions required to coordinate the activities and to complete the project on time.

Public Procurement working group (PPWG) will coordinate and maintain control of all the tenders and procurement procedures for acquiring the equipment. During the project planning phase, a preliminary analysis of all the instrumentation and the associated procurement procedures was carried out and an accurate timeline for the different kinds of procedures was set out. The analysis was refined upon the negotiatiation phase and re In particular, the following timeline for tender assignment is proposed, which takes into account an appropriate contingency time for the most complex procedures, namely

- 6 months for European tenders

- 4 months for tenders in the range 200K€ -139K€ (class Art. 1 c. 2.a L 120/2020) and with "unicita'" features.

- 2 months for MEPA and/or tenders of value less than 40K€

Further, we have already estimated the time of installation/commissioning/approval for each instrument and produced the consequent payment flows as discussed later.

PPWG has the main task of carefully and rapidly implementing and continuously monitoring all the above tenders, to keep control of all the procedures development time, given the overall constraint imposed by the "AVVISO": all tenders have to be assigned within 31.12.2023. Assuming that the project starts in November 2022 we scheduled all the tenders in staggered way with the latest tender assigned at month 12, within a 2 months buffer period with respect to the deadline.

There is another important issue to be pointed out: the proponent and co-proponents have to assure fund availability to set-up all tender procedures that need to be published within the first months of the project and to make the payments within the due dates. This will require tight control over the overall cash flow; the availability of sufficient advanced funding is of paramount importance, since the inadequacy of advance funding can jeopardize the entire project.

HR recruitment working group (HRWG) will coordinate all the hiring procedures planned for the project: the total number of fixed term contracts is rather high even though it sums up to less than 10% of the overall PRP@CERIC budget The low percentage is because the upgraded infrastructures and facilities already have dedicated human resources with adequate competences.

31.1.2 List of critical risks

Here below are listed the identified PRP@CERIC critical risks (R) with their level of likelihood (L=Low, M=Medium, H=High) and mitigation measures (M). The complete Risk Register will be fully developed during the first Steering Committee meeting and will be

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and mitigation measures (M). The complete Risk Register will be fully developed during the first Steering Committee meeting and will be maintained as a standing agenda item at all the subsequent meetings. Different classes of risks can be identified, which could have a different impact during the different phases of the project characterized as short (up to M18), medium (from M18- M30) and long term (10-years operation). When appropriate, risk mitigation measures are reported including those that de- facto have already been taken (M1) and the ones to apply in the following (M2).

R1: Delay in tender publication (L); M1- Type of procedures have been already pre- screened and ranked according to a priority list for establishing the needed publication time of the tender procedure. Technical specifications prepared before the project start for all the major equipment; M2 - Tenders will be rescheduled according to the expected delivery time of the goods.

R2: Delay in procedure closure due to legal complaints by applicants (L); M1- A market search is planned for all the PRP@CERIC purchases; M2- Careful application of public procurement procedures: Tender documentation double checked by senior legal experts in public procurement before publications.

R3: Delays in good delivery (M); M1- Intermediate Objectives have been defined with some buffer in the schedule to offer realistic flexibility; M2- Define tender procedures that encompass penalties for delayed delivery.

R4: Difficulties in FAIR by design implementation/ adoption (M);M1- A data team will be available and specific support actions have been planned; M2 – Additional support will be provided by the Area team, possibly enlarging the group and preparing ad- hoc training activities for the OU in trouble.

R5: Difficulties in the recruiting process of fixed-term personnel (M); M1- A detailed description of HR competences has been prepared during the project preparation phase, which will be discussed at the kick-off meeting; M2- Recruitment calls will be published in international platforms, to attract international talents and to favour the so called "Brain return".

R6: Difficulties in the recruiting process for Maestro fellowship (L) M1- Solid relationships are in place with several Universities, where Maestro program can be promoted; M2 Recruitment calls will be published in international platforms, to attract international talents.

R7: Respect of gender proportion (M); M1 - we apply all the measures suggested by the Horizon Europe Guidance on Gender Equality Plans M2- Monitoring of the gender balance by the HR recruitment working group and strengthening of targeted promotion actions.

R8: Low oversubscription rate (L); M2- Enhance promotion of the PRP@CERIC ecosystem through dedicated communication channels. Exploit international network of the project partners to widen the user-base toward life-science of infectious disease.

R9: Too high oversubscription rate (Applicants unsatisfaction) (L); M1- Digital transition toward HT stations mitigates the risk; M2- To strengthen actions for stations automation

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(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

To strengthen actions for stations automation

R10:Not-adequate success in EU project grants (L);M2: Analysis of the weaknesses and strengthening of the opportunities: enlarge the EU network and cooperation with EU partners. Reinforce links with the national centers and partners in other RIs.

R11: Low number of access requests to the platform from industry (M); M1: A marketing strategy to reach the business targets and make them aware of the scientific and technological offer of PRP@CERIC is foreseen in activity 4; M2: Multiple channels will be used, both direct promotion to companies and taking advantage from affiliation to networks providing support in searching business partners

31.1.3 Economic ad financial plan for the operation of the infrastructure(s) as resulting from the project, for at least ten years starting from the final payment

Based on the ESFRI analysis and the experience at the European Research Infrastructures, among which is CERIC-ERIC, the running costs per year of an operational RI are in the range 5% to 10% of the total investment cost (construction & commissioning). This evaluation would place the increase of the operational costs of the upgraded infrastructure PRP@CERIC below an extra 5 MEuros per year. During the 10-year operation phase the additional staff with technical and scientific profile needed to ensure the RI services, support to users, widening of the scientific reach and engagement of communities will be similar, or higher, than in the setup and commissioning phase of the upgrade under NPPR.
That sets the overall additional long term operational extra-cost of CERIC-ERIC closer to 5 MEuros per year.
Most of the upgraded facilities will remain in existing premises that do not require special refurbishing. In one case, the UO Area-Sud, needs extra-funding to reinforce the offer at the multi-omics lab over the years. Support to that, beyond the quota of running costs for PRP@CERIC, will be included into the ordinary funding request to MUR.
Operational costs of the upgraded infrastructure fall into these categories:
- consumables (reagents, chemicals…) and services offered to the users
- maintenance contracts for large equipment (Cryo-EM, BSL3,…)
- continuous upgrade of the instruments (data centers, …)
- extraordinary maintenance
- software licenses and HPC sessions
- technical, scientific, and managerial staff

A sustainable plan to cover the anticipated costs is based on the following estimates for both direct and indirect economic and commercial values that flow from operating the infrastructure at national and international level.
Direct economic values include:
- institutional endowments for the CERIC-ERIC international partnership (56%)
- investment by co-located collaborating organisations, like Elettra S.C.p.A and the ICGEB at the Area Northern Units (9%)

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

- investment by co-located collaborating organisations, like Elettra S.C.p.A and the ICGEB at the Area Northern Units (9%)
- fees resulting from market-driven access (industrial research, proprietary results,…) (5%)
- fees resulting from negotiated access mode or partial coverage of consumables (access to the RI' services based on collaboration agreements with research organisations) (8%)
- entry quota from new partners after the 3 years period (2%)
- funding obtained in international competitive processes (15%)
- funding obtained in national competitive processes (3%)
- funding obtained in regional competitive processes (3%)

Additional and significant indirect economic values are identified as:
- research and non-research job creation
- development of regional communities
- leveraging domestic funding by attracting international funding
- encouraging trade and investment opportunities
- sharing risks associated with running the infrastructure by framing it in the international context
- enhancing the international reputation of researchers and institutions
- strengthening reputation to access international funding
- attracting and retaining international research talent
- training of young researchers

31.1.3.1 Managements Costs

(See documents uploaded)

31.1.3.2 Revenues

(See documents uploaded)

31.2 Brief analysis related to DNSH principle

PRP@CERIC is fully compliant with the DNSH principle, since the implementation of the designed upgrade does not cause significant harm to any of the six environmental objectives within the meaning of Article 17 of the Taxonomy Regulation: (a) climate change mitigation; (b) climate change adaptation;
(c) the sustainable use and protection of water and marine resources; (d) the transition to a circular economy; (e) pollution prevention and control; (f) the protection and restoration of biodiversity and ecosystems.

None of the proposed investments is related to environmentally harmful research as defined in the guidelines and taxonomy (e.g. fossil fuels or their downstream use, facilities for the disposal of waste in landfill, in mechanical biological treatment plants, or incinerators for the

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

or their downstream use, facilities for the disposal of waste in landfill, in mechanical biological treatment plants, or incinerators for the treatment of waste).
A brief analysis is provided to highlight the reasons why the project implementation is associated with a limited risk of environmental damage, and, on the contrary, it partially contributes to the green transition and environmental sustainability.

Climate change mitigation. PRP@CERIC activities do not lead to significant emissions of greenhouse gases. In this respect, it is relevant to focus on the impact of the most energy-intensive activities of PRP@CERIC, related to Elettra facility and the Data Center hosted on the Basovizza site.

Unique among existing accelerator-based facilities, Elettra draws its uninterruptible electrical power, heating and cooling from a high-efficiency trigeneration plant. Three gas turbines employing natural gas produce electricity and heat, heat exchangers are used to recover the heat lost from the electricity generation process and make it available to users and, finally, high-efficiency absorption refrigerators are used to generate cooling power using heat as a source, rather than electricity. While conventional thermoelectric power plants convert about 30% of the fuel energy into electricity and the remaining 70% is lost as heat, with a trigeneration plant more than 80% of the fuel is used, both as a source of heating and as energy to power an absorption cycle for refrigeration of environments or fluids. Among the significant advantages offered by natural gas-based trigeneration we mention: 1) a reduction in fuel consumption, thanks to an improvement in the overall efficiency of the system, which, with the same amount of primary energy, is able to produce electricity, heat and refrigeration; 2) a reduction in energy transmission losses, thanks to the proximity of the electrical, thermal and refrigeration energy production plants to the places of consumption; 3) a reduction in environmental impact, given that lower fuel consumption contributes to reducing CO2 emission; 4) an economic saving in the medium / long term, thanks to the lower quantity of fuel consumed and the tax concessions that are currently applied to alternative energy systems.

Data centres installed at Area Science Park are part of an existing infrastructure providing district heating and cooling as well as electricity generation by photovoltaic systems. Even though the increase in energy consumption (estimated in about 300 MWh yearly) derived from local operation of PRP@CERIC is only a small fraction of the overall power and energy consumption of the campus, it will be real time monitored by the energy manager of Area Science Park in order to optimize the control strategies to keep the PUE lower than 1.2. as much as possible. A research PhD project recently started with the goal of reducing energy footprint of computational workloads by optimizing the algorithm behind, so increasing the overall throughput of the system with the same amount of energy.

Climate change adaptation: According to the principles highlighted in the previous section, PRP@CERIC does not have an increased negative impact on the current and future climate scenario, nor on the activity itself, people, nature or property. All kind of users will be able to access the facilities both on-site and remotely (sending samples to local researchers, connecting to data-centers and establishing digital collaboration environments). However, remote access or sending samples to be characterized by the local instrument scientists will be encouraged practices. This approach will reduce the mobility of involved people, which is the most radical and efficient way to reduce mobility-related CO2 emissions and environmental externalities. Further advantages of this approach are an increased resilience of research infrastructures during crisis, and a larger user base for research, training and commercial urposes. The FAIR-by-design approach

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(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

research infrastructures during crisis, and a larger user base for research, training and commercial urposes. The FAIR-by-design approach will also contribute on reducing the energy cost related to storing large, unorganized dataset, so reducing memory space occupancy and, moreover, reducing the energy cost of data intensive algorithms to classify, annotate and organize data at later stage. Overall, this approach will ensure a substantial gain in sustainability and energy efficiency.

Sustainable use and protection of water and marine resources: PRP@CERIC activities are not detrimental to the good health of water bodies (surface, groundwater or marine) or harm its quality or reduce its ecological potential. In particular, the BSL3 laboratory will be equipped with a certified organic waste decontamination system for the treatment of waste water.

Transition to a circular economy: PRP@CERIC does not result in significant inefficiencies in the use of recovered or recycled materials. Based on the concept of upgrading existing facilities (rather than building new ones), PRP@CERIC embodies the principle of reuse and upgrade and it will prolong the useful life of existing assets in the frame of circular economy. All new equipment will be hosted in existing buildings, reducing the need for new resources (including soil consumption), as well as minimising the cost and waste generation related to decommissioning; [reference: REGULATION (EU) 2020/852 Art. 13]

Pollution prevention and control: PRP@CERIC will not cause increased emissions of pollutants in the air, water or soil. PRP@CERIC contributes substantially to pollution prevention and control by providing to scientific and industrial users the instruments for tackling emerging human, animal and vegetal pathogens of health and economic concern, thus minimising any adverse impact on human health and the environment by the informed production, use or disposal of chemicals to fight future outbreaks. Moreover, all the equipment included in PRP@CERIC applies state-of-the art solutions (such as reduction of sample sizes) that effectively minimize the use of materials, chemical products and organic solvents. [reference: REGULATION (EU) 2020/852 Art. 14]

Protection and restoration of biodiversity and ecosystems. PRP@CERIC does not harm the good condition and resilience of ecosystems or the conservation status of habitats and species. In this context BLS3 system is equipped with H14 extra-high efficiency terminal absolute filters for the air circulation system. Moreover a better knowledge of pathogens achieved through PRP@CERIC facilities can support innovative responses to potential outbreaks, fostering sustainable agricultural practices based on the characterization of bacterial communities in soils and sediments, as well as helping to define better strategies to protect, restore and enhance terrestrial, marine and other aquatic ecosystems.

PRP@CERIC integrated digital facility will operate over a 10-years period after the upgrade with most of its equipment and services expected to operate for an additional 8-10 years period before major refurbishing. During the expected life cycle of the infrastructure, ordinary maintenance will be routinely applied. Given the characteristics of the installations for the upgrade, a real decommissioning plan of the PRP platform is not needed.

31.3 Brief analysis to FAIR principle

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(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

The PRP@CERIC digital approach requires "by construction" a full adherence to FAIR principles. The data ecosystem made available in WP11 and offered to all the experimental stations and users will be built relying upon FAIR principles, in their far-reaching meaning and with advanced implementations.
WP11 will deploy the digital ecosystem which, in its final form, will provide:
A FAIR data space for PRP@CERIC digital output, intended here not only as data, but also as metadata schema and the software to manage it, online services, procedures, and algorithms to fully enable sharing and reuse. The FAIR data space will allow to store FAIR datasets and/or digital objects with their associated PID.
An interoperability layer service, to enable easy and seamless exchange and collection of automatized metadata thanks to the implementation of FAIR-by-design data acquisition technology at all the nodes (operational units) endowed with upgraded instruments.
An integrated find-and-access service (catalogue) to easily browse all the data contained in the repositories. The catalogue will also be interoperable and, therefore, the PRP@CERIC wealth of data will be easily indexed and integrated with many other meta-catalogues, thus reaching a wider basin of users.
A set of data services and tools to track data provenance from generation up to publication, as well as to perform data analytics, search and storage.
This is not only a formidable technological task but is, most importantly, a cultural challenge. A dedicated training action is described in WP12, to create a well-established team of data curators, data stewards, and data engineers that will guide the PRP@CERIC scientific community in learning to use and exploiting at its best the digital ecosystem that will be developed.
The team will provide guidelines to all the Operating Units to implement, for all the upgraded instruments, FAIR-by-design protocols and define together metadata schema that could then be shared among the community.
Moreover, the team will stimulate awareness about FAIR data principles and promote best practices addressed at the enlarged community of users that PRP@CERIC aims to reach.
As an example, PRP@CERIC will ask to all users – to establish default behaviors and favour engagement on these topics - to create a data management plan for their projects. To make this action smoother a web tool will be provided, and data curators will suggest and guide users in its creation. Users will therefore be engaged since their first encounter with the ecosystem, with FAIR data methodology and tools, , hopefully stimulating an imitation mechanism at their Institutes, thus triggering a virtuous circle. The digital ecosystem is by-design interoperable and, moreover, EOSC compliant: connection to/from EOSC services will be made possible and will be pursed during the project.
The ecosystem will provide also monitoring tools across the scientific infrastructure that, in strict cooperation with the management of the different WPs, will allow to track all appropriate information associated with PRP@CERIC operations, and will enable innovative services for accurate cost-analysis of research at the RI.

31.4 Gender equality plan

UniSalerno, Unisalento and UniNapoli have already Gender Equality Plans (GEP) approved and operational; GEPs of Area Science Park and CNR will be approved soon. These GEPs are loaded as annex (filename: Annex-GEP.pdf)
PRP@CERIC will implement the following actions:
-work-life balance: smart working will be promoted to harmonize family needs with professional engagement. PRP@CERIC partners

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

-work-life balance: smart working will be promoted to harmonize family needs with professional engagement. PRP@CERIC partners will support families in children care (facilitating the access to nursery schools through institutional arrangements, supporting programs for summer camps) and will foresee benefits for elderly care.
-organisational culture: gender equality principles are embedded in partners organisations and in project management structure. CNR, UNINA, UNISA and UNISALENTO have Gender Budget approved; Area will have its own in due time. Internal monitoring will include gender related indicators. Training devoted to gender issues is foreseen by the partners' GEPs.
-gender balance in decision-making: gender balance principle will be applied in all project boards; women leadership in decision-making bodies will be promoted.
-gender equality in recruitment and career progression: in line with the call, female quota of 40% will be achieved by encouraging women participation by means of a targeted campaign. Gender balance will be applied in the selection committees definition. Prizes devoted to excellence in research will be awarded to female researchers, in the limits set by the art. 15 of Law decree 218/2016 and similar regulations. Studies investigating the gender dimension will be encouraged.
-measures against gender-based violence: each partners' GEPs foresee specific actions to prevent and monitor situations of physical or psychological violence.
-gender equality in training (WP12): non-discrimination principles will be applied in trainees selection, aiming at 50% women. Study grants will be awarded to best performing female students.

31.5 Synergies with other proposals within the recovery and resilience plan

The intrinsic interdisciplinary cut of the project and the potential for a rather wide range of applications in research on pathogens, can promote many synergies with initiatives of the NextGen EU plan and other European programs.
With reference to the Mission M4C2 and the Component M4C2.1 "Rafforzamento della ricerca e diffusione di modelli innovativi per la ricerca di base e applicata…":
-the Investment 1.1 Fondo per il Programma Nazionale Ricerca (PNR) e progetti di Ricerca di Rilevante Interesse Nazionale (PRIN) sees a very close connection with the activity plan that Area is pursuing under the PNR funding, namely the analysis and testing of Fair-by-Design case studies for the data collection on a typical Synchrotron installation;
-the Investment 1.3: Partenariati allargati estesi a Università, centri di ricerca, imprese e finanziamento progetti di ricerca di base offers opportunities of collaboration on the subject 13. Malattie infettive emergenti; furthermore, the interdisciplinary character of the project foresees a direct interaction with the subjects 1 and 7: "Intelligenza artificiale: aspetti fondazionali" and "Cybersecurity, nuove tecnologie e tutela dei diritti", for the key aspects regarding the amount of data that will be produced. In addition, the subject 6: "Diagnostica e terapie innovative nella medicina di precisione" will benefit from the multi-omic capabilities of the project and unique cutting-edge technological facilities for the biomedical field. Finally, the subjects 8 and 10: "Conseguenze e sfide dell'invecchiamento" and "Modelli per un'alimentazione sostenibile" will exploit the potential outcomes of the projects for human wellbeing.
-the Investment 1.4: Potenziamento strutture di ricerca e creazione di "campioni nazionali di R&S" su alcune KET frames already a collaboration between PRP@CERIC and the National Center on the Sviluppo di terapia genica e farmaci con tecnologia a RNA coordinated by the University of Padova as witnessed by the letter of intent exchanged between Area and the University of Padova (see attached doc).

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(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

attached doc).

Under the same line of investment 1.4 and with specific reference to the National Center on Simulazioni, calcolo e analisi dei dati ad alte prestazioni, an active response to the calls that will be issued by the Spoke In-silico Medicine and Omics Data is anticipated, and further engagement with the National Center Centro Nazionale per la Biodiversità (CNB).

With reference to the Component M4C2.2 "Sostegno ai processi di innovazione e trasferimento tecnologico":

-the Investment 2.3 Potenziamento ed estensione tematica e territoriale dei centri di trasferimento tecnologico per segmenti di industria could represent a proper frame for supporting the high TRL activities that the PRP@CERIC partnership might generate.

With reference to the Mission M4C2 and the Component M4C2.3. "Potenziamento delle condizioni di supporto alla ricerca e all'innovazione":

- the Investment 3.1: Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione has the remarkable potential of creating additional synergies among the selected RIs in both the same and the diverse ESFRI thematic areas. As PRP@CERIC exploits characterization tools available at Elettra, synergetic links with the NFFA-DI installations are expected. The scientific realm of PRP@CERIC favors collaborations and synergies with the RI projects in the Health&Food field. Among them, RIs INSTRUCT-ERIC, especially for the exploitation of the different structural biology services implemented under the project ITACA.SB funded by PNRR, and EURO-BIOIMAGING ERIC funded by PNRR as SEE LIFE.

All these connections and interactions at national level, makes the PRP@CERIC RI a crucial infrastructure to link the different initiatives of the PNNR. At European level PRP will strengthen the offer of CERIC-ERIC with an impact on the biotech and life science user communities.

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32 Total budget for the proposal

32.1 Entire project costs

COSTS (€) ENTIRE PROJECT			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	1.591.038,00	2.017.818,00	3.608.856,00
b. Scientific instrumentation and technological equipment, software licenses and patent	13.794.228,12	18.781.170,05	32.575.398,17
c. Open Access, Trans National Access, FAIR principle implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	624.640,00	0,00	624.640,00
e. Indirect costs, including running costs	1.183.693,35	1.497.929,17	2.681.622,52
f. Training activities	900.000,00	600.000,00	1.500.000,00
Total	18.093.599,47	22.896.917,22	40.990.516,69

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP01 - WP01 - Project Management]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	212.850,00	212.850,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	0,00	0,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	14.899,50	14.899,50
f. Training activities	0,00	0,00	0,00
Total	0,00	227.749,50	227.749,50

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP02 - WP02 - Pathogen Enabling Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	0,00	0,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	4.581.100,00	4.581.100,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	320.677,00	320.677,00
f. Training activities	0,00	0,00	0,00
Total	0,00	4.901.777,00	4.901.777,00

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	232.500,00	306.504,00	539.004,00
b. Scientific instrumentation and technological equipment, software licenses and patent	1.235.742,51	2.846.443,00	4.082.185,51
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	102.776,98	220.706,29	323.483,27
f. Training activities	0,00	0,00	0,00
Total	1.571.019,49	3.373.653,29	4.944.672,78

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP04 - WP04 - Integrated Structural Biology Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	272.448,00	272.448,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	4.754.950,00	4.754.950,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	351.917,86	351.917,86
f. Training activities	0,00	0,00	0,00
Total	0,00	5.379.315,86	5.379.315,86

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	163.468,80	163.468,80
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	2.129.621,71	2.129.621,71
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	160.516,34	160.516,34
f. Training activities	0,00	0,00	0,00
Total	0,00	2.453.606,85	2.453.606,85

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP06 - WP06 - Multi functional and dynamic Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	116.250,00	102.168,00	218.418,00
b. Scientific instrumentation and technological equipment, software licenses and patent	2.515.152,00	756.888,00	3.272.040,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	380.640,00	0,00	380.640,00
e. Indirect costs, including running costs	210.842,94	60.133,92	270.976,86
f. Training activities	0,00	0,00	0,00
Total	3.222.884,94	919.189,92	4.142.074,86

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP07 - WP07 - Multi-Omic platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	893.538,00	296.287,20	1.189.825,20
b. Scientific instrumentation and technological equipment, software licenses and patent	7.928.264,55	1.814.457,34	9.742.721,89
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	244.000,00	0,00	244.000,00
e. Indirect costs, including running costs	634.606,18	147.752,12	782.358,30
f. Training activities	0,00	0,00	0,00
Total	9.700.408,73	2.258.496,66	11.958.905,39

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP08 - WP08 - Interplaying bioelectronic Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	232.500,00	0,00	232.500,00
b. Scientific instrumentation and technological equipment, software licenses and patent	834.069,06	0,00	834.069,06
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	74.659,75	0,00	74.659,75
f. Training activities	0,00	0,00	0,00
Total	1.141.228,81	0,00	1.141.228,81

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP09 - WP09 - AI and Simulations-augmented Platform]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	116.250,00	229.878,00	346.128,00
b. Scientific instrumentation and technological equipment, software licenses and patent	1.281.000,00	0,00	1.281.000,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	97.807,50	16.091,46	113.898,96
f. Training activities	0,00	0,00	0,00
Total	1.495.057,50	245.969,46	1.741.026,96

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP10 - WP10 - User Access and Outreach]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	204.336,00	204.336,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	0,00	0,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	14.303,52	14.303,52
f. Training activities	0,00	0,00	0,00
Total	0,00	218.639,52	218.639,52

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP11 - WP11 - FAIR data approaches and advanced management services]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	229.878,00	229.878,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	1.897.710,00	1.897.710,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	148.931,16	148.931,16
f. Training activities	0,00	0,00	0,00
Total	0,00	2.276.519,16	2.276.519,16

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.2 For each Work Package (Specific Objective), as per the following table

COSTS (€) WORK PACKAGE [WP12 - WP12 - Training and Education]			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	0,00	0,00
b. Scientific instrumentation and technological equipment, software licenses and patent	0,00	0,00	0,00
c. Open Access, Trans National Access, FAI principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	63.000,00	42.000,00	105.000,00
f. Training activities	900.000,00	600.000,00	1.500.000,00
Total	963.000,00	642.000,00	1.605.000,00

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.3 For each project participant (Applicant and co-Applicants), as per the following table repeat the table for each Applicant and co-Applicant.

COSTS (€) **PARTICIPANT [Area Science Park]**			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	428.538,00	1.541.034,00	1.969.572,00
b. Scientific instrumentation and technological equipment	1.646.756,00	12.886.130,05	14.532.886,05
c. Open Access, Trans National Access, FAIR principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	145.270,58	1.030.901,49	1.176.172,07
f. Training activities	0,00	300.000,00	300.000,00
Total	2.220.564,58	15.758.065,54	17.978.630,12

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.3 For each project participant (Applicant and co-Co-Applicants), as per the following table repeat the table for each Applicant and co-Co-Applicant.

COSTS (€) **PARTICIPANT [Consiglio Nazionale per le Ricerche]**			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	0,00	476.784,00	476.784,00
b. Scientific instrumentation and technological equipment	0,00	5.895.040,00	5.895.040,00
c. Open Access, Trans National Access, FAIR principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	0,00	467.027,68	467.027,68
f. Training activities	0,00	300.000,00	300.000,00
Total	0,00	7.138.851,68	7.138.851,68

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.3 For each project participant (Applicant and co-Co-Applicants), as per the following table repeat the table for each Applicant and co-Co-Applicant.

COSTS (€) **PARTICIPANT [Università degli Studi di Salerno]**			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	697.500,00	0,00	697.500,00
b. Scientific instrumentation and technological equipment	6.862.111,06	0,00	6.862.111,06
c. Open Access, Trans National Access, FAIR principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	244.000,00	0,00	244.000,00
e. Indirect costs, including running costs	567.252,78	0,00	567.252,78
f. Training activities	300.000,00	0,00	300.000,00
Total	8.670.863,84	0,00	8.670.863,84

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.3 For each project participant (Applicant and co-Co-Applicants), as per the following table repeat the table for each Applicant and co-Co-Applicant.

COSTS (€) **PARTICIPANT [Università degli Studi del Salento]**			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	232.500,00	0,00	232.500,00
b. Scientific instrumentation and technological equipment	4.451.292,00	0,00	4.451.292,00
c. Open Access, Trans National Access, FAIR principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	380.640,00	0,00	380.640,00
e. Indirect costs, including running costs	375.510,24	0,00	375.510,24
f. Training activities	300.000,00	0,00	300.000,00
Total	5.739.942,24	0,00	5.739.942,24

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

32.3 For each project participant (Applicant and co-Co-Applicants), as per the following table repeat the table for each Applicant and co-Co-Applicant.

COSTS (€) **PARTICIPANT [Università degli Studi di Napoli Federico II]**			
	Costs included in the request for funding		
	To be located within the eight southern Regions	To be located outside the eight southern Regions	**Total requested grant**
a. Fixed term personnel specifically hired for the project	232.500,00	0,00	232.500,00
b. Scientific instrumentation and technological equipment	834.069,06	0,00	834.069,06
c. Open Access, Trans National Access, FAIR principal implementation	0,00	0,00	0,00
d. Civil infrastructures and related systems	0,00	0,00	0,00
e. Indirect costs, including running costs	95.659,75	0,00	95.659,75
f. Training activities	300.000,00	0,00	300.000,00
Total	1.462.228,81	0,00	1.462.228,81

c) PROJECT DESCRIPTION

(The information provided in this section will be evaluated with reference to criteria A.1, A.2, A.4, B.1-B.4)

PROPOSED PAYMENT PLAN

Bimester	Payment Amount	Cumulative Payment Amount
1	**0,00 €**	**0,00 €**
3	**348.984,78 €**	**348.984,78 €**
4	**0,00 €**	**348.984,78 €**
5	**434.697,80 €**	**783.682,58 €**
6	**1.424.391,46 €**	**2.208.074,04 €**
7	**2.574.487,77 €**	**4.782.561,81 €**
8	**32.112,84 €**	**4.814.674,65 €**
9	**3.107.085,25 €**	**7.921.759,90 €**
10	**3.944.037,42 €**	**11.865.797,32 €**
11	**3.916.974,66 €**	**15.782.771,98 €**
12	**9.236.966,40 €**	**25.019.738,38 €**
13	**1.451.294,50 €**	**26.471.032,88 €**
14	**0,00 €**	**26.471.032,88 €**
15	**14.519.483,81 €**	**40.990.516,69 €**

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	Cumulative Costs
1	Recruitment of infrastructure Manager and first Management activities	0,00	0,00
3	Management activities coordinated by IM , U.O. Area Padriciano_1	45.549,90	45.549,90
6	Management activities coordinated by IM, U.O. Area Padriciano_2	45.549,90	91.099,80
9	Management activities coordinated by IM, U.O. Area Padriciano_3	45.549,90	136.649,70
12	Management activities coordinated by IM , U.O. Area Padriciano_4	45.549,90	182.199,60
15	Management activities coordinated by IM, U.O. Area Padriciano_5	45.549,90	227.749,50

36 WP title

WP01 - Project Management

37 WP number

WP01

38 Start month(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park

40 WP Leader

Stefano Cozzini (Area campus Padriciano)

41 Summary of the activities envisaged in the WP

The management of the project is crucial to fully implement the work program, respecting the envisaged schedule and budget regulations, involving all partners, while monitoring that quality requirements of project's outputs and deliverables are fully met.
Area Science Park oversees the overall coordination of PRP@CERIC project and is responsible for all contractual arrangements, negotiation, technical/financial management and reporting to the MUR.
The WP1 aims at:
- ensuring the achievement of project objectives and outcomes, providing that the activities will not divert from the objectives;
- monitoring the overall implementation of the project, the workflow, the provision of deliverables;
- harmonizing the technical Work Packages and the activities of the partners;
- monitoring the scientific quality of the project;
- ensuring early identification of problems, so that timely contingency measures can be taken (risk management);
- ensuring the observance of the budget, the fulfilment of administrative and financial duties and the monitoring of the expenditures in compliance with any regulation set by MUR;
- supporting and supervising public procurement administrative procedures for the purchase of scientific and technical instrumentations for all partners
-supporting the recruitment procedure for the Infrastructure Manager, project and administrative managers as well as researchers for all the partners;
- ensuring the digital monitoring of the research infrastructure and the sharing of monitoring data within the partnership;
- managing the constant flow of information among partners

Area Science Park will be constantly in touch with the WP leaders to monitor the status of related tasks and compare it with the actuation plans. Together with all PPs, Area will identify and monitor any technical and management risk as well as any other issue that might affect project progress, to carry out mitigation actions as timely as possible.
Technical and financial reporting and any interaction with the MUR will be performed by Area team with the support of the Project Management Board.
Referring to the quality management, a dedicated Project Management Plan will be developed in line with Area's certification UNI EN ISO 9001:2015 to set the operational guidelines, structure and different roles, conflict resolution and decision- making processes, timing and buffers, risk monitoring and management.
Due to the complexity and heterogeneity of the PRP@CERIC project activities, the project management is conceived in accordance with the following multilayer structure composed by boards and sectorial working groups with the following composition and functions:
Steering Board (SB) is the decision-making body of the project and is composed of partners' scientific representatives plus Elettra and ICGEB representatives. The SB is chaired by Area representative. The SB is responsible for the strategic guidance of the research activities, for developing the research infrastructure's governance, for the quality monitoring, the monitoring of the performance indicators and outputs, for managing issues related to data management and IP. If needed, the SB takes decisions on technical and budget modifications and towards any defaulting partners.
Composition: 7 members (1 representative for each applicant/co-applicant + 1 member for Elettra and 1 member for ICGEB); led by Area's representative.
Meetings: at least 5 physical or online from M1.
Project Management Board (PMB) is responsible for overall management and implementation of the project. It is an essential body ensuring the regular exchange of information among partners. Coordinated by the Infrastructure Manager (IM), the PMB:
- oversees the technical, administrative and financial implementation of the project;
- monitors the fulfillment of the scheduled activities (effective vs planned timing):

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

- monitors the fulfillment of the scheduled activities (effective vs planned timing):
- monitors the activities of the partners and of the O.U.;
- monitors any risk and informs the SB about any relevant issue/specific problem to be solved, provides the financial and technical reporting to Area Science Park in due time.
Within the PMB, Area Science Park's team will guarantee the regular exchange of information among partners and with the MUR and will provide financial and technical reporting and any other specific support to the MUR.
Composition: 13 members (project and financial manager each applicant/co-applicant + 1 representative for ELETTRA and ICGEB); led by the IM.
Meetings: physical or online on bi-monthly basis.
The PMB will be supported in its actions by three thematic working groups:
- Human Resource Recruitment Working Group (HRWG) oversees the recruitment process of new HRs that will be working on the project. Thanks to the expertise of HR department of each co-applicant, this group manages the administrative recruitment process in relation to the requirements of the call, such as gender balance and seniority issues.
Composition: 13 members (1 expert in HR and 1 PM for each co-applicant); led by Area's representative.
Meetings: at least 6 thematic from M1 to M12.
- Public Procurement working group (PPWG) oversees the procurement of the research infrastructures according to the existing national and European public procurement regulations.
Composition: 13 members (1 expert in PP and 1 PM for each PP); led by Area's representative.
Meetings: at least 6 thematic from M1 to M18.
- Digital implementation working group (DIWG) oversees all the activities and the development of software tools required to implement a fully digital integrated ecosystem in all its components.
Composition: 13 members (1 expert in Digitalization and 1 PM for each co-applicant); led by Area's representative.
Meetings: at least 6 thematic from M2 to M30.
Advisory Board (AB) is composed by external public or private experts in fundamental and applied research using RI for their research activities. The AB contributes to the definition of the most effective and sustainable user model, to the RI governance structure, to the definition of training activities and of the internationalization strategy. The members of the AB are appointed by the SB, which also chooses its chairperson.
Composition: from 3 to 5 members (selected among external international Research Infrastructures experts); led by the AB chairperson.
Meetings: at least 4 physical or online from M6
Infrastructure Management and Monitoring Board (IMMB) is the body which manages all PRP@CERIC operation: experiments proposal allocation workflow (according with the agreed "sharing" policies), platform usage monitoring and experiments' scientific outcomes monitoring. Furthermore, it will foster the participation of project partners to EU funded projects exploiting PRP@CERIC investigation potential and further contributing to its long-term sustainability.
Composition: 12 members – 1 representative for each OO.UU. or more in case of OO.UU. hosting multiple facilities (3 from Area; 2 from CNR-IOM; 1 from CNR-IC; 2 from University of Salerno; 1 from University of Salento; 1 from University Federico II; 1 representative of CERIC-ERIC which manages peer review open access procedure; 1 representative for Area which manages EPIRO - see WP10); led by the IM.
Meetings: at least 1 meeting every 3 months (physical or online) from M12.
WP1 activities run throughout the project in close relation to the technical and transversal WPs. The first specific task to be developed pertains to the appointment of all decision-making and project management bodies (act. 1). Then, supported by dedicated working groups, the PMB will identify public procurement procedures for scientific and technical instrumentation purchase (act. 2) and will define the recruitment procedure for the new professional human resources required for project implementation (act. 3). The last activity, instead, is focused on the data management and the digital monitoring of PRP@CERIC.

42 WP inter-relation with other WWPP

All Workpackages

43 Most relevant outcome:

The most relevant outcome of WP1 is the assurance of achieving all WP deliverables and project results. PRP@CERIC partners, coordinated by Area Science Park, guarantee the efficient management of all project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

PRP@CERIC partners, coordinated by Area Science Park, guarantee the efficient management of all project activities, which entails the effective coordination of project partners in performing their activities, the workplan monitoring according to the expected timeline, the quick overcoming of the risks that may arise.
To this aim, a project management multilayer model is envisaged, which foresees a Steering Board (SB) composed by professionals with decision making power for strategic decisions, a Project Management Board (PMB) with executive and administrative responsibilities supported in its tasks by specific sectorial working groups (public procurement, human resources, digital implementation). PMB regularly reports to the Steering Board, which approves or redirects its work.
The management flow leads to the establishment at M12 of the Infrastructure Management and Monitoring Board (IMMB), the responsible body for overall platform operation. It starts to meet and work around project mid-life, in order to perform a sort of trial stage and become fully operative and getting up to speed by the end of the project. The IMMB guarantees sustainability and long-term vision of the multilayer model applied, since it has the fundamental task of keeping running the RI for the years to come.
Finally, the multilayer management structure foresees an Advisory Board (AB) composed by external public or private professionals in fundamental and applied research, to be appointed from the very beginning of the project. The AB meets regularly, gives advice and provides support to the SB, in a first phase and to the IMMB later, in taking strategic decisions for PRP@CERIC management, maintenance and operation.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of infrastructure Manager and first Management activities	1	- PRP@CERIC Project Management Structure - Minutes of project decision making, management and advisory bodies
Management activities coordinated by IM , U.O. Area Padriciano_1	3	- Six month report on the IM activities and associated time-sheets - Minutes of project decision making, management and advisory bodies - PRP@CERIC Project Management Plan - PRP@CERIC Data Management Plan
Management activities coordinated by IM, U.O. Area Padriciano_2	6	- Six month report on the IM activities and associated time-sheets - Minutes of project decision making, management and advisory bodies
Management activities coordinated by IM, U.O. Area Padriciano_3	9	- Six month report on the IM activities and associated time-sheets - Digital Infrastructure Management and Monitoring Tool - Minutes of project decision making, management and advisory bodies
Management activities coordinated by IM , U.O. Area Padriciano_4	12	-Six month report on the IM activities and associated time-sheets -Minutes of project decision making, management and advisory bodies

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Padriciano_4		
Management activities coordinated by IM, U.O. Area Padriciano_5	15	- Final report on the IM activities and associated time-sheets - PRP@CERIC Management and Operation Agreement - Minutes of project decision making, management and advisory bodies

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of infrastructure Manager and first Management activities	1	Number of contracted Infrastructure Manager : 1 Number of minutes of SB meetings :1 Number of minutes of PMB meetings: 1 Number of minutes of HRWG meetings: 1 Number of minutes of PPWG meetings: 1 Number of minutes of DIWG meetings: 1
Management activities coordinated by IM , U.O. Area Padriciano_1	3	Number of minutes of PMB meetings: 2 Number of minutes of AB meetings: 1 Number of minutes of HRWG meetings: 3 Number of minutes of PPWG meetings: 2
Management activities coordinated by IM, U.O. Area Padriciano_2	6	-Number of minutes of SB meetings: 1 -Number of minutes of PMB meetings: 3 -Number of minutes of HRWG meetings: 2 -Number of minutes of PPWG meetings: 2 -Number of minutes of DIWG meetings: 2 -Number of minutes of IMMB meetings: 1
Management activities coordinated by IM, U.O. Area Padriciano_3	9	-Number of Digital Infrastructure Management and Monitoring Tool available: 1 -Number of minutes of SB meetings: 1 -Number of minutes of PMB meetings: 3 -Number of minutes of AB meetings: 1 -Number of minutes of PPWG meetings: 1 -Number of minutes of DIWG meetings: 1 Number of minutes of IMMB meetings: 2
Management activities coordinated by IM , U.O. Area Padriciano_4	12	-Number of minutes of SB meetings: 1 -Number of minutes of PMB meetings: 3 -Number of minutes of AB meetings: 1 -Number of minutes of DIWG meetings: 1 -Number of minutes of IMMB meetings: 2
Management activities coordinated by IM, U.O. Area Padriciano_5	15	-Number of minutes of SB meetings: 1 -Number of PRP@CERIC Management and Operation Agreement: 1 -Number of minutes of PMB meetings: 3 -Number of minutes of AB meetings: 1 -Number of minutes of DIWG meetings: 1 -Number of minutes of IMMB meetings: 2

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

46 WP Intermediate Objectives:

IO Title	*Recruitment of infrastructure Manager and first Management activities*		
IO Bimestre	*1*	IO Costs	*0,00*

IO Desciption

Recruitment of the Infrastructure Manager.
Area Science Park, in agreement with the HR recruitment working group, will recruit the Infrastructure Manager which will be contracted and fully engaged in PRP@CERIC by M2.
By M2, Area Science Park will deliver the Project Management Structure and start drafting the Project Management plan. PMS is the list and contact details of appointed members for each different board and working group. The Project Management plan, instead, includes the different management procedures to be applied during project lifetime; the quality processes to be followed to ensure high quality results and their timely delivery to the MUR; the risk management methods, tools and procedures that will be used to tackle any issue that could have a negative impact on project development.

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document.

List of meetings to be hold:
-1st meeting of SB
-1st meeting of PMB
-1st meeting of HRWG
-1st meeting of PPWG
-1st meeting of DIWG

IO Title	*Management activities coordinated by IM , U.O. Area Padriciano_1*		
IO Bimestre	*3*	IO Costs	*45.549,90*

IO Desciption

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document.

By M6 Area Science Park will draft ad deliver the Data Management Plan which will be revised, if needed, every 12 months. It will describe in detail data management procedure and it is addressed to all PRP@CERIC users, both those belonging to the project O.U. and those from CERIC-ERIC Open Access procedure. CERIC-ERIC data policy and fair data approach will be considered and harmonized within the data policy. The DMP will be composed of two sections: the first one will specify how to handle personal data in accordance with GDRP while the second section will be devoted to the scientific data management. The DMP will be drafted keeping in mind all DECOS services (WP11) and presenting the easiest and most natural way to interact with them. The IM is the person in charge of monitoring DPM full adoption in the frame of all activities.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

charge of monitoring DPM full adoption in the frame of all activities.
List of meeting to be hold:
-2nd and 3rd meetings of PMB
-2nd, 3rd and 4th meetings of HRWG
-2nd and 3rd meetings of PPWG
-1st meeting of AB

IO Title	*Management activities coordinated by IM, U.O. Area Padriciano_2*		
IO Bimestre	*6*	IO Costs	*45.549,90*

IO Desciption

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document.
List of meetings to be hold:
-2nd meeting of SB
-4th, 5th and 6th meetings of PMB
-5th and 6th meetings of HRWG
-4th and 5th meetings of PPWG
-2nd and 3rd meetings of DIWG
-1st meeting of IMMB

IO Title	*Management activities coordinated by IM, U.O. Area Padriciano_3*		
IO Bimestre	*9*	IO Costs	*45.549,90*

IO Desciption

By M18 the Digital Infrastructure Management and Monitoring Tool will be completed and integrated in the DECOS, the Digital ECOsystem of Research Infrastructure (RI) developed in the frame of WP11 - FAIR data approaches and advanced management services. The DIMMT is the pivotal tool for managing and monitoring the operation of PRP@CERIC RI. It is aimed at monitoring the RI performance indicators and outputs: experiments proposal allocation workflow (according with the agreed "sharing" policies), platform usage monitoring and users' activities monitoring.

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document.
List of meeting to be hold:
-3rd meeting of SB
-7th, 8th and 9th meetings of PMB
-6th meeting of PPWG

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

-6th meeting of PPWG
-4th meeting of DIWG
-2nd meeting of AB
-2nd and 3rd meetings of IMMB

IO Title	*Management activities coordinated by IM , U.O. Area Padriciano_4*		
IO Bimestre	*12*	IO Costs	*45.549,90*

IO Desciption

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document,
List of meetings to be hold:
-4th meeting of SB
-10th, 11th and 12th meetings of PMB
-5th meeting of DIWG
-3rd meeting of AB
-4th and 5th meetings of IMMB

IO Title	*Management activities coordinated by IM, U.O. Area Padriciano_5*		
IO Bimestre	*15*	IO Costs	*45.549,90*

IO Desciption

The agreement establishes and points out policies, regulations, conditions and procedures for the overall management and monitoring of the RI and must be accepted and signed by all PRP@CERIC partners. The aim of the agreement is to assure complete and effective platform's operation, with special reference to ex-post scenario. It will gather: commitment and responsibility of all partners in keeping running the PRP@CERIC for the years to come, the guidelines for accessing to the facilities (deliverable 1 WP10) and IMMB operational rules (also produced in the frame of WP10 activity 1).
First version of PRP@CERIC MOA will be drafted at month 12, once the IMMB is appointed. The final version will be approved and signed by month 29 leading to the long-term exploitation of PRP@CERIC investigation potential.

Appointed members of project decision making, management and advisory bodies, regularly meet to run the project. The work of the IM in this respect is crucial for activities' success and for the correct administrative and financial management, including reporting. Each board or working group meeting will be organized on the basis of a detailed agenda. Meetings' minutes with the main decisions adopted, presentations (if present), attendance sheet and to-do-list produced within the reporting period will be gathered in a single document.
List of meetings to be hold:
- 5th meeting of SB
- 13th, 14th and 15th meetings of PMB
- 6th meeting of DIWG
- 4th meeting of AB

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

- 4th meeting of AB
- 5th and 6th meetings of IMMB

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: N/A

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Project Management structure

49 Activity short name

1.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Due to the complexity of the PRP@CERIC project, the decision-making management will follow a multilayer structure with a long-term perspective as described in the summary.
The members of the project decision-making bodies will be appointed during the kick-off meeting and will be permanently involved in overall project implementation (boards) or provisionally on specific issues (working groups). Gender balance as well as women leadership will be promoted in the composition of each body.
The composition of each board and working group has been detailed in WP1 summary.
Dedicated meetings (physical and online) will be scheduled for each board/group according with the timing of the intermediate objective and to be confirmed during the kick-off meeting.
During each meeting, partners will present the progress of activities carried out during previous months, underlining any difficulty, risk and potential delay, and discuss on the progress of scientific, technological and economic indicators. With reference to the administrative and financial management, a dedicated project accounting codification and a separate storage for project documents will be implemented, ensuring traceability of the use of PNRR funds and allowing MUR officers to run inspections, on-site audits and information exchange.
Referring to quality management, a dedicated project management plan will be developed in line with Area Science Park's certification UNI EN ISO 9001:2015, to set the operational guidelines, roles, conflict resolution and decision-making processes, timing, risk monitoring and management. Reporting to the MUR will be performed by Area Science Park, also supporting MUR representatives in case of local auditing or any additional request. Finally, in the frame of act. 1, PRP@CERIC partners will produce and sign the agreement for platform operation after project conclusion (PRP@CERIC Management and Operation Agreement).

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

212.850,00 €

Cost description: Infrastructure Manager (IM) - rank Dirigente Tecnologo I livello - 30 PM
The IM will work across all the WP1 activities. The cost is charged on this activity for simplicity reasons.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.5 e. Indirect costs

14.899,50 €

Cost description: discrepancy between standard and tabulated costs for personnel, travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Management of public procurement procedure for scientific and technical instrumentation

49 Activity short name

1.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	14

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Purchasing scientific and technical instrumentation is pivotal in PRP@CERIC project. Coordination in the purchasing process is even more important and crucial for project's successful implementation. For this reason, a dedicated working group led by Area Science Park will oversee the timely definition of the administrative tenders and the proper implementation of the procedures by each project partner. The Public Procurement working group (PPWG), which is composed by purchasing administrative experts on public procurement of each partner, will meet regularly from the very beginning of the project and will report all issues to the PMB. According to the specific requirements defined in technical work packages and to the final cost of each research instrumentation upgrade, the most proper procurement procedure will be jointly defined according to the existing national and European public procurement regulations, and guaranteeing also the respect of the rules pointed out in Italian law n.108 of 29th July 2021 and the decree of 7th December 2021 - "Adoption of guidelines aimed at promoting gender and generational equal opportunities, as well as the employment inclusion of people with disabilities in public contracts financed with the resources of the PNRR and PNC". The activity will be funded by in-kind contribution from Area Science Park.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

0,00 €

Cost description: N/A

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Recruitment procedure for the Infrastructure Manager, researchers, project managers

49 Activity short name

1.3

50 Activity Start month and duration

Activity Start month	1	Activity Duration	12

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

52 Activity description

New technical, scientific and administrative human resources to be exclusively assigned to PRP@CERIC project implementation are envisaged to be recruited, in order to allow the success of the project. This activity will be performed by the HR recruitment working group (HRWG), which is composed by experts working for the HR departments of each partner. This group will coordinate the whole administrative recruitment process: from the identification of hiring needs to the preparation of job descriptions and calls, from selection of applicants to their contracting.
The whole hiring procedure will be finalized by M12 with the contracting of the following profiles essential to the implementation and sustainability of the project:
-1 Infrastructure Manager (IM) – IM full profile description is available under section C.
-33 researchers, with different scientific backgrounds, selected by each partner according to their specialization.
-5 project and administrative managers hired by Area Science Park, whom main task is to support and collaborate with the Infrastructure Manager; their cost is covered under budget line "indirect cost".
All recruitment processes will be performed in compliance with the regulations for public recruitment. In line with the Italian low n.108 of 29th July 2021 and the decree of 7th December 2021, criteria oriented towards the objectives of equality will be indicated as necessary requirements. The recruitment process will be implemented with the goal of enhancing the participation of young students and researchers. Calls for applications will be adequately promoted both at national and international level, in order to recruit the highest profile researchers. In this respect, the calls will be promoted throughout Italian regions and also abroad with the active support of Euraxess network. The activity will be funded by in-kind contribution from Area Science Park

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: see note on activity budget 1.1

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Digital monitoring of research infrastructure

49 Activity short name

1.4

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Effective monitoring is the key factor for successful project implementation and for an efficient and sustainable RI management and operation in the long run.
PRP@CERIC project monitoring system will be fully digital and realized through the "Digital Infrastructure Management and Monitoring Tool (DIMMT)". DIMMT will be completed by M18 and integrated in the DECOS, the Digital ECOSystem of Research Infrastructure, developed in the frame of WP11 - FAIR data approaches and advanced management services. DIMMT is aimed at monitoring the RI performance indicators and outputs: experiments proposal allocation workflow (according with the agreed "sharing" policies), platform usage monitoring and users' activities monitoring. All tasks will be performed by the Digital Implementation working group (DIWG), reporting regularly to the PMB and the SB. Approximately at halftime project duration, the DIWG will handover monitoring functions and the DIMMT to the Infrastructure Management Monitor Board (IMMB).
In order to design and plan the DIMMT, PRP@CERIC data policy will be defined at the very beginning of the project. By M6 the DIWG will draft the "Data Management Plan (DMP)" according to CERIC-ERIC data policy and fair data approach. The DMP will be composed of two sections: the first one will specify how to handle personal data in accordance with GDRP while the second section will be devoted to the scientific data management. The DMP will be drafted keeping in mind all DECOS services (WP11) and presenting the easiest and most natural way to interact with them. The IM is the person in charge of monitoring DPM full adoption in the frame of all project activities. Data storage and data management will be also arguments to be periodically reported to the SB. The activity will be funded by in-kind contribution from Area Science Park.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: see note on activity budget 1.1

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP01 - WP01 - Project Management]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

0,00 €

Cost description: N/A

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	Cumulative Costs
12	Upgrade of the HTS laboratory by automated handling and high throughput imaging_ HTS-BSL2 Station	1.507.737,00	1.507.737,00
15	Upgrade of the BSL3 laboratory to a BSL3 user facility	2.741.340,00	4.249.077,00
15	Upgrade of the HTS laboratory by automated handling and high throughput imaging_HTS-BSL3 Station	652.700,00	4.901.777,00

36 WP title

WP02 - Pathogen Enabling Platform

37 WP number

WP02

38 Start month(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park

40 WP Leader

Danilo Licastro (Area campus Padriciano)

41 Summary of the activities envisaged in the WP

The added value of PRP@CERIC relies in the possibility of accessing high-end analytical instrumentation available at CERIC-ERIC

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

The added value of PRP@CERIC relies in the possibility of accessing high-end analytical instrumentation available at CERIC-ERIC for the analysis of infectious pathogens in the most native conformation in their target cell or tissue. To meet user needs, available laboratories at ICGEB (in OU Area Campus Padriciano) are upgraded to an integrated user facility for the handling of infectious agents up to biosafety level 3 (BSL3) and strategies are developed for the safe manipulation of infectious material upon decontamination without impacting on the biological properties to be assessed. The facility acts as a platform for enabling hazardous pathogen investigation at RI facilities and is transversal to all the platforms of PRP@CERIC project. Indeed, the WHO maintains in the priority list of diseases also the "disease X", which represents the knowledge that a serious international epidemic could be caused by a pathogen currently unknown to cause human disease.

Activity 2.1 Biosafety Level 3 Laboratory Module 1

Since 1998, a BSL3 laboratory has been operating in Area Science Park at the International Centre for Genetic Engineering and Biotechnology (ICGEB), serving not only the Centre and its Member Countries, but also the territory of Friuli Venezia Giulia and its scientific and health institutes (https://www.icgeb.org/molecular-virology/). Over the years, the laboratory has distinguished itself for its research activities on HIV/AIDS, Hepatitis C, and several vector-borne viruses such as tick-borne encephalitis, Dengue virus, Zika, West Nile, Chikungunya, Yellow Fever and Usutu. From the early stages of the Coronavirus emergency, protocols for viral isolation and characterization were immediately activated following requests from the local Health Authority. In addition, serological and molecular tests for SARS-CoV-2 have been developed together with studies aiming at investigating the virus-host interaction for the development of antiviral strategies and decontamination strategies of public spaces, in partnership, collaboration and interaction with national and international healthcare institutions, pharmaceutical companies and other public and private entities including the Biological Weapons Convention of the United Nations in the biosecurity sector.

The SARS-CoV-2 pandemic has shown the need to review and strengthen biosecurity procedure and the necessity of integrating the current BSL3 laboratory with spaces for: 1) high throughput functional screening of biological agents; 2) hosting novel instrumentation to be tested (i.e. IR and Raman systems of WP5.2 and WP7); 3) the handling of infected animals . This upgrade is essential for the study of pathogenicity and transmission and for the identification of new tools for research, in line with the mission of the PRP@CERIC, including the definition of workflows for the safe handling of pathogens . The upgraded BSL3 laboratory is transversal to all experimental WP3-8, with a close collaboration on the preparation of workflows. Indeed, the joint ICGEB/Elettra postdoctoral fellowship program allowed the establishment of the first end-to-end workflow for the safe analysis of SARS-CoV-2 by THz spectroscopy (WP5.6). The activities to be conducted in the BSL3 are integrated both with the international research carried out at the ICGEB, but also with projects of Area Science Park and Elettra Sincrotrone, to form a biosafety and biosecurity pole with the critical mass adequate to the epidemic risks of the coming decade.

Activity 2.2 HTS Stations and Cell-Culture Laboratory

In 2008, ICGEB developed the first academic High Throughput Screening (HTS) laboratory in Italy resulting in extensive expertise in the field of drug discovery that was successfully exploited for the identification of new molecules and druggable targets (https://www.icgeb.org/high-throughput-screening-equipment/). The integration of the BLS3 laboratories with cutting edge HTS instrumentation represents a unique set-up for the study of host-pathogen interactions. In particular, the experimental pipeline will be designed around two main screening stations:

1) "HTS-BSL3" station dedicated to automated handling, screening and live imaging of infected samples ("Pathogen-positive" BLS3+ containment, see above Activity 2.1). HTS-BSL3 station will consist of a brand-new standalone system developed on two deck level layout equipped as it follows. Central in the footprint we will have a collaborative robotic arm that allows transport of micro-plates between all the enclosed instruments (washing/dispensing station, lidding/delidding and transfer station, sealer, incubator, plate readers).

2) "HTS-BSL2" station designed to feed and support the activities of HTS-BSL3 . This station will be mainly dedicated to automated library preparation and imaging of non-infectious samples in a BSL2 containment. HTS-BSL2 consists of an upgrade of the existing HTS core facility at ICGEB, which is getting outdated. This upgrade is essential to guarantee 1) adequate throughput in library preparation, which is essential to feed HTS-BLS3 (WP2.1); 2) support to HTS-BSL3 outputs by providing superior imaging capabilities. The cores of the HTS-BSL2, will be 1) the liquid handling station for library printing, reformatting and cherry picking; 2) the HTS microscope. Adequate automation will be provided by a collaborative robotic arm.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

the HTS microscope. Adequate automation will be provided by a collaborative robotic arm.

The proposed HTS stations allow the screening of selected libraries on the sub-cellular phenotypes and dynamics of infection, and horizontally fits multiple WPs: (i) fingerprinting of cellular metabolic pathways; (ii) Prototyping of image analysis pipelines for the conversion of phenotypic outputs into numbers , (iii) generation of large collections of cellular profiles that can be used as training data-set for the development of AI-guided phenotypic identification algorithms (WP9); (iv) mirroring image-based-phenotypic screenings to multi-omic, functional&dynamic and hyperspectral analysis (WP7, WP6, WP5). This will allow us to generate integrated datasets describing in multiple dimensions the perturbations imposed by a high number of treatments in the presence of a given pathogen.

Data storage (images and metadata) integrity and analysis capacity will be implemented by upgrading the current database architecture which, allows multiple users to navigate and analyze data via a web-browser interface while exploiting the computing capacity of ICGEB hardware infrastructure integrated in WP11. Moreover, this set-up is scalable (both in terms of computing and storing capacity) and perfectly suits the aim of PRP@CERIC

Between simple cellular models of infection and animal models it is now possible to reproduce the complexity of human or animal tissues in vitro providing a fundamental tool for the study of infection. To complete the setup in support of the PRP@CERIC, the existing cell culture laboratory, suitable for the derivation and culture of primary human cells, creation of human organoids, organ-on-a-chip and human cell/tissue biobanking will be made available to the users. This facility will generate cellular models of human or animal tissues to be transferred into the BSL3 laboratory (WP2.1) and HTS stations, as well as to the integrative multi-technique phenotyping macro-platform, to study the mechanisms of pathogen infection and identify novel therapeutic approaches.

42 WP inter-relation with other WWPP

WP3,WP4,WP5,WP6,WP7,WP8,WP9,WP10,WP11,WP12

43 Most relevant outcome:

There is a gap between the standard technologies for handling pathogens at the appropriate biosafety level and the access to high-end instrumentation. On one side, available containment laboratories are often insufficiently refurbished with instrumentation, while, to access instruments outside the containment laboratory, the pathogen needs to be inactivated, often losing critical features in the process. This gap has not been systematically addressed to provide fast access to a wide portfolio of techniques, which is of paramount importance when confronting an emerging infectious disease. WP2 aims at providing both the proper stations/laboratories and the know-how to fill this gap. Outcomes of WP2 are:
1.Upgrade of the BSL3 laboratory to a user facility, including the handling of small animals. The upgrade is designed not to interrupt the activity of the current BSL3 lab, which will be required operational to complete some of the tasks of PRP@CERIC. The final laboratory will be a hub for infectious human, animal and vegetal (WP8) model of infection, connected by defined safety protocols to the CERIC-ERIC facilities.
2.Upgrade of the high-throughput screening laboratory. The plan aims at inserting one HTS station within the BSL3 containment environment and a second one outside at BSL2 as an upgrade of the one currently operational at ICGEB. This will allow both infectious and non-infectious screens to be processed in parallel, in an interconnected structure, greatly expanding the capacity of the facility and ability to meet user needs.
3.Fingerprinting cellular metabolic pathways to define a set of predefined procedures to explore pathogen- host interactions. Different pathogens often impact the same cellular metabolic pathways, which help in understanding the life cycle of the virus, their pathogenesis, and represent a target for therapy and possible biomarkers. In this project each pathway will be mapped both with standard tools and with the instruments of the integrative multi-technique phenotyping macro-platform, to provide a dataset to be used for early characterization of unknown pathogens.
The pathogen-associated phenotypes that will be generated are: Plasma membrane; ER stress and Integrated Stress Response (ISR) that is the first line of reaction upon pathogen
exposition; Cell death, apoptosis and pyroptosis; Autophagy; Mitochondrial fragmentation; Viral-induced Nuclear remodeling, DNA damage and repair.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

remodeling, DNA damage and repair.

4.At the core of the project is the accessibility of the infectious material to the CERIC-ERIC stations that do not operate at BSL3 level. The only way forward is to render the material unable to cause infection, but each inactivation strategy by definition perturbs essential features of the pathogen, thus often compromising the results of the experiment. In this project, model pathogens of great interest and potential pathogenic risk are either deactivated by physical and chemical means, depending on the final technology to be applied. An alternative route is to develop genetically modified pathogens that are unable to cause disease. Although this route appears cumbersome, the current advances in synthetic gene manipulation allow extremely fast results as it has been demonstrated in the last pandemic.

A facility for the handling of iPS cells for the preparation of organoids and for the maintenance of ex vivo tissue cultures is already operational at ICGEB. This laboratory is essential to provide complex multicellular structures for infection experiments to be conducted in the BSL3 lab or HTS stations, as well as at the diverse phenotyping platform of PRP@CERIC. Availability of these animal and human models represents both an intermediate step between simple cell cultures and in vivo experiments, thus limiting the use of animals, but also an added value for the PRP@CERIC in offering more meaningful experimental models. Vegetal/agricultural pathogen-host interaction models will be provided according to WP8.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Upgrade of the HTS laboratory by automated handling and high throughput imaging_ HTS-BSL2 Station	12	Report on the Act. 2.2 working status focused on the instrumentational acquisition for HTS laboratory
Upgrade of the BSL3 laboratory to a BSL3 user facility	15	Report on the Act. 2.1 working status focused on the acquisition of the BSL3 laboratory items
Upgrade of the HTS laboratory by automated handling and high throughput imaging_HTS-BSL3 Station	15	Report on the Act. 2.2 working status focused on the instrumentational acquisition for HTS laboratory

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Upgrade of the HTS laboratory by automated	12	1.Number of new HTS stations available at PRP@CERIC for users in BSL2 environment as planned in WP2 in accordance with Act. 2.2. The KPI target value is set to 1 at M22.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

by automated handling and high throughput imaging_ HTS-BSL2 Station		The KPI target value is set to 1 at M22. 2. Number of submitted proposals for experiments requiring HTS-BSL2 TheKPItarget value is set to 5 for the CERIC-ERIC call of semester M30+M24
Upgrade of the BSL3 laboratory to a BSL3 user facility	15	1. Number of upgraded BSL3 available at PRP@CERIC for users as planned in WP2 in accordance with specific objective 1 as defined in section 29 The KPI target value is set to 1 at M30 2. Number of submitted proposals for experiments requiring BSL3 facility as planned in WP2. TheKPItarget value is set to 5 for the CERIC-ERIC call of semester M30+M24
Upgrade of the HTS laboratory by automated handling and high throughput imaging_HTS-BSL3 Station	15	1. Number of stations available at PRP@CERIC for users in BSL3 environment as planned in WP2 in accordance with Act. 2.2. The KPI target value is set to 1 at M28. 2. Number of submitted proposals for experiments requiring HTS-BSL3 facility as planned in WP2. TheKPItarget value is set to 3 for the CERIC-ERIC call of semester M30+M24

46 WP Intermediate Objectives:

IO Title *Upgrade of the HTS laboratory by automated handling and high throughput imaging_ HTS-BSL2 Station*

IO Bimestre *12* IO Costs *1.507.737,00*

IO Desciption

Activity 2.2 delivers an upgrade of the existing HTS core facility at ICGEB. The upgrade is necessary to adequately support the activities of HTS-BSL3 module. The upgrade will consist in the generation of screening platform equipped as it follows: liquid handling station, automated plate sealer, random access stacker, barcode reader for plate tracking during library maintenance, lidding/de-lidding station, plate washers/dispensers compatible with 96 and 384 multi-well plates, multimode plate reader (already available), incubator with automated transfer station for kinetic assays with live cells, state-of-art HTS microscope, automation robot.

IO Title *Upgrade of the BSL3 laboratory to a BSL3 user facility*

IO Bimestre *15* IO Costs *2.741.340,00*

IO Desciption

For activity 2.1, turn-key supply and installation of a BSL3 laboratory for the handling of infected cells/animals. The laboratory is fully equipped comprising the acquisition of ad hoc instrumentation including: biohazard hoods, incubators, fridges and freezers 4, -20, -80, -120 °C, inverted microscopes, autoclaves, thermomixers, centrifuges, benchtop ultracentrifuge, benchtop cell sorter, benchtop live

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

-80, -120 °C, inverted microscopes, autoclaves, thermomixers, centrifuges, benchtop ultracentrifuge, benchtop cell sorter, benchtop live microscope, vortex, vacuum pumps, shakers, pipetts, ELISA reader/washer, RT PCR thermocycler, benches and chairs, cage racks for small animals, electroporator, gene gun, balances, surgical kits, digital thermometer, air shower/changing room, cage washer, ice-maker, filtered face-masks, pass-through, mouse isolators.

IO Title	*Upgrade of the HTS laboratory by automated handling and high throughput imaging_HTS-BSL3 Station*		
IO Bimestre	*15*	IO Costs	*652.700,00*

IO Desciption

For activity 2.2 (HTS-BSL3 station), a new stand-alone instrumentation for running automated handling, screening and live imaging of infected samples will be acquired. The station consists of: Automated plate sealer, Random Access stacker, Barcode reader for plate tracking, Lidding and de-lidding station, Plate washer and dispenser compatible with 96 and 384 multi-well plates, Multimode plate reader with dual monochromators for fluorescence, chemiluminescence and absorbance measurements, CO2 incubator with temperature control and automated transfer station, HTS microscope (already available), Collaborative robotic arm.

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

48 Activity title

Biosafety level 3 Laboratory Module 1

49 Activity short name

2.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Activity2.1 aims at the upgrade of the BLS3 laboratories at ICGEB, as anticipated by the LoI between Area and the ICGEB (see the uploaded document PRP_Lettera-Intenti-Area-ICGEB-signed), with the goal of enabling the following activities: 1) running High Throughput Screening (HTS) of biological agents; 2) hosting novel instrumentation provided by other partners of the PRP@CERIC; 3) handling of 2 different pathogens in parallel; 3) Infecting and handling small animals for the development of in-vivo models. The resulting equipment represents a unique set-up for the study of host-pathogen interactions by microscopy-based HTS.

Instrument order and hardware commissioning

A tender will be organized based on an executive study to renovate and upgrade current ICGEB BSL3. A suitable company will be identified among those that can offer a competitive package and robust execution of such a key infrastructure taking into primary consideration the safety of the operators and the containment of infectious material. The tender will include not only the building but also basic operational instrumentation to run the facility.

Scientific Commissioning:
Due to the experience maturated by the staff of the Molecular Virology lab, currently heading the BSL3 facility at ICGEB, the upgraded BSL3+ facility will be immediately available to users after installation at month 30.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

2.562.000,00 €

Cost description: Upgrade of the existing BSL3 laboratory at ICGEB. The upgrade will consist of multiple activities aimed at enabling the new BSL3 facility to perform the following activities: 1) hosting a platform for high throughput functional screening of biological agents; 2) hosting novel instrumentation provided by other partners of the PRP@CERIC; 3) handling of 2 different pathogens

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

biological agents; 2) hosting novel instrumentation provided by other partners of the PRP@CERIC; 3) handling of 2 different pathogens in parallel; 3) infection and handling of small animals.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

179.340,00 €

Cost description: Indirect cost will be used for
travel expenses
consumables
hiring of administrative staff
further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

HTS Stations

49 Activity short name

2.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Activity 2.2 aims at the integration of the BLS3+ laboratories (Activity 2.1) with a cutting edge High Throughput Screening (HTS)

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity 2.2 aims at the integration of the BLS3+ laboratories (Activity 2.1) with a cutting edge High Throughput Screening (HTS) instrumentation. The resulting facility represents a unique set-up for the study of host-pathogen interactions by microscopy-based HTS.

Instrument order and hardware commissioning:
HTS-BLS3 and HTS-BLS2 stations are conceived as an unique installation composed by multiple modules (single instruments) integrated with a robotic automation. The design of each station will be customized according to: 1) available space; 2) safety containment; 3) experimental procedures; 4) number of instruments to be integrated. Research market has already started, and we identified, for this type of realization, as the most appropriate European providers Peak Automation and Analysis (PAA), Tecan, PerkinElmer, Hamilton and Thermo Fisher Scientific. We will tender each station (HTS-BLS3 and HTS-BLS2) according to 1) a detailed list of the characteristics of each instrument; 2) a detailed list of procedures that the station must perform. Procedures will be the object of both factory acceptance test (FAT) and site acceptance test (SAT). Publication of the tender procedure is expected at M8, conclusion and order of the instrument at M16. SAT is expected at M22 and M28 for HTS-BLS2 and HTS-BSL3 respectively.

Scientific Commissioning:
Due to the experience maturated by the staff of the ICGEB, the HTS facility will be immediately available to users after installation at month 30. In-presence, fully remote as well as mix-modes can be supported by the two stations thanks to the high level of automation.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

2.019.100,00 €

Cost description: HTS-BSL3 module will consist of a brand-new standalone system developed as it follows. Central in the footprint we will have a collaborative robotic arm that allows transport of micro-plates between all the instruments. The robotic harm will integrate the following instruments: 1) automated plate sealer; 2) random access stackers; 3) barcode reader for plate tracking; 4) lidding and de-lidding station 4) plate washer and dispenser compatible with 96 and 384 multi-well plates; 5) Multimode Plate reader with environmental control, and dual monochromators for fluorescence, chemiluminescence and absorbance measurements; 6) Incubator (CO2 and temperature control) with automated transfer station for kinetic assays with live cells; 7) HTS microscope equipped for widefield and confocal automated fluorescence microscopy equipped with high magnification water immersion objectives and environmental control (Temp and Co2) for live pathogen visualization (Currently part of the ICGEB-HTS facility) . 8) Automation consisting of a collaborative robot for automated plate handling, Modular decks, random access racks, barcode readers, de-lidder station, computers, software and accessories for custom automation solutions;

HTS-BSL2 module will consist of 1) Liquid Handler for library preparation including cherry picking protocols; 2) automated plate sealer; 3) random access stackers; 4) barcode reader for plate tracking during library maintenance; 5) lidding and de-lidding station; 6) plate washer and dispenser compatible with 96 and 384 multi-well plates for automated IF staining; 7) Multimode Plate reader with injectors, environmental control, and dual monochromators for fluorescence, chemiluminescence and absorbance measurements (Currently part of the ICGEB-HTS facility) ; 8) Incubator (CO2 and temperature control) with automated transfer station for kinetic assays with live cells; 9) state of the art HTS microscope for widefield and confocal automated fluorescence microscopy.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP02 - WP02 - Pathogen Enabling Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

141.337,00 €

Cost description: Indirect cost will be used for
-travel expenses
-consumables
-hiring of administrative staff
further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment of Personnel for WP3 activities, U.O. Area Basovizza	0,00	0,00
3	Recruitment of Personnel for WP3 activities, U.O. CNR-IC	0,00	0,00
3	Recruitment and activities of N°2 Fixed Time researcher type A on activity 3.3, U.O. DIFARMA	49.755,00	49.755,00
5	Upgrade of the SPARK multiplate reader	54.826,40	104.581,40
6	Activities of Personnel for WP3 activities, U.O. Area Basovizza_1	54.659,88	159.241,28
6	Activities of Personnel for WP3 activities, U.O. CNR-IC_1	27.329,94	186.571,22
6	Activities of Personnel for WP3 activities, U.O. DIFARMA_1	49.755,00	236.326,22
7	Upgrade of the ITC instrument from ITC200 to PEAQ-ITC	185.040,45	421.366,67
9	Activities of Personnel for WP3 activities, U.O. Area Basovizza_2	54.659,88	476.026,55
9	Upgrade of the Wave (Creoptix) instrument from two to four channels	164.480,40	640.506,95
9	Activities of Personnel for WP3 activities, U.O. CNR-IC_2	27.329,94	667.836,89
9	Activities of Personnel for WP3 activities, U.O. DIFARMA_2	49.755,00	717.591,89

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

	DIFARMA_2		
9	Upgrade of the Elettra protein production and characterization facility_2	57.437,60	775.029,49
9	Upgrade of Elettra protein production and characterization facility_1	605.248,71	1.380.278,20
10	Acquisition of a multiparametric instrument for the analysis of molecular interactions	274.134,00	1.654.412,20
10	Upgrade of the Elettra protein production and characterization facility_3	201.032,00	1.855.444,20
10	Implementation of a high-throughput automated crystallization facility_ HT crystallization robot	172.312,80	2.027.757,00
11	The DIFARMA small molecules synthesis platform expansion completed	1.322.244,49	3.350.001,49
11	Acquisition of a HPLC-MS system for analytical and preparative purposes	541.414,65	3.891.416,14
11	Implementation of a high-throughput automated crystallization facility_ Imaging Robot	789.767,00	4.681.183,14
12	Activities of Personnel for WP3 activities, U.O. Area Basovizza_3	54.659,88	4.735.843,02
12	Activities of Personnel for WP3 activities, U.O. CNR-IC_3	27.329,94	4.763.172,96
12	Activities of Personnel for WP3 activities, U.O. DIFARMA_3	49.755,00	4.812.927,96
15	Activities of Personnel for WP3 activities, U.O. CNR-IC_4	27.329,94	4.840.257,90
15	Activities of Personnel for WP3 activities, U.O.	49.755,00	4.890.012,90

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

	WP3 activities, U.O. DIFARMA_4		
15	Activities of Personnel for WP3 activities, U.O. Area Basovizza_4	54.659,88	4.944.672,78

36 WP title

WP03 - Sample Preparation and characterization Platform for health and drug discovery

37 WP number

WP03

38 **Start month**(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno
CNR-IC	Istituto di Cristallografia – Sede Secondaria di Trieste	CO-APPLICANT: Consiglio Nazionale per le Ricerche

40 WP Leader

Alberto Cassetta (CNR-IC)

41 Summary of the activities envisaged in the WP

WP3 will be focused on the preparation, purification and characterization of the samples, different in size and nature, to be central in the multiscale and multimodal techniques described in the present upgrade of CERIC-ERIC. The platform described in WP3 will be instrumental to the activities of the PRP@CERIC and on the development of enabling technologies and the characterization tools offered by the infrastructure. Besides, availability of modern core facilities devoted at the production of mg-scale pure protein samples and to the synthesis of gram-scale bioactive compounds is also a general valuable asset in CERIC-ERIC. WP3 activities are pivotal in understanding mechanisms of pathogenesis and offer fundamental tools for the development of therapeutics. WP3 activities are also an integral part of a platform for hits and leads identification according to a structure-based drug discovery approach. The activities in WP3 are crucial for the development of bioactive, low-molecular mass molecules against the targets previously identified (Activities 3.1, 3.2, WP2, WP4, WP5, WP7, WP9).
The understanding and the modulation of the mechanisms of pathogenicity often need experimental validation by in vitro approach. Such investigations require the availability of biomacromolecules like enzymes or membrane receptors, at the highest purity level and in relatively

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

investigations require the availability of biomacromolecules like enzymes or membrane receptors, at the highest purity level and in relatively large quantity. Indeed, a relevant proportion of the activities at the core of PRP@CERIC relies on the disposal of significant amounts of pure proteins and macromolecular complexes. This is often the bottleneck in a range of projects, from structural analysis of pathogen targets using macromolecular crystallography or CryoEM, to their biophysical characterization, and the implementation of assays for high-throughput drug screening. Large-scale protein production requires infrastructures and expertise that are not always readily available in small/medium size research groups or companies; an efficient solution is thus the implementation of a centralized facility offering access to top-of-the-range instruments and know-how. The Activity 3.1 will implement the Protein Production laboratory at Elettra that will provide expertise for production of a range of macromolecular samples, including single proteins, antibodies, protein complexes, etc. A variety of expression systems will be available, ranging from bacteria to insect and mammalian cells. The characterization of the samples, through biophysical and biochemical assays will provide the relevant quality controls as well as the useful information on the function and mechanism of action of the target protein or protein complex. Pure and well-characterized protein samples will be fed to a variety of activities within the platform.

The biomolecular mechanism and drugs actions are often mediated by proteins and requires different approaches for a clear understanding. Knowledge of the 3D structure of proteins is fundamental to validate the mechanism of action of proteins and to guide the process of target-based drug discovery. Macromolecular crystallography is one of the main techniques for the determination of the atomic structures of proteins bound to drugs. The main bottleneck in crystal structure determination is to obtain well-diffracting crystals, that requires large amount of highly pure proteins, and is a time-consuming process. The availability of HT crystallization robots, that can dispense 25-100 nL droplets, performing thus thousands of crystallization experiments, allows to minimize both time and sample handling, and support parallel project progression. Another time-consuming and critical step is the evaluation of a huge number of crystallization experiments to identify the most promising results. Automated visualization systems allow the remote inspection of multiple plates, following the time course of each experiment without manual intervention. These high-throughput crystallization methods are especially important in the field of structure-based drug design, where one needs to crystallize a protein in complex with hundreds of compounds. The results produced daily from the high-throughput station for crystallization described in Activity 3.2, will be remotely accessible from users as a score of the digital images of different crystallization trials.

A proper answer against a novel pathogen menace includes the search for novel drugs as part of a therapy against the infection. The rational design of small organic molecules capable of neutralizing a specific target is an effective way of searching for new molecules of therapeutic value. Such a target-based approach requires not only understanding the target function, but also requires the rational design of a panel of new molecules. The experimental validation of the potential hits identified in WP2 and WP9 requires the ability to synthesize a relatively high number of new compounds. Activity 3.3 proposes a high-throughput synthetic laboratory aimed at the preparation of libraries of small-molecule compounds in rapid times and gram-scale, coherent with the development of synthetic procedures DNSH compliant. Indeed, the novel synthetic laboratory proposed as a CERIC-ERIC upgrade will be capable of 50 compounds/day exploiting green and sustainable synthetic protocols based on microwave systems, flow and electrochemical reactors. Advanced purification equipment will be available for chiral resolution and fast purification and will be based on supercritical fluid chromatography coupled with benchtop NMR and MS instruments. The entire synthetic platform will be highly integrated through automatic and robotic systems for the speed-up of the synthetic process.

The availability of fast biophysical techniques capable of a quantitative evaluation of the affinity or residence time of ligands for a therapeutic target can be seen as a validation mode of virtual docking results. It also provides a selection of the target-ligands complexes to be further analyzed in WP4 by structural methods. WP3 will offer a facility devoted to fast and thorough analysis of target/ligand interactions in a medium to high-throughput perspective. Several, orthogonal techniques are envisaged in Activity 3.4: GCI, ITC, fluorescence polarization, electrically switchable nanolevers, in an attempt to globally and quantitatively evaluate the thermodynamics, the kinetics and the hydrodynamics of the interactions. While focused on target interactions with low-molecular mass ligands, the Biophysical laboratory of UO CNR-IC, available through the CERIC-ERIC upgrade, will be capable also of dealing with protein-protein interactions such as those involving monoclonal antibodies.

42 WP inter-relation with other WWPP

WP2,WP4,WP5,WP6,WP7,WP8,WP9,WP10,WP11,WP12

43 Most relevant outcome:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

The Sample Preparation and characterization Platform will offer instrumentation and expertise to obtain samples of recombinant proteins from pathogens and hosts ensuring the delivery of soluble, stable and pure proteins that are prerequisite for the success of any drug discovery pipeline. The Protein Production laboratory at Elettra will offer the expression in prokaryotes and eukaryotes (insect and mammalian cells) and purification of large quantities and varieties of proteins. Quality assessments will be guaranteed by fast analytical assays with low sample consumption, to validate the proteins suitability for the different applications. Tools for biochemical and biophysical assays will be available, to give insights into the in vitro function of the target proteins. The laboratory will be organized to cover the whole protein production workflow offering complete support to users, also favoring their direct access to the lab services, ensuring a dedicated tutoring service.
An expansion of the Elettra crystallization station, proposed in Activity 3.2 and consistently with the LoI referring to all the collaboration activities between Area and Elettra SCpA (see the uploaded document PRP_Lettera-Intenti-Area-Elettra-signed), will provide users with a modern station for high-throughput crystallization and structure-based drug discovery. An up-to-date crystallization robot will not only allow to perform automatic and rapid crystallization experiments, saving time and effort, but also to minimize sample use. The facility will significantly increase the rate of success of crystallization trials, and the number of structures obtained. State-of-the-art imaging systems will allow remote monitoring of the experiments detecting promising micro-crystals that will be the starting point for further optimization, or may feed the CryoEM facility for micro-electron diffraction (WP4). Access to users will be possible both in person and remotely.
The activity 3.3 will be focused on the implementation of the small molecule synthesis unit of fast, effective, green and high-yield synthetic strategies for the rapid development of new molecular libraries. In particular, within the RI needs, activity 3.3 will be devoted to the high throughput chemical synthesis by implementation of microwave, continuous-flow and electrochemical synthesis, also improving compounds purification and characterization capabilities
The Biophysical Laboratory implemented in Activity 3.4 will offer orthogonal biophysical methodologies to allow a consistent view of target-ligand binding events. While naturally included in hit-to-lead pipeline, the facility will be of use when investigating the molecular basis of pathogenesis. The upgraded facility will analyze targets and ligands of very different molecular weight and affinities, from high fM to mM. thermodynamics, kinetics, and hydrodynamics can be explored with the facility, in a medium to high-throughput perspective with low-volume low-concentration samples.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP3 activities, U.O. Area Basovizza	3	N/A
Recruitment of Personnel for WP3 activities, U.O. CNR-IC	3	N/A
Recruitment and activities of N°2 Fixed Time researcher type A on activity 3.3,	3	Six-months report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

A on activity 3.3, U.O. DIFARMA		
Upgrade of the SPARK multiplate reader	5	Report on the Act. 3.4 working status focused on the SPARK (TECAN) instrument upgrade
Activities of Personnel for WP3 activities, U.O. Area Basovizza_1	6	Six-months report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. CNR-IC_1	6	Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. DIFARMA_1	6	Six-months report on the Personnel activities and associated time-sheets
Upgrade of the ITC instrument from ITC200 to PEAQ-ITC	7	Report on the Act. 3.4 working status focused on the ITC 200 instrument upgrade to PEAQ-ITC
Activities of Personnel for WP3 activities, U.O. Area Basovizza_2	9	Six-months report on the Personnel activities and associated time-sheets
Upgrade of the Wave (Creoptix) instrument from two to four channels	9	Report on the Act. 3.4 working status focused on the Wave (Creoptix) instrument upgrade to 4 channels
Activities of Personnel for WP3 activities, U.O. CNR-IC_2	9	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. DIFARMA_2	9	Six-months report on the Personnel activities and associated time-sheets
Upgrade of the Elettra protein production and	9	Report on the Act. 3.1 working status focused on the acquisition and installation of a new cold room

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

production and characterization facility_2		
Upgrade of Elettra protein production and characterization facility_1	9	Report on the Act. 3.1 working status focused on the instrumentation acquisition for MP, MST and orbital shaker
Acquisition of a multiparametric instrument for the analysis of molecular interactions	10	Report on the Act. 3.4 working status focused on the instrumentation acquisition for the multiparametric instrument for the analysis of molecular interactions
Upgrade of the Elettra protein production and characterization facility_3	10	Report on the Act. 3.1 working status focused on the instrumentation acquisition for FPLC and 1 floor centrifuge with rotor and HEPA filter
Implementation of a high-throughput automated crystallization facility_ HT crystallization robot	10	Report on the Act. 3.2 working status focused on the acquisition and installation of a new HT crystallization robot
The DIFARMA small molecules synthesis platform expansion completed	11	Report on the Act. 3.3 working status focused on the implementation of small molecules synthesis platform.
Acquisition of a HPLC-MS system for analytical and preparative purposes	11	Report on the Act. 3.4 working status focused on the instrumentation acquisition for the HPLC-MS system
Implementation of a high-throughput automated crystallization facility_ Imaging Robot	11	Report on the Act. 3.2 working status focused on the acquisition and installation of the two integrated imaging systems
Activities of	12	Six-months report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for WP3 activities, U.O. Area Basovizza_3	12	Six-months report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. CNR-IC_3	12	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. DIFARMA_3	12	Six-months report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. CNR-IC_4	15	Final Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP3 activities, U.O. DIFARMA_4	15	Final report on the Personnel activities and associated time-sheet
Activities of Personnel for WP3 activities, U.O. Area Basovizza_4	15	Final report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of Personnel for WP3 activities, U.O. Area Basovizza	3	1-Number of signed contracts. The KPI target value is set to 2 at M6
Recruitment of Personnel for WP3 activities, U.O. CNR-IC	3	1-Number of signed contracts. The KPI target value is set to 1 at M6
Recruitment and activities of N°2 Fixed Time researcher type	3	1-Number of signed contracts. The KPI target value is set to 2 at M6 2-Achievement of the technical and scientific competences according to the identified scientific responsible.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Fixed Time researcher type A on activity 3.3, U.O. DIFARMA		2-Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of the SPARK multiplate reader	5	- Number of SPARK (TECAN) instruments upgraded for PRP@CERIC users: The KPI target value is set to 1 at M24 2 - Number of protein-ligand experiments performed by the upgraded SPARK (TECAN) instrument: The KPI target value is set to 2 at M30 3 - Number of protein-ligand experiments performed by the facility requiring at least two combined techniques, and including the upgraded SPARK instrument: The KPI target value is set to 2 at M30
Activities of Personnel for WP3 activities, U.O. Area Basovizza_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. CNR-IC_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. DIFARMA_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of the ITC instrument from ITC200 to PEAQ-ITC	7	1 - Number of ITC200 instruments upgraded to PEAQ-ITC for PRP@CERIC users: The KPI target value is set to 1 at M24 2 - Number of protein-ligand experiments performed by the PEAQ-ITC instrument: The KPI target value is set to 2 at M30 3 - Number of protein-ligand experiments performed by the facility requiring at least two combined techniques, and including the upgraded PEAQ-ITC instrument: The KPI target value is set to 2 at M30
Activities of Personnel for WP3 activities, U.O. Area Basovizza_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of the Wave (Creoptix) instrument from two to four channels	9	1 - Number of Wave (Creoptix) instruments upgraded to four channels for PRP@CERIC users: The KPI target value is set to 1 at M24 2 - Number of protein-ligand experiments performed by the upgraded Wave

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

		2 - Number of protein-ligand experiments performed by the upgraded Wave instrument: The KPI target value is set to 2 at M30 3 - Number of protein-ligand experiments performed by the facility requiring at least two combined techniques, and including the upgraded Wave instrument: The KPI target value is set to 2 at M30
Activities of Personnel for WP3 activities, U.O. CNR-IC_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. DIFARMA_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of the Elettra protein production and characterization facility_2	9	1-Number of new cold rooms available for PRP@CERIC users. The KPI target value is set to 1 at M30.
Upgrade of Elettra protein production and characterization facility_1	9	1-Number of new instruments for protein production at PRP@CERIC for users The KPI target value is set to 6 at M24 2- Number of acquired MP and MST data sets at M24. The KPI target value is set to 4; The KPI target value is expected to increase at least of 6 units at M30, and for the following semesters from M30 to M30+M24. 3- Number of protein production user projects using the orbital shakers and Centrifuge. The KPI target value is set to 4 at M24; The KPI target value is expected to increase at least of 6 units at M30, and for the following semesters from M30 to M30+M24.
Acquisition of a multiparametric instrument for the analysis of molecular interactions	10	1 - Number of nanolever-based instruments upgraded to four channels for PRP@CERIC for users: The KPI target value is set to 1 at M24 2 - Number of protein-ligand experiments performed by the newly acquired nanolever-based instrument: The KPI target value is set to 2 at M30 3 - Number of protein-ligand experiments performed by the facility requiring at least two combined techniques, and including the newly acquired nanolever-based instrument: The KPI target value is set to 2 at M30
Upgrade of the Elettra protein production and characterization facility_3	10	1- Number of protein production user projects using the FPLC and 1 floor centrifuge with rotor . The KPI target value is set to 4 at M24; The KPI target value is expected to increase at least of 6 units at M30, and for the following semesters from M30 to M30+M24.
Implementation of a high-	10	1-Number of new crystallization stations available for PRP@CERIC users. The KPI target value is set to 1 at M24

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

of a high-throughput automated crystallization facility_ HT crystallization robot		KPI target value is set to 1 at M24 2-Number of crystallization plates prepared. The KPI target value is set to 40 at M30;
The DIFARMA small molecules synthesis platform expansion completed	11	-Number of compound libraries synthetized in a M30 + M24 period The KPI target value is set to 2 -Number of newly trained users for SFC and Flow chemistry platforms The KPI target value is 15 at M30 + M24 -Number of new trained users for high throughput synthesis Laboratory The KPI target value is set to 8 at M30+M24
Acquisition of a HPLC-MS system for analytical and preparative purposes	11	1 - Number of HPLC-MS system implemented for PRP@CERIC users: The KPI target value is set to 1 at M24 2 – Number of small-molecule ligands purified and analyzed with the HPLC-MS system: The KPI target value is set to 5 at M30 3 – Number of protein samples analyzed with the HPLC-MS system: The KPI target value is set to 2 at M30
Implementation of a high-throughput automated crystallization facility_ Imaging Robot	11	1-Number of imaging systems at crystallization stations available for PRP@CERIC users. The KPI target value is set to 2 at M20 2-Number of crystallization plates prepared. The KPI target value is set to 40 at M30; the KPI target value is set to 200 at M30 + M24
Activities of Personnel for WP3 activities, U.O. Area Basovizza_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. CNR-IC_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. DIFARMA_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. CNR-IC_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of	15	PI: Achievement of the technical and scientific competences according to the

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for WP3 activities, U.O. DIFARMA_4	15	PI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP3 activities, U.O. Area Basovizza_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP3 activities, U.O. Area Basovizza*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

Recruitment of 2 Researchers for 24 months for activities 3.1 and 3.2 (1 FTE each)

IO Title *Recruitment of Personnel for WP3 activities, U.O. CNR-IC*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

2 years contract for TD researcher with a background in biophysics, molecular biology, or chemistry, that will be involved in the development of the facility and in biomolecular interactions experiments (1 FTE)

IO Title *Recruitment and activities of N°2 Fixed Time researcher type A on activity 3.3, U.O. DIFARMA*

IO Bimestre *3* IO Costs *49.755,00*

IO Desciption

Recruitment of N°2 Fixed Time researcher type A (RTD-A, L.240/2010) in Medicinal Chemistry.
Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.3

IO Title *Upgrade of the SPARK multiplate reader*

IO Bimestre *5* IO Costs *54.826,40*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*5*	IO Costs	*54.826,40*

IO Desciption

Activity 3.4 foresee an expansion of the techniques currently available at the Biophysical Laboratory of CNR-IC to be made available to PRP@CERIC. To allow for a wider panel of techniques available at the Biophysical Laboratory at CNR-IC fluorescence polarization and fine T control will be implemented in the SPARK plate reader, to implement a new methodology in molecular recognition investigation, with limited sample consumption and complementary to the other techniques available at the Biophysical Laboratory.

IO Title	*Activities of Personnel for WP3 activities, U.O. Area Basovizza_1*		
IO Bimestre	*6*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.1 and 3.2

IO Title	*Activities of Personnel for WP3 activities, U.O. CNR-IC_1*		
IO Bimestre	*6*	IO Costs	*27.329,94*

IO Desciption

echnical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Activity 3.4

IO Title	*Activities of Personnel for WP3 activities, U.O. DIFARMA_1*		
IO Bimestre	*6*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.3

IO Title	*Upgrade of the ITC instrument from ITC200 to PEAQ-ITC*		
IO Bimestre	*7*	IO Costs	*185.040,45*

IO Desciption

As a complementary instrument to sensor-based instrumentation and for a complete thermodynamic parametrization of the binding interactions, the Isothermal Titration Calorimeter currently used at the Biophysical Laboratory at CNR-IC for the target-drugs interaction studies, will be upgraded to a semi-automatic instrument for higher throughput and increased sensitivity. Under the Activity 3.4, the upgrade to a new ITC system, made available to PRP@CERIC users, allows for a larger number of samples to be analyzed within a day. Furthermore, the upgraded ITC instrument will deliver data of higher accuracy for a careful evaluation of the

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

3.4, the upgrade to a new ITC system, made available to PRP@CERIC users, allows for a larger number of samples to be analyzed within a day. Furthermore, the upgraded ITC instrument will deliver data of higher accuracy for a careful evaluation of the thermodynamic parameters of binding event, in solution.

IO Title	*Activities of Personnel for WP3 activities, U.O. Area Basovizza_2*		
IO Bimestre	*9*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.1 and 3.2

IO Title	*Upgrade of the Wave (Creoptix) instrument from two to four channels*		
IO Bimestre	*9*	IO Costs	*164.480,40*

IO Desciption

Under the activity 3.4, the panel of methodologies and techniques currently available at Biophysical Laboratory at CNR-IC, will be upgraded and expanded. The Grating Coupled Interferometry based instrument, in-use for accurate protein-ligand interaction studies, to four channels will be upgraded to four channels. The upgrade allows for a drastic reduction of the time required for the analysis together with a higher throughput in sample analysis. A novel and more sophisticated method of analysis will be also implemented

IO Title	*Activities of Personnel for WP3 activities, U.O. CNR-IC_2*		
IO Bimestre	*9*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Activity 3.4

IO Title	*Activities of Personnel for WP3 activities, U.O. DIFARMA_2*		
IO Bimestre	*9*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.3

IO Title	*Upgrade of the Elettra protein production and characterization facility_2*		
IO Bimestre	*9*	IO Costs	*57.437,60*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity 3.1 foresees the acquisition and installation of a new cold room at UO Area Basovizza

IO Title	*Upgrade of Elettra protein production and characterization facility_1*		
IO Bimestre	*9*	IO Costs	*605.248,71*

IO Desciption

For activity 3.1, a new generation instrument to assess protein integrity and function will be acquired: a mass photometry system (MP) and a microscale thermophoresis system (MST) to assess sample quality and protein-ligand interaction using very little sample. In addition, 3 orbital shaking incubators will be acquired to grow bacteria, insect and mammalian cells respectively.

IO Title	*Acquisition of a multiparametric instrument for the analysis of molecular interactions*		
IO Bimestre	*10*	IO Costs	*274.134,00*

IO Desciption

A novel instrument, based on electrically switchable nanolevers, will be implemented at the Biophysical Laboratory at CNR-IC, and made available to PRP@CERIC users. Under Activity 3.4 the newly acquired instrument will complement the existing instruments now operating at Biophysical Laboratory at CNR-IC, being suited for high-throughput analysis of hydrodynamic parameters, conformational changes upon binding. Furthermore, this new instrument allows for the evaluation of the avidity of antibodies and possesses FRET mode capabilities.

IO Title	*Upgrade of the Elettra protein production and characterization facility_3*		
IO Bimestre	*10*	IO Costs	*201.032,00*

IO Desciption

For activity 3.1, foresees the acquisition of 3 chromatography systems for fast preparative purification of proteins. One of the systems will perform for low volume sample handling,
and 1 floor centrifuge with rotor and HEPA filter.

IO Title	*Implementation of a high-throughput automated crystallization facility_ HT crystallization robot*		
IO Bimestre	*10*	IO Costs	*172.312,80*

IO Desciption

Act. 3.2 will reinforce the Crystallization station at Elettra to allow high-throughput experimental management for SBDD projects that require the efficient manipulation of hundreds of compounds, performing thousands of crystallization trials in parallel. To this scope, a fast and versatile robotic system for HT crystallization of nanoliter-size samples in 96-well microplates using different geometry is needed; the system will be integrated by a humidity-controlled chamber to avoid sample evaporation.

IO Title	*The DIFARMA small molecules synthesis platform expansion completed*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*The DIFARMA small molecules synthesis platform expansion completed*		
IO Bimestre	*11*	IO Costs	*1.322.244,49*

IO Desciption

The DIFARMA small molecules synthesis platform will be expanded allowing high-throughput synthesis and pursuing green and sustainable chemical procedures through the use of microwave systems, flow-chemistry and electrochemical reactors Similarly, purification capability of HT synthesis Laboratory will be implemented by fully automated flash chromatographic stations, working both in direct and inverse phase to allow fast and reliable purification of lipophilic and hydrophilic molecules. The final aim is to increase the synthetic capability of at least 50 compounds/day. Faster and eco-friendly purification strategies will also be implemented, by taking advantage of the speed and efficiency of supercritical fluid chromatography both at analytical and preparative scale, which will provide enantioselective separation, for the precise characterization of chiral compounds. Robotization for starting material selection, manipulation and pick-up will be introduced for synthesis and purification to save time, increase yields and improve safety. The different modules of the platform will provide lab scale as well gram-scale synthesis to support both lead compounds and candidate drug synthesis. Furthermore, purity assessment and compound characterization will be performed by an integrated benchtop NMR and LC-MS system. Activity 3.4 will be fully integrated with multi- omics platform allowing synthesis for the different druggable targets identified therein (7.1). Moreover, the activity 3.4 will provide chemical tools for structural analysis, target entanglement studies (WP4) and will be supported by in silico studies (WP9) and cellular HTS (WP2) for the design of target-based molecular libraries.

IO Title	*Acquisition of a HPLC-MS system for analytical and preparative purposes*		
IO Bimestre	*11*	IO Costs	*541.414,65*

IO Desciption

A HPLC-MS with a detector for relatively high m/z will be implemented under the Activity 3.4 and is an essential tool to check for both the integrity and the identity of the proteins and ligands samples and will be of use also in activity 3.1. Furthermore, a preparative HPLC-MS will be also required to carry out an on-site further purification steps on low-molecular mass ligands.

IO Title	*Implementation of a high-throughput automated crystallization facility_ Imaging Robot*		
IO Bimestre	*11*	IO Costs	*789.767,00*

IO Desciption

The increased throughput will require the implementation of an automated imaging system suitable to handle hundreds of crystallization plates and store them at controlled temperatures. In Act. 3.2, two integrated imaging systems will be installed in the Crystallization station of Elettra; one to keep temperature controlled at 20°C and the other to ensure stable 4°C control. Each system will include a microscope with an independent light path for crystallization experiments imaging using transmitted and polarized light and UV light. A dedicated Laboratory Information Management System (LIMS) will allow to manage image collection and analysis, using a universally recognized scoring system to help automatic identification of crystals and/or promising conditions. Collected images will be accessible to users throughout the Virtual User System of Elettra for data analysis and management.

IO Title	*Activities of Personnel for WP3 activities, U.O. Area Basovizza_3*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*12*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.1 and 3.2

IO Title	*Activities of Personnel for WP3 activities, U.O. CNR-IC_3*		
IO Bimestre	*12*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Activity 3.4

IO Title	*Activities of Personnel for WP3 activities, U.O. DIFARMA_3*		
IO Bimestre	*12*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.3

IO Title	*Activities of Personnel for WP3 activities, U.O. CNR-IC_4*		
IO Bimestre	*15*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Activity 3.4

IO Title	*Activities of Personnel for WP3 activities, U.O. DIFARMA_4*		
IO Bimestre	*15*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.3

IO Title	*Activities of Personnel for WP3 activities, U.O. Area Basovizza_4*		
IO Bimestre	*15*	IO Costs	*54.659,88*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Technical and Scientific activities of the personnel for the fulfillment of WP3 deliverables associated to Act. 3.1 and 3.2

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Protein Production and Characterization

49 Activity short name

3.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Upstream: 3 orbital shaking incubators will be acquired to grow bacteria, insect and mammalian cells respectively, and 1 floor centrifuge with rotor and HEPA filter.

Downstream: 3 FPLCs systems will be acquired: 1 of analytical and 2 of preparative scale. The preparative FLPCs will be located inside a newly installed cold room that will replaced the old one. For FPLC only two companies, BioRad and Cytiva, sell instruments with the required specifications.

Quality control: Two new generation instruments to assess protein integrity and function will be acquired: (i) microscale thermophoresis (MST) system to quantify binding affinities in-solution on different molecules, using very little sample; (ii) a photometry system (MP) to measure in minutes the mass of single molecules in solution to evaluate stability, and oligomerization using very little sample.. Both procedures will not require public tender as instruments have unique specifications and unique providers.

For all the instruments, market search will start at
M1. Delivery and installation of the goods is expected at B8-B9 depending on the type of procedure, according with the project timeline.

Commissioning with samples by PRP partners, or in-house research will start at M18 for MST and M20 for MP. Commissioning for upstream and downstream equipment will start at M24.
FAIR integration and follow-up will start at the end of the PRP project.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: A fixed term scientist with strong expertise in protein expression, purification and biochemical/biophysical characterization with knowledge in production and analysis of multi-macromolecular complexes and proteins from hosts and pathogens. For the Activity 3.1 she/he will be accounted for 1 FTE from M6 to M30 (24 months).

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

807.213,00 €

Cost description: Nr. 3 Orbital shakers for cell cultures with temperature control (refrigerated), stackable with related accessories for Erlenmeyer Flasks of 250-2000 ml, with option of CO2 influx:

Nr. 1 high performing floor-centrifuge for large volume sample clarification with HEPA filter and large-volume rotor, installation;

Nr. 3 Fast Protein Liquid Chromatography (FPLC) systems for analytical and preparative purification of proteins comprising software, computer, installation, training, and 1-year warranty;

Nr. 1 Microscale thermophoresis system including control-notebook, control and analysis software, delivery & set up, 1-year warranty, and training on site;

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Nr. 1 Mass-photometric system with anti-vibration desk including control-computer, control-analysis software, delivery and installation, 1-year warranty, and training on site;

Cold room with internal benches for chromatographic systems including delivery and installation;

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

63.656,67 €

Cost description: - travel expenses
-consumables
-hiring of administrative staff
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Protein Crystallization

49 Activity short name

3.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

52 Activity description

At Elettra is present a small crystallization suite, with limited throughputs that serves the internal scientist's community. Aim of activity 3.2 is to reinforce the facility enhancing throughput of crystallization trials, plate storage and sample imaging in order to allow performing SBDD projects that require the manipulation of hundreds of compounds in parallel.
A crystallization robot will be installed in the Crystallization station of the Structural Biology Lab of Elettra to perform high-throughput, cost-effective liquid-handling with dispensing reproducibility down to 25 nl. The system will be suitable for different crystallization configurations and equipped with active humidity chamber to avoid sample evaporation. Acquisition of the documentation will start in M6 and a public tender will not be required as the system has unique features and a unique provider. The order and purchase procedures will be at M12, and installation and training will be completed by M18.
In the same room will be located two crystallization imager equipped with double optical devices: a visible light optical system with polarization filter and an UV light microscope to detect protein crystals. Both systems will be furnished with temperature-controlled storage hotels for plate incubation at 20°C and 4°C respectively. Market research will start at M6 and publication of the tender will be done by M12. Order and acquisition procedures will be completed by M14, while installation, training and payment will occur M22. Commissioning with samples by PRP@CERIC partners, or in-house research for the crystallization robot will start in M20 and be completed in M28; for the crystallization imagers it will start at M24and will end in M30. From M30 the facility will be open to CERIC/ERIC users and other users.
FAIR integration and follow-up will start during commissioning at M20 and will continue beyond the end of the PRP project.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: A fixed term scientist with expertise in protein crystallization, macromolecular structure determination and biophysical methods with knowledge in structure based drug design..
*For the Activity 3.2 she/he will be accounted for 1 FTE from M6 to M30 *24 months)*

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

899.140,00 €

Cost description: Liquid handling robot for protein crystallization drop with volume range 25 nl - 1.2 ul with position plate deck humidity chamber and including PC, application software;

Nr. 2 automated imaging and incubation systems for protein crystallization plates for incubation at 4 °C or 20 °C. The systems will include Visible light optics, UV light optics, barcoding printer, control and analysis software plus web license, PCs;

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.5 e. Indirect costs

70.091,56 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-hiring of administrative staff
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Drug-target interaction modelling: lead compound identification

49 Activity short name

3.3

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	DIFARMA	Participant	Università degli Studi di Salerno

52 Activity description

In the activity 3.3 aims to strength the actual capability of the HT synthesis Laboratory unit to rapidly provide pure and fully characterize compound libraries to be immediately tested against identified druggable targets. In the frame of WP3 this activity foresees the implementation of effective and green synthetic and purification strategies by i) microwave solid phase synthesizers and a scalable (mg/Kg) reactor apparatus, ii) supercritical fluid chromatography (SFC) at both analytical and preparative scale by novel CO2 based LC systems, which are also capable of enantioselective separation by dedicated chiral stationary phases, iii) rapid chemical characterization by a novel, compact benchtop NMR (Bruker Fourier 80) and purity assessment by UHPLC- PDA-MS (ARC.system coupled to QDa mass detector).
Instrument order and hardware commissioning: The activity 3.3 will start at month M8 with the tender publication of SFC, NMR, LC-MS which for their specifications are delivered by only three companies, respectively Shimadzu, Bruker and Waters, while complete labware for HT synthesis will be preceded by market search during M6-M7. The tender assignment will close at the end of month M11, while delivery and installation will take place during M15-M17, followed by training at M18-20.
Scientific Commissioning: The sample preparation platform will be capable of working in integration with activity 3.4 for fast assessment of target-ligand interaction. The platform will be immediately open after testing in working conditions at M21.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

of target-ligand interaction. The platform will be immediately open after testing in working conditions at M21.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation from M21. In-house research and user operation will continue until the end of the project and beyond, supported by UNISA-DIFARMA researchers.
Each platform will be opened to users from month M20. In-house research and user operation will continue until the end of the project and beyond.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

232.500,00 €

Cost description: N°2 Fixed Time researcher type A (RTD-A, L.240/2010) in Medicinal Chemistry. Previous expertise: Synthesis of small molecules)

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.235.742,51 €

Cost description: N°1 Benchtop Bruker NMR system with autosampler and comprising of software and training for n°4 users, extended full risk warranty;
N°1 Shimadzu Supercritical fluid chromatography systems (analytical) comprising of software and training for n°4 users, extended full risk warranty;
N°1 Benchtop LCMS system Waters with autosampler, column oven, compact single quadrupole MS analyzer, including software and training for 4 users, extended full risk warranty;
Complete platform for HT synthesis, purification and preliminary physicochemical characterization;

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

102.776,98 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-hiring of administrative staff
-further improving automation

54.6 f. Training activities

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Biophysical investigation of target-ligand interactions

49 Activity short name

3.4

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	CNR-IC	Participant	Consiglio Nazionale per le Ricerche

52 Activity description

In activity 3.4 we propose to upgrade and expand the panel of methodologies currently available Biophysical Laboratory, by improving the existing instrumentation and adding complementary novel instrumentation.
Instrument order and hardware commissioning:
The actions undertake will be the following:
Upgrade of the Wave (Creoptix) instrument from two to four channels: Order procedure is expected to be concluded at M6. Installation, training and payment are expected to be completed at M18.
Upgrade of the ITC instrument from ITC200 to PEAQ-ITC. Order procedure is expected to be concluded at M9. Installation, training and payment are expected to be completed at M13.
Upgrade of the SPARK multiplate reader. Order procedure is expected to end at M7. Installation, training and payment are expected to be completed at M10.
Acquisition of a multiparametric instrument for the analysis of molecular interactions. Market analysis and tender procedures are expected to end at month 14. Installation, training and payment are expected to be completed at M19.
Acquisition of a HPLC-MS system for analytical and preparative purposes: Market analysis and tender procedures are expected to end at month 18. Installation, training and payment are expected to be completed at M22.

Scientific Commissioning: Test of the instrumentation with samples provided by PRP@CERIC partners, or from in-house research will start at the end of hardware commissioning and will last for 4 months that is. At the end of the test phase, the instrumentation will be open to users.
Software Commissioning: Architecture design and FAIR integration of the data produced in Activity 3.4 will proceed as a parallel. We expect full integration for the end of the project.

54 Activity budget

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP03 - WP03 - Sample Preparation and characterization Platform for health and drug discovery]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: 2 years contract for TD researcher with a background in biophysics, molecular biology or chemistry, that will be involved in the development of the facility and in biomolecular interactions experiments

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.140.090,00 €

Cost description: Upgrade of the currently available instrument Wave (Creoptix) exploiting Grating Coupled Interferometry from two channel to four channel.
Upgrade of Isothermal Titration Calorimeter from ITC200 to PEAQ-ITC instrument (Malvern)
Upgrade of the currently used microplate reader TECAN SPARK for T control (18-42), AlphaSCREEN and fluorescence polarization analysis.
Acquisition of a new instrument that allows to probe the hydrodynamic friction of molecules and serves to determine the size, shape and conformation of biomolecules and capable of FRET of the like of Helix+ instrument produced by Dynamic Biosensors.
Implementation of a HPLC equipped with a UV / Visible monochromator detection and an ESI SPRAY Mass detector and a preparative HPLC equipped with a UV / Visible filter detector.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

86.958,06 €

Cost description: CNR indirect costs will be partially used to cover the institutional overheads that cover the running costs of the Institute. The remaining part will be used as follows:
-Travel costs, conference fees, training periods
-Chemical and biological Hoods maintenance, Waste disposal
-Consumables and running costs linked to the experimental activity like chemicals and disposable materials.

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	Cumulative Costs
3	Recruitment of Personnel for WP4 activities, U.O. CNR-IOM	0,00	0,00
6	Activities of Personnel for WP4 activities, U.O. CNR-IOM_1	72.879,84	72.879,84
9	Activities of Personnel for WP4 activities, U.O. CNR-IOM_2	72.879,84	145.759,68
12	Activities of Personnel for WP4 activities, U.O. CNR-IOM_3	72.879,84	218.639,52
15	CryoEM station installation,commissioning and determination of the structure of a gold standard	5.087.796,50	5.306.436,02
15	Activities of Personnel for WP4 activities, U.O. CNR-IOM_4	72.879,84	5.379.315,86

36 WP title

WP04 - Integrated Structural Biology Platform

37 WP number

WP04

38 Start month(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
CNR-IOM	Istituto Officina dei Materiali del CNR	CO-APPLICANT: Consiglio Nazionale per le Ricerche

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

40 WP Leader

Marco Lazzarino (CNR-IOM)

41 Summary of the activities envisaged in the WP

The aim of the WP4 is to establish an integrated structural biology platform within the CERIC-ERIC Trieste node implementing the following actions: 1) establishing a facility for Cryo-microscopy for structural biology, structured with a Cryo- electron microscope (CryoEM) station able to cover the whole range of electron-based techniques, from single particle analysis (SPA), to electron diffraction on sub-micrometric crystals (MicroED), to cryo-electron tomography (CryoET) from biological organelles or frozen cellular lamellas; 2) complementing with X-ray structural characterization techniques: 2a) available to date single-crystal XRD from small molecules to macromolecules at XRD1 Elettra and CNR-IC beamline, MX beamline XRD2 at Elettra, powder diffraction on drug formulations at XRD1 and MCX beamlines; small-angle X-ray scattering (SAXS) at the Austrian SAXS@Elettra beamline through CERIC-ERIC; 2b) foreseen in the upgrade program of Elettra to Elettra 2.0 diffraction limited storage ring (μXRD beamline at Elettra 2.0); 3) exploiting the facilities present at Elettra and CNR: protein production and characterization carried out in the Structural Biology Laboratory at Elettra and in the Biophysical Laboratory of CNR-IC.

Structural biology can provide a detailed description of proteins and macromolecular complexes at the atomic level, and thus offer an essential framework to understand their functions. This information is not only a fundamental step in the elucidation of the mechanism of action and biological role of proteins and nucleic acids, but generates invaluable information for the exploitation of this knowledge in medicine and industry, from the rational design of new drugs, antiviral and antibiotics, the optimization of therapeutic antibodies, to the development of vaccines.
The remarkable success of structural methods in biology have continuously been driven by rapid and constant technical and infrastructural developments. Initially, XRD have been the major tools to investigate macromolecules. Intense and tunable X-ray sources offered by synchrotrons provided a huge boost to the field, allowing scientists to tackle complex macromolecular assemblies, integrating low resolution techniques such as SAXS and high-resolution macromolecular crystallography (MX). In Italy, Trieste has been at the very core of these developments, providing access to one of the first European 3rd generation tunable Xray crystallography beamlines (XRD1), as well as a to the more recent MX-dedicated beamline (XRD2).
However, high resolution information by MX is limited by the need of obtaining well-ordered crystals. With the increasing knowledge and the developments of more sophisticated molecular biology tools, scientists wish to tackle larger and more complex assemblies, which are often flexible, polymorphic and thus less easy to trap into ordered lattices. Since the '90s, low resolution information on these complexes was obtained by either SAXS or CryoEM, but only the recent development of direct electron detectors enabled a resolution sufficient to build a three-dimensional atomic model and to interpret biological data in the context of a chemical model.
Although the importance of CryoEM to study single macromolecular structures has long been recognised, only very recently the first centres have been opened in Italy, but still their capacity is far beyond the increasing demands from the community of structural and molecular biologists.
There is obviously a large overlap between CryoEM and MX communities. In a structural project, a great fraction of the effort is focussed on expressing and purifying to high homogeneity proteins and protein complexes. Likewise, the same tools are used for model building, refinement and analysis. This overlap has triggered the establishment of CryoEM laboratories within or very near synchrotron facilities at ESRF, Diamond, Solaris, Petra, etc; these CryoEM facilities are often run as a "beamline", exploiting the infrastructure already in place for user selection and management.
An additional area of overlap directing the synergic upgrade of the integrated structural biology PRP@CERIC ecosystem relies on the possibility of obtaining structural information from microcrystals and nanocrystals. Very often protein crystallization experiments can produce showers of small crystals rather than the larger single crystals needed for conventional MX experiments. State-of-the-art MX beamlines, such as the planned upgraded μXRD at Elettra 2.0, will allow microcrystal diffraction, that will extend the useful crystal size down to a few μm. For submicrometric crystals (typically 100-200 nm), that cannot be analysed by micro-XRD, micro-electron diffraction (MicroED) is the method of choice, for the fast, high-resolution structure determination. The same technique can be used for small molecule structure, providing an essential tool for the pharmaceutical industry, which is complementary to single crystal X-ray diffraction and powder diffraction (performed at XRD1, XRD2 and MCX beamlines). Electron-based methods, in particular Cryo-electron tomography (CryoET), play an important role also in the visualization of cellular and subcellular structure. CryoET can also be

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

electron tomography (CryoET), play an important role also in the visualization of cellular and subcellular structure. CryoET can also be used to visualize a variety of other medically relevant biological systems, from exosomes to the fibres involved in neurodegenerative diseases.

42 WP inter-relation with other WWPP

WP2,WP3,WP5,WP6,WP7,WP9,WP10,WP11,WP12

43 Most relevant outcome:

The integrated structural biology platform will provide Italian and European users with state-of-the-art experimental instruments and expertise in the field of macromolecular crystallography and cryo-electron microscopy, integrated with small-angle X-ray scattering and powder diffraction. The facility will establish optimized workflows to efficiently access a wide range of complementary technologies that will help to solve research questions in a time and cost-effective manner.
The centralised location of a wide offer of structural biology instruments, from synchrotron-based X-ray techniques (single crystal and microcrystal X-ray diffraction, powder diffraction, small-angle X-ray scattering), to electron-based techniques (single particle cryo-electron microscopy, micro-electron diffraction and electron tomography), will grant user access to an internationally competitive and integrated pipeline, at the forefront of modern structural biology.
Within the CERIC-ERIC consortium, this platform will be integrated in an already existing CryoEM framework, which also includes a high performance CryoEM facility at Solaris (PL). The planned cryo-microscopy facility will offer either the possibility of determining autonomously a large number of macromolecular structures to atomic resolution, while users could extend and refine the analysis via access also to the top-of-the-range Solaris instrument; the integration between these facilities will allow users to easily access these machines in a seamless manner. Must to be highlighted at this stage that Solaris synchrotron does not host a MX beamline, and therefore the bidirectional support is also from XRD2 beamline to Solaris user, strengthened by the foreseen beamline upgrade. The revamp of the MX XRD2 beamline toward μXRD at Elettra 2.0 DLSR will provide users with a state-of-the-art beamline allowing to collect high-quality data from much smaller crystals, with higher throughput, contributing to structure-based drug screenings against viral and bacterial targets.
We expect that the facility will attract users from Italy and abroad and will produce a significant number of three-dimensional atomic structures and/or tomograms of biological and medical relevance. At the same time the facility will provide the expertise and the preliminary results requested to access to the high-end cryoEM instrumentation.
The importance of structural biology (and especially CryoEM) in fighting pathogens has been remarkably exemplified by the ongoing Covid-19 pandemic: within a few weeks from the identification and sequencing of the virus, a constant stream of structures has flooded the Protein Data Bank, essential non only in the elucidation of the molecular mechanisms at the bases of viral infection and proliferation, but also instrumental in the development of vaccines, and the search for anti-Covid drugs. As the latest example, within less than 3 weeks from the identification of the Omicron variant, the CryoEM structure of the complex between the mutated Omicron spike protein and the human ACE receptor was announced. Indeed, images of the structure of the virus or the spike protein have become so ubiquitous as to be as well known to world citizen as the DNA double helix.
Another important outcome of the platform will be the training of a new generation of structural biologists and microscopists, with multidisciplinary expertise. The collective movement towards more and more integrated approaches generate the need for new professional figures, able to face this new scientific and technological landscape and to fully exploit the new structural biology opportunities offered.
The unique context provided by the Trieste node, with a hub including a remarkable mix of structural biologists, physicists and nanotechnologists, is the ideal milieu to potentially produce new applications, new methodologies and/or technological advances, which could benefit both basic science as well as industrial applications.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP4 activities, U.O. CNR-IOM	3	N/A
Activities of Personnel for WP4 activities, U.O. CNR-IOM_1	6	Six month report on the Personnel activities and associated time-sheets
Activities of Personnel for WP4 activities, U.O. CNR-IOM_2	9	Six month report on the Personnel activities and associated time-sheets
Activities of Personnel for WP4 activities, U.O. CNR-IOM_3	12	Six Month Report on the Personnel activities and associated time-sheets
CryoEM station installation,commissioning and determination of the structure of a gold standard	15	Report on the Act.4.1 working status focused on the acquisition of the Cryo-EM facility.
Activities of Personnel for WP4 activities, U.O. CNR-IOM_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of Personnel for WP4 activities, U.O. CNR-IOM	3	1-Number of signed contracts. The KPI target value is set to 2 at M6
Activities of Personnel for WP4 activities, U.O. CNR-	6	-Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

WP4 activities, U.O. CNR-IOM_1		
Activities of Personnel for WP4 activities, U.O. CNR-IOM_2	9	-Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP4 activities, U.O. CNR-IOM_3	12	- Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
CryoEM station installation,commissioning and determination of the structure of a gold standard	15	Number of new stations installed at PRP@CERIC as planned in WP4. The KPI target value is set to 1 for the end of the project. Number of scheduled proposals for experiments requiring access to the CryoEM station @ CERIC- ERIC The KPI target value is set to 3 for each semester after the end of the commissioning M30 to M30+M24
Activities of Personnel for WP4 activities, U.O. CNR-IOM_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP4 activities, U.O. CNR-IOM*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

Recruitment of 1 First Researcher and a Technologist each for 24 months for activity 4.1 (1 FTE+1 FTE)

IO Title *Activities of Personnel for WP4 activities, U.O. CNR-IOM_1*

IO Bimestre *6* IO Costs *72.879,84*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP4 deliverables associated to Act. 4.1

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Activities of Personnel for WP4 activities, U.O. CNR-IOM_2*		
IO Bimestre	*9*	IO Costs	*72.879,84*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP4 deliverables associated to Act. 4.1

IO Title	*Activities of Personnel for WP4 activities, U.O. CNR-IOM_3*		
IO Bimestre	*12*	IO Costs	*72.879,84*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 4.1

IO Title	*CryoEM station installation,commissioning and determination of the structure of a gold standard*		
IO Bimestre	*15*	IO Costs	*5.087.796,50*

IO Desciption

.Activity 4.1 will take care about the acquisition, installation and commissioning of a CryoEM microscope. The major features of the required system are:
a 200kV coherent FEG source, to reduce the electron damage on thin vitrified samples, but being able to work also on thicker slices, such as the lamellas prepared by SEM/FIB. The possibility to operate at variable voltages between 80kv to 200kV will be considered a plus.
a high-end Direct Electron Detector camera to increase the S/N ratio and thus reduce the sample irradiation, feature essential for high resolution single particle cryoEM and 3D tomography
± 45deg goniometer (at least)
automated cryo-sample loader
stable energy filter to reject inelastic electrons and increase S/N ratio.
an automatic plunger for the controlled blotting and vitrification of samples
A tender procedure will be managed by the CNR procurement office, who has extensive experience in the management of large tenders. With the help of the Elettra technical services, a dedicated space will be organized, including a vibration isolated basement and a suitable acoustic, electromagnetic air temperature and air humidity control system.
A BSL2 environment will be established to host the vitrification instrument to enable the investigation of wild type mild pathogens. After installation and training, the first protein structures will be demonstrated by the facility personnel. A standard protein will be investigated, such as the VitroEase Apoferritin Standard. Designed specifically to keep intact its structure and meet the required levels of purity and aggregation, Apoferritin, a 474 kDa protein, is considered the gold standard for cryo-EM. The reconstruction of the structure of this protein will set the end of the commissioning and the opening of the facility to user, and constitute the demonstration of the quality of the CryoEM station.

IO Title	*Activities of Personnel for WP4 activities, U.O. CNR-IOM_4*		

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Activities of Personnel for WP4 activities, U.O. CNR-IOM_4*		
IO Bimestre	*15*	IO Costs	*72.879,84*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 4.1

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Establishment of a state-of-the-art CryoEM facility for particle analysis

49 Activity short name

4.1

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

4.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	CNR-IOM	Participant	Consiglio Nazionale per le Ricerche

52 Activity description

The WP4_1 activity aims at the installation and the commissioning of a top-of-the range electron microscope, optimized for structural biology. A 200 keV microscope (fully equipped with a coherent 200 keV FEG sources, automated cryo-sample loader, a high-end Direct Electron Detector and a stable energy filter) appears as the best cost/benefit profile. The instrument should be optimised for a range of applications, from single particle analysis (SPA) to micro-crystal electron diffraction (MicroED) to cryo-electron tomography (CryoET). It should be characterized by high optical stability, provide full automation of optical alignments, include an automatic cryo-sample loading system, and be suitable for high-speed data collection, to ensure the high throughput pipeline necessary for a users' facility. To take full advantage of the current and potential development, the instrument should be fully upgradable, so as to offer the possibility of future upgrades (new better detectors, optimised energy filters, etc.) The facility will also include an automatic plunger for the controlled blotting and vitrification of samples.
After installation, an intense training activity is foreseen, which will be comprised in the tender and cover by the project. The operativity of the facility, including the trained personnel will be tested on standard proteins, such as apoferritin, whose structure reconstruction is recognised as a benchmark in the CryoEM community. Further tests will be run on proteins whose expression and purification is already standardized at Elettra, such for example, hexameric helicases.
Beside the common open-source strategies adopted be the structural biology community, new algorithms for data storage, image classification and averaging will be developed together with the WP9 activity. In this regard WP4_1 will provide the required data.
Finally, access protocols and requirements will be developed, with the publication of the first call for access at month 29.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

272.448,00 €

Cost description:

A CNR technologist III level, I fascia, with previous expertise in electron microscopy, preferentially applied to the investigation in the field of single molecular microscopy and structural biology, will follow the installation operating within the Elettra- CNR facility of structural biology. His/her duties will include the safety management and the training and assistance to CERIC-ERIC users. The recruitment process will start at the month 1 so that he/she will be active starting from month 7.
A CNR first researcher, with previous expertise in electron microscopy, preferentially applied to the investigation in the field of single molecular microscopy and structural biology, will follow the installation and commitment phase and will be responsible to manage the facility.
The recruitment process will start at the month 1 so that he/she will be active starting from month 7.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP04 - WP04 - Integrated Structural Biology Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

4.754.950,00 €

Cost description: A CryoEM microscope with the following features:
a 200kV coherent FEG source, so to reduce the electron damage on thin vitrified samples, but being able to work also on thicker slice. Such as the lamellas prepared by SEM/FIB. The possibility to operate at variable voltages between 80kv to 200kV will be considered as an interesting option. a high-end
Direct Electon Detector camera to increase the S/N ratio and thus reduce the sample irradiation, feature essential for high resolution single particle cryoEM and 3D tomography
± 45deg goniometer (at least)
Automated cryo-sample loader
Stable energy filter to reject inelastic electrons and increase S/N ratio.
A vitroblotting station for sample vitrification
Equipment of a dedicated space, including a vibration isolated basement and a suitable acoustic, electromagnetic air temperature and air humidity control system
A BSL2 environment will be established to host the vitrifications station to enable the investigation of wild type mild pathogens

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

351.917,86 €

Cost description: CNR indirect costs (will be partially used to cover the institutional overheads that cover the running costs of the Institute. The remining will be used as follows:
-for travel costs, conference fees and dedicated training periods
for consumables and other running costs linked to the experimental activities, such as, for instance, liquid nitrogen, reagents for cellular culture and staining, TEM grids, sample cryo-shipping
for informatic costs, computers, storage, software licenses

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment of Personnel for WP5 activities, U.O. Area Basovizza	0,00	0,00
6	Activities of Personnel for WP5 activities, U.O. Area Basovizza_1	43.727,90	43.727,90
9	Activities of Personnel for WP5 activities, U.O. Area Basovizza_2	43.727,90	87.455,80
11	Upgrade of IUVS and IUVS-OFFline UVRR microscopy station.	106.819,93	194.275,73
11	Implementation of a new CERIC-ERIC SISSI-OFFline imaging station (SubMicro SISSI-Bio)	720.580,82	914.856,55
12	Activities of Personnel for WP5 activities, U.O. Area Basovizza_3	43.727,90	958.584,45
13	Implementation of fully independent IR nanoscopy stations (Nano SISSI-Bio)	1.105.524,00	2.064.108,45
13	Implementation of Micro SISSI-Bio	345.770,50	2.409.878,95
15	Activities of Personnel for WP5 activities, U.O. Area Basovizza_4	43.727,90	2.453.606,85

36 WP title

WP05 - Multimodal Hyperspectral imaging Platform

37 WP number

WP05

38 Start month(relative to kick-off of the project) and **duration** (in month)

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

38 Start month(relative to kick-off of the project) and duration (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park

40 WP Leader

Alessio Ansuini (Area campus Basovizza)

41 Summary of the activities envisaged in the WP

The goal of PRP@CERIC WP05 is to implement a label-free digitally integrated multimodal hyperspectral imaging platform at Elettra, for achieving multiplexing information on diverse class of samples, ranging from individual macromolecules to cells, tissues and tissue models, to tackle biomedical research questions holistically and across multiple scales, exploiting probing photons from hard X-rays to Far-infrared (FIR)-THz radiation. The Multimodal Hyperspectral imaging platform, enabled for pathogen research by the chemical-physical decontamination strategies developed in WP2, will provide a set of integrated markers, based on organic molecules-biomacromolecules and inorganic trace elements, able to describe bio-samples beyond the morphological details and to assess the fundamental traits of the molecular pathways affected by the host-pathogen interaction.
In WP5 the capacities of the CERIC-ERIC RI will be strengthened by i) upgrading the analytical instruments for infrared (IR) imaging, UV Resonance Raman (UVRR) imaging, for increasing multi-instrument cross-talk and level of digitalization (Activity 5.1, 5.4); ii) adding new state-of-the art infrared imaging instruments to the platform, widening the spatial-complementarity for improving multiplexing capabilities (Activities 5.2, 5.3); iii) organically harmonizing with the other CERIC-ERIC instruments at Elettra not directly involved in the instrumental upgrade (with specific reference to X-ray microCT at SYRMEP beamline and soft X-rays imaging and fluorescence at TwinMic beamline), and foreseen with the upgrade of Elettra to Elettra 2.0 Diffraction limited Storage ring (micro-XRF); iv) unifying with the other forefront imaging and spectroscopic capabilities of the multi-omic (WP7) and multi-functional and dynamic (WP6) platforms, integrated in the multi-technique phenotyping macro-platform.
IR and UVRR Imaging are nowadays well-established and complementary tools to investigate biological samples by providing non-destructive analyses and label-free chemical specificity. They allow retrieving from a single spectrum complementary information intersecting omic and structural sample domains: overall macromolecular profile of the sample, fine details on protein secondary-structure, lipidic composition and membrane fluidity, DNA fragmentation and unfolding, and many others. Properly trained for fingerprinting the cellular metabolic pathways perturbed by the infection in suitable cellular models (WP2), guided by ad-hoc developed identification algorithms (WP9), IR and UVRR techniques will contribute to the rapid recognition of the host-pathogen interaction mechanisms as well as drug pathways at cellular and tissue level, allowing to complement the other approaches of the Integrative multi-technique phenotyping platform, and therefore to improve both quality and efficiency of the research pipeline.
IR histology (H) and cytology (C) are in the CERIC offer with SISSI-Bio beamline at Elettra and its off-line station (SISSI-Bio OFFline). IRC undoubtably benefits from the collimation and brilliance of IR Synchrotron Radiation (IRSR) microscopy, allowing

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

OFFline). IRC undoubtably benefits from the collimation and brilliance of IR Synchrotron Radiation (IRSR) microscopy, allowing single-cell analysis, also under physiological conditions, in biocompatible IR-transparent fluidic devices for in-situ label-free cytometry. Conversely, IRH performs faster with extended IR conventional sources. From one side, the micrometric lateral resolution of far-field IR microscopy is even too much for complementing large area or less-resolved approaches, as in the case of X-ray micro-CT and MS-Imaging respectively (WP7). From the other side, the same micrometric lateral resolution is too poor for being fully synergic with imaging approaches with sub-micrometric lateral resolution, such as UVRR-Imaging and soft and hard X-ray fluorescence, as well as Visible-fluorescence in WP2 and WP6. The aforementioned limitations will be overcome in:
Activity 5.1) implementing independent and fully optimized Micro SISSI-Bio and Micro SISSI-Bio OFFline stations for IRC and IRH respectively, making them fully remote operational also for live-cells analysis;
Activity 5.2) widening the CERIC offer with a new IR microscope with sub-micrometric lateral resolution integrated with Vis-epifluorescence for dry and wet bio-sample measurements, making it fully remote operational also for live-cells analysis;
Activity 5.3) implementing independent and fully optimized Nano-SISSI-Bio and Nano-SISSI-BioOffline stations. Nano-resolved infrared capabilities, nowadays offered by the most advanced near-filed infrared microscopes, provide the unique opportunity to extend the vibrational domain. By combining surface-sensitivity of IR s-SNOM with the larger penetration depth of Photo-Thermal Expansion (PTE) approaches, morpho/mechanical details provided by SEM and AFM approaches (WP6) will be linkable with the locale chemical/structural composition of cellular membranes at nanodomain level, while individual cell organelles or intracellular spaces will be accessible from their chemistry beyond morphology, taking advance from the preparation approaches set at WP4 for cryoEM studies. These are just a few examples of the forefront science of the host-pathogen interaction that will be achievable.
Macro UVRR Raman capabilities are offered to CERIC users on IUVS beamline and its off-line instrumentation (IUVS-OFFline) at Elettra. With respect to Visible-Raman, the resonant effect improves the selectivity of the technique through an excitation-wavelength dependent enhanced sensitivity for UV-active molecular moieties, with special reference to nucleobases and aromatic amino acids in biological samples, and takes full advantage from the tunability of the synchrotron source. Activity 5.4. focuses on the upgrade from macro to micro-UVRR capabilities at IUVS for multi-wavelengths deep-UV biomolecular imaging and analysis with sub-micrometric lateral resolution, allowing its full integration with the other imaging approaches of the platform.
Trace metals, both endogenous and exogenous, often are at the center of the host-pathogen interactions: metal homeostasis changes dramatically in response to pathogen infections but the comprehension of their role in pathogenicity mechanisms is still in its infancy. In CERIC-ERIC elemental sensitivity is offered by soft X-ray microscopy-Low Energy (LE) micro-XRF at TwinMic beamline. Nevertheless, while soft X-rays are more sensitive to light elements, hard micro-XRF is the technique mostly sensitive to transition metals, such as Mn, Fe, Cu and Zn, that play a role in the pathogen-infection molecular mechanisms. The present capabilities of XRF beamline at Elettra allow for macro-XRF only with a spatial resolution non exceeding 100 μm. Micro XRF capabilities with a spatial resolution of 1 μm are foreseen in the framework of Elettra synchrotron upgrade to Elettra 2.0, for improving the cross-talk with other SR-based and no SR- based imaging approaches. Therefore, the implementations foreseen in WP5 are functional also to the upcoming development of Elettra facility.
The full exploitation of the multiplexing capabilities of the platform will proceed in synergy with its digitalization improving automation, interoperability of samples and FAIR data (WP09), to promote data sharing, exchange and mutual complementarity also with other tools (WP11).
In the framework of WP5, activity 5.5 is a research activity aimed at the study of flexibility and mobility properties of the key molecular infector mediators by FIR-THz spectroscopy, for adding a dynamical perspective to structural studies of WP4. The level of maturity of technologies and background knowledge on the topic is too scarce for proposing this activity to users, but represents a direction of intervention for the sustainability and renewal of the RI beyond the end of the project.

42 WP inter-relation with other WWPP

WP2,WP3,WP4,WP6,WP7,WP8,WP9,WP10,WP11,WP12

43 Most relevant outcome:

WP5 will provide CERIC-ERIC RI users with a unique digitally integrated platform for multimodal label-free hyperspectral imaging for the study of the fundamental traits of host-pathogen interaction and drug- pathways, covering a range of spatially resolved morpho-chemical details that go from individual nanometric cellular domains

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

covering a range of spatially resolved morpho-chemical details that go from individual nanometric cellular domains to individual cells, tissue models and tissues.
CERIC-ERIC RI already provides a set of individual analytical stations suitable for the purposes of multimodal bioimaging at its Italian Partner facility, Elettra (SISSI-Bio beamline, SISSI-Bio Offline, IUVS beamline, IUVS OFFlline Laboratory, SYRMEP and TwinMic beamlines). WP5 activities will enrich the platform with new experimental stations and boost the instrument capacities in terms of sensitivity, spatial complementarity, automation level for a more efficient exploitation of the beamtime, interoperability of samples and collected data, overall widening the CERIC-ERIC instrument offer and increasing the RI digital capabilities in terms of ability to meet the user demand.
Facility users will have the possibility to selected among the possible instruments the ones that better fit their scientific questions, exploiting the complementarity of the information from imaging techniques at comparable lateral resolution, for research at organ (in case of X-ray micro-CT), tissue, cellular and subcellular level up to few nanometer chemical details, invisible with other approaches. Instrument automation will be maximized along the project duration and beyond, through the integration of hardware components (for example for automated detector cooling and autofocusing) and hardware strategies for increasing the data-collection throughput relying, for example, on automated sample exchange whenever possible, learning from more standardized approaches, such as high-throughput drug-screening in WP2, and approaching them. Automated routines for sample selection, in order to collect the same Region of Interest (ROIs) across the diverse techniques applied in sequence on the same tissue sample, on contiguous slides, on equally representative cell population or on nanometric ROIs from large samples will be developed (WP9), overall reducing the operator intervention and operator bias, as well as making the instruments more user-friendly.
Post-beamtime user support will also be enormously improved with PRP@CERIC project, being an essential step for the digitalization and full exploitation of the platform. Automated open-source algorithms for image registration will be developed in WP9 and put at disposal to the users, in order to get full advantage from the multiplexing capabilities of the platform and accomplish data interoperability with the omics (WP7), functional and dynamic (WP6) and morpho-structural (WP4) approaches of the overall PRP@CERIC ecosystem. This outcome is propaedeutic to the construction of n-dimensional host-pathogen interaction recognition patterns, built according to WP2, that will allow the user to end-up to quick answer to its questions on the base of open-source libraries and classification algorithms.
Summarizing, WP5 will enormously increase the attractive potential of CERIC-ERIC toward life science users at Elettra facility, opening to the communities of scientists and medical doctors dealing with infection-related disorders, that will benefit from dedicated laboratories for infective sample handling/manipulation and sample preparation, and especially from dedicated and innovative decontamination strategies aimed at saving the key sample features to be tested, guaranteeing the safety of Lab workers and users themselves at the analytical facilities (WP2).
Finally, yet importantly, the upgrades here proposed will be readily exploitable by the whole CERIC-ERIC user community, belonging to scientific fields as diverse as material science, energy material, cultural heritage and many more.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP5 activities, U.O. Area Basovizza	3	N/A
Activities of Personnel for	6	Six month report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Personnel for WP5 activities, U.O. Area Basovizza_1		
Activities of Personnel for WP5 activities, U.O. Area Basovizza_2	9	Six Month Report on the Personnel activities and associated time-sheets
Upgrade of IUVS and IUVS-OFFline UVRR microscopy station.	11	Report on the Act. 5.4 working status focused on the instrumentation upgrade and hardware commissioning
Implementation of a new CERIC-ERIC SISSI-OFFline imaging station (SubMicro SISSI-Bio)	11	Report on the Act. 5.2 working status focused on the instrumentation upgrade and hardware commissioning.
Activities of Personnel for WP5 activities, U.O. Area Basovizza_3	12	Six Month Report on the Personnel activities and associated time-sheets
Implementation of fully independent IR nanoscopy stations (Nano SISSI-Bio)	13	Report on the Act. 5.3 working status focused on the instrumentational upgrade and hardware commissioning
Implementation of Micro SISSI-Bio	13	Report on the Act. 5.1 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for WP5 activities, U.O. Area Basovizza_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Recruitment of Personnel for WP5 activities, U.O. Area Basovizza	3	1-Number of signed contracts. The KPI target value is set to 2 at M6
Activities of Personnel for WP5 activities, U.O. Area Basovizza_1	6	PI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP5 activities, U.O. Area Basovizza_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of IUVS and IUVS-OFFline UVRR microscopy station.	11	1-Number of upgraded multi- wavelengths deep-UV Resonance Raman biomolecular imaging stations available at PRP@CERIC for users The KPI target value is set to 1 at M24 2- Number of submitted proposals for experiments requiring the new station available at PRP@CERIC The KPI target value is set to 2 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 4 units the following semesters from M30 to M30+M24.
Implementation of a new CERIC-ERIC SISSI-OFFline imaging station (SubMicro SISSI-Bio)	11	1-Number of new independent sub-micrometric infrared lateral resolution at PRP@CERIC for users The KPI target value is set to 1 at M24 2- Number of submitted proposals for experiments requiring the new station available at PRP@CERIC The KPI target value is set to 2 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 4 units the following semesters from M30 to M30+M24.
Activities of Personnel for WP5 activities, U.O. Area Basovizza_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Implementation of fully independent IR nanoscopy stations (Nano SISSI-Bio)	13	1-Number of upgraded/new independent digital nanoscopy infrared stations available at PRP@CERIC for users The KPI target value is set to 2 at M30 2- Number of submitted proposals for experiments requiring one of the new independent stations available at PRP@CERIC The KPI target value is expected to be of 4 units for semesters from M30 to M30+M24
Implementation	13	1-Number of upgraded/new independent IR far-field microscopy stations at

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Implementation of Micro SISSI-Bio	13	1-Number of upgraded/new independent IR far-field microscopy stations at PRP@CERIC for users. The KPI target value is set to 2 at M24 2- Number of submitted proposals for experiments requiring one of the new independent stations available at PRP@CERIC. The KPI target value is set to 4 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 4 units the following semesters from M30 to M30+M24.
Activities of Personnel for WP5 activities, U.O. Area Basovizza_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP5 activities, U.O. Area Basovizza*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

Recruitment of 2 Researchers for 24 months for activities 5.1-5.3&5.5 (0.8 FTE) and for activity 5.4 (0.8 FTE)

IO Title *Activities of Personnel for WP5 activities, U.O. Area Basovizza_1*

IO Bimestre *6* IO Costs *43.727,90*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP5 deliverables associated to Act. 5.1-5.5

IO Title *Activities of Personnel for WP5 activities, U.O. Area Basovizza_2*

IO Bimestre *9* IO Costs *43.727,90*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP5 deliverables associated to Act. 5.1-5.5

IO Title *Upgrade of IUVS and IUVS-OFFline UVRR microscopy station.*

IO Bimestre *11* IO Costs *106.819,93*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity 5.4 is the implementation of an innovative station for multi- wavelengths deep-UV Resonance Raman biomolecular imaging, realized through the upgrade of the macro- UVRR instrument now available at IUVS beamline. A straight confocal microscope with the possibility of transmitted and reflected illumination and sample viewing camera in the UV range will be acquired and coupled with the multi-wavelength UVRR spectrometer of IUVS. The UVRR microscopy station will be capable to analyse efficiently and quickly biological cell/tissue specimens by generating chemical sample maps with a mapping field smaller than 1x1 µm2. Depending on the specific requirements of the users, the microscopy end-station will be available both online (light provided by SR) and offline, through CERIC-ERIC IUVS-OFFline entry-point, thus meeting the requests of a larger community of users.

IO Title	*Implementation of a new CERIC-ERIC SISSI-OFFline imaging station (SubMicro SISSI-Bio)*		
IO Bimestre	*11*	IO Costs	*720.580,82*

IO Desciption

Activity 5.2 foresees the establishment of a new imaging station at sub-micrometric lateral resolution, based on the breakthrough technology of Optical Photothermal Infrared (O-PTIR). O-PTIR technology is a novel pump-probe spectroscopy technique, based on infrared pump, that induces photothermal effects into a sample at wavelength matching vibrational transition and uses a visible probe laser focused on the sample, providing chemical imaging with spatial resolution wavelength-independent in the range of few hundreds of nanometers.
The proposed instrument will be the first installed in Italy and one of the first worldwide. SubMicro SISSI-Bio represents the ideal bridge with i) both far-field infrared imaging approaches and infrared nanoscopy, combining upper-middle spatial resolution and fast-imaging capabilities; ii) samples operable at BSL3 facilities: due to its stand-alone nature its operation is scheduled for defined time-slots at BSL3 PRP@CERIC lab for vibrational imaging of live-infected cells.

IO Title	*Activities of Personnel for WP5 activities, U.O. Area Basovizza_3*		
IO Bimestre	*12*	IO Costs	*43.727,90*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP5 deliverables associated to Act. 5.1-5.5

IO Title	*Implementation of fully independent IR nanoscopy stations (Nano SISSI-Bio)*		
IO Bimestre	*13*	IO Costs	*1.105.524,00*

IO Desciption

In 2019, an apertureless scattering-type near-field scanning optical microscope (s-SNOM) has been installed at SISSI-Bio. The system, that combines AFM technology with FTIR spectroscopy, allows FTIR spectroscopy with a lateral resolution of few tens of nanometers. Being nano- resolved spectral imaging approaches extremely time-consuming by nature, the available time for nano-resolved approaches to CERIC- ERIC users will be quite limited, while the user demand is constantly in increase. Act. 5.3 will establish two independent nanoscopy stations at SISSI-Bio, dedicating the present instrument with conventional laser sources (Nano SISSI-BioOffline) and the new instrument to IRSR nanoscopy in the MIR-FIR regime exploiting the ultrabroadband nature and superior stability of the synchrotron infrared source (Nano SISSI-Bio). SISSI-Nano stations will be a unicum on the Italian scenario, and essentially unparalleled thanks to the coupling with IRSR.

IO Title	*Implementation of Micro SISSI-Bio*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Implementation of Micro SISSI-Bio*		
IO Bimestre	*13*	IO Costs	*345.770,50*

IO Desciption

SISSI-Bio beamline is equipped with a Hyperion 3000 Vis-IR microscope, dedicated alternatively to both IRH imaging with conventional source and IRC microscopy with IRSR. The two modalities have therefore only limited user access. Act. 5.1 foresees the installation of a new Vis-IR microscope. This will allow the implementation of independent, and fully optimized stations: Micro SISSI-Bio OFFline for IRH, and Micro SISSI-Bio for SR IRC. The two stations will be able to work in parallel and support remote-user operation, contributing to widening the CERIC-ERIC user community.

IO Title	*Activities of Personnel for WP5 activities, U.O. Area Basovizza_4*		
IO Bimestre	*15*	IO Costs	*43.727,90*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP5 deliverables associated to Act. 5.1-5.5

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Training activities

Cost description: N/A

48 Activity title

IRSR SISSI-Bio and SISSI-Bio OFFline far-field microscopy stations (Micro SISSI-Bio)

49 Activity short name

5.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 5.1 provides two fully independent user stations for IR microscopy: Micro SISSI-Bio with IRSR and Micro SISSI-BioOffline with conventional source. To this aim the acquisition of new Vis/IR microscope is planned. For matching the requirements of large area imaging and spatial resolution capabilities of X-ray micro-CT and MSI, the microscope will be equipped with a larger area FPA detector (128x128 pixels) and low NA objective/condenser pair.
Instrument order and hardware commissioning: For reducing the upgrade costs the Vis/IR microscope will be coupled with the vertex 70 interferometer already available at SISSI-Bio laboratory. The market research will start at M0, looking for the compatibility between interferometer and microscope. Publication of the tender procedure is expected at M3, conclusion and order of the instrument at M7. The instrument will be delivered about 15 months after the order. Installation and Site Acceptance Testing (SAT) will be done within M23. The independent Micro SISSI-Bio and SISSI-BioOffline stations will be immediately open to users at M23. In-presence, fully remote as well as mix-modes can be supported by the two instruments thanks to the degree of automation on these types of microscopes. Automation and interoperability solutions will be studied and implemented according to WP9 and WP11 within M23.
Scientific Commissioning: Micro SISSI-BioOffline and Micro IRSR SISSI-Bio facilities with micrometric lateral resolution will contribute to PRP@CERIC Specific Scientific Objective 2 as defined in section 29.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation within M23.
In-house research and user operation will continue until the end of the project and beyond,supported by Elettra permanent staff, that will be in-kind involved for the entire duration of the project.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2,

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2, 5.3, 5.6 and 7.7. The search will look for a candidate with a strong biophysical background.
The researcher will be involved in research act. 5.5, and will support activities 5.1, 5.2, 5.3 and 7.7 for the scientific commissioning of the facilities and PRP@CERIC user support. she/he will be accounted for 0.2 FTE from M6-M30 on all the aforementioned activities.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

323.150,00 €

Cost description: FTIR Vis/IR microscope (compatible with FTIR VERTEX 70 interferometer), equipped with FPA detector (128X128 pixels) and Low Magnification Mid-IR Optics (objective/condenser)

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

24.050,86 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

SISSI-Bio OFFline imaging station at submicrometric lateral resolution (SubMicro SISSI-Bio)

49 Activity short name

5.2

50 Activity Start month and duration

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 5.2 will be actuated through the acquisition of a new-concept infrared microscope, based on the breakthrough technology of Optical Photothermal Infrared (O-PTIR) for infrared imaging in reflection and transmission mode with lateral resolution of few hundreds of nanometers (SubMicro SISSI-Bio). The system will be equipped with a dual range spectral region QCL, covering 3000-2700&1800-950 cm- 1, and suitable optics for transmission measurements with water-immersion objectives. The instrument will also be equipped for correlative epi-fluorescence.
Instrument order and hardware commissioning: To the best of our knowledge, the O-PTIR patent is held by PHOTHERMAL SPECTROSCOPY CORP. A further market research will be done at M5-M6. Publication of the tender procedure is expected at M7, conclusion and order of the instrument at M13, delivery at M18.
Installation, training and SATs will therefore be done within M20. 4 months for hardware commissioning are planned. The new SubMicro SISSI-Bio station will be open in parallel to Micro-SISSIBio and Nano-SISSIBio at M24 to CERIC-ERIC users in presence and remote. Automation and interoperability solutions will be studied in parallel and implemented according to WP9, WP11 during the hardware Commissiong phase.
Scientific Commissioning: SubMicro SISSI-Bio will contribute to PRP@CERIC Specific SO 2 (as referred in section 29)for both tissues and cellular models. A special emphasis will be given on the complementation of the measurements with the Visible fluorescence methods in WP2 and WP6, to pursue the main PRP@CERIC goal of the creation of a multi- technique phenotyping platform for host-pathogen interaction studies. Operation at BSL3 level is foreseen.
Software Commissioning: FAIR by design will be implemented at M24 (WP11)
In-house research and user operation will continue until the end of the project and beyond, supported by Elettra permanent staff, that will be involved for the entire duration of the project.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2, 5.3, 5.6 and 7.7. The search will look for a candidate with a strong biophysical background.
The researcher will be involved in research acct. 5.5, and will support activities 5.1, 5.2, 5.3 and 7.7 for the scientific commissioning of the facilities and PRP@CERIC user support. she/he will be accounted for 0.2 FTE from M6-M30 on all the aforementioned activities.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

673.440,00 €

Cost description: O-PTIR system with the following add-ons: Dual range QCL, counter propagatint mode, transmission module, Transmission Illumination, ultra lower power laser detector for coloured and dark samples 8such as histological slides), water immersion objectives, white field epi-fluorescence, Installation and Training

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

objectives, white field epi-fluorescence, Installation and Training

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

48.571,15 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

IRSR and offline nanoscopy stations at SISSI-Bio (Nano SISSI-Bio)

49 Activity short name

5.3

50 Activity Start month and duration

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 5.3 will be implemented by setting an off-line nanoscopy end station decoupling the present instrument from IRSR (Nano SISSI-BioOffline) and through the acquisition of a s- SNOM microscope for IRSR MIR-FIR nanoscopy (Nano SISSI-Bio). The FIR

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

SISSI-BioOffline) and through the acquisition of a s- SNOM microscope for IRSR MIR-FIR nanoscopy (Nano SISSI-Bio). The FIR region is mostly unexplored by the international nanoscopy community, this spectral domain not being covered by bench-top sources. Conversely, IRSR very well covers this domain and the feasibility of SR FIR Nanoimaging and Nanospectroscopy has been recently proven (doi: 10.1021/acsphotonics.8b00565). To this aim, optical elements of the interferometric path will be designed for both MIR and FIR applications, and a dual detector optical path, for MIR-MCT and FIR-bolometric detection will be required.
Instrument order and hardware commissioning: Market research will start at M3. Publication of the procedure is expected at M6, conclusion and order of the instrument at M12. The instrument will be delivered within 10 months after the order (M22). Upon arrival, installation and SAT will be concluded within 2 months (M24). Hardware commissioning will take 4/6 months (M28). Independent Nano SISSI-Bio and Nano SISSI-Bio Offline facilities will be open to PRP@CERIC users at M30. Automation of the instruments is not foreseeable considering the type of measurements, while interoperability solutions will be studied in parallel and implemented according to WP9 and WP11.
Scientific Commissioning: Both instruments will contribute to PRP@CERIC Specific Scientific Objective 2 as defined in section 29, for both tissues and cellular models, also at single organelle level, bridging WP4 and WP6.
Software Commissioning: FAIR by design will be implemented for both instruments within M30.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2, 5.3, 5.6 and 7.7. The search will look for a candidate with a strong biophysical background.
The researcher will be involved in research acct. 5.5, and will support activities 5.1, 5.2, 5.3 and 7.7 for the scientific commissioning of the facilities and PRP@CERIC user support. she/he will be accounted for 0.2 FTE from M6-M30 on all the aforementioned activities.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.033.200,00 €

Cost description: Infrared Scattering Scanning-type Near Field Optical Microscope (s-SNOM) optically setup for working over the entire MIR-FIR range (diamond-based beam-splitter technology) with dual detector port for Mid-IR detection (MCT detector, embedded on the instrument) and Far-IR detection, equipped with MIR laser sources.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

73.754,35 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

73.754,35 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Multi-wavelengths UVRR microscopy station

49 Activity short name

5.4

50 Activity Start month and duration

Activity Start month	6	Activity Duration	24

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 5.4 aims at extending the multi-wavelength UVRR approach to the label-free biomolecular imaging for the analysis of cells and tissues. This goal will be achieved with the acquisition of the confocal microscope, equipped with optical parts and objectives specifically working in the DUV, that will be coupled with the multi-wavelength UVRR spectrometer already available on IUVS. Micrometric to sub- micrometric lateral resolution will be achievable. The microscopy end-station will be guaranteed to work with several DUV excitation wavelengths that will be provided both by synchrotron and off-line laser sources. For this, different sources-to-sample optical paths will be designed for diverse DUV ranges. The switching between different excitation wavelengths will be completely automated and remotely controllable.
Instrument order and hardware commissioning: Market research will start at M6 looking for companies able to guarantee the coupling with the Trivista spectrometer already available at IUVS laboratory.
Publication of the procedure is expected at M10, conclusion and order of the instrument at M12. The instrument delivery is planned 6 months after the order and the installation will require about 1 month (M19). After that, 3 months of commissioning will be necessary for the full automatization and remotization of the setup (M22). The instrument will open to CERIC-ERIC users in presence, mix modality as well as remotely by machine operated by the BL staff at M22. Interoperability solutions will be studied in parallel and implemented according to WP9, WP11 within M22.
Scientific Commissioning: Activity 5.4 will contribute to PRP@CERIC Specific Scientific Objective 2 as defined in section 29.
Software Commissioning: FAIR by design will be implemented for both within M20.
In-house research and user operation will continue until the end of the project and beyond, supported by Elettra permanent staff.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

In-house research and user operation will continue until the end of the project and beyond, supported by Elettra permanent staff.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

81.734,40 €

Cost description: A fixed term researcher with proven experience in the field of Raman and possibly UV resonance Raman spectroscopy and good skills in the optics and photonics related disciplines will be recruited for the activities 5.4 and 7.8. The researcher will take care of the installation, testing and commissioning of the new UVRR microscopy facility, as well as of the scientific commissioning of the facilities and PRP@CERIC user support For Activity 5.4 she/he will be accounted for 0.8 FTE from M6 to M18, and 0.8 FTE from M18 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

99.831,71 €

Cost description: Upgrade of Trivista with confocal microscope working in deep-UV range with possibility of back-illumination and visualization camera of the sample+ motorized stage for high-resolution mapping + motorized opto- mechanical parts for automatic switching among different excitation wavelengths + installation and training

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

12.709,63 €

Cost description: Indirect cost will be used for
- travel expenses
-consumables
-further improving automation

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

FIR-THz low-energy molecular vibrations: motility and flexibility of key infection mediators

49 Activity short name

5.5

50 Activity Start month and duration

Activity Start month	6	Activity Duration	24

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

It is nowadays well established that SARS-CoV-2 enters human cells through the physical interaction between the receptor-binding domain (RBD) of its spike protein and the human cell receptor ACE2. A recent study, based on Normal Mode Analysis (NMA), proves that the key-to-lock RBD-ACE2 interaction is modulated by the mechanical properties of the infection mediators, such as mobility and flexibility (doi:10.1016/j.matt.2020.10.032), affecting the lethality and infection rate. FIR and THz radiation couples to low-energy degrees of freedom of proteins, thereby providing a direct probe of their conformation potentials. Nevertheless, it is still not properly understood how thermally activated modes lead to functionally relevant conformational changes. Activity 5.5 aims at employing FIR and THz spectroscopy at SISSI-Bio and TeraFERMI beamlines on COVID-19 spike protein in order to single-out the relevant normal modes related to the RBD flexibility, and which are expected to provide different spectroscopic features between COVID-19 variants with diverse infectivity degree. This very ambitious research program requires a highly interdisciplinary team, involving not only know-how in vibrational spectroscopy techniques, but also computational resources for NMA (WP11) supported by structural data (WP4), a virology laboratory for the identification of the variants (WP2, WP7), a protein expression facilities (WP3), metamaterials and plasmonic devices for improving the sensitivity of the vibrational techniques and complement nanomechanical studies at WP6-Att. 6.5. It is therefore the perfect scientific match between many of the activities of PRP@CERIC project and an exciting field of research for young scientists, that will contribute to exceed the statuary key-to-lock concept toward a dynamic perspective. The success of the activity therefore is based on human capital for progressing in science and opens new opportunities for next-generation facility users.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2, 5.3, 5.5 and 7.7. The search will look for a candidate with a strong biophysical background.
The researcher will be involved in research acct. 5.5, and will support activities 5.1, 5.2, 5.3 and 7.7 for the scientific commissioning of the facilities and PRP@CERIC user support. she/he will be accounted for 0.2 FTE from M6-M30 on all the aforementioned activities.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP05 - WP05 - Multimodal Hyperspectral imaging Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

1.430,35 €

Cost description: Indirect cost will be used for travel expenses

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment and activities of Personnel for WP6 activities, U.O. UniSalento	24.877,50	24.877,50
3	Recruitment of Personnel for WP6 activities, U.O. Area Basovizza	0,00	24.877,50
5	Set- up of a real-time deformability cytometry/cythomechanics investigation station in microfluidics	379.871,40	404.748,90
6	Activities of Personnel for WP6 activities, U.O. Area Basovizza_1	27.329,94	432.078,84
6	Activities of Personnel for WP6 activities, U.O. UniSalento_1	24.877,50	456.956,34
6	Establishment of state-of-the-art station to perform single-cell flow cytometry	639.646,00	1.096.602,34
7	Set up an experimental station for the preparation of radiation-sensitive and biological samples	2.078.980,02	3.175.582,36
9	Activities of Personnel for WP6 activities, U.O. Area Basovizza_2	27.329,94	3.202.912,30
9	Activities of Personnel for WP6 activities, U.O. UniSalento_2	24.877,50	3.227.789,80
10	Establishment of an AFM setup for high-speed high-resolution imaging and spectroscopy	809.870,18	4.037.659,98
12	Activities of Personnel for WP6 activities, U.O. Area Basovizza_3	27.329,94	4.064.989,92

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

	Basovizza_3		
12	Activities of Personnel for WP6 activities, U.O. UniSalento_3	24.877,50	4.089.867,42
15	Activities of Personnel for WP6 activities, U.O. Area Basovizza_4	27.329,94	4.117.197,36
15	Activities of Personnel for WP6 activities, U.O. UniSalento_4	24.877,50	4.142.074,86

36 WP title

WP06 - Multi functional and dynamic Platform

37 WP number

WP06

38 **Start month**(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
UniSalento	Department of Mathematics and Physics "Ennio De Giorgi"	CO-APPLICANT: Università degli Studi del Salento
UniSalento	Department of Mathematics and Physics "Ennio De Giorgi"	CO-APPLICANT: Università degli Studi del Salento
UniSalento	Department of Mathematics and Physics "Ennio De Giorgi"	CO-APPLICANT: Università degli Studi del Salento
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park

40 WP Leader

prof.ssa Rosaria Rinaldi

41 Summary of the activities envisaged in the WP

The aim of PRP@CERIC WP6 is to implement and support the setting of a multiscale biophysical platform for the definition of functional and dynamic traits of the host-pathogen interaction. The platform will provide the PRP@CERIC scientific and technological pipeline with state-of-the-art correlative electron, photon and force microscopies to assess the impact of pathogens on hosts at the tissue,

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

pipeline with state-of-the-art correlative electron, photon and force microscopies to assess the impact of pathogens on hosts at the tissue, cellular and subcellular level, to capture details on pathogens' uptake mechanisms as well as on the molecular/morphological/biophysical aspects that tune the cellular response facilitating pathogens' survival and replication. Cellular samples mechanics will be assessed in order to investigate possible deviation from usual cellular and subcellular architectures as a consequence of pathogen-induced effects, overall providing a fingerprint of the disease induced unbalanced cell mechanics. Results of the different methodologies will be intertwined and integrated with the other WPs analysis, for a comprehensive understanding of host-pathogen interaction and drug resistance pathways helping to define novel targets for the development of effective drugs.

The multi-functional and dynamic platform is conceived as a scientifically- interconnected geographically-distributed platform. Two facilities will contribute to it, related to UO UniSalento, Department of Mathematics and Physics, UO AREA campus Basovizza, NanoInnovation Lab at Elettra facility. The UniSalento facility is an integral part of the BOL, intended to strengthen the distributed research infrastructure CERIC - ERIC in the field of biological and biomedical research. The 200 square meter lab is equipped with a CRYO_TEM Jeol NEOARM JEM-ARM200F (HOLO-TEM). The UniSalento facility will be supported by two research groups, which will provide specific expertise in applied physics (CEDAD GROUP – Prof. Calcagnile) and condensed matter physics (NanoBiotechnology, NanoMedicine and NanoBioelectronics (NNN)-Facility – Prof. Rinaldi). The Nanoinnovation Lab at Elettra facility, led by Prof. Casalis, is equipped with several AFM microscope systems for operation in air and liquid environment and high resolution measurements on a large variety of samples, ranging from biological to inorganic. The multi-functional and dynamic platform of PRP@CERIC is in continuity with BOL actions, aiming to reinforce and extend the network and the instrument capabilities to support user research on cellular and sub-cellular host-pathogen science in cross-correlation with the activities proposed in all the others WPs, like WP2 for sample preparation, WP3 for drug implementation and biophysical interaction, WP5 for multimodal hyperspectral analysis, WP7 for multi-omics-MS data, and WP4 for structural biology studies at single macromolecule level.

The HOLO-TEM station at UniSalento facility will enable the development of advanced electron microscopy methodologies for the study of bio/organic samples. To exploit the full potential of the instrument, it is necessary to set up a laboratory dedicated to the preparation of radiation-sensitive samples, with dedicated cryo-manipulation systems, setting a biological sample preparation and investigation station. FIB/SEM has the unique possibility to couple simultaneous investigation of sample morphology, cell surface and subsurface characteristics and cell ultrastructure investigation with in situ sample manipulation, providing preliminary data and/or sample preparation prior to HOLO-TEM sample investigation. It will support the implemented HOLO TEM infrastructure and will allow CERIC-ERIC users to access to state-of-the-art preparation instruments for biological samples in order to perform accurate TEM investigations.

The investigation of the immune response is necessary in order to deeply understand the cellular response following an interaction with a pathogen/nanostructured material. Furthermore, the evaluation of immunomodulation is necessary to test the efficacy of a free drug or one that has been internalised within a biocompatible carrier (vesicles, liposomes and aquasomes). In order to implement the results obtained through standard biological tests, a state-of-the-art system will be acquired to perform single-cell flow cytometry characterisations. To this aim we would acquire the Amnis® ImageStream®X Mk II Imaging instrument (LUMINEX), which is, to date, the most performing and versatile solution for a wide range of studies, combining the phenotyping capability of flow cytometry with high resolution images and at the same time, matches IR and UVRR cytology approaches of WP5.

Cell mechanics is a critical indicator of cell health because it regulates processes such as cell migration, tissue integrity, and differentiation through cytoskeleton rearrangements. Therefore, mechanical properties contribute to the understanding and evaluation of the effects of drug treatment, immune cell activation, stem cell differentiation, or disease prognosis. However, a comprehensive and accurately coupled estimation of biomechanical and molecular changes of cells under different stimulations has not been widely addressed, particularly in the case of cell pathogen/nanostructured material/drug and virus like synthetic systems interactions Two different and complementary methodologies and related instruments will be provided.

Currently the NNN-Facility at UniSalento combines atomic force microscopy (AFM) investigation, under cell-living conditions, and high-resolution fluorescence microscopy (CLSM and STED) in order to correlate the change in cell membrane mechanical behavior to nuclear and cytoskeletal protein rearrangements. However, the present instrument only allows the study of adherent cells. To overcome this limitation, real-time deformability cytometry instrument (RT-FDC-ZellMechanic, DE) will be purchased to study the mechanobiological behavior of a large population (>106) of cells with any phenotype. In addition, data obtained via RT-FDC will provide an accurate estimate of the elasticity of the entire cell body and/or specific intracellular components, thanks to a unique analysis algorithm that quantifies mechanical properties via real-time fluorescent acquisitions.

The NanoInnovation lab at Elettra has expertise in AFM imaging at the molecular, cellular and tissue level. One of the two AFMs of the lab, mounted on an inverted optical microscope, is dedicated to cell biomechanics. To strengthen the facility a new AFM will be added, featuring a more quantitative control of the interaction force to capture in real-time dynamic processes in physiological relevant

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

featuring a more quantitative control of the interaction force to capture in real-time dynamic processes in physiological relevant environments, simultaneously enabling fast force mapping at the nanoscale. Such measurements will help understanding the mechanisms adopted by pathogens to invade cells, key to disease diagnosis and treatment. It will permit CERIC-ERIC users to highlight the contribution of membrane structure/elasticity to the resistance to pathogen interaction and to study the dynamic surface properties of native virions, especially in the presence of pathogen' drug-resistance pathways.

42 WP inter-relation with other WWPP

WP2,WP3,WP4,WP5,WP7,WP8,WP9,WP10,WP11,WP12

43 Most relevant outcome:

The multi-functional, ultra-high-resolution (spatial and temporal) platform developed in WP6 will provide CERIC-ERIC RI users with powerful, comprehensive, integrated biophysical tools for the definition of the most relevant traits of the host-pathogen functional and dynamical interaction in physiological environment. The integration of the information with the multi-omic and morpho-chemical hyperspectral domains of WP7 and WP5, respectively will provide to PRP@CERIC the multiplex impetuous for addressing pathogen research timely and promptly.
Specifically, PRP@CERIC WP6 will consolidate the scientific and technological pipeline with the state-of-the- art imaging and electron-based, photon-based and force-based microscopy approaches to provide useful information on biophysical/biomolecular aspects of cell response to pathogens. The pathogenic mechanisms involved in invasion and in overcoming the immune response are in fact numerous, depend on the specific host tissue and can vary due to pathogen adaptation and mutation. Only a multi-technique approach can follow the entire mechanism, exploiting high time and spatial resolution at the subcellular, cellular and tissue level. This platform will concur to determine novel molecular targets to steer efficient drug design.
The present platform will insist on already-operative facilities, improving their potential with new stations, as listed below:
- At UniSalento facility: a cryo- FIB/SEM+iFLM station and dedicate sample preparation lab for biological sample EM, to be integrated with the CRYO_TEM Jeol NEOARM JEM-ARM200F (HOLO-TEM) instrument, with 60pm resolution;
- At UniSalento facility: a state-of-the-art station to perform single-cell flow cytometry and sub-100nm imaging; simultaneous characterizations;
- At UniSalento facility: a real-time deformability cytometry station with tailored microfluidic device implementation set-up;
- At NanoInnovation Lab of Elettra facility (UO Area campus Basovizza): an AFM station for video-rate ultra high-resolution imaging and spectroscopy of the dynamics of biomolecular interactions in physiological enviroment, integrating correlative fluorescence microscopy and AFM biomechanics
The integration of the existing capabilities with the new and /or upgraded instruments foreseen in WP6 will enormously increase the attractive potential of the RI toward Life Science users. Facility users will have the possibility to perform different experiments putting together the most advanced electron microscopy and spectroscopy methodologies and high-resolution imaging techniques, with mechanobiology and SERS studies, in order to assess the cell pathogen/nanostructured material/drug interactions at different functional level.
This attraction potential will be unique for the community of scientists working in multidisciplinary research field, embracing different disciplines like cell biology, nanomedicine and drug design, mathematical modelling and advanced omics studies.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Title	Bimester	Deliverables
Recruitment and activities of Personnel for WP6 activities, U.O. UniSalento	3	Six month report on personnel activities and associated time-sheet
Recruitment of Personnel for WP6 activities, U.O. Area Basovizza	3	N/A
Set- up of a real-time deformability cytometry/cytho mechanics investigation station in microfluidics	5	Report on the Act.6.3 working status focused on the instrumentation acquisition for the set-up of real-time deformability cytometry and cythomechanics investigation station in microfluidics
Activities of Personnel for WP6 activities, U.O. Area Basovizza_1	6	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP6 activities, U.O. UniSalento_1	6	Six-months report on the Personnel activities and associated time-sheets
Establishment of state-of-the-art station to perform single-cell flow cytometry	6	Report on the Act.6.2 working status focused on the instrumentation acquisition installation of the system Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer
Set up an experimental station for the preparation of radiation-sensitive and biological samples	7	Report on the Act.6.1 working status focused on the instrumentation acquisition for the set-up of the laboratory for the sample preparation, comprising: RF sputtering for grid stabilization, cleaning and hydrofiling plunge freezer for EM grids Biological sample TEM preparation by automated microwave-assisted processing and embedding SEM/EDS sample inspection system for quality assessment Microfluidic chip fabrication set-up for sub microliter biological sample handling Microbiological Safety Cabinet, MSC_class II CRYO-FIB/SEM+iFLM
Activities of	9	Six Month Report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for WP6 activities, U.O. Area Basovizza_2	9	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP6 activities, U.O. UniSalento_2	9	Six Months Report on the Personnel activities and associated time-sheets
Establishment of an AFM setup for high-speed high-resolution imaging and spectroscopy	10	Report on the Act. 6.4 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for WP6 activities, U.O. Area Basovizza_3	12	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP6 activities, U.O. UniSalento_3	12	Six-months report on the Personnel activities and associated time-sheets
Activities of Personnel for WP6 activities, U.O. Area Basovizza_4	15	Final Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP6 activities, U.O. UniSalento_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment and activities of Personnel for WP6 activities, U.O. UniSalento	3	1-Number of signed contracts. The KPI target value is set to 1 at M6 Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

U.O. UniSalento		
Recruitment of Personnel for WP6 activities, U.O. Area Basovizza	3	1-Number of signed contracts. The KPI target value is set to 1 at M6
Set- up of a real-time deformability cytometry/cytho mechanics investigation station in microfluidics	5	1-Number of new instruments for the establishment of a real-time deformability cytometry and cythomechanics investigation station in microfluidics at PRP@CERIC for users: The KPI target value is set to 1 at M8. 2- Number of acquired real-time deformability cytometry and cythomechanics investigation in microfluidics data sets at M20: The KPI target value is set to 6; The KPI target value is expected to increase at least of 4 units at M30.
Activities of Personnel for WP6 activities, U.O. Area Basovizza_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP6 activities, U.O. UniSalento_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Establishment of state-of-the-art station to perform single-cell flow cytometry	6	1-Number of new instruments for the establishment of state-of-the-art station to perform single-cell flow cytometry and sub-100nm imaging simultaneous characterizations at PRP@CERIC for users : The KPI target value is set to 1 at M10. 2- Number of acquired single "cell analysis" data sets at M24. The KPI target value is set to 6; The KPI target value is expected to increase at least of 3 units at M30.
Set up an experimental station for the preparation of radiation-sensitive and biological samples	7	1-Number of new instruments for experimental station dedicated to the preparation and handling of radiation-sensitive and biological samples at PRP@CERIC for users : The KPI target value is set to 7 at M14 2- Number of radiation-sensitive sample to be handled/prepared and pre-inspected for HOLO_TEM investigation : KPI is set to 20 at M24. The KPI target value is expected to increase at least of 10 units at M30.
Activities of Personnel for WP6 activities, U.O. Area Basovizza_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP6 activities, U.O.	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

U.O. UniSalento_2		
Establishment of an AFM setup for high-speed high-resolution imaging and spectroscopy	10	1-Number of new independent Atomic Force Microscopy setup stations at PRP@CERIC for users. The KPI target value is set to 1 at M20 2- Number of submitted proposals for experiments requiring the new Atomic Force Microscopy setup PRP@CERIC. The KPI target value is set to 2 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 3 units the following semesters from M30 to M30+M24
Activities of Personnel for WP6 activities, U.O. Area Basovizza_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP6 activities, U.O. UniSalento_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP6 activities, U.O. Area Basovizza_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP6 activities, U.O. UniSalento_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment and activities of Personnel for WP6 activities, U.O. UniSalento*

IO Bimestre *3* IO Costs *24.877,50*

IO Desciption

Recruitment of 1 Researcher for 30 months for activities 6.2. Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.2

IO Title *Recruitment of Personnel for WP6 activities, U.O. Area Basovizza*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Recruitment of Personnel for WP6 activities, U.O. Area Basovizza*		
IO Bimestre	*3*	IO Costs	*0,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.4

IO Title	*Set- up of a real-time deformability cytometry/cythomechanics investigation station in microfluidics*		
IO Bimestre	*5*	IO Costs	*379.871,40*

IO Desciption

Activity 6.3 will provide to the users a real time deformability cytometry station (RT-FDC) useful to capture and analyze real time up to 1000 cells in a channel without the use of fluorescent labels. The cells deformed by hydrodynamic forces without additional handling or staining will allowing to quantify differences in cell cycle phases, studying mechanical stiffening of cells upon the interaction with nanoparticles/vesicles and drugs. In addition, by analysis of distribution and average of pixel intensity of transmitted light, will allow to identify certain cell types and their content, to quantify cell size and shape.
Moreover, the high-resolution fluorescence module, integrated in the instrument, will allow analysis of the shape of the fluorescence peak (on three separate channels) in real time at a rate of up to 1 000 cells per second. Thus, this instrument will permit the study of cellular processes by means of a flow cytometry system with a high acquisition rate. This fundamental approach in biological research combined with stiffness analysis to extract the mechanical behavior of the whole cell represents the necessary protocol to obtain a complete understanding of the biological event under investigation.
The results obtained with RT-FDC instrument will be integrated with those obtained by means of other advanced microscopy and spectroscopy system, like the Bioscope Catalyst AFM (Bruker, California, USA) and STED microscopy located in the NNN-facility of UniSalento.
It will be possible to produce on-site microfluidics devices and wirings for RT-FDC studies and manipulation of biological samples.

IO Title	*Activities of Personnel for WP6 activities, U.O. Area Basovizza_1*		
IO Bimestre	*6*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.4

IO Title	*Activities of Personnel for WP6 activities, U.O. UniSalento_1*		
IO Bimestre	*6*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.2

IO Title	*Establishment of state-of-the-art station to perform single-cell flow cytometry*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Establishment of state-of-the-art station to perform single-cell flow cytometry*		
IO Bimestre	*6*	IO Costs	*639.646,00*

IO Desciption

Activity 6.2 will provide to the users a single-cell flow cytometry (Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer) instrument, useful to analyse large numbers of cells quickly, developing statistically robust results. This instrument combines the standard flow cytometry with the detailed imagining providing to measure cell size and the accurate morphology of ultrastructural elements at the resolution of mixed sub-populations in heterogeneous samples, upon the interaction with nanoparticles/vesicles and drugs measuring up to 12 multispectral images of up to 5000 cells or particles per second. The instrument has 6 image channels that include brightfield, darkfield and fluorescence, up to 7 excitation lasers, with 40X magnification.
The information acquired will be fundamental in order to understand apoptotic, necrotic events as well as the biochemical pathways which are triggered in the inflammatory phenomena in immune cells, like monocytes and dendritic cells (NF-Kb translocation, cytokines storm etc).
This instrument will be profoundly connected to the other stations of the platform, in particular with HOLO- TEM connecting the morphological and physico-chemical data regarding the nanomaterials and pathogens to the plasma membrane of cells in order to understand the chemical bound at the interfaces.

IO Title	*Set up an experimental station for the preparation of radiation-sensitive and biological samples*		
IO Bimestre	*7*	IO Costs	*2.078.980,02*

IO Desciption

The Biological sample preparation and investigation station for HOLO-TEM need the combination of fluorescence and SEM imaging together with ion milling in a single instrument such as a cryo-FIB-SEM. This correlative system has the ability to check the final lamellae for fluorescently labelled targets, ensuring they are located within the 200-300 nm thin cryo-lamellae. A suitable software enables data correlation between fluorescent and SEM microscopy and other correlative light microscopy data can be imported for targeting and the identification of features of interest. As regard single particles cryo-TEM analysis, the sample will be cryo-vitrified on stabilized support grids.
Given the high level of information that HOLO-TEM allows, it is particularly important to be aware that the sample preparation process may have introduced artefacts (morphological, structural and chemical). Then, preparation samples is the most critical step in achieving optimal results.
Therefore, it is necessary to equip the laboratory with verification and control systems that allow, in addition to the manipulation of very thin samples (a few tens of nanometres) on suitably prepared supports, to assess the quality of the preparation both from a morphological and chemical point of view. This control must be carried out continuously and under economically sustainable conditions. A high-precision imaging system is required to ascertain the quality of the prepared samples, at nanometric resolution, with a high depth of field, also capable of highlighting any contamination.

IO Title	*Activities of Personnel for WP6 activities, U.O. Area Basovizza_2*		
IO Bimestre	*9*	IO Costs	*27.329,94*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.4

IO Title	*Activities of Personnel for WP6 activities, U.O. UniSalento_2*		
IO Bimestre	*9*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.2

IO Title	*Establishment of an AFM setup for high-speed high-resolution imaging and spectroscopy*		
IO Bimestre	*10*	IO Costs	*809.870,18*

IO Desciption

Act. 6.4 will provide to RI users an ultrasensitive Atomic Force Microscope (AFM) featuring high-speed (video rate, >1200 lines/sec) and fast force mapping (1 kHz). This instrument will allow label-free evaluation of the biophysical effects of pathogens/drugs/model nanosystems (e.g. vesicles) on the recipient cells, by distinguishing the contribute of membrane structure and elasticity to the resistance to pathogen interaction, to identify the different uptake routes (e.g. membrane fusion; endocytosis) undertaken by pathogens and their modification upon interaction with drugs. By correlating biomechanical data, high speed imaging of the morphological changes at the cell membrane with epi-fluorescent microscopy measurements already available at the NanoInnovation Lab facility, and with IR and UVRR microscopy analysis of WP5, we will be able to evaluate subcellular modifications (e.g. focal adhesions; F-actin; chromatin decondensation) induced by the interaction with pathogens, and eventually with drugs and drugs encapsulated in vesicles (liposomes, extracellular vesicle) or loaded on viral-like particles. Also, the determination of the specific internalization route and the membrane macromolecules involved will allow to test new targets for drug design. The high- speed AFM will turn extremely useful even to determine the variations in the dynamics of pathogens membrane proteins (e.g. spike proteins for SARS-CoV2) upon inactivation as from WP2 and in synergy with the activities of WP5, with special emphasis on Act. 5.5: the correlation of the mechanical properties of key-infector mediators as revealed by FIR-THZ spectroscopy, both at model-system and cellular level. Such multi-technique matching will boost the concept of dynamic key-to-look paradigm, as novel experimental trait of the facility. It indeed goes without saying that nano-scale morpho-mechanical approaches of WP6 are the ideal complement to nano-resolved chemical analysis at WP5.3, allowing the morpho-mechanical-chemical traits of host-pathogen interaction mechanism to be disclosed with the innovative correlative approach.

IO Title	*Activities of Personnel for WP6 activities, U.O. Area Basovizza_3*		
IO Bimestre	*12*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.4

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Activities of Personnel for WP6 activities, U.O. UniSalento_3*		
IO Bimestre	*12*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.2

IO Title	*Activities of Personnel for WP6 activities, U.O. Area Basovizza_4*		
IO Bimestre	*15*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.4

IO Title	*Activities of Personnel for WP6 activities, U.O. UniSalento_4*		
IO Bimestre	*15*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP6 deliverables associated to Act. 6.2

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

package, as well as in the intermediate objectives.

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Biological sample preparation and investigation station for HOLO-TEM

49 Activity short name

6.1

50 Activity Start month and duration

Activity Start month	2	Activity Duration	28

51 OU in charge of the Activity

OU short name	UniSalento	Participant	Università degli Studi del Salento

52 Activity description

To exploit the full potential of "HOLO-TEM" and apply advanced electron microscopy methodologies for the study of organic matter on a nanoscopic scale, it is necessary to set up a laboratory for the sample preparation, specifically dedicated to the preparation of radiation-sensitive materials. Sample preparation needs the electrical, thermal, and mechanical stabilisation of the support grids. Then single organic macromolecules (proteins, lipids, nucleic acids, viruses...) must be cryo-vitrified before cryo-TEM observation. The massive organic samples (tissues, cells, or bacteria) preparation involves different fixation steps, dehydration series with solvent, resin infiltration and embedding, sectioning and mounting sections on specimen grids. The cryo FIB/SEM will allow us to prepare site-specific TEM samples for both inorganic and biological materials. The availability of both an electron and ion column will guarantee both a detailed recognition of the sample ultrastructure, surface morphology and sub-cellular composition, and a safe in situ sample handling and sample preparation for subsequent TEM. The presence of a fluorescence device would allow us to precisely identify the area of interest, and to prepare the sample from the specific area. The selected FIB will also allow us to immediately transfer the prepared lamella inside the cryo-holder and therefore into the microscope, without any heating or further handling of the sample, that would dramatically destroy it.
Instrument order and hardware commissioning: The Biological sample preparation and investigation station for HOLO-TEM need the combination of fluorescence and SEM imaging together with ion milling in a single instrument such as a cryo-FIB-SEM. This correlative System has the ability to check the final lamellae for fluorescently labelled targets, ensuring they are located within the 200-300 nm thin cryo-lamellae.
Scientific Commissioning: The Biological sample preparation/investigation facility.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.562.332,00 €

Cost description: The activity contributes to the acquisition of a correlative CryoFIB/SEM -fluorescent microscopy: a DualBeam platform combined with a dedicated cryo-stage, cooling, loading and transfer system, which allows for streamlined production of high quality cryo-lamellas for TEM tomography.
Main Features: 1-Electron optics:
pre-aligned electron optical column – with continuous beam current control and optimized aperture angle – which is optimized for high resolution and for beam stability.
2-Ion optics: Sidewinder ion column. Field emission focused ion beam optics with liquid metal ion source (LMIS) emitting Gallium ions. Drift suppression mode as standard for non-conductive samples.
3-Correlative System (Integrative Fluorescence Light Microscope) to combine fluorescence imaging and ion milling within a single microscope –.
SAMPLE PREPARATION EQUIPMENTS to be added and among them:
- RF magnetron sputtering system.
- Plunge freezer for sample preparation

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

380.640,00 €

Cost description: Dedicated electrical cabling, vibration damping platforms and room temperature control systems will be installed

54.5 e. Indirect costs

136.008,04 €

Cost description: Indirect cost will be used for management, running and access costs of the facility, consumables, maintenance, discrepancy between standard and tabulated costs for personnel, travel

54.6 f. Training activities

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

48 Activity title

Single-cell flow cytometry and imaging characterizations

49 Activity short name

6.2

50 Activity Start month and duration

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	UniSalento	Participant	Università degli Studi del Salento

52 Activity description

The activities contributed to the acquisition of new Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer completed to the Data Acquisition Software.
Instrument order and hardware commissioning:
The instrument Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer will be ordered at month one of funding. A direct purchase will be made (without a call for tenders) given the instrument's uniqueness and the absence on the market of an instrument with similar characteristics and performance.
Scientific Commissioning:
The Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer contributes to perform high resolution images on single cells (different types) after incubation with pathogens, nanomaterials, and drugs. The instrument will be located on NanoBiotechnology, NanoMedicine and NanoBioelectronics immediately open to users after the installation and training
Software Commissioning:
The IDEAS® image analysis software will be installed at the same time to the instrument allowing to quantify and analyze of the generated images. As part of the project, the BOL laboratory will support research and user operation into the future.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: A fixed term researcher (RTDA) with proven experience in atomic force microscopy and fluorescence microscopy will be recruited for the activities 6.2 We will look for a candidate with a strong biophysical background. The researcher will be involved in the commissioning of the instrument described in 6.2, in the correlation of this machine with the other instruments of the research facility lab, in the research activities described in 6.3 and in creating synergy with the activities described in WP6.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

lab, in the research activities described in 6.3 and in creating synergy with the activities described in WP6.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

597.800,00 €

Cost description: The activities contributed to the acquisition of:
new Amnis® - ImageStream®X Mk II -Imaging Flow Cytometer completed to the Data Acquisition Software. The instrument is equipped of:
High Power Blue Excitation Laser Upgrade - 488 nm, 400 mW (AT TIME of instrument purchase)
UV Excitation Laser - 375 nm, 70 mW
Violet Excitation Laser - 405 nm, 120 mW
Green Excitation Laser - 561 nm, 200 mW
AutoSampler
MultiMag - 60X, 40X, and 20X (AT TIME of instrument purchase)
Extended Depth of Field (EDF) Option for first camera/6-channel

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

49.983,50 €

Cost description: ndirect cost will be used for management, running and access costs of the facility, consumables, maintenance, discrepancy between standard and tabulated costs for personnel, travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Real-time deformability cytometry and cythomechanics

49 Activity short name

6.3

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	UniSalento	Participant	Università degli Studi del Salento

52 Activity description

The activities contributed to the acquisition of new real-time deformability cytometry station (RT-FDC, produced by ZellMechanic, Dresden, Germany) completed to the Data Acquisition Software.
Instrument order and hardware commissioning:
The real-time deformability cytometry station (RT-FDC, ZellMechanic, Dresden, Germany) instrument will be ordered at month one of funding. A direct purchase will be made (without a call for tenders) given the instrument is uniqueness, and the absence on the market of an instrument with similar characteristics and performance.
Scientific Commissioning:
The real-time deformability cytometry (RT-FDC, produced by ZellMechanic, Dresden, Germany) will contribute to study the mechanobiological behavior of a large population (>106) of cells with any phenotype, by means of an accurate estimation of the elasticity, starting from a hydrodynamic induced deformation, of the entire cell body and/or specific intracellular components.
This instrument will allow to fully characterize morpho-mechanical properties in suspended or adhesive cells after interaction with pathogens/nanoparticles, drugs/vesicles.
Software Commissioning:
The control and acquisition software ShapeIn will be installed at the same time to the instrument, and its cost is included in the instrument price. Differently, the data visualization software ShapeOut for post processing analysis of acquisitions is freeware (open source). This policy is very useful in the perspective of this project, because the foreign researchers will be able to analyse later the acquisitions made in our laboratories.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

355.020,00 €

Cost description: The activity contributes to the acquisition of:
a new real-time deformability cytometry platform (RT-FDC, produced by ZellMechanic, Dresden, Germany) completed to the Data Acquisition Software. The instrument is equipped of:
ZM-AcCellerator extended with high-speed imaging system (CMOS camera and frame grabber), high-power LED-illumination system AcCellerator L1 (460 nm), precision syringe pump with two syringe modules, pump rack, SampleStage and SampleBox, high-performance computer.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

performance computer.
ZM-ZEISS_AO3_ManToMot - Inverted microscope – ZEISS Axio Observer 3 equipped to perform "real-time deformability cytometry" using the AcCellerator. The system including: 100 % transmission to left side port with camera mount, 40x objective, NA 0.65, air/no immersion, manual and motorized XY stage for Zeiss Axio Observer.
ZM Fluorescenc eModule for fluorescence intensity measurements in parallel to cell mechanical measurements. Coupled to the side port of the ZEISS Axio Observer. Including laser safety add-ons for the microscope. Up to three excitation lines and detection channels of choice.
ZM-HeatModule Heating enclosure to the AcCellerator with ZEISS Axio Observer. This module allows the control of temperature during measurements – between the room temperature and 37 °C.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

24.851,40 €

Cost description: with camera mount, 40x objective, NA 0.65, air/no immersion, manual and motorized XY stage for Zeiss Axio Observer.
ZM Fluorescenc eModule for fluorescence intensity measurements in parallel to cell mechanical measurements. Coupled to the side port of the ZEISS Axio Observer. Including laser safety add-ons for the microscope. Up to three excitation lines and detection channels of choice.
ZM-HeatModule Heating enclosure to the AcCellerator with ZEISS Axio Observer. This module allows the control of temperature during measurements – between the room temperature and 37 °C.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Atomic Force Microscopy setup for high-speed high-resolution imaging and nanomechanics

49 Activity short name

6.4

50 Activity Start month and duration

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

The main purpose of this activity is to strengthen the capacities of the NanoInnovation lab at Elettra by acquiring a novel AFM, allowing for a quantitative control of the interaction force, providing the required stability to capture dynamic processes in physiological environment and, last by not least, easy operation also for non-specialized users. High-speed and fast force mapping provided by this type of machine, recently available on the market, will allow the real-time evaluation of the biophysical effects of pathogens on the recipient cells. In particular, the effect of membrane specific lipids/proteins on the internalization of pathogens by cells will be highlighted, and further tested on the other platforms developed in WP6, as well as by the correlative microscopies available at the NanoInnovation Lab. AFM imaging of living cells will also be developed. Finally, single pathogen video rate images will allow to determine the dynamics of surface proteins and their role in cell invasion.
Instrument order and hardware commissioning:
The video-rate AFM station with environmental control and fast force mapping will be ordered at the end of a call for tenders, which is expected at month 5. Order is expected to be finalized at month 11. The AFM is expected to be delivered 6 months after the order. This instrument will allow to acquire force curve in liquid environment at high sampling rate and unprecedented precise force control on pathogens, nanovesicles, cell membranes.
Scientific Commissioning:
The capability to acquire data on host/pathogens interaction, with details on the interaction dynamics at cell membranes, in different physiological environments, is expected to be completed 3 months after the instrument arrival. This instrument will be tested also in terms of imaging on live cells. In this case the commissioning will be ended 6 months after the instrument delivery.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: A fixed term researcher with proven experience in atomic force microscopy and fluorescence microscopy will be recruited for the activities 6.4. We will look for a candidate with a strong biophysical background. The researcher will be involved in the commissioning of the instrument described in 6.4, in the correlation of this machine with the other instruments of the research facility lab, in the research activities described in 6.4 and in creating synergy with the activities described in WP6. She/he will provide PRP@CERIC user support
For the Activity 6.4 she/he will be accounted for 1 FTE from M6 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

756.888,00 €

Cost description: he activity contributes to the acquisition of a video-rate AFM equipped with nanomechanical curves acquisition at high sampling rate. The machine will consist of:
fast scanning AFM setup (higher than 1200 line/second, frame rates up to 45 frames/second); ultra- stable imaging (photothermal excitation technology);
motorized laser and detector alignment and simple probe loading;

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP06 - WP06 - Multi functional and dynamic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

motorized laser and detector alignment and simple probe loading;
fast force mapping (maps force curves up to 1kHz);
fully sealed sample cell with perfusion capability;
environmental AFM liquid cantilever holder;
environmental AFM cooler heater sample stage assembly (0-120 oC);
small spot RF-modulated laser diode source (nominal 3 µm × 9 µm cantilever spot size)

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

60.133,92 €

Cost description: Indirect cost will be used for management, running and access costs of the facility, consumables, maintenance, discrepancy between standard and tabulated costs for personnel, travel

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment and activities of 3 RTD-A Researcher on activity 7.1, 7.2 and 7.3, U.O UniSalerno	74.632,50	74.632,50
3	Recruitment and activities of 1 RTD-A Researcher on activity 7.4, U.O. UniSalento	24.877,50	99.510,00
3	Recruitment of Personnel for 7.7 and 7.8 WP7 activities, U.O. Area Basovizza	0,00	99.510,00
5	Recruitment of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud	0,00	99.510,00
5	Recruitment of Personnel for 7.5 WP7 activities, UU.O. Area Basovizza	0,00	99.510,00
6	Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_1	74.632,50	174.142,50
6	Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_1	24.877,50	199.020,00
6	Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _1	38.261,89	237.281,89
6	Activities of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud_1	62.251,53	299.533,42
8	Set-Up of MoViLab_POCAnalyis	32.112,84	331.646,26
9	Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_2	24.877,50	356.523,76
9	Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_2	74.632,50	431.156,26

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

9	Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD	132.094,71	563.250,97
9	Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _2	92.921,79	656.172,76
12	Set-Up of MoViLab_Environmental Analysis	192.434,64	848.607,40
12	NGS facility upgrade for Proteomics NGS based on site integration	297.281,22	1.145.888,62
12	NGS facility upgrade for Single cell sequencing on site integration	716.030,05	1.861.918,67
12	NGS facility upgrade for Spatial transcriptomics (act. 7.5)	703.610,60	2.565.529,27
12	Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_3	24.877,50	2.590.406,77
12	Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_3	74.632,50	2.665.039,27
12	Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_3	132.094,71	2.797.133,98
12	Upgrade of BOL-MS platform with a Multi-omic Orbitrap-MS station	2.036.561,85	4.833.695,83
12	Upgrade of BOL-MS platform with High-throughput Sample-Prep station	1.000.813,50	5.834.509,33
12	Upgrade of BOL-MS platform with Multimodal Mass spectrometry Imaging Q-TOFs station	1.873.249,00	7.707.758,33
12	Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _3	92.921,79	7.800.680,12
15	Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_4	24.877,50	7.825.557,62

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

	UniSalento_4		
15	NGS facility upgrade for automatization of high throughput quality	723.713,76	8.549.271,38
15	NGS facility upgrade for automatization of sample extraction	594.479,16	9.143.750,54
15	NGS facility upgrade for automatization of sample storage and handling.	443.836,00	9.587.586,54
15	Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_4	74.632,50	9.662.219,04
15	Implementation of BAMS (Biomedical Accelerator Mass Spectrometry) for drug-distribution studies	2.071.669,85	11.733.888,89
15	Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_4	132.094,71	11.865.983,60
15	Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza_4	92.921,79	11.958.905,39

36 WP title

WP07 - Multi-Omic platform

37 WP number

WP07

38 **Start month**(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno
DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno
DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno
UniSalento	Department of Mathematics and Physics "Ennio De Giorgi"	CO-APPLICANT: Università degli Studi del Salento
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Area SUD	Sede Area Sud c/o Universita' di Salerno	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park

40 WP Leader

Pietro Campiglia (DIFARMA)

41 Summary of the activities envisaged in the WP

The goal of PRP WP7 is to expand the multi-omic capabilities of the mass spectrometry (MS) and genomic platforms of the Bio Open Lab (BOL) at the Department DIFARMA of University of Salerno and in Area Science Park, to enforce their potential in deciphering key molecular changes following host-pathogen interaction, disease progression, and drug treatment, to assist and guide the biomedical and pharmaceutical research in pandemic events.
To achieve this task the WP activities will be implemented with i) novel cutting-edge fully digitalized (MS) and sample-prep stations, ii) fully digitalized Spatial Single Cell multi-omics Next Generation Sequencing stations, and finally iii) with photon-based techniques for in situ pathogen recognition and phenotyping. MS and NGS facilities, for their unique ability to characterize metabolites, lipids, proteins, transcripts and genes, will be seamless connected with the potential of handle biological infection models and the drug screening abilities of WP2 and WP3 respectively, as well as in integrate and complement the hyperspectral imaging, microscopy and structural biology activities of WP5, WP6 and WP4, and finally deliver informative rich data for A.I (WP9). Within CERIC-ERIC RI, the WP7 upgrade will represent a unicum in the RI scenario by i) strengthening the BOL-MS techniques portfolio by novel dedicated instrumentation for MS and NGS (7.1, 7.2, 7.4, 7.5), ii) enlarging the possibility to users with a digital, automated, high-throughput multi-omic station (7.3, 7.6), iv) translating omics findings into fast, portable, user friendly optical-based POCs analysis tools (WP 7.7, 7.8). The scientific commissioning of the platform, after defining accurate protocols for biological specimen handling, set up by the WP2, will establish streamlined workflows for a complete and accessible integration with users and other WPs. The main points enforced by WP7 will be MS, NGS, and spectroscopy techniques.
As outlined by the Covid-19 pandemic, metabolism has a crucial impact on infection and immunity. To rapidly understand host-pathogen interaction it is essential to highlight key metabolic changes for: i) Disease diagnosis and prognosis, ii) Biomarker identification and validation, iii) Assist therapy choice. Many metabolic pathways are involved in host-pathogen immune response, such as glycolysis, TCA cycle, pentose phosphate pathway, amino acid synthesis, fatty acid synthesis and oxidation, lipidome and proteome changes. Conventional biology techniques fail in deciphering this complex molecular paint, and novel multi-dimensional strategies are mandatory, which, assisted by chemometrics, can retrieve fundamental information to drive drug discovery.
Among the different strategies, MS techniques are highly suited to elucidate this complex molecular scenario, by the unique ability to simultaneously detect and quantify metabolites, lipids and proteins in cells, biofluids, tissues. Nevertheless, these different molecules require dedicated conditions, and cannot be analyzed on the same instrument without downtimes. Dedicated MS instruments are required to screen hundreds of samples and provide reliable results, which is the challenge of the MS employment in biomedical and clinical fields. In the frame of WP7 this limitation will be surpassed by i) Four novel FTMS benchtop instruments to increase the speed and level of coverage for each biological task: metabolomics, lipidomics, proteomics and DMPK. This will rely on the implementation of Orbitrap-MS Exploris, capable of both qualitative and quantitative analysis, halving the time needed for analyses (Act. 7.1), ii) Expand the spatial-omics potential by upgrade to multimodal MS-imaging (MSI) (Act. 7.2) by addition of two Q-TOF instruments with MALDI-2. This label free techniques able to analyze directly on the tissue the spatial distribution of biomolecules, deliver complementary information with histology enable direct exchange with hyperspectral and microscopy activities (WP5 and 6) by its non-destructive behavior iii)

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

with histology enable direct exchange with hyperspectral and microscopy activities (WP5 and 6) by its non-destructive behavior iii) Overcome the limitations of manual sample preparation by an automated sample preparation station, providing high repeatability and safer protocols for operators (Act. 7.3), iv) Support MS-imaging, spectroscopic and microscopy methods with a Biomedical accelerator mass spectrometry (BAMS) instrument based on the detection of the radioactive isotope of carbon (14C) for pharmacokinetics and metabolism (Act. 7.4).
Genomic identification and the successive characterization of SARS-CoV-2 variants of concern, during the Covid-19 pandemic, has shown the central role of next generation sequencing (NGS) in an effective response against a pandemic event, not only for virus identification but also to assess the effects of new drugs. The increased request of sequencing activity highlighted two major limitations: i) Turnaround times due to lack of integration of automatization steps for compatibility with other omics. ii) Structural limitation on sequencing where data points observed represent bulk samples (many cells) of a single omic technique. While bulk sequencing is still a necessary resource for viral identification or simple Genetic and Epigenetic evaluation of molecules, this approach lacks the proper structure to address more complex scenarios where heterogeneity of the starting material like tissues or multi cell-based samples will strongly affect the readout. In the frame of WP7 this limitation will be surpassed by two dedicated activities: i) Station upgrade for automatization. The process will integrate sample preparation steps for multipurpose omics linking all the available automatization in a digitalized and remotely trackable process that will lead from sample to the data (Act. 7.5). ii) Upgrade for Spatial Single Cell multi-omics NGS. The selected instrumentation will help the user of the facility to obtain single cell data with or without the morphological information of the original sample (Act. 7.6). A multipurpose workflow will allow the user to integrate multiplex immunoassays of proteins on the same sample still using the available NGS Platform as readout, simplifying the final data in a common format.
While multi-omics can characterize with high specificity potential biomarkers for precision medicine, the rapid diagnosis in the clinical setting remains a great challenge, as outlined by covid-19 pandemic. In addition to the omics-based approaches, the WP aims to translate the MS-omics findings into inexpensive, fast, portable, solutions not requiring extensive operator training that can be performed at hospitals and clinics in resource poor settings, such as third developing country, in the form of Point-of-Care (POC) tools. FTIR spectroscopy supported by chemometrics has been used as a POC tool for bacterial or viral infection. Act 7.7 aims to strengthen the capabilities of SISSI-BioOffline@Elettra through the acquisition of a compact and portable ATR-FTIR interferometer, to be devoted to the identification of pathogens in biofluids. Proper omic approaches in WP7 will be exploited for the methodology validation and will be developed in synergy with Act. 7.8. Indeed, Deep UV (DUV) Resonance Raman, supported by chemometrics, has demonstrated valuable capabilities of detection and identification of bio-specimens. Hence, in the framework of Activity 7.8 it is planned to extend the user offer of deep-UV Resonance Raman platform of IUVS-OFFline@Elettra facility by acquiring a portable handheld UVRR instrument with the ability to perform detection and differentiation of pathogens directly in situ. The scientific commissioning of the activities, that overall will set a Mobile Vibrational Laboratory (MoVibLab), will be pursued through the screening of a pathogen spectral library as provided by the Virology group of ICGEB for enabling the development of chemometric protocols for the automated on-site identification and screening of pathogens.

42 WP inter-relation with other WWPP

WP2,WP3,WP4,WP5,WP6,WP8,WP9,WP10,WP11,WP12

43 Most relevant outcome:

WP7 will provide a unique digital cutting-edge solution to CERIC-ERIC RI for users which need a complete characterization of molecular actors involved in specific biological mechanisms. This unique platform allows new opportunities for the CERIC-ERIC RI users, in particular to the biology, medical, pharmaceutical as well industrial community involved in the field of infectious/pathogen but also in the study of other metabolic- based diseases. This upgrade will be also crucially linked with the possibilities offered by the BLS3 and BLS2 laboratories for pathogens handling. In fact, biosamples must be handled in a framework where processes need to be standardized, harmonized and quality controlled to the highest possible quality level. This can be achieved by implementing a range of automation of critical processes including sampling storage, multi-omics sample extraction and library preparation and evaluation. This technological upgrade will fulfill a complete workflow from sample to sequencing with minimum, or even without, operator handling. Dedicated instrumentation will enable the existing MS and sequencing facility to integrate sample handling, extraction and preparation from multi-omic automated analysis increasing the security of the facility and its capability enabling multi-user access.
The MS platform upgrade will double the speed at which the MS-based multi-omic analyses are carried out, by

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

The MS platform upgrade will double the speed at which the MS-based multi-omic analyses are carried out, by dedicated instruments running 24/7 responding to the specific tasks and address biological questions in a timely manner, without incurring in downtimes due to the change of analysis condition. The upgrade will expand the current capability by reaching the potential to analyze almost 100.000 samples/year, by implementing dedicated HRMS instruments. An additional tool will be represented by BAMS, which will integrate drug discovery and development enabling a variety of biological applications including: studies on cell turnover, pharmacokinetics and biodistribution of drug candidates and covalent binding of compounds with DNA and proteins.
Moreover, for the Genomic and Epigenomic already available sequencing services, the new instrumentations will enable the existing sequencing facility to provide single cells genomics services. With the acquired instrumentation the facility will be able to target up to 10,000 cells per sample updating the existing bulk process of quality control and post sequencing analysis. With the upgrade it will be possible to exploit the throughput of the available high performing sequencer to obtain genomic data points of a single cell instead of a population of cells. A second facility upgrade will be based on Spatial transcriptomics, a molecular profiling method that allows scientists to measure genomic activity directly from a tissue sample integrating omics data with the morphological information of the original sample. Moreover, a third upgrade will be based on Proximity Extension Assay technology combining multiplex immunoassays of proteins with NGS as a readout method. The assay will be run on a dedicated-automated system using minimal volumes of bio-specimens. In addition, these findings will be translated into spectroscopy based analytical tools for rapid, portable, in situ phenotyping for the purpose of POC at the site of the patient and environmental analysis at the site of contamination.
This large, combined potential is highly attractive for both academic, public and private research institutes, as well as medium and large bio-pharmaceutical companies, providing a comprehensive platform for bottom-up and top-down approaches in drug discovery, repurposing and testing. Furthermore, the translation to portable devices is of great interest for the industrial compartment, being transferable into multiple contexts.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment and activities of 3 RTD-A Researcher on activity 7.1, 7.2 and 7.3, U.O UniSalerno	3	Six Month Report on the Personnel activities and associated time-sheets
Recruitment and activities of 1 RTD-A Researcher on activity 7.4, U.O. UniSalento	3	Six Month Report on the Personnel activities and associated time-sheets
Recruitment of Personnel for 7.7 and 7.8 WP7 activities, U.O. Area Basovizza	3	N/A
Recruitment of Personnel for 7.6 WP7 activities,	5	N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

WP7 activities, U.O. Sede Area Sud		
Recruitment of Personnel for 7.5 WP7 activities, UU.O. Area Basovizza	5	N/A
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_1	6	Report on the Act. 7.1-7.3 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_1	6	six month reports on the Personnel activities and associated time-sheets
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _1	6	Report on the Personnel activities and associated time-sheets
Activities of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud_1	6	Report on the Personnel activities and associated time-sheets
Set-Up of MoViLab_POCAnalyis	8	Report on the Act. 7.7 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_2	9	six month reports on the Personnel activities and associated time-sheets
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_2	9	Report on the Act. 7.1-7.3 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD	9	six month report on the Personnel activities and associated time-sheets
Activities of	9	Report on the Personnel activities and associated time-sheets

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(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _2	9	Report on the Personnel activities and associated time-sheets
Set-Up of MoViLab_Environmental Analysis	12	Report on the Act. 7.8 working status focused on the instrumentation upgrade and hardware commissioning
NGS facility upgrade for Proteomics NGS based on site integration	12	Report on the Act. 7.5 working status focused on Proteomics NGS based on site integration
NGS facility upgrade for Single cell sequencing on site integration	12	Report on the Act. 7.5 working status focused on Next Generation Sequencing facility upgrade for Single cell sequencing on site integration
NGS facility upgrade for Spatial transcriptomics (act. 7.5)	12	Report on the Act. 7.5 working status focused on Next Generation Sequencing facility upgrade for Spatial transcriptomics on site integration
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_3	12	six month reports on the Personnel activities and associated time-sheets
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_3	12	Report on the Act. 7.1-7.3 working status focused on the instrumentation upgrade and hardware commissioning
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_3	12	Report on the Personnel activities and associated time-sheets
Upgrade of BOL-MS platform with a Multi-omic Orbitrap-MS station	12	Report on the Act. 7.1 Upgrade of BOL-MS platform with a Multi-omic Orbitrap-MS station
Upgrade of BOL-MS	12	Report on the Act. 7.3 Automation upgrade for multi-omics-MS based sample preparation

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

BOL-MS platform with High-throughput Sample-Prep station		preparation
Upgrade of BOL-MS platform with Multimodal Mass spectrometry Imaging Q-TOFs station	12	Report on the Act 7.2 Multimodal mass spectrometry imaging platform upgrade
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _3	12	Report on the Personnel activities and associated time-sheets
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_4	15	Final reports on the Personnel activities and associated time-sheets
NGS facility upgrade for automatization of high throughput quality	15	Report on the Act. 7.6 working status focused on automatization of high throughput quality. control and library preparation automatization on site integration.
NGS facility upgrade for automatization of sample extraction	15	Report on the Act. 7.6 working status focused automatization of sample extraction on site integration.
NGS facility upgrade for automatization of sample storage and handling.	15	Report on the Act. 7.6 working status focused on automatization of sample storage and handling on site integration
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_4	15	Report on the Act. 7.1-7.3 working status focused on the instrumentation upgrade and hardware commissioning
Implementation of BAMS	15	Report on the Act. 7.4 set-up of the new instrument, assessment of its performances in terms of precision, accuracy, sensitivity, sample throughput.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

of BAMS (Biomedical Accelerator Mass Spectrometry) for drug-distribution studies		performances in terms of precision, accuracy, sensitivity, sample throughput.
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_4	15	Final Report on the Personnel activities and associated time-sheets
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza_4	15	Final reports on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment and activities of 3 RTD-A Researcher on activity 7.1, 7.2 and 7.3, U.O UniSalerno	3	-Number of signed contracts. The KPI target value is set to 3 at M6 - Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Recruitment and activities of 1 RTD-A Researcher on activity 7.4, U.O. UniSalento	3	-Number of signed contracts. The KPI target value is set to 1 at M6 -Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Recruitment of Personnel for 7.7 and 7.8 WP7 activities, U.O. Area Basovizza	3	1-Number of signed contracts. The KPI target value is set to 2 at M6
Recruitment of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud	5	Number of signed contracts. The KPI target value is set to 4 at M12
Recruitment of Personnel for 7.5	5	Number of signed contracts. a. The KPI target value is set to 3 at M12

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Personnel for 7.5 WP7 activities, UU.O. Area Basovizza		a. The KPI target value is set to 3 at M12 2.
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_1	6	KPI Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Set-Up of MoViLab_POCA nalyis	8	-Number of portable FTIR instruments PRP@CERIC for users. The KPI target value is set to 1 at M24 2- Number of submitted proposals for experiments requiring demanding for the portable FTIR station available at PRP@CERIC. The KPI target value is set to 3 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 4 units the following semesters from M30 to M30+M24. 3- Number of pathogen species recorded for building ATR-FTIR Library for pathogen recognition. The KPI target value is set to 10 for M30.
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Set-Up of MoViLab_Environmental Analysis	12	1-Number of portable portable handheld UVRR instrument PRP@CERIC for users. The KPI target value is set to 1 at M24 2- Number of submitted proposals for experiments requiring demanding for the portable handheld UVRR instrument station available at PRP@CERIC. The KPI target value is set to 3 for the CERIC-ERIC call of semester M24-M30, M30; The KPI target value is expected to increase at least of 4 units the following semesters from M30 to M30+M24. 3- Number of pathogen species recorded for building ATR-FTIR Library for pathogen recognition. The KPI target value is set to 10 for M30.
NGS facility upgrade for Proteomics NGS based on site integration	12	Number of new users performing proteomic NGS based sequencing 4 months after the upgrade The KPI target value is set to 3 at M28.
NGS facility upgrade for Single cell sequencing on site integration	12	Number of performed experiments of Single cell sequencing 4 months (M30) after the upgrade. The KPI target value is set to 16 at M30
NGS facility upgrade for Spatial transcriptomics (act. 7.5)	12	Number of new users performing experiments of Spatial Transcriptomics 6 months (M30) after the upgrade. The KPI target value is set to 3 at M30
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Upgrade of BOL-MS platform with a	12	Number of new users performing experiments of metabolomic, lipidomics, proteomics and pharmacokinetics 4 months (M30) after the upgrade. The KPI target value is set to 3 at M30

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

platform with a Multi-omic Orbitrap-MS station		The KPI target value is set to 3 at M30 The KPI target value is expected to increase with an annual rate of at least 5% in the following years.
Upgrade of BOL-MS platform with High-throughput Sample-Prep station	12	Number of biological samples processed by automated sample preparation platforms 4 months (M30) after the upgrade. The KPI target value is set to 5000 at M30 The KPI target value is expected to increase with an annual rate of at least 5% in the following years.
Upgrade of BOL-MS platform with Multimodal Mass spectrometry Imaging Q-TOFs station	12	Number of new users performing experiments of multimodal mass spectrometry imaging (MSI) 4 months (M30) after the upgrade. The KPI target value is set to 3 at M30 The KPI target value is expected to increase with an annual rate of at least 5% in the following years.
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _3	12	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
NGS facility upgrade for automatization of high throughput quality	15	Number of samples undergone a complete automated process after upgrade.The KPI target value is set to 62 at M30.
NGS facility upgrade for automatization of sample extraction	15	Number of biospecimens extracted 4 months (M34). The KPI target value is set to 384 at M34.
NGS facility upgrade for automatization of sample storage and handling.	15	Number of samples stored in 6 months (M36).The KPI target value is set to 384 at M36
Activities of Personnel for 7.1	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_4		identified scientific responsible. KPI: YES/NO
Implementation of BAMS (Biomedical Accelerator Mass Spectrometry) for drug-distribution studies	15	Number of samples processed by the BAMS instrument 6 months (M30) after the installation (D 7.4). 1. The KPI target value is set to 200 at M30 2. The KPI target value is expected to increase with an annual rate of at least 20% in the following years.
Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza_4	15	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment and activities of 3 RTD-A Researcher on activity 7.1, 7.2 and 7.3, U.O UniSalerno*

IO Bimestre *3* IO Costs *74.632,50*

IO Desciption

Recruitment of 3 Fixed Time researcher type A (RTD-A, L.240/2010) for act. 7.1. 7.2 and 7.3 (1 FTE each) in Medicinal Chemistry.
Technical and Scientific activities of the personnel for the fulfillment of WP7,

IO Title *Recruitment and activities of 1 RTD-A Researcher on activity 7.4, U.O. UniSalento*

IO Bimestre *3* IO Costs *24.877,50*

IO Desciption

Recruitment of N1 Fixed Time researcher type A (RTD-A, L.240/2010) in Applied Physics, for act. 7.4
Technical and Scientific activities of the personnel for the fulfillment of activity 7.4

IO Title *Recruitment of Personnel for 7.7 and 7.8 WP7 activities, U.O. Area Basovizza*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Recruitment of Personnel for 7.7 and 7.8 WP7 activities, U.O. Area Basovizza*		
IO Bimestre	*3*	IO Costs	*0,00*

IO Desciption

Recruitment of 2 Researchers for 24 months for activities 7.7 (0.2 FTE) and for activity 7.8 (0.2 FTE)

IO Title	*Recruitment of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud*		
IO Bimestre	*5*	IO Costs	*0,00*

IO Desciption

Recruitment of one technician, a young researcher, a data scientist and a Senior researcher for activities 7.6

IO Title	*Recruitment of Personnel for 7.5 WP7 activities, UU.O. Area Basovizza*		
IO Bimestre	*5*	IO Costs	*0,00*

IO Desciption

ecruitment of 3 young researcher,one for each technology update for activity 7.5

IO Title	*Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_1*		
IO Bimestre	*6*	IO Costs	*74.632,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.1. 7.2 and 7.3

IO Title	*Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_1*		
IO Bimestre	*6*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.4

IO Title	*Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _1*		
IO Bimestre	*6*	IO Costs	*38.261,89*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.5,7.7,7.8

IO Title	*Activities of Personnel for 7.6 WP7 activities, U.O. Sede Area Sud_1*		
IO Bimestre	*6*	IO Costs	*62.251,53*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.6

IO Title	*Set-Up of MoViLab_POCAnalyis*		
IO Bimestre	*8*	IO Costs	*32.112,84*

IO Desciption

The non-invasive analysis and characterization of biological specimens can be performed at the site of the patients or at contaminated environments using portable instrumentation based on ATR-FTIR and DUVRR vibrational spectroscopies. The MoVibLab will provide a coherent access to a set of portable and hand-held equipment and related libraries, for in-situ non-destructive analysis of biofluids and biological traces in operational environments, aimed at specific identification and classifications of pathogens. Act. 7.7 refers to the implantation of MoVibLab for the ATR-FTIR portable instrument and will offer the possibility to move science at the place of the users, also in the industrial compartment. This possibility will be newly offered thanks to the upgrade foreseen with the PRP@CERIC platform.

IO Title	*Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_2*		
IO Bimestre	*9*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.4

IO Title	*Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_2*		
IO Bimestre	*9*	IO Costs	*74.632,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.1. 7.2 and 7.3

IO Title	*Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD*		
IO Bimestre	*9*	IO Costs	*132.094,71*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.6

IO Title	*Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _2*		
IO Bimestre	*9*	IO Costs	*92.921,79*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.5-7.7-7.8

IO Title	*Set-Up of MoViLab_Environmental Analysis*		
IO Bimestre	*12*	IO Costs	*192.434,64*

IO Desciption

Act. 7.8 refers to the implantation of the MoVibLab for a portable handheld UVRR instrument for detection of increasingly smaller concentrations of chemical and biological materials in water, in air, or on surfaces at increasingly larger standoff distances of 1 to 5 m, in the field, in real time, and in full daylight conditions. Thanks to the dual diagnostic and inactivation potential of UV light, the new instrument and developed libraries will be devoted to the real-time diagnostic of inactivation of pathogens in operational environments for the certification of efficacy of sanitization protocols, also based on UV irradiation. The upgrade will offer the possibility to move science in situ, also in the industrial compartment. This possibility will be newly offered thanks to the upgrade foreseen with the PRP@CERIC platform.

IO Title	*NGS facility upgrade for Proteomics NGS based on site integration*		
IO Bimestre	*12*	IO Costs	*297.281,22*

IO Desciption

Available services on genomic and epigenomic are based on sequence data production and are completely separated from proteomic data generation. With the acquired instrumentations the facility will be able to run on a dedicated-automated system using minimal volumes of serum, plasma, or any other type of biological sample. The selected technology combining multiplex immunoassays of proteins, with Next Generation Sequencing as a readout method will exploit the potential of next generation sequencing sequencer for proteomic application

IO Title	*NGS facility upgrade for Single cell sequencing on site integration*		
IO Bimestre	*12*	IO Costs	*716.030,05*

IO Desciption

Available sequencing services are based on bulk sequencing where the data points observed represent bulk samples (many cells) and

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Available sequencing services are based on bulk sequencing where the data points observed represent bulk samples (many cells) and unrelated with the original sample position in tissues or complex structure. With the acquired instrumentations the facility will be able to target up to 10,000 cells per sample updating the existing bulk process of quality control and post sequencing analysis. The update will enable the facility to provide a complete service for single-cell projects.

IO Title	*NGS facility upgrade for Spatial transcriptomics (act. 7.5)*		
IO Bimestre	*12*	IO Costs	*703.610,60*

IO Desciption

With the acquired instrumentations the facility will be able to produce molecular profiling data that allows scientists to measure genomic activity directly from a tissue sample integrating omic data with the morphological information of the original sample.

IO Title	*Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_3*		
IO Bimestre	*12*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.4

IO Title	*Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_3*		
IO Bimestre	*12*	IO Costs	*74.632,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.1. 7.2 and 7.3

IO Title	*Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_3*		
IO Bimestre	*12*	IO Costs	*132.094,71*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.6

IO Title	*Upgrade of BOL-MS platform with a Multi-omic Orbitrap-MS station*		
IO Bimestre	*12*	IO Costs	*2.036.561,85*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

The BOL lab possesses two HRMS instruments for metabo/lipidomics (a Bruker TimsTOFPro) and for proteomics (Thermo Lumos), which are currently employed in alternated cycles. Hence the users have limited time and cycles of downtime are necessary to change conditions and check instrument status. To expand the access to other users and increase the amount of samples/year the platform plans the acquisition and installation of four dedicated Exploris Orbitrap benchtop MS instruments, equipped with software and chromatographic solutions, which in detail will be devoted to; i) Untargeted/targeted analysis of polar metabolites by HILIC-HRMS, ii) Untargeted/targeted analysis of lipids by RP-UHPLC-HRMS, iii) DMPK based on MS, iiii) Bottom-up and chemical proteomics to highlight novel druggable proteins by nano-LC-HRMS. These new stations will run in parallel, with specific workflows for the analyte class, with minimal downtimes, with digital access for remote users.

IO Title	*Upgrade of BOL-MS platform with High-throughput Sample-Prep station*		
IO Bimestre	*12*	IO Costs	*1.000.813,50*

IO Desciption

t the present the BOL lab relies mostly on manual sample preparation. This limits the throughput and safety. The infrastructure aims to solve this challenge by implementation of automated sample-preparation robotized instruments for metabolomics and for proteomics with liquid handlers, shakers, vacuum assisted evaporators, and with the implementation of green approaches by supercritical fluid extraction (SFE) coupled to supercritical fluid chromatography-MS, which ensures speed, robustness and low environmental impact, for fast analysis of biological specimen such as dried blood spots. This will address potential sources of variation due to manual handling and at the same time increase the safety for the users in the handling of biological specimens.

IO Title	*Upgrade of BOL-MS platform with Multimodal Mass spectrometry Imaging Q-TOFs station*		
IO Bimestre	*12*	IO Costs	*1.873.249,00*

IO Desciption

he BOL lab is equipped with a MALDI-TOF-TOF for MSI (Bruker Rapiflex tissuetyper). The limitation of this instrument is related to the potential interference of isobaric molecules and from the limited amount of time per sample. In this regard the infrastructure foresees the implementation of multimodal mass spectrometry imaging, by the acquisition and installation of one novel Q-TOF-MS technology, equipped with a MALDI-2 (MALDI post-ionization) source and with ion mobility technology. This will result in the ability to perform multimodal MSI and surpass the limitation of the current MSI device by ion mobility technology. This will represent a unicum tool for Italian and CERIC-ERIC users.

IO Title	*Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza _3*		
IO Bimestre	*12*	IO Costs	*92.921,79*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.5-7.7-7.8

IO Title	*Activities of Personnel for 7.4 WP7 activities, U.O UniSalento_4*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*15*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.4

IO Title	*NGS facility upgrade for automatization of high throughput quality*

IO Bimestre	*15*	IO Costs	*723.713,76*

IO Desciption

Actually, the Next Generation Sequencing platform relies on automatization that involves exclusively nucleic acid library preparation. To improve the flexibility of the facility, a dedicated fully automated robotized instrument able to integrate multi-omic related steps will be implemented.

IO Title	*NGS facility upgrade for automatization of sample extraction*

IO Bimestre	*15*	IO Costs	*594.479,16*

IO Desciption

To improve the flexibility towards multi-omics, a dedicated fully automated robotized system able to process different sample matrices during the same run will be implemented and linked with a robotized high throughput quality control and library preparation automatization

IO Title	*NGS facility upgrade for automatization of sample storage and handling.*

IO Bimestre	*15*	IO Costs	*443.836,00*

IO Desciption

ince biosamples must be handled in the highest standardized, harmonized and quality level, the upgrade will implement a range of automation of sample handling including sampling, storage, and retrieval.

IO Title	*Activities of Personnel for 7.1 7.2 7.3 WP7 activities, U.O UniSalerno_4*

IO Bimestre	*15*	IO Costs	*74.632,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.1. 7.2 and 7.3

IO Title	*Implementation of BAMS (Biomedical Accelerator Mass Spectrometry) for drug-distribution*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Implementation of BAMS (Biomedical Accelerator Mass Spectrometry) for drug-distribution studies*		
IO Bimestre	*15*	IO Costs	*2.071.669,85*

IO Desciption

An essential asset for drug-development will be added to BOL by Biomedical Accelerator Mass Spectrometry (BAMS) which has been adopted as a powerful bio-analytical method for human studies in the areas of pharmacology and toxicology. To assist classic DMPK studies, BOL will rely on the use of 14C as a tracer and in the implementation of a new state-of-the-art instrument capable cutting edge performances in terms of 14C sensitivity and samples processing capabilities for evaluating the distribution and binding of novel drug candidates allowing the use of low-level drug doses. Microdosing and microtracing will result in a more cost and time effective drug development pipeline. This will represent a unicum tool for Italian and CERIC-ERIC users.

IO Title	*Activities of Personnel for 7.6 WP7 activities, U.O. Area SUD_4*		
IO Bimestre	*15*	IO Costs	*132.094,71*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7.6

IO Title	*Activities of Personnel for 7.5 7.7 7.8 WP7 activities, U.O. Area Basovizza_4*		
IO Bimestre	*15*	IO Costs	*92.921,79*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP7 deliverables associated to Act. 7-5-7.7-7.8

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

Civil infrastructures and related systems

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Multi-omics-MS based upgrade for host-pathogen interaction studies and biomarker discovery

49 Activity short name

7.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	DIFARMA	Participant	Università degli Studi di Salerno

52 Activity description

Activity 7.1 aims to expand the multi-omics potential of the DIFARMA Bio open Lab platform with dedicated instruments for every application. For this purpose, plans the acquisition of four Thermo Exploris 120 benchtop MS instruments fully equipped with dedicated UHPLC systems and software solutions (Compound Discoverer, Lipid Search Proteome Discoverer, and Tracefinder) as support to the current MS devices of BOL.
Instrument order and hardware commissioning: The market activity is not needed since Thermo Scientific holds the patent for the Orbitrap based MS instruments, hence the activity will start at project month M0. The tender procedure publication is expected at the end of M2, the conclusion at M6 and installation and testing during M9-12. Users on site training will be performed at M13-14, specialized in factory training at M15. The installation will be considered complete only when the station will be proven to work in its final form as an integrated update of the infrastructure and opened to users (estimated time M26) in person and remotely within M30. Scientific Commissioning: The multi-omics MS based platform will operate also receiving biological specimens by WP2 developed protocols and capable to work with cell lysates, biofluids and tissue homogenates. The four instruments will be immediately open to users after testing in working conditions at M26, Remote user monitoring will be implemented within the timeframe of the project (M30) to enable the facility to provide a complete digital service to external users.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

enable the facility to provide a complete digital service to external users.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation from M26.
In-house research and user operation will continue until the end of the project and beyond, supported by UNISA-DIFARMA researchers.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: Fixed Time researcher type A (RTD-A, L.240/2010) in Medicinal Chemistry. The successful candidate, with previous expertise in Spectroscopy/Spectrometry techniques. The personnel will guide the infrastructure development for multi-omics and collaborate with drug discovery activity of WP3. The recruiting process will start at month 00, so that he/she will be active from 02 to 30 month.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.903.328,83 €

Cost description: N°4 Thermo Orbitrap Exploris 120 with respective UHPLC systems, Compound Discoverer, Lipid Search, Proteome Discoverer and Trace finder software, comprising of training for n°4 users, extended full risk warranty. Characteristics: Resolution up to 120K at m/z 200, Mass range of 40-3000 m/z. Ready to run method templates available, with a drag and drop user interface. Constant < 1 ppm mass accuracy with a single calibration, Up to 22 Hz at 15.000 resolution. Front end separation UHPLC personalized on the specific omic application as well as software for metabolite, lipid, protein and drug profiling.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

141.370,52 €

Cost description: Indirect cost will be used to cover running costs relative to the management of the project from the institution

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

48 Activity title

Multimodal mass spectrometry imaging platform upgrade

49 Activity short name

7.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	DIFARMA	Participant	Università degli Studi di Salerno

52 Activity description

The activity 7.2 aims to improve the mass spectrometry imaging (MSI) station of the Bio Open Lab platform with multimodal MSI by addition of Matrix-assisted laser desorption/ionization combined with laser-induced post ionization (MALDI-2). This will rely on the acquisition and installation of one Q-TOF instrument with MALDI-2 source and Trapped ion mobility (TIMS, Bruker).
Instrument order and hardware commissioning: The market activity is not needed since the instrument is uniquely available from Bruker. The tender procedure publication is expected at the end of M2, the conclusion at M6 and installation and testing during M9-12. Users on site training will be performed at M13-14, specialized in factory training at M15. The installation will be considered complete only when the station will be proven to work in its final form as an integrated update of the infrastructure and opened to users (estimated time M26) in person and remotely within M30.
Scientific Commissioning: The multimodal MSI based station will be capable of working with tissue specimens and integrated with WP5 and 6. The two instruments will be immediately open to users after testing in working conditions M26. Remote user monitoring will be implemented within the timeframe of the project (M30) to enable the facility to provide a complete digital service to external users.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation from M26.
In-house research and user operation will continue until the end of the project and beyond, supported by UNISA-DIFARMA researchers.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: Fixed Time researcher type A (RTD-A, L.240/2010) in Medicinal Chemistry. The successful candidate, with previous expertise in Spectroscopy/Spectrometry techniques. The personnel will guide the infrastructure development for multi-omics and collaborate with drug discovery activity of WP3. The recruiting process will start at month 00, so that he/she will be active from 02 to 30 month.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

1.750.700,00 €

Cost description: N°1 Bruker TIMSTOFLEX MALDI-2, with Metaboscape and SCILS software, comprising of on site and in factory training for n°2 users, extended full risk warranty

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

130.686,50 €

Cost description: Indirect cost will be used to cover running costs relative to the management of the project from the institution

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Automation upgrade for multi-omics-MS based sample preparation

49 Activity short name

7.3

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	DIFARMA	Participant	Università degli Studi di Salerno

52 Activity description

The activity 7.3 aims to strengthen the sample preparation capabilities for biospecimens, by the integration of an automated station for sample preparation for mass spectrometry based multi-omics. This will be achieved by implementing the actual labware with automated

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

sample preparation for mass spectrometry based multi-omics. This will be achieved by implementing the actual labware with automated sample-prep instruments for metabolomics and proteomics, capable of performing liquid-liquid extraction, digestion, MALDI matrix deposition etc. as well as system based on supercritical fluid extraction (SFE) coupled to a supercritical fluid chromatography.
Instrument order and hardware commissioning: The specific requirements for each instrument are guaranteed respectively by specific companies, namely Shimadzu, Preomics, Agilent and HTX technologies, the market activity is therefore not needed. The tender procedure publication is expected to start at M8, and the assignment at M12. The installation and testing will be held during M15-17, while onsite training will be performed at M18-19, and in the factory at M20. The installation will be considered complete only when technology will be proven to work in its final form and opened to users (estimated time M26) in person and remotely within M30.
Scientific Commissioning: The sample preparation station will be capable to work in automated fashion with different biological specimens coming from the WP2 protocols, The instruments will be immediately open after testing in working conditions at M26.
Remote user monitoring will be implemented within the timeframe of the project (M30) to enable the facility to provide a complete digital service to external users.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation from M16.
In-house research and user operation will continue until the end of the project and beyond, supported by UNISA-DIFARMA researchers.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: 1 Fixed Time researcher type A (RTD-A, L.240/2010) in Medicinal Chemistry. Previous expertise: Spectroscopy/Spectrometry techniques. The personnel will guide the infrastructure development for omics and drug discovery interaction (WP7 and WP3). Starting at M02-M30..

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

691.339,72 €

Cost description: -Agilent 2DLC-plus BRAVO system for metabolomics sample preparation, including delivery, installation, software and training for 4 users
-Preomics PREon for proteomics sample preparation, including software and training for 3 users
-HTX technologies, M5 sprayer for MALDI-Imaging, including delivery, installation, software, extended warranty and training for two users
-UPS dedicated system for labware
-IT support upgrade

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

244.000,00 €

Cost description: Refurbishing of laboratory infrastructure for biological safety upgrade

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.5 e. Indirect costs

73.611,28 €

Cost description: Indirect cost will be used to cover running costs relative to the management of the project from the institution.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Implementation of high sensitivity isotope marker spectrometry for drug development

49 Activity short name

7.4

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	UniSalento	Participant	Università degli Studi del Salento

52 Activity description

The activity 7.4 aims to implement the BioAMS as analytical tool in support of adsorption, distribution, metabolism and excretion (ADME) microdosing and microtracing drug development. This activity will be connected with WP3 to evaluate novel drug compounds as well as their binding to protein targets.
Instrument order and hardware commissioning: The specific requirements for the BioAMS instrument are guaranteed by Prof. Lucio Calcagnile, the market activity is therefore not needed. The tender procedure publication will be actuated in months M03 and is expected to start at M05, close at M06, and the assignment at M08. The installation and testing will be held during M24, while user training will be performed at M22, and the platform will be opened to users from month M26.
Scientific Commissioning: The BioAMS interacts with drug development activities of WP3. The instruments will be immediately open to users after training at M26, both in-presence and fully remote, with the support of UNISALENTO personnel who are already able to work with similar AMS devices.
Software Commissioning: A FAIRification Process is already in place and FAIR by design will be implemented in parallel to user operation from M26.
In-house research and user operation will continue until the end of the project and beyond, supported by UNISALENTO researchers.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

116.250,00 €

Cost description: 1 Fixed Cost of fixed term personnel specifically hired for the project: Fixed time laboratory Technician. Previous expertise: instrumentation for spectrometric analyses, high voltage systems, isotopic analyses, chemical processing for isotopic analyses. Three years.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.936.140,00 €

Cost description: In the frame of the current activity the acquisition of a state-of-the art AMS (Accelerator Mass Spectrometry) system for the detection at ultra-high sensitivity levels of the radioactive isotope of carbon (14C) is planned. The system will allow the measurement of 14C/12C isotopic ratios at the level of 103 below the natural level and of the order 10-15, in samples containing 1-10 microgram of carbon.
The instrument will allow adsorption, distribution, metabolism and excretion (ADME) studies by using low concentration of radiolabeled drugs.
The characteristics of the BAMS system (Bio-AMS) can be detailed as in the following: low beam energy (<250 kV) compact AMS system, vacuum insulated high voltage platform, for 14C and (possibly) other rare nuclides detection. Precision: Better than 0.2 % on 14C/12C, Sensitivity: < 2 x 10-15 on 14C/12C ratio as measured on blank sample. Ion source: Hybrid sputtering ion source for gas and solid cathodes. Possible Optionals: Interfaces: Gas Interface for source feeding allowing fully automated gas analysis from autosampler, Elemental Analyzer and CO2 filled tubes, dedicated interface for microdosing applications. Gas interface for online sample combustion and carbon mass quantification, optimized for high sample throughput. Additional features: Low energy consumption, high sample throughput, reduced maintenance, data acquisition and analysis software and accessories.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

143.667,30 €

Cost description: Indirect cost will be used to cover running costs relative to the management of the project from the institution and consumables.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Updating of Sequencing facility for Singe Cell, Multi-omics-based Sequencing

49 Activity short name

7.5

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 7.5 aims to upgrade the existing sequencing facility exploiting the already available infrastructure with the acquisition of 3 major platforms for: Single cell sequencing, Spatial transcriptomics and Proteomics NGS based instrumentations.
Activity will start from month 0 (M0) with an evaluation of UpToDate available technical Solutions. The update will take into account newly compatible technology that might be available in the market of single cell sequencing, Spatial transcriptomics and Protein NGS based instrumentations. A detailed list of the technical requirements will be completed at M1 to support the public tender procedure to be issued at M2 for Spatial transcriptomics; M4 for Single cell sequencing and M6 for Proteomics NGS based. The technical requirements deliverable will be archived thanks to 3 scientists of the infrastructure that will work independently for each instrument implementation while, the public tender preliminary investigation, will be under the supervision of the dedicated structure of the OU.
Iter of the tender is estimated to be concluded within M8, for Spatial transcriptomics and Single cell sequencing, or M10 for Proteomics NGS based. The tender will include a mandatory delivery of the instrument within 4 months from the adjudication date (estimated M12-M14). The installation will be considered complete only when technology is proven to work in its final form as an integrated update of the infrastructure (estimated time M16). Three dedicated resources will be selected following GEP procedure at M10 and assigned to support the instrument integration in the available workflows. The obtained team of 3 scientists and 3 new recruits will test the upgrade facility with 3 real pilot projects, one for each technology update, to be concluded within 12 months (M28). Remote user monitoring will be implemented within the timeframe of the project (M30) to enable the facility to provide a complete digitalized service.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

255.420,00 €

Cost description: 3 Fixed Cost of fixed term personnel specifically hired for the project: Fixed time laboratory Technician. Previous expertise: instrumentation for spectrometric analyses, high voltage systems, isotopic analyses, chemical processing for isotopic analyses. 20 month each from month 10 to month 30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.604.599,88 €

Cost description: Single cell enabling instrumentations including: Laser cell capture microscopy, single cells library preparation instrument with efficient partition of cells a High cell capture rates still accounting for cell size flexibility and parallelization of sample preps to be linked with single cell library automation robot.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

preps to be linked with single cell library automation robot.
Spatial Transcriptomics enabling instrumentations including: Spatial Profiler selector and ancillary equipment. The instrument will combine the best of spatial and molecular profiling technologies by generating data from up to 8-12 tissue slides per day in a flexible and robust spatial solution designed to conform for ever-changing research needs.
Proteomics NGS based enabling instrumentations including: Proteo genomics platform enabling high- throughput, large scale analysis of thousands of proteins simultaneously, while using less than a drop of blood and maintaining exceptional levels of specificity, sensitivity and dynamic range. The platform needs to incorporate either qPCR or NGS as a readout method to be implemented as an upgrade of the existing facility

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

130.201,40 €

Cost description: Indirect costs, including running costs. Consumables including single use plasticware and molecular biology reagents necessary for single cell preparation and related sequencing reagents to support the use of Single cell Next Generation Sequencing facility upgrade. Consumables composed of histology slides and disposables; molecular biology reagents necessary for Spatial transcriptomics preparation and related sequencing reagents to support the use of Spatial Transcriptomics Sequencing upgrade.
Consumables composed of histology slides and disposables; Antibodies and molecular biology. reagents necessary for immunoassays of proteins with Next Generation Sequencing preparation and related sequencing reagents.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Updating of Sequencing facility for high number, multi-omics Sample preparations

49 Activity short name

7.6

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

OU short name	Area SUD	Participant	Area Science Park

52 Activity description

Activity 7.6 aims to upgrade the existing sequencing facility enabling the infrastructure to process samples for multi-omics downstream analysis.
Activity will start from month 0 (M0) with an evaluation of UpToDate available Automatization Solutions. The update will consider newly compatible technology that might be available in the market of sample storage, sample extraction and high throughput quality control and library preparation automatization. A detailed list of the technical requirements will be completed at M2 for sample storage and M6 for sample extraction and multi-omics high throughput library preparation and control. The obtained technical requirements will support the public tender procedures to be issued respectively at M3 and M7. The requirements deliverable will be archived thanks to 2 senior scientists of the infrastructure that will work sequentially for each instrument implementation while, the public tender preliminary investigation, will be under the supervision of the dedicated structure of the OU.
Iter of the tender is estimated to be concluded within M15 covering Supplier Identification and Order of the instrumentations. The tender will include a mandatory delivery of the instrument within 4 months from the adjudication date (estimated M19). The installation will be considered complete only when technology is proven to work in its final form as an integrated update of the infrastructure (estimated time M23). Three dedicated resources will be selected following GEP procedure at M8-10 and assigned to support the instrument integration in the available workflows. The final team of scientists handling the facility will test the upgrade with 3 pilot projects, one for each technology update, to be concluded within 8 months (M30). Remote user monitoring will be implemented within the timeframe of the project (M30) to enable the facility to provide a complete digitalized service.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

428.538,00 €

Cost description: Figures with High technical skills will be required to properly support the acquired instrumentation including: experience in sample and tissue preparation and biobanking, experience in proteomic preparation and experience in process automatization and integration of proteomics and genomics.
The team is formed by:
senior researcher from M8 to M30 2 junior research from M10 to M30
1 data engineering to coordinate data sharing and data services among different operating units from M6 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.646.756,00 €

Cost description: Sample storage and handling automatization instrumentations including: Dedicated storage refrigerators and dedicated robots for tubes and plates handling.
Multi-omics sample extraction automatization instrumentations including: Dedicated pre-PCR extractor with integrated Ultrasonicator and fluorometer.
High throughput quality control and library preparation instrumentations including: Dedicated post-PCR automation , Automated Electrophoresis and ancillary equipment.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

145.270,58 €

Cost description: Indirect costs, including running costs. Consumables including: single use plasticware for automatization; molecular biology reagents for sample extraction; single use reservoir for sonication; molecular biology reagents for Nucleic acid quantification and molecular biology reagents for protein quantification to support the use of the facility upgraded to automated Multi-omics sample extraction and quantification . Consumables including: single use plasticware for automatization; molecular biology reagents for Real-time PCR; molecular biology reagents for Automated Electrophoresis; molecular biology reagents for to support the use of the facility upgraded to automated Multi-omics library preparation.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Optical based diagnostic: ATR-FTIR for pathogens identification and phenotyping

49 Activity short name

7.7

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 7.7 aims to develop a specific library for pathogen recognition for the purposes of POC analysis. The activity will be supported by WP9 and implemented in synergy with Activity 7.8 in order to set a Mobile Integrated Vibrational Laboratory (MoVibLab) for pathogens identification and phenotyping. In order to accomplish the Activity task, the SISSI-BioOffline facility at Elettra will be upgraded with a portable ATR-FTIR spectrometer.
Instrument order and hardware commissioning: The activity will start at M1 with a market search for suitable ATR-FTIR interferometers. The tender will open at M4 and be awarded at M6. The instrument will be delivered at M12 and tested within M13. Training is not needed for this instrument. Instrument will open to CERIC-ERIC users at M25, after scientific commissioning.
Scientific commissioning: The instrument portability will allow to define a chemometric model directly measuring active pathogens at

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Scientific commissioning: The instrument portability will allow to define a chemometric model directly measuring active pathogens at BSL3 exploiting the spectral library as provided by the Virology group of ICGEB (B5) and then to transfer the technology in real POC scenario (M30). The library will be continuously implemented on the basis of scientific user requests, letting to operate the instrument at the site of the user. The activity may be of great interest for the industrial compartment, being transferable into multiple contexts due to low-cost, easy-to-use and reliable. Activity promotion for scientific users and companies will continue throughout the project and beyond, also at the site of the companies thanks to movable technology.
Software commissioning: A FAIRification Process on comparable FTIR technology is already in place and FAIR by design will be implemented within M25.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in infrared microscopy will be recruited for the activities 5.1, 5.2, 5.3, 5.5 and 7.7. The search will look for a candidate with a strong biophysical background. The researcher will be involved in research Att. 5.5, and will support activities 5.1, 5.2, 5.3 and 7.7 for the scientific commissioning of the facilities and PRP@CERIC user support.
For the Activity 7.7 she/he will be accounted for 0.2 FTE from M6 to M30.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

30.012,00 €

Cost description: FTIR portable interferometer with ATR module.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

3.531,19 €

Cost description: Indirect cost will be used to cover travel expenses.

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

48 Activity title

Optical based diagnostic for Pathogen identification: UV identification and inactivation of pathogen

49 Activity short name

7.8

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 7.8 aims to test and optimize the capability of UVRR spectroscopy methods for the identification and inactivation of pathogens in operational environments such as water, air or surfaces. The activity plans to extend the user offer of deep-UV Resonance Raman platform of IUVS-OFFline facility at Elettra by acquiring a portable handheld UVRR instrument with the ability to detect and discriminate pathogens specimens directly in situ, at standoff distances of 1 to 5 m, in real time, and in full daylight conditions.
Instrument order and hardware commissioning: The activity will start at months 0 with a market analysis of the portable handheld Deep-UV Resonance Raman system. The market search will end at M2, the tender published at M4 and awarded at M6. The instrument will be delivered at M21. Installation and SAT will be done within M22.
Scientific commissioning: About 3 months for completing the hardware commissioning and standardizing in situ measurements protocols is needed. At M25 the instrument will be open to CERIC-ERIC users. The instrument portability will allow to define a chemometric model (WP9) directly measuring active pathogens at BSL3 exploiting the spectral library as provided by the Virology group of ICGEB and then to transfer the technology in real contaminated scenarios (M30). The library will be continuously implemented on the basis of user requests.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

20.433,60 €

Cost description: A fixed term researcher with proven experience in the field of Raman and possibly UV resonance Raman spectroscopy and good skills in the optics and photonics related disciplines will be recruited for the activities 5.4 and 7.8. The researcher will take care of the installation, testing and commissioning of the new UVRR microscopy facility, as well as of the scientific commissioning of the facilities and PRP@CERIC user support
For the Activity 7.8 she/he will be accounted for 0.4 FTE from M18 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

179.845,46 €

Cost description: Portable Deep-Ultraviolet Raman Spectroscopy Instrument Standoff:
software for chemometric analysis of Raman spectra .

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP07 - WP07 - Multi-Omic platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

14.019,53 €

Cost description: Indirect cost will be used to cover consumables and travel expenses.

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
1	Recruitment of Personnel for WP8.1 and WP8.2 activities	0,00	0,00
3	Activities of Personnel for WP8 activities, UNINA_0	49.755,00	49.755,00
6	Activities of Personnel for WP8 activities, UNINA_1	49.755,00	99.510,00
7	Biointerfaces development and biotesting (8.3)	144.619,25	244.129,25
7	Molecular and supramolecular characterization (8.1)	144.448,05	388.577,30
9	Activities of Personnel for WP8 activities, UNINA_2	49.755,00	438.332,30
10	Multimodal optical, electrical and electrochemical analysis (8.2)	167.238,74	605.571,04
11	Human Clinical Investigation (8.5)	138.370,52	743.941,56
11	One Health Veterinary & Agriculture (OHVA) pathogen handling and identification (8.4)	297.777,25	1.041.718,81
12	Activities of Personnel for WP8 activities, UNINA_3	49.755,00	1.091.473,81
15	Activities of Personnel for WP8 activities, UNINA_4	49.755,00	1.141.228,81

36 WP title

WP08 - Interplaying bioelectronic Platform

37 WP number

WP08

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

38 **Start month**(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II

40 WP Leader

Alberto Aloisio (UNINA)

41 Summary of the activities envisaged in the WP

WP8 collects facilities and expertise to develop, characterize, and test in-the-field devices aiming at interfacing biological system with traditional and/or innovative electronic devices. This is in line with the PRP@CERIC mission to improve CERIC-ERIC potential in pathogen screening, diagnostic and therapeutic, bridging the gaps between material science, biotechnology and electronics.
Specifically, the role played by Task Force of Bioelectronics at Università degli Studi di Napoli Federico II (UNINA_Bioel_TF in the following) in WP8 of PRP@CERIC is to focus on development and characterization of those bioelectronic devices addressing pathogen handling and tackling. Such devices complement the classic approaches for the investigating of host-pathogen interaction mechanisms and their identification. both in fundamental research and industrial applications. As a matter of fact, bioelectronics devices represent a brand new perspective in investigations and therapy, moving them from the scale of advanced laboratories, to the one of portable, implantable, if not edible instruments. This offers a strategic advantage in terms of "pathogen readiness" as regards portability, sustainability, personalization and the cost-effectiveness of diagnostic and therapeutic protocols.
The use of bioelectronic devices in precision medicine is increasingly acquiring an essential role for the modernization, scalability and sustainability of diagnostic and therapeutic protocols (doi.org/10.1021/acs.chemrev.1c00539). The ability of bioelectronics to bi-directionally interface biology with electronics and to sustain unlabeled, rapid and affordable (continuous) monitoring in vitro and in vivo, is supporting the reduction in animal studies. By moving towards synthetic models (organ-on-chip and organoid), it plays a key role in advancing the drug discovery paradigm. Also, electrochemical readout schemes can be paired with optical methods, currently dominating biological assays and crucial in WP2 and WP3. WP8 aims at integrating all these characterization methods and at providing the RI users a multidisciplinary, interplaying platform for bioelectronic purposes.
The impact of bioelectronics in animal as well as vegetal pathologies study and treatment is more and more growing. It encompasses a wide range of applications, from the virus detection (10.1021/acsnano.1c06813) to the in vivo neuromodulation (10.1021/acs.chemrev.1c00390) to the development of a reliable and label-free detection devices plant pathogenic such as Xylella Fastidiosa bacteria (doi.org/10.1002/anbr.202100043), achieving LODs comparable with the label-needing ELISA gold standard.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Fastidiosa bacteria (doi.org/10.1002/anbr.202100043), achieving LODs comparable with the label-needing ELISA gold standard. Integration of multidisciplinary expertise is mandatory to allow the RI user handling bioelectronic devices intended for tackling and treatment of known as well as emerging pathogen risks. In this perspective, within the PRP@CERIC project, WP8 supports the device design (from materials selection to signal read-out), its characterization and deployment in diagnostics and clinical practice. In this perspective, it is crucial for PRP@CERIC to provide the entire chain of facilities required to carry on an exhaustive research on bioelectronics devices. Such chain include chemical and physical characterization of bioelectronic materials (Act. 8.1 Molecular and supramolecular characterization) and of device properties (Act. 8.2 Multimodal optical, electrical and electrochemical analysis), to the investigation of device-biosystem interaction (Act. 8.3 Biointerfaces development and biotesting), device functional characterization (Act. 8.4 One Health Veterinary & Agriculture - OHVA pathogen handling and identification), considering also clinical diagnostics (Act. 8.5 Human clinical investigation). Activities 8.1 to 8.3 will be devoted to the upgrade of the analytical instruments already in place at the Task Force laboratories, while Activities 8.4 and 8.5 will provide PRP@CERIC with biosafety level 3 laboratory and vegetal/agricultural pathogen-host interaction models, therefore expanding the potentialities expressed in WP2 for cellular and animal models.
For the complete chemical characterization of materials for the design and fabrication of devices, the WP8 makes available to the users: i) a NMR laboratory (liquid and at the solid state spectrometers); ii) an electron microscopy lab for performing advanced characterization of surfaces, also at the interface with biological environments; iii) a full set of optical spectroscopy equipment (UV/VIS NIR, Fluoro-max, X-rays Fluorescence), a mass spectrometry lab, an X-ray diffractometer and integrated microspectroscopy system for TERS (Tip Enhanced Raman Spectroscopy) equipment allows working at the state of the art in each field. For the choice and fabrication of the device active layers which will be functionalized and tailored toward the desired target investigation/sensing, the knowledge and availability of pathogen macromolecules from WP3 are expected to provide crucial information. At the same time, WP8 can provide useful information of key-traits of the tested macromolecules, integrating with biophysical characterization tools in WP3. Furthermore, sub-micro and nano resolved hyperspectral imaging approaches of WP5 may provide useful alternative characterization roots.
The fine tuning of bioelectronic device response towards a given pathogen, i.e. for POC devices, need validation with more established approaches, such as the ones by lab-grade equipment of the multi-omic platform WP7 (Activities 7.7 and 7.8). Reciprocally, WP7.7 and WP7.8 activities can find support from bioelectronics device data, for finalizing device portability. Strong impact in WP8 activities is also expected from WP6. Tomography and super-resolution fluorescence microscopy can be targeted to the device-cellular spatial-mechanical interaction, whose knowledge critically impacts bioelectronic device development.
Electrical and electrochemical characterizations of the devices are achieved by means of advanced semiconductor parameters analyzers and multimodal electrochemical workstation. The lab equipment also allows the RI users to study the electrical conduction mechanisms, by means of 1/f noise analysis down to the mHz band. Low-noise read-out amplifiers and shielding schemes can be combined to achieve the best S/N ratio and hence the highest resolution in pathogen detection.
The diagnostic validation requires a comparison to golden standard diagnostic procedures (i.e., RT-PCR, NGS, etc.). Within UNINA_Bioel_TF automatic workstations for RNA/DNA extraction, PCR machines for genome amplification and full equipment for next-generation sequencing analysis will be paired with a bank of biological samples that stores more than two-thousands samples from COVID-19 patients. A strong effort is put into favoring the user's design, characterization and test of low-cost, single-use and portable biosensing instruments, in the quest for medical diagnostics in remote and under-developed regions.
All activities will interact with WP11 to enable fair and open access to all data collected. Overall the interoperation of WP8 within the PRP@CERIC will pair the high level technical tool improvement of the infrastructure with a "knowledge platform" for the mindful bioelectronic device development, in the context of a full integration of the facilities. This is expected to strongly improve the IR scope, including expertise and tools to translate results from pathogen investigation into device-based pathogen handling/tackling actions. On this ground, a mid/long term perspective foresees improved access to bioelectronic tools for sustainable medical practices. This will enhance accessibility of medical tools in developing region, will improve proximity and personalized medicine and spur the quest for integrated med-tech approaches in health care politics.

42 WP inter-relation with other WWPP

WP2,WP3,WP5,WP6,WP7,WP9,WP10,WP11,WP12

43 Most relevant outcome:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

This WP provides a complete set of analytical tools suitable for characterization of diagnostic labs, from the molecular scale of the active components of the devices, to functional characterization and clinical use.
The achievement of this goal is grounded on the integration and upgrade of top standard facilities at the Bioelectronics UNINA_Bioel_TF and will expand the potential of the PRP@CERIC toward bioelectronics researcher addressing pathogen tackling in a 'one health' perspective.
The use of bioelectronics is gaining more and more attention in view of the development of innovative material science approaches into vegetal, animal and human diagnostics and therapeutics. Biosensors are improving both sustainability and portability of pathogen tackling strategies. This WP carries a unique attraction potential for scientists operating at the frontiers of the med-bio-tech, working on the advancement of health care innovative techniques and of health emergencies handling. The attraction potential for companies is also obvious and relevant, being the sensitivity/cost compromise of these devices appealing for commercialization purposes.
A full set of complementary facilities in a single site will allow users to address the whole range of activities behind bioelectronics device development, from the concept, to the materials, up to the (pre)clinical test.

Such facilities include molecular and supramolecular characterization lab, electrical measurements tools, bioenvironment mimicking equipment, animal and vegetal models, as well as bank of biological samples (including thousands of samples from COVID-19 patients).

The availability within the RI of such multidisciplinary asset in a single OU at UNINA is expected to strongly improve and fasten the work of users, especially those ones involved in new device design and device optimization.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP8.1 and WP8.2 activities	1	N/A
Activities of Personnel for WP8 activities, UNINA_0	3	six month report on the Personnel activities and associated time-sheets
Activities of Personnel for WP8 activities, UNINA_1	6	Six month report on the Personnel activities and associated time-sheets
Biointerfaces development and biotesting (8.3)	7	Report on the Act. 8.3 working status which encompasses the upgrade or acquisition of: - live cell recorder instrument for multiwell fluorescence microscopy with new dedicated spheroid growth assays software that will allow the high throughput analysis and screening of multiplexed 3D samples. - LSFM with three laser line sources with their complete optical paths and table. - 3D bioprinting system to double the capability to produce 3D cell substrate

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

		- 3D bioprinting system to double the capability to produce 3D cell substrate - 3D printer for nanoarray-based microfluidic devices with a set of diode lasers in the UV-band with related controller electronics. - ultrasound imaging.
Molecular and supramolecular characterization (8.1)	7	Report on the Act.8.1 working status on the upgrade of three instruments devoted to chemical investigation/characterization of materials: - The 400 MHz Avance III Bruker BBFO probe of the NMR equipment is upgraded with a 5 mm 400 MHz Z-Gradient high resolution probe - A new detector (XFlash Detector, 10mm²) at the Scanning Electron Microscope FESEM FEI - The available TERS is equipped with a system for measuring, concurrently with the Raman spectrum, UV-Vis and fluorescence spectra
Activities of Personnel for WP8 activities, UNINA_2	9	Six month report on the Personnel activities and associated time-sheets
Multimodal optical, electrical and electrochemical analysis (8.2)	10	Report on the Act. 8.2 working status which encompasses the upgrade of: - Frame grabber for IR camera - Signal analyser for noise characterization - microscopy workstation for microfluidic platform
Human Clinical Investigation (8.5)	11	Report on the Act. 8.5 working status focussing on the instrumentational upgrade and hardware commissioning: 1)Upgrading the PCR equipment with Digital-PCR machine and a software for the analysis of NGS data 2) Adding quantitative immunofluorescence analyzer with rapid diagnostic kit are added to the fast isothermal PCR already present. 3)Upgrading the "traditional" instrumentation with wireless vital signs monitor will be combined with.
One Health Veterinary & Agriculture (OHVA) pathogen handling and identification (8.4)	11	Report on the Act. 8.4 working status focussing on the upgrade of: - MALDI Biotyper sirius one IVD (Bruker) analyzer. - microscopes with confocal spinning disk and a motorized XYZ stage system - PalmSens4 multistation
Activities of Personnel for WP8 activities, UNINA_3	12	Six Month Report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

UNINA_3		
Activities of Personnel for WP8 activities, UNINA_4	15	Final report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of Personnel for WP8.1 and WP8.2 activities	1	1-Number of signed contracts: the KPI target value is set to 2 at M2
Activities of Personnel for WP8 activities, UNINA_0	3	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP8 activities, UNINA_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Biointerfaces development and biotesting (8.3)	7	1-Number of upgraded/new independent instruments available to PRP@CERIC users: The KPI target value is set to 5 at M15
Molecular and supramolecular characterization (8.1)	7	1- Number of upgraded/new independent spectroscopy stations at PRP@CERIC for users: the KPI target value is set to 3 at M15 2- Number of submitted proposals for experiments requiring multi-instrumental access to CERIC-ERIC that account for at least one of the new instruments available at the RI and set in WP8: the KPI target value is set to 1 at M30 and 2 at M30+M24
Activities of Personnel for WP8 activities, UNINA_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Multimodal optical, electrical and electrochemical analysis (8.2)	10	1 - Number of upgraded/new instruments for PRP@CERIC users: the KPI target value is set to 3 at M21 2 - Number of submitted proposals for experiments requiring multi-instrumental access to CERIC-ERIC that account for at least one of the new instruments available at the RI and set in WP8: the KPI target value is set to 1 at M30 and 2 at M30+M24.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Human Clinical Investigation (8.5)	11	1-Number of upgraded/new equipment available at PRP@CERIC for users: The KPI target value is set to 3 at M25 2- Number of submitted proposals for experiments requiring multi-instrumental access to CERIC-ERIC that account for at least one of the new instruments available at the RI and set in WP8: the KPI target value is set to 1 at M30 to 2 at M30+M24.
One Health Veterinary & Agriculture (OHVA) pathogen handling and identification (8.4)	11	1- Number of upgraded/new instruments for PRP@CERIC users: the KPI target value is set to 3 at M25 2- Number of submitted proposals for experiments requiring multi-instrumental access to CERIC-ERIC that account for at least one of the new instruments available at the RI and set in WP8: the KPI target value is set to 2 at M30+M24.
Activities of Personnel for WP8 activities, UNINA_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP8 activities, UNINA_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP8.1 and WP8.2 activities*

IO Bimestre *1* IO Costs *0,00*

IO Desciption

Recruitment of 2 Researchers for 30 months for activities 8.1 and 8.2

IO Title *Activities of Personnel for WP8 activities, UNINA_0*

IO Bimestre *3* IO Costs *49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

IO Title *Activities of Personnel for WP8 activities, UNINA_1*

IO Bimestre *6* IO Costs *49.755,00*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

IO Title	*Biointerfaces development and biotesting (8.3)*		
IO Bimestre	*7*	IO Costs	*144.619,25*

IO Desciption

PRP@CERIC users will be able to access lab-on-chip instruments in a microfluidic context, interfaced with OECT for device testing and developing. Viability assays and confocal and epi-fluorescence microscopy imaging to evaluate cell/tissue status after electrical measurements can be also performed.

IO Title	*Molecular and supramolecular characterization (8.1)*		
IO Bimestre	*7*	IO Costs	*144.448,05*

IO Desciption

PRP@CERIC users will be able to perform chemical characterization of materials in a nuclear magnetic resonance lab, including spectrometers operating at liquid and solid state.
The 600 MHz AVANCE NEO is equipped with cryoprobe suitable for the advanced characterization of polymeric matrixes and solid state samples.
We plan to upgrade the probe with a high resolution 5 mm SmartProbe 400 MHz Z-Gradient (Bruker iProbe).
The EDS Microanalysis lab, based on the available Scanning Electron Microscope FESEM FEI Nova NanoSEM 450 I, will be also be available and upgraded with a new detector (XFlash Detector, 10mm²), to complete the surface characterization of the bio-device materials.
TERS microspectroscopy is one of the most advanced techniques of chemical imaging, coupling the nanometric resolution of AFM with the fingerprinting character of the Raman/SERS spectroscopy. TERS finds applications in the molecular characterization of surfaces and materials and in cellular imaging for biomedical applications.
We plan to upgrade the TERS with a hyphenated system controlled via optical fibers, to measure, concurrently with the Raman spectrum, UV-Vis and fluorescence spectra.
Activity n.1 encompasses the upgrade of three instruments devoted to chemical investigation/characterization of materials.

IO Title	*Activities of Personnel for WP8 activities, UNINA_2*		
IO Bimestre	*9*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

IO Title *Multimodal optical, electrical and electrochemical analysis (8.2)*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*10*	IO Costs	*167.238,74*

IO Desciption

PRP@CERIC users will be able to operate a full suite of tools for device and sensor characterization, also covering microwave and photonics. Moreover, equipment to perform detailed EIS (Electrochemical Impedance Spectroscopy) analysis of biosensors is available. Voltammetry with custom profiles can be performed in order to assess the bio- recognition features of the sensors under test. The lab also allows in-depth characterization of low-frequency (1/f) noise, down to the mHz region, in order to study the electrical conduction mechanisms and IR analysis.
We plan to upgrade the IR analysis system with a Frame grabber, the signal analyser for noise characterization and the microscopy workstation for microfluidic platform.

IO Title	*Human Clinical Investigation (8.5)*		
IO Bimestre	*11*	IO Costs	*138.370,52*

IO Desciption

Activity n.5 will bring to the RI users the ability to testing and validate novel prototypes of biosensors for the detection of Sars-CoV-2 or other viral or bacterial pathogens. Biosensors response and golden standard diagnostic procedures (i.e., RT-PCR, NGS, etc.) are compared. The validation will include the analysis of: Analytical sensitivity of the novel devices on scalar dilution of viral genomes; Analytical specificity on samples of genic material free from Sars-Cov-2 sequences; diagnostic sensitivity (using different genotypes of Sars-Cov-2, i.e., wild-type. Delta, omicron, etc,); diagnostic specificity, i.e., the percentages of negative samples correctly identified as negatives.

IO Title	*One Health Veterinary & Agriculture (OHVA) pathogen handling and identification (8.4)*		
IO Bimestre	*11*	IO Costs	*297.777,25*

IO Desciption

Activity 4 plans to support researchers and stakeholders who need biosensors tests, to identify the pathogens present in agro-ecosystems or in urbanized environments at different times of the human- animal-environment interaction. It also establishes a multicriteria digital platform that allows to associate the presence of pathogens with the risk factors that would influence the health of animals, plants, and ecosystems. Key tools include a MALDI Biotyper sirius IVD System (Bruker), a widefield fluorescence and LSC microscope and an impedance spectroscopy platform.

IO Title	*Activities of Personnel for WP8 activities, UNINA_3*		
IO Bimestre	*12*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

IO Title	*Activities of Personnel for WP8 activities, UNINA_4*		
IO Bimestre	*15*	IO Costs	*49.755,00*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP8 deliverables

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Molecular and supramolecular characterization

49 Activity short name

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

49 Activity short name

8.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

Activity n.1 benefits from a full collection of spectroscopy instruments, including liquid and solid state nuclear magnetic resonance, a microscopy lab for an advance structural and supramolecular characterization of surfaces also at the interface with biological environments, and an Integrated microspectroscopy system for TERS (Tip Enhanced Raman Spectroscopy), comprising an atomic force microscope (AFM) coupled to a confocal Raman spectrometer with 638 nm laser source.
Activity n.1 cencompasses the upgrade of three instruments devoted to chemical investigation/characterization of materials.
1) The 400 MHz Avance III Bruker BBFO probe of the NMR equipment is upgraded with a 5 mm SmartProbe 400 MHz Z-Gradient high resolution probe (Bruker iProbe)..
2)A new detector (XFlash Detector, 10mm²) is added to the Scanning Electron Microscope FESEM FEI Nova NanoSEM 450 I, making available to the RI users a keyinstrument to complete the surface characterization of the materials constituting the bio-devices.
3)The available TERS is equipped with a system for measuring, concurrently with the Raman spectrum, UV-Vis and fluorescence spectra..
Instrument order and hardware commissioning: Commissioning of the upgraded 400 MHz Avance III Bruker BBFO probe to users at month [M18]
Tender publication for the Bruker upgrade parts at month [M4] Closure of the tender [M8]
Delivery and installation [M16]

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: A fixed-term researcher with proven experience in instrumental chemical-physical characterization will be recruited for the activities 8.1 and partially 8.3. The search will look for a candidate with a strong chemical background. 1 RTDA from M1 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

134.998,17 €

Cost description: 5 mm SmartProbe 400 MHz Z-Gradient high resolution probe (Bruker iProbe); XFlash Detector, 10mm²;

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: 5 mm SmartProbe 400 MHz Z-Gradient high resolution probe (Bruker iProbe); XFlash Detector, 10mm²; Upgrade of TERS;

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

17.587,38 €

Cost description: Travel and Consumables

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Multimodal optical, electrical and electrochemical analysis

49 Activity short name

8.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

Activity n.2 includes a full suite of characterization tools for devices and sensors, also covering microwave and photonics. Moreover, equipment to perform detailed EIS (Electrochemical Impedance Spectroscopy) analysis of biosensors is available. Voltammetry with

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

equipment to perform detailed EIS (Electrochemical Impedance Spectroscopy) analysis of biosensors is available. Voltammetry with custom profiles can be performed in order to assess the bio- recognition features of the sensors under test. The lab also allows in-depth characterization of low-frequency (1/f) noise, down to the mHz region, in order to study the electrical conduction mechanisms.
Activity n.2 encompasses the upgrade of equipment devoted to electrical and electrochemical characterization of materials and devices.
1)Upgrading the Noise Analyzer to the newest available equipment.
2)Acquiring a Dip Coater.
3)new digital image acquisition card.
Instrument order and hardware commissioning: Since all upgrades are connected to proprietary equipment, they can be acquired without completing too complex 'tenders' for purchase and therefore we have them available relatively quickly.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: A fixed-term researcher with proven experience in instrumental physical (electrical) characterization will be recruited for the activities 8.2 and partially 8.3 and 8.5. The search will look for a candidate with a strong physical background.
1 RTDA from M1 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

156.297,90 €

Cost description:
- Frame grabber card with on board memory and high performance of data transfer;
- Signal noise analyzer;
- Dip Coater.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

19.078,35 €

Cost description: Travel and Consumables

54.6 f. Training activities

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

48 Activity title

Biointerfaces development and biotesting

49 Activity short name

8.3

50 Activity Start month and duration

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

Activity n.3 enables the RI users to access lab-on-chip instruments in a microfluidic context, interfaced with OECT for device testing and developing. Viability assays and confocal and epi-fluorescence microscopy imaging to evaluate cell/tissue status after electrical measurements can be also performed.
In this Activity, the RI can also support the design of FET biosensors based on the use of nanomaterials, such as 2D nanoflakes of graphene and MoS2 that exhibit metal and semiconductor behavior, respectively. The use of 2D materials in this field is extremely impacting since they show the highest obtainable surface-to-volume ratio. This way, it is possible to realize sensors that expose the widest surface to agents to be sensed.
A 3D biolab contributes to expand the scope of device testing and it is equipped with a 3D bioprint to produce cell substrate by additive manufacturing technology, a fully automated live cell recorder instrument for multiwell fluorescence microscopy, and a light sheet fluorescence microscope (LSFM) that allows both the live and post-fixed 3D analysis, at single cell level resolution, of 3D samples.
Activity n.3 encompasses the upgrade of equipment devoted to electrical and electrochemical characterization of materials and devices.
1)Upgrade the live cell recorder instrument for multiwell fluorescence microscopy with new dedicated spheroid growth assays software that will allow the high throughput analysis and screening of multiplexed 3D samples.
2)Upgrade the LSFM with laser line sources.
3)Acquisition of a 3D bioprinting system to double the capability to produce 3D cell substrate.
4)Acquisition of a 3D printer for nanoarray-based microfluidic devices with a set of diode lasers in the UV-band with related controller electronics.
5)Acquisition of a ultrasound imaging.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

135.158,18 €

Cost description:
-diode lasers UV-band with related controller electronics;
-Ultrasonic flaw detector;
-3D biolab: live cell recorder platform-Spheroid growth assays software licence;
-Nanosecond Pulsed Laser;
-3D bioprinting system;

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

9.461,07 €

Cost description: Travel and Consumables

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

One Health Veterinary & Agriculture (OHVA) pathogen handling and identification

49 Activity short name

8.4

50 Activity Start month and duration

Activity Start month	5	Activity Duration	25

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

Activity 4 plans to support researchers and stakeholders who need biosensors tests, to identify the pathogens present in agro-ecosystems or in urbanized environments at different times of the human- animal-environment interaction. It also establishes a multicriteria digital platform that allows to associate the presence of pathogens with the risk factors that would influence the health of animals, plants, and ecosystems. Key tools include a MALDI Biotyper sirius IVD System (Bruker), a widefield fluorescence microscope and an LSC microscope.
Activity n.4 encompasses the upgrade of the validation instruments specific to animal and agro-ecosystems.
1)Upgrading of the MALDI Biotyper sirius one IVD (Bruker) analyzer.
2)Equipping the microscopes with confocal spinning disk and a motorized XYZ stage system, to allow the RI users to analyze high number of samples containing pathogens efficiently and quickly.
3)To upgrade the PalmSens4 multistation.
Instrument order and hardware commissioning: As upgrades are intended for preexisting instruments and they are produced by single sellers: market research is therefore not needed. The activity will start at project month 0 with the starting of the tender procedures. Publication of the procedure is expected at B2, conclusion and order of the instrument at B4. The instrument will be delivered about 6 months after the order (B7). Installation, training and verification of accordance with the technical specifications will be therefore done within B8.
4 months for hardware commissioning are planned.
Scientific Commissioning: The new labs will be in parallel open at B10 to Bioel_TfA_UNINA in presence, mix modality as well as remotely by machine operated by the internal staff.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

278.296,49 €

Cost description: -upgrade of microscopes to fully automated confocal spinning disk;
-MALDI Biotyper Sirius IVD;
-upgrade the PalmSens4 multistation

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

19.480,75 €

Cost description: Travel and Consumables

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Human Clinical Investigation

49 Activity short name

8.5

50 Activity Start month and duration

Activity Start month	5	Activity Duration	25

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

Activity n.5 will bring to the RI users the ability to testing and validate novel prototypes of biosensors for the detection of Sars-CoV-2 or other viral or bacterial pathogens. Biosensors response and golden standard diagnostic procedures (i.e., RT-PCR, NGS, etc.) are compared. The validation will include the analysis of: Analytical sensitivity of the novel devices on scalar dilution of viral genomes; Analytical specificity on samples of genic material free from Sars-Cov-2 sequences; diagnostic sensitivity (using different genotypes of Sars-Cov-2, i.e., wild-type. Delta, omicron, etc,); diagnostic specificity, i.e., the percentages of negative samples correctly identified as negatives. The Lab is equipped with automatic workstations for RNA/DNA extraction, PCR machines for genome amplification and full equipment for next-generation sequencing analysis. In addition, it has a bank of biological samples that stores more than two-thousands of samples from COVID-19 patients.
Activity n.5 encompasses the upgrade of equipment devoted to the deployment of biosensors in clinical diagnostics.
1)upgrade the PCR equipment with Digital-PCR machine and a software for the analysis of NGS data
2)Quantitative immunofluorescence analyzer with rapid diagnostic kit are added to the fast isothermal PCR already present.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP08 - WP08 - Interplaying bioelectronic Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

2)Quantitative immunofluorescence analyzer with rapid diagnostic kit are added to the fast isothermal PCR already present.
3)Wireless vital signs monitor will be combined with the "traditional" instrumentation already present allowing a faster and safer staging of the patients.
Instrument order and hardware commissioning: For this equipment (PCR machine and Immune analyzer) not requiring market research the activity will start at project month 0 with the starting of the tender procedures. Freeze storage and wireless facilities will require markets research.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

129.318,32 €

Cost description: Digital-PCR machine and a software for the analysis of NGS data;
Immunofluorescence analyzer;
Wireless vital signs monitor

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

9.052,20 €

Cost description: Travel and Consumables

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
1	Recruitment of Personnel for 9.1 WP9 activities, U.O. Area Padriciano	0,00	0,00
1	Recruitment of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM	0,00	0,00
3	Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_0	24.877,50	24.877,50
3	Recruitment of Personnel for 9.3 WP9 activities, U.O. CNR IOM	0,00	24.877,50
3	Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_0	27.329,94	52.207,44
6	Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_1	24.877,50	77.084,94
6	Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_1	27.329,94	104.414,88
6	Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_1	27.329,94	131.744,82
9	Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_2	24.877,50	156.622,32
9	Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_2	27.329,94	183.952,26
9	Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_2	27.329,94	211.282,20
9	AI computing infrastructure for image analysis and interpretation facility	1.370.670,00	1.581.952,20

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

	interpretation facility upgrade.		
12	Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_3	24.877,50	1.606.829,70
12	Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_3	27.329,94	1.634.159,64
12	Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_3	27.329,94	1.661.489,58
15	AI-augmented research infrastructure facility upgrade.	0,00	1.661.489,58
15	Simulation tools for PRP@CERIC mechanism and in silico drug design.	0,00	1.661.489,58
15	Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_4	27.329,94	1.688.819,52
15	Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_4	27.329,94	1.716.149,46
15	Activities of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM_4	24.877,50	1.741.026,96

36 WP title

WP09 - AI and Simulations-augmented Platform

37 WP number

WP09

38 Start month(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
DIEM	Department of Information and Electrical engineering and Applied Mathematics (DIEM	CO-APPLICANT: Università degli Studi di Salerno
CNR-IOM	Istituto Officina dei Materiali del CNR	CO-APPLICANT: Consiglio Nazionale per le Ricerche

40 WP Leader

Pierluigi Ritrovato (DIEM)

41 Summary of the activities envisaged in the WP

The aim of the WP9 is to establish AI and simulations-enabling computational ecosystem for life-sciences applications, upgrading the existing infrastructures of the AREA-Basovizza Trieste node and of the Università di Salerno node through a radical increment of both data storage and computing capabilities, particularly tailored for GPU-based applications, specifically designed for current and future challenges in AI for computational biology. The platform, distributed in nature, are specifically tailored to integrate with the forthcoming facilities at Elettra and CNR in Trieste and at Bio-Open Lab in Salerno: on the one hand researchers will have immediate access to post-processing of the data of each experiment, on the other they will interact with a composite data and computational ecosystem that opens the door to large-scale statistical analysis transversal to the single experiment as well as to simulation and deep-learning techniques dedicated to in-silico modelling.
Thus, WP9 focuses on facilitating AI exploitation and AI-based advanced simulations to analyze and interpret high-throughput biological data, such as those obtained from WP3-WP8 experimental stations. While artificial intelligence algorithms, models and simulations are continuously demonstrating their impact and potential in computational biology, their actual implementation and usage in the scientific community are often limited by several barriers. A first barrier is represented by the accessibility to HPC facilities disposing of adequate computational power for executing highly parallelized algorithms. A second barrier is faced when adapting generic AI models to a particular experiment or analysis. Indeed, applying state-of-the-art algorithms needs specific software setups, and novel problem-specific models often require the implementation of dedicated libraries. Furthermore, an additional barrier is raised by the need of continuous interaction of a highly multidisciplinary team of experts when facing challenges posed by applying computational methods for answering biological questions such as the rational design of new drugs or the optimization of therapeutic antibodies.
The PRP@CERIC WP9 will contribute to overcome the barriers to access cutting-edge AI-based data analysis and molecular simulations for pathogen investigation by (i) providing an interconnected set of computing and storage instruments, geographically distributed, equipped with the most advanced technology solutions for AI models execution and capable of managing and storing the massive amount of data produced by the PRP@CERIC facilities; and (ii) providing a multi-disciplinary group of research scientists with a well-recognized scientific reputation at international level, covering the different disciplines and including a strong expertise in AI model development, experimentation and validation. These, coupled with the continuous and integrated acquisition of data from the laboratories, will establish an advanced multi-lab coordination facility to readily tackle urgent questions posed by insurgence of new pathogens.
According to this general aims WP9 activities will achieve the following goals:
G1.Design and deploy AI computing and storage platform in Area Science Park and University of Salerno existing HPC datacenters;
G2.Analyse, in collaboration with the other WPs (WP2-WP8) the existing software libraries, frameworks and tools to configure and deploy them on the PRP@CERIC computing platform;
G3.Understand the other WPs needs in terms of data analytics to identify, develop and experiment in-silico tools and algorithms based on the more suitable AI models;
G4.Exploit the computing platform for building new datasets using the data generated by the instruments or using augmentation and generation techniques inspired by established AI practices.
The G1 goal will be accomplished during the first 18 months, where the two existing HPC datacenters will be extended with new state of the art hardware equipment and made available to the PRP@CERIC researchers.
The G2 goal will be achieved by providing support to the researchers involved in other WPs (WP2-WP8) to facilitate the configuration and deployment on the computing platform the software (tools, libraries and frameworks) that are provided with the instruments and need

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

and deployment on the computing platform the software (tools, libraries and frameworks) that are provided with the instruments and need to analyse and elaborate the data produced. The software will be organised and shared in a suitable form in collaboration with WP11, to make it accessible and guarantee uniformity in its usage.
The G3 goal will be reached throughout the whole project with a systematic comparison and review of the work performed by the researchers involved in the project to investigate and understand the data analysis and interpretation needs to exploit algorithmic innovations in the field of Artificial Intelligence and simulation to 1) support the harmonic development of existing RI and its upgrades 2) enable the analysis and integration of heterogeneous data (images, videos, time series, sequences and graphs) produced by the instruments and related software. Starting from the analysis and interpretation problem, the idea is to select, train (on the data produced by PRP@CERIC instruments), experiment and deploy the most suitable AI models and simulations collecting their specific libraries/packages ready to use.
Finally, the achievement of G4 goal is a natural consequence of the activities performed in WP9, providing an important contribution to the scientific community in general and a support for success of the activities of PRP@CERIC WP11.

Activity WP9.1 "AI-augmented research infrastructure" will provide the computational infrastructure that enable complex structural-functional inferences of biological molecules and algorithmic instruments for molecular design, based on state-of-the-art machine learning research. The Activity will realize this objective by extending experimental stations with suitable software infrastructure; furthermore, it will provide machine learning tools for multi-omics integration, for the purpose of structure prediction and molecular design tasks.
Activity WP9.2 "AI Infrastructure for image analysis and interpretation" is focused on building a computing infrastructure devoted to execute AI based models for the analysis and interpretation of several kind of images. Since the WP9 provides the enabling platform for supporting highly intensive computational task for data analysis and interpretation, the collaboration with the other WPs activities will be focused on the application of AI models for images analysis and related to problems such us in-vitro study of protein docking/folding, protein/ligand interaction, crystallization test prediction and classification, segmentation, feature extraction and classification of mass spectrometry, genomic hyperspectral and functional images of tissues and cells.

Activity WP9.3 "Simulation tools for PRP@CERIC" is focused on classical and quantum-classical (QM/MM) all-atoms simulations to study the mechanism underlying pathogen infections and to exploit this information for drug design. WP aims are aligned and synergic with Activity WP9.1. This offers the opportunity to tackle similar problems from diverse perspectives whose integration – the incorporation of detailed physical models in machine learning algorithms in a principled way - is object of intensive research.

42 WP inter-relation with other WWPP

WP3, WP4, WP5, WP6, WP7, WP8, WP11, WP12

43 Most relevant outcome:

The new assets that will be acquired with PRP@CERIC project will extend the computational capability of the existing CERIC-ERIC infrastructure turning towards the adoption of AI models and simulations for the analysis of multiplexing imaging data.
The new tangible assets will extend the existing datacenters of two different participants: Area Science Park and University of Salerno. The existing datacenter already have computing capabilities for supporting the implementation of machine learning and deep learning models as well as traditional HPC solutions for big data analytics.
The expansion of the computational architecture will be stratified in three separate components to meet the needs of the diversified applications that will contribute to the project:
•Expansion of ORFEO's thin partition with about 1500 cores for QM/MM Molecular Dynamics, in a configuration equivalent or superior to: 2 x CPU Intel CascadeLake 8260, each with 24 cores, or AMD EPYC, mounting 64 cores.
•expansion of ORFEO's GPU partition with the addition of 16/20 nodes each of them equipped with two GPU of the latest generation for a total of 32/40 GPUs This partition will address intermediate size AI applications and classical MD simulation. Nodes will install processors with 24/32 cores depending on the vendor.
•Expansion of the infrastructure for training of large size AI applications with a configuration equivalent or superior to 4 DGX A100 stations for a total of 32 GPUs.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

to 4 DGX A100 stations for a total of 32 GPUs.

The new components of the facility will be connected to the existing ones through an extension/integration of the InfiniBand network.
At the University of Salerno it is under construction (will be available in April 2022) the datacenter for the Bio Open Lab project part of the CERIC-ERIC infrastructure with:
•18 thin nodes: each node has Intel bi-processors server with 76 cores, 1TB of RAM and 4 GPU AMD PI100 with 32GB RAM;
•5 Fat nodes:, each node has an intel 4-processors server with 112 cores, and 6TB of RAM;
•14 GPU nodes: each node has an AMD Epyc bi-processors server with 128 cores, 2TB of RAM and NVIDIA HGX board with 4 A100 GPU with 320GB of RAM and interconnected with NVlink bus;
•5 PB of High-performance storage based on BeeGFS with 40GB/s of throughput
•1.5 PB of secondary storage for cold data.
This infrastructure will be extended with the new NVIDIA AI architecture based on the DGX POD that integrate NVIDIA AI servers with 8 H100 GPU with 80GB of ram each. In particular, we plan to buy a POD with 3 DGX. This kind of infrastructure, differently from the already available ones based on NVIDIA HGX with only 4 GPU, will allow to work on very large datasets like the ones for wide genomic studies, in-vitro molecular studies or for analysing and comparing multi host-pathogen interaction with a reduced computational time. The infrastructure will enable use of new and emerging deep learning models for the drug-to-drug interaction studies, in-vitro drug design, multi-tasking deep learning models for image analysis.
On top of the infrastructural upgrades of the Area Science Park and University of Salerno sites the other important outcome of this WP will be the augmentation of the diverse experimental stations of WP2-WP8 with the computational layers required for their baseline workings.
We expect that this activity will generate multiple opportunities for training young scientist, interested at data-driven experimental biology, nanotechnology, multi-omics etc, in an environment that realize a melting-pot of interdisciplinary competences in the field of computational biology, AI and simulation modelling.
Finally, the WP will contribute to achieve two other outcomes: the datasets for training the AI models and the software repository collecting packages, libraries, and tools.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for 9.1 WP9 activities, U.O. Area Padriciano	1	N/A
Recruitment of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM	1	N/A
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-	3	Six Month Report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

U.O. UNISA-DIEM_0		
Recruitment of Personnel for 9.3 WP9 activities, U.O. CNR IOM	3	N/A
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_0	3	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_1	6	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_1	6	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_1	6	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_2	9	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_2	9	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_2	9	Six Month Report on the Personnel activities and associated time-sheets
AI computing infrastructure for image analysis and interpretation	9	Report on the Act. 9.2_1 working status focused on the instrumentational upgrade and hardware commissioning

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

interpretation facility upgrade.		
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_3	12	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_3	12	Six Month Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_3	12	Six Month Report on the Personnel activities and associated time-sheets
AI-augmented research infrastructure facility upgrade.	15	Report on the Act. 9.1 working status focused on the establishment of the AI-augmented research infrastructure
Simulation tools for PRP@CERIC mechanism and in silico drug design.	15	Report on the Act. 9.3 working status focused on simulation tools and in silico drug design.
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_4	15	Final Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_4	15	Final Report on the Personnel activities and associated time-sheets
Activities of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of Personnel for 9.1 WP9 activities, U.O. Area Padriciano	1	Number of signed contracts. The KPI target value is set to 1 at M2
Recruitment of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM	1	1-Number of signed contracts. The KPI target value is set to 1 at M2
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_0	3	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Recruitment of Personnel for 9.3 WP9 activities, U.O. CNR IOM	3	1-Number of signed contracts. The KPI target value is set to 1 at M6
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_0	3	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_1	6	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_1	6	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_2	9	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/N

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_2	9	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_2	9	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
AI computing infrastructure for image analysis and interpretation facility upgrade.	9	Number of new infrastructure users. The KPI target value is set to 30 within 30 months Number of trained users. The KPI target value is set to 15 at M30
Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_3	12	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_3	12	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
AI-augmented research infrastructure facility upgrade.	15	1. Number of AI-based models for multi-omics data analysis: The KPI target values is set to: 2 AI-based models within B15; 1 within B15+B12 2. Number of new or extension of existing one datasets: The KPI target values is set to 1 within B15 3.Number of trained users The KPI target value is set to 8 at B15 4. Number of new infrastructure users: The KPI target value is set to 15 within B15
Simulation tools for PRP@CERIC mechanism and in silico drug design.	15	Number of simulations: The KPI target values: 2 B15; The KPI target values is set to 1 from B15 + B12
Activities of Personnel for 9.1	15	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Personnel for 9.1 WP9 activities, U.O. Area Padriciano_4		identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_4	15	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM_4	15	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/N

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for 9.1 WP9 activities, U.O. Area Padriciano*

IO Bimestre *1* IO Costs *0,00*

IO Desciption

Recruitment of 1 Researcher for 30 months for activity 9.1 (1 FTE)

IO Title *Recruitment of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM*

IO Bimestre *1* IO Costs *0,00*

IO Desciption

Recruitment of 1 Researchers for 30 months for activity 9.2 (1 FTE)

IO Title *Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_0*

IO Bimestre *3* IO Costs *24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2.

IO Title *Recruitment of Personnel for 9.3 WP9 activities, U.O. CNR IOM*

IO Bimestre *3* IO Costs *0,00*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

Recruitment of 1
Researchers for 24 months for activity 9.3 (1 FTE)

IO Title	*Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_0*		
IO Bimestre	*3*	IO Costs	*27.329,94*

IO Desciption

technical and Scientific activities of the personnel for the fulfillment of activity 9.1.

IO Title	*Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_1*		
IO Bimestre	*6*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2.

IO Title	*Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_1*		
IO Bimestre	*6*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.1.

IO Title	*Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_1*		
IO Bimestre	*6*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.3

IO Title	*Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_2*		
IO Bimestre	*9*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2.

IO Title	*Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_2*		
IO Bimestre	*9*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.3

IO Title	*Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_2*		
IO Bimestre	*9*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.1.

IO Title	*AI computing infrastructure for image analysis and interpretation facility upgrade.*		
IO Bimestre	*9*	IO Costs	*1.370.670,00*

IO Desciption

The existing computing infrastructure available at University of Salerno, has been designed two years ago and presents same constrains in terms of AI models elaboration and scalability over large scale datasets. The new PRP@CERIC infrastructure will provide more flexibility to researchers belonging to the CERIC-ERIC infrastructure, scaling up the AI computing resources according to their needs and leveraging on the latest advancement in terms of GPU based computing infrastructure

IO Title	*Activities of Personnel for 9.2 W9 activities, U.O. UNISA-DIEM_3*		
IO Bimestre	*12*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2.

IO Title	*Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_3*		
IO Bimestre	*12*	IO Costs	*27.329,94*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.1.

IO Title	*Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_3*		
IO Bimestre	*12*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.3

IO Title	*AI-augmented research infrastructure facility upgrade.*		
IO Bimestre	*15*	IO Costs	*0,00*

IO Desciption

Area Science Park AI-HPC facility ORFEO has been specifically built to meet the requirements in terms of storage and data processing of modern NGS genomic analysis. The main objective of Activity 9.1 will be the upgrade of the Orfeo computational facility to establish an AI-augmented research infrastructure that enables the experimental stations of the other WPs to exploit state-of-the-art machine learning algorithms for life-sciences, ensuring constant compatibility with the specifics defined in the interoperable layer of WP12.

After installation of the facility, access to ORFEO will be granted to the scientists of the other WPs following the best-practices of security and usability. The installation of specific software and development of the experimental deep-learning models will follow. The effectiveness of the procedure will be demonstrated by means of a test use case.

The test use case will be the success in the collaboration with A4.1 of WP4 for the reconstruction of the structure of a standard protein, such as the VitroEase Apoferritin Standard, and test of recent deep-learning models for Cryo-EM data analysis

IO Title	*Simulation tools for PRP@CERIC mechanism and in silico drug design.*		
IO Bimestre	*15*	IO Costs	*0,00*

IO Desciption

The WP9 will set an ecosystem built on a series of state-of-the-art computational methods (ranging from classical to quantum-classical molecular dynamics simulations, and in silico drug design tools), promptly available on the computational platform created with this project and relying on a team of experienced researchers which can supply the technical and biophysical support to illuminate the atomic-level mechanism by which pathogens infect human cells.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Activities of Personnel for 9.1 WP9 activities, U.O. Area Padriciano_4*		
IO Bimestre	*15*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.1.

IO Title	*Activities of Personnel for 9.3 WP9 activities, U.O. CNR IOM_4*		
IO Bimestre	*15*	IO Costs	*27.329,94*

IO Desciption

Final Report on the Personnel activities and associated time-sheets

IO Title	*Activities of Personnel for 9.2 WP9 activities, U.O. UNISA-DIEM_4*		
IO Bimestre	*15*	IO Costs	*24.877,50*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of activity 9.2

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

AI-augmented research infrastructure

49 Activity short name

9.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

The objective of Activity 9.1 is the development of an AI-augmented research infrastructure aimed at enhancing the results and integrating the findings of other WPs. The activity will rely on a cutting-edge computational architecture specifically tailored for modern AI applications, and on the expertise of the RET research group in the design and deployment of state-of-the-art machine and deep learning algorithms for life sciences applications. The upgraded ORFEO facility will assist instrumental discoveries through machine learning methods, not only by enhancing the quality of the results and speeding up the analysis, but also by allowing the integration of diverse multi-omics data sources and assisting experimental design through in- silico modelling.
The focus points of the activity are deeply rooted in the latest achievements of the data-driven revolution in omics-sciences introduced by AI:
•deploy and possibly further develop deep learning algorithms aimed at (i) facilitating instrument usage by automating the postprocessing of data, and (ii) improving the interpretation of results obtained from the experimental technique such as Cryo-EM of WP4 and multimodal hyperspectral imaging techniques of WP5;
•perform advanced statistical analysis of multiplexing data multi-omics produced in other WP7, with particular emphasis on the construction and the study of synthetic representations by means of neural networks, to shed new insights on the underlying biological processes;
•leverage recent AI-based solutions which allow accurate structural predictions from sequence-only information and automatic annotation of biomolecules, to enrich current techniques for drug- discovery in support and in collaboration with the activities of WP3, both by exploring de novo protein design and by studying protein-ligand interaction.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

In close collaboration with the other WPs, Activity 9.1 will foster the harmonization of the diverse workflows of the laboratories to speed up discovery

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

127.710,00 €

Cost description: A fixed time researcher will be hired for 30 months.
Profile is a data scientist with data science scientific expertise with a sound competence and experience on intermediate-to-large-scale machine learning projects. Experience in the field of software engineering, high performance computing, development of data services and data-centric-AI and MLOP is a plus

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

8.939,70 €

Cost description: Travel / conference fee

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

AI Infrastructure for image analysis and interpretation

49 Activity short name

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

9.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	DIEM	Participant	Università degli Studi di Salerno

52 Activity description

Leveraging on about thirty years of experience in Artificial Intelligence applications available at DIEM research group, the objective of the activity is to exploit the new AI computing infrastructure for analyzing and interpreting the huge amount of image data produced by the PRP@CERIC instruments.
In particular, the activity will be supported by the new NVIDIA POD facility designed for massive AI applications1 helping scientist with the application of AI techniques for analyzing different kind of images starting from one produced by the mass spectroscopy facility, new digital microscopy/nanoscopy, TEM facilities (multiplexing information).
The UNISA-DIEM group has already studied and developed deep learning model for: microscopy HEP2 image analysis classification (leading the organization of 2 international context with the involvement of several research groups); MRI, TAC and mammography analysis for breast cancer detection and classification; ultrasound, MRI and TAC images for liver pathology analysis and disease classifications.
In summary the activity will provide, software, libraries and tools to support the study, definition and deploy AI models for biological image analysis produced by the different imaging experimental stations active in the PRP@CERIC WPs for:
•Prediction/recognition (scoring) of protein crystallization process from images
•Histological images segmentation and automatic image regions classification
•Automatic cellular samples classification and recognitions
•Automatic slide images alignment using morphological features from tissues gene expression, hyperspectral imaging
•chemometric classification and prediction models based on the combination of multiplexing information for the prediction of the host-pathogen interaction and its progression as a function of different treatments
•image segmentation, and feature co-localization from mass spectrometry, microscopy, space transcriptomics and histology on tissues and cells

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

116.250,00 €

Cost description: We plan to hire a 3 year researcher (RTD of type A) with a degree in computer engineering (scientific sector ING-INF/05) with expertise on Artificial intelligence and deep neural network design and their application for omic data analysis and in particular for images analysis as well as in High Performance Computing.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.281.000,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: The configuration we plan to buy is strictly related to the actual state of the art technology and related costs, that will be subject to change in the next 12 months.
The existing UNISA infrastructure, actually under development in the frame of the CERIC-ERIC project Open Bio Lab (will be fully operative in May/June 2022) will be extended with PRP@CERIC with the following equipment, depending on the cost of the HW at the time of the purchase:
•A POD with 3 NVIDIA DGX (each DGX has 4 H100 GPU equipped with 80GB RAM);
•A Storage sub system to support data staging activities and make some preliminary validation of the models before to run the models training on the whole infrastructure

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

97.807,50 €

Cost description: Travel
Management cost of the datacenter.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Simulation tools for PRP@CERIC

49 Activity short name

9.3

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

OU short name	CNR-IOM	Participant	Consiglio Nazionale per le Ricerche

52 Activity description

This activity will aim to develop computational methods/protocols and supply expertise for their application to study the mechanism of pathogens infections and to design small molecules to contrast them. The synergic application of all-atom simulations with experimental approaches can enrich the interpretation of experimental results, and aid to discover innovative therapeutic strategies. In this scenario, the development of a computational arsenal based on advanced classical and quantum-classical (QM/MM) all-atoms simulations (i.e. canonical and/or or artificial intelligence-driven enhanced sampling) will be developed and used to (i) integrate, complement experimental structural data obtained by the other WPs; (ii) to expand the capabilities of cryo-EM in capturing biologically relevant structures hidden within the low-resolution density regions of cryo-EM maps; (iii) to unravel specific mechanistic facets of bacterial or viral proteins mediating the infection (i.e. proteins triggering viral entrance into host cell, enzymes promoting their replication, proteins and protein/RNA machineries responsible of bacterial infections and resistance to antibiotics, interactions of the pathogen proteins with the membrane of the host cells.); (iv) to perform in silico drug discovery studies to contrast pathogen actions. Moreover, AI-based method will boost the capabilities and speed up the analysis of data generated by the simulations.
Moreover, the CNR-IOM team will provide a database of computational tools to study these systems (force field databases for antiviral/antibiotics drugs, for sugars moieties of viral proteins and antibodies and for lipids of the pathogen membrane). The developed computational methods/protocols and tools are fully portable to any biomolecular system involved in pathogen infection. The personnel employed to work on this project will ensure that the protocols and the databases will be developed, maintained, and updated.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: We plan to hire a 2 years researcher (RTD of type A) with a degree in chemistry or physics (scientific sector Chim02/Phys02) with expertise in all-atom simulations, AI-based enhanced sampling techniques and drug design. as well as in High Performance Computing.

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP09 - WP09 - AI and Simulations-augmented Platform]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.5 e. Indirect costs

7.151,76 €

Cost description: Travel and conference fee

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment of Personnel for WP10 activities, U.O. Area Padriciano	0,00	0,00
4	IP&M Helpdesk set up (ACTIVITY 5)	0,00	0,00
6	PRP@CERIC access policies harmonization (activity 10.1)	0,00	0,00
6	Activities of Personnel for WP10 activities, U.O. Area Padriciano_1	54.659,88	54.659,88
9	PRP@CERIC offer definition ("catalogue")	0,00	54.659,88
9	Activities of Personnel for WP10 activities, U.O. Area Padriciano_2	54.659,88	109.319,76
12	PRP@CERIC full integration into CERIC-ERIC Offer	0,00	109.319,76
12	Call PRP4S3	0,00	109.319,76
12	Activities of Personnel for WP10 activities, U.O. Area Padriciano_3	54.659,88	163.979,64
13	Entry Portal for Industrial Research explOitation – EPIRO Set Up	0,00	163.979,64
15	Activities of Personnel for WP10 activities, U.O. Area Padriciano_4	54.659,88	218.639,52

36 WP title

WP10 - User Access and Outreach

37 WP number

WP10

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

38 Start month(relative to kick-off of the project) and duration (in month)

WP Start	1	WP Duration	30

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park

40 WP Leader

Maddalena Furlan (Area Padriciano)

41 Summary of the activities envisaged in the WP

WP10 is devoted to the definition of shared policies for access regulation to all PRP@CERIC facilities as well as for valorization of research results and knowledge transfer to the productive world, with the aim to reach the full operation of PRP@CERIC and lead to its long-term sustainability.
PRP@CERIC, organized as a digital interoperable distributed platform, will contribute to the strengthening of CERIC-ERIC and will allow the PRP@CERIC partners to take advantage and make steps forward in their own institutional research and training activities, as well as in all types of collaborative projects within them and with other external partners.
Since PRP@CERIC mission builds upon the shared use of its facilities to fully exploit its research potential, PRP@CERIC experimental stations will integrate CERIC-ERIC Open Access Offer, giving researchers from across Europe (and beyond) access to its facilities, enabling state-of-the-art experimental research, collaboration and capacity building.
Granting open access through excellence driven CERIC-ERIC procedures fulfils scientific needs and raises the efficiency of research helping in bundling interests and fostering international collaboration.
Moreover, placing PRP@CERIC into a wider landscape, enabling access to industrial users too, can help to develop a well-functioning environment in which relevant stakeholders are collaborating along and across industry and sector-specific value chains to create solutions to socio-economic and business challenges.
Therefore, PRP@CERIC will implement procedures leading to its full usability, balancing among institutional and collaborative research (including training activities and participation to competitive financed projects) of each partner with an excellence-driven access channel for research and a market-driven access channel for industry, with the following proportions in operational scheduling:
•Institutional and collaborative research ≥ 60%
•CERIC-ERIC peer review open access procedure: ≤ 20%
•Industrial R&D projects: ≤ 20%
Consistently with CERIC-ERIC vision to offer an integrated, multidisciplinary and multinational research infrastructure open on a competitive basis to drive excellence, innovation and European integration, it is worth to notice that the access to PRP@CERIC to competitive basis to drive excellence, innovation and European integration, it is worth to notice that the access to PRP@CERIC to conduct research activities on a non-commercial basis will cover at least 80% of operations.
On these basis, in order to build-up and make PRP@CERIC fully running, partners will collaborate in detailing the relevant

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

On these basis, in order to build-up and make PRP@CERIC fully running, partners will collaborate in detailing the relevant regulatory framework (sharing their terms and conditions for e.g. access, intellectual property rights, confidentiality, liability and possible fees) (Activity 1); integrating PRP@CERIC experimental stations into CERIC-ERIC Open Access Offer (Activity 2); activating PRP@CERIC entry channel for industry (EPIRO - Entry Portal for Industrial Research explOitation) and related services (Activity 2)and boosting it with Business Development actions (Activity 4).
WP10 will also develop functions more commonly linked with technology transfer, supporting patenting, licensing and spin-off creation, setting-up a Helpdesk devoted to raise awareness about these topics among PRP@CERIC researchers (Activity 5).
Finally, in order to build around PRP@CERIC an environment to support the development of small high-tech enterprises, spin-off and start-up companies, Area Science Park will run a pilot action to test the feasibility of using selected PRP@CERIC facilities as a Scientific and Technological Incubator (Activity 6).
Activity 1 is focused on the completion of the whole PRP@CERIC regulatory framework, collecting and matching terms and conditions for access and, where relevant, cost models applied to calculate the operating running costs of the stations by each Partner.
Activity 1 includes the functioning of the Infrastructure Management and Monitoring Board (see WP1), which, within its role of managing and monitoring the whole PRP@CERIC operation with a long-term sustainability perspective, will be in charge of balancing the scheduling of experiments at the PRP@CERIC facilities on the agreed proportions (Institutional and collaborative research ≥ 60%; CERIC-ERIC peer review open access procedure: ≤ 20%; Industrial R&D projects: ≤ 20%).
It is worth to notice that PRP@CERIC will allow users to access its facilities both on-side and remote, exploiting the solutions which have proved their effectiveness during the COVID-19 emergency/lockdown, e.g. installation of communications software and development of automation strategies up to remote-controlled robots to enable experiments to be undertaken remotely and instruments to be operated with no or fewer people on the site.
Activity 2 will be actuated by the integration of PRP@CERIC facilities into CERIC-ERIC Open Access Offer, implementing CERIC-ERIC website and built-in user-portal for proposal submission (the Virtual Unified Office - VUO) and, if necessary, suggesting CERIC-ERIC to integrate the international and independent panel of peer reviewers with complementary competences.
The focus of the Activity 3 is the establishment of an Entry Portal for Industrial Research exploitation (EPIRO), a single-entry channel managed by Area Science Park, comprehensive of defined access procedures to be implemented digitally.
Activity 4 is aimed at building, establishing and consolidating contacts, relationships and collaboration with companies, applying Area Science Park business intelligence competences and tools to find PRP@CERIC industrial target to be contacted and conveyed through EPIRO.
Activity 5 is focused on the setting-up the Intellectual Property & Marketing (IP&M) Helpdesk, which will raise PRP@ERIC scientists' awareness of the business potential of their own inventions. To this aim, Area Science Park will make available its PatLib Centre to PRP@CERIC partners, offering information about patents and patents filing procedures, verifying the novelty of the results achieved conducting prior-art searches on patent documents, providing information about research results global market potential and trends and identifying the research results eligible to be commercialized via spin-off creation.
Activity 6 is focused on the implementation of a pilot action aimed at verifying the ambitious purpose to make PRP@CERIC acting as a Scientific and Technological Incubator for small high-tech enterprises, spin-off and start-ups by the means of a public notice for the presentation of expressions of interest to use PRP@CERIC facilities for implementing projects finalized to the realization of prototypes and of the minimum viable product.
All WP10 Activities will be coordinated by Area Science Park, but they need a strong commitment and involvement by all the Partners in order to be implemented successfully and managed as a part of overall open research and innovation environment.
WP10 Activities will not require large investments, since they are complementary with other WWPP and are aligned with Area Science Park overall mission and existing competences in IP Management and Research Valorization. Nevertheless, PRP@CERIC needs a customized and dedicated approach to Business Development, which will be guaranteed by adding two additional staff unit, gathering scientific knowledge and marketing skills, to the existing IP Management and Research Valorization team.

42 WP inter-relation with other WWPP

All WPs

43 Most relevant outcome:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

The outcome of WP10 is the full operation of PRP@CERIC, integrating institutional and collaborative research activities (including training and participation to competitive financed projects) with a broader opening to the scientific community (excellence-driven access) and to industry (market-driven entry channel).
The excellence-driven access will be pursued by updating and implementing with PRP@CERIC facilities the CERIC-ERIC Open Access Offer, which will be the entry gate for peer-review free of charge submission procedure PRP@CERIC, providing an excellence-driven access to its facilities, will attract leading researchers, build bridges between research communities, facilitate knowledge-sharing and by these means enabling steps forward in fundamental and applied research.
As well as meeting the demand of the scientific community for state-of-the-art resources supporting excellent science, PRP@CERIC will also explore different ways to engage with industry, including direct support with services, testing and proving technology, as well as stimulating innovation-driven research on pre-competitive challenges.
To this aim, PRP@CERIC will activate a market-driven entry channel, EPIRO (Entry Portal for Industrial Research explOitation) endowed with an online database with the available research instruments and related expertise ("Browsable catalogue"), to let industrial users be aware of opportunities provided by PRP@CERIC to respond to business-oriented needs. Although EPIRO target is industry, it could be used also by research institutions for requesting services on commercial basis.
Supported by digital transition strategies, PRP@CERIC will reach its full operation also allowing all types of users to access its facilities both on-site and remote, and such an approach would also contribute to build a more sustainable research infrastructure environment and, more in general, a more sustainable society. As a matter of fact, remote access can increase the resilience of research infrastructures during crisis, reduce their ecological footprint through travel decrease and enlarge their user base, both for research, training and commercial purposes.
It is also worth to notice that building and operating PRP@CERIC will entail the development of innovative methods for data integration, management, and analysis that could be impactful in fields such as information technology.
Moreover, the opening of PRP@CERIC facilities will foster the setting up of a technology-based environment (PRP@CERIC "Agorà") where the broad range of scientific complementary competences and skills could act as supply side of new knowledge and as effective testbeds of innovative technologies. PRP@CERIC "Agorà" will be developed by establishing and managing, as a part of an overall pro-innovation strategy:
•Demand pull processes to engage with potential industrial partners and clients (Activity 3 and 4)
•Technology push processes to develop functions more commonly linked with technology transfer, such as patent licensing and spin-off creation (Activity 5)
•Scientific and Technological Incubation processes to open opportunities that would otherwise be inaccessible to newco due to prohibitive cost of equipment (Activity 6)
Finally, the development of such an environment could raise PRP@CERIC attractiveness also by creating opportunities for the mobility of researchers to and from science and industry or services.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP10 activities, U.O. Area Padriciano	3	N/A
IP&M Helpdesk set up (ACTIVITY 5)	4	REPORT: IP&M Helpdesk access guidelines

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

set up (ACTIVITY 5)		
PRP@CERIC access policies harmonization (activity 10.1)	6	REPORT: PRP@CERIC access guidelines
Activities of Personnel for WP10 activities, U.O. Area Padriciano_1	6	Six month report on the Personnel activities and associated time-sheets
PRP@CERIC offer definition ("catalogue")	9	- Static (printable) version of the PRP@CERIC Catalogue - Browsable (on-line) PRP@CERIC catalogue
Activities of Personnel for WP10 activities, U.O. Area Padriciano_2	9	Six Month Report on the Personnel activities and associated time-sheets
PRP@CERIC full integration into CERIC-ERIC Offer	12	Printable version of the updated sections "Open Access Offer "and "Labs and Instruments" of CERIC-ERIC website
Call PRP4S3	12	Public notice to support small high-tech enterprises, spin-off and start-up companies publication (Call PRP4S3)
Activities of Personnel for WP10 activities, U.O. Area Padriciano_3	12	Six Month Report on the Personnel activities and associated time-sheets
Entry Portal for Industrial Research explOitation – EPIRO Set Up	13	-Flow Chart of the Entry Portal for Industrial Research explOitation – EPIRO - EPIRO section active on Area Science Park Website
Activities of Personnel for WP10 activities, U.O. Area Padriciano_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Recruitment of Personnel for WP10 activities, U.O. Area Padriciano	3	- Number of signed contracts. The KPI target value is set to 2 at M6
IP&M Helpdesk set up (ACTIVITY 5)	4	IP&M Helpdesk contact channel open related KPI reachable on B15 (N. 15 researchers asking advisory services to the Helpdesk) and ex-post (B15+B12: 50 researchers asking advisory services to the Helpdesk
PRP@CERIC access policies harmonization (activity 10.1)	6	N/A
Activities of Personnel for WP10 activities, U.O. Area Padriciano_1	6	KPI: Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
PRP@CERIC offer definition ("catalogue")	9	Number of access to the online browsable PRP@CERIC catalogue KPI at month30: 1500 (?)
Activities of Personnel for WP10 activities, U.O. Area Padriciano_2	9	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
PRP@CERIC full integration into CERIC-ERIC Offer	12	•Updated "Open Access Offer "and "Labs and Instruments" sections of CERIC-ERIC website •related KPI reachable on B15 (N. 34 access requests to PRP@CERIC coming from CERIC-ERIC channel) and ex-post (B15+B12: N. 237 access requests to PRP@CERIC coming from CERIC-ERIC channel)
Call PRP4S3	12	Call PRP4S3 Publication - related KPI reachable on B15 (N.10 expression of interest)
Activities of Personnel for WP10 activities, U.O. Area Padriciano_3	12	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Entry Portal for Industrial Research explOitation – EPIRO Set Up	13	KPI reachable on B15: N.10 access requests to PRP@CERIC coming from EPIRO ex-post (B15+B12): 34 access requests to PRP@CERIC coming from EPIRO
Activities of Personnel for WP10 activities, U.O. Area	15	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

U.O. Area Padriciano_4		

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP10 activities, U.O. Area Padriciano*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

Recruitment of 2 Technologists (2 Business Development Staff) for 24 months for activities in WP10 (2 FTE)

IO Title *IP&M Helpdesk set up (ACTIVITY 5)*

IO Bimestre *4* IO Costs *0,00*

IO Desciption

The function of the Helpdesk is aimed to raise awareness on technology transfer strategies to exploit PRP@CERIC research results and bring academic inventions to the market. The PaLib Centre of Area Science Park will act as a Helpdesk for all PRP@CERIC partners, providing advisory services to researchers interested to verify the market potential of their products/inventions. Thanks to the Helpdesk, scientists can receive information about patents, patentability requirements and patent filing procedures; managing intellectual property within the partnership avoiding conflicts of interests; ask for prior-art searches on patent documents and information on market potential and applicability of the technologies developed, also in order to identify possible licensees and/or partners for further developments.

IO Title *PRP@CERIC access policies harmonization (activity 10.1)*

IO Bimestre *6* IO Costs *0,00*

IO Desciption

The deliverable gathers together and makes consistent with CERIC-ERIC policies and regulations the regulatory framework of PRP@CERIC Partners, collecting and matching their terms and conditions for access and cost models applied to calculate the operating running costs of the stations by each Partner.
Area Science Park will collect and coordinate the access authorization procedures and usage parameters and operating costs by PRP@CERIC partners, harmonizing them with CERIC-ERIC policies and rules, and, where relevant, applying consistent cost models to single and multi-instrument investigations.
A final unique document gathering all regulatory frameworks will be drawn up: PRP@CERIC access guidelines.

IO Title *Activities of Personnel for WP10 activities, U.O. Area Padriciano_1*

IO Bimestre *6* IO Costs *54.659,88*

IO Desciption

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Technical and Scientific activities of the personnel for the fulfillment of WP10 deliverables.
More specifically: contribution of the new Business Development Staff Unit, which will be inserted in ASP existing IP Management and Research Valorization team, to the deliverables "IP&M Helpdesk access guidelines"; "PRP@CERIC access guidelines" and to others WP10 activities

IO Title	*PRP@CERIC offer definition ("catalogue")*		
IO Bimestre	*9*	IO Costs	*0,00*

IO Desciption

Definition of PRP@CERIC offer for the business world, with the investigation potentiality organized by its possible industrial applications (including case studies), in order to guide and support companies in identifying, choosing and applying for both stand-alone services and multi-technique investigations offered by PRP@CERIC.

IO Title	*Activities of Personnel for WP10 activities, U.O. Area Padriciano_2*		
IO Bimestre	*9*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP10 deliverables.
More specifically: contribution of the new Business Development Staff Units, which will be inserted in ASP existing IP Management and Research Valorization team, to the implementation of PRP@CERIC Catalogue and to others WP10 operating activities

IO Title	*PRP@CERIC full integration into CERIC-ERIC Offer*		
IO Bimestre	*12*	IO Costs	*0,00*

IO Desciption

The objective consists in the integration of PRP@CERIC facilities, stations and instruments into CERIC-ERIC Open Access Offer.

IO Title	*Call PRP4S3*		
IO Bimestre	*12*	IO Costs	*0,00*

IO Desciption

Area Science Park will launch and manage a pilot action to test if PRP@CERIC could act as a Scientific and Technological Incubator, letting newco access to facilities equipped with state-of-the-art scientific instrumentation and services to support them in their early stage of development, making available a whole set of enabling technologies to overcome the well-known barrier of high costs of R&D activities.
To his aim, a public notice for the presentation of expressions of interest to exploit PRP@CERIC facilities for projects finalized to the realization of prototypes, or of the minimum viable product, by small high-tech enterprises, spin-off and start-up companies, will be published.
This pilot action will involve only the PRP@CERIC Partners willing to make available for the initiative quotes of their 60%

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

published.
This pilot action will involve only the PRP@CERIC Partners willing to make available for the initiative quotes of their 60% assigned to institutional and collaborative research, if consistent with their institutional mission.

IO Title	*Activities of Personnel for WP10 activities, U.O. Area Padriciano_3*		
IO Bimestre	*12*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP10 deliverables.
More specifically: contribution of the new Business Development Staff Unit, which will be inserted in ASP existing IP Management and Research Valorization team, to the PRP@CERIC full integration into CERIC-ERIC Open Access Offer and to the Call PRP4S3 drafting and publication and to others WP10 operating activities

IO Title	*Entry Portal for Industrial Research expl0itation – EPIRO Set Up*		
IO Bimestre	*13*	IO Costs	*0,00*

IO Desciption

EPIRO is the PRP@CERIC Entry Portal for Industrial Research expl0itation, specifically dedicated to commercial purposes. The entire process, from first contacts or information requests to the completion of experimental tests is designed to be fully digital. Area Science Park oversees the organization, management and operation of EPIRO, hosting in its website the dedicated section which includes information about EPIRO services and process flow and a searchable database with the available research stations and related expertise organized by industrial application (the "Browsable Catalogue")

IO Title	*Activities of Personnel for WP10 activities, U.O. Area Padriciano_4*		
IO Bimestre	*15*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP10 deliverables.
More specifically: contribution of the new Business Development Staff Unit, which will be inserted in ASP existing IP Management and Research Valorization team, to the EPIRO Set Up and to others WP10 operating activities

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Access Policy Framework Definition

49 Activity short name

10.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	12

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

PRP@CERIC will establish policies and relevant procedures leading to the full usability of its facilities, managing the coexistence of institutional and collaborative research (including training activities and participation to competitive financed projects) of each partner with CERIC-ERIC Open Access Policies and with the industrial demand of services and contract research.
In order to define the overall PRP@CERIC access policies framework, each partner hosting a facility must share its mandatory rules and regulations for access, with particular reference to work safety and biosecurity issues and, if available, other internal rules or guidelines setting aspects like institutional diversified access policies, type of service (e.g. access to the facilities, access to the facilities with technical assistance, experimental services and contract research) and cost and pricing models applied, where relevant.
Furthermore, each PRP@CERIC partner will be asked to calculate the operating running costs of its facilities, in order to evaluate the necessary budget for their long-term sustainability.
The resulting regulatory framework on the one hand has to be consistent with CERIC-ERIC Open Access Procedures, on the other provides the basis on which to build PRP@CERIC commercial offer and pricing strategy.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

provides the basis on which to build PRP@CERIC commercial offer and pricing strategy.
Activity 1 includes the definition of the Infrastructure Management and Monitoring Board (IMMB) operation rules. IMMB, composed by 1 representative of each facility, 1 representative of CERIC-ERIC and the representative of Area Science Park managing EPIRO, will be in charge of scheduling the research activities by the PRP@CERIC facilities prioritizing the demand coming from CERIC-ERIC peer-review open access procedure, and balancing the institutional and collaborative research of each partner with the industrial demand of services and contract research.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: A Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.
The profile will contribute 3 PM month on activity 10.1 from M12 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

2.383,92 €

Cost description: Travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

CERIC-ERIC Open Access Offer Integration

49 Activity short name

10.2

50 Activity Start month and duration

Activity Start month	1	Activity Duration	24

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

CERIC is a European Research Infrastructure Consortium (ERIC) providing open access with a single entry point to leading national research infrastructures in 8 European countries. Each member country contributes to CERIC by making available and supporting high-quality facilities, which are strongly complementary to each other, allowing the integrated use of analytical tools and solutions for research in the fields of energy, health, food, cultural heritage and more.
Access to the facilities is open to researchers from all over the world through the submission of single- or multi-technique proposals and two calls for proposals launched every year. A peer review evaluation system guarantees free access on a competitive basis to the available multi-probe techniques. CERIC-ERIC users are required to publish the results of the experiments with appropriate credit to CERIC facilities and to the local scientific and technical staff involved.
The aim of this Activity is to allow open access to PRP@CERIC facilities through CERIC-ERIC peer-review submission procedure, that will be achieved through:
the integration of CERIC-ERIC Open Access Offer Website with PRP@CERIC Labs and Instruments of the Pathogen Enabling Platform (WP2), Sample Preparation and Characterization Platform (WP3), Integrated Structural Biology Platform (WP4), Multimodal Hyperspectral Imaging Platform (WP5), Multi-functional and Dynamic Platform (WP6), Multi-Omics Platform (WP7) and Interplaying Biolectronic Platform (WP8);
the update of the VUO (Virtual Unified Office) submission system;
the definition of authorship and acknowledgement policy specifically designed for PRP@CERIC instrument usage.
The first task will be coordinated by Area Science organizing the relevant information gathered from scientists of PRP@CERIC facilities, the second task will be done in collaboration with CERIC-ERIC IT team

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: A Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.
The profile will contribute 3 PM month on activity 10.2 from M12 to M30.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

2.383,92 €

Cost description: Travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

EPIRO set up

49 Activity short name

10.3

50 Activity Start month and duration

Activity Start month	1	Activity Duration	30

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

The aim of Activity 3 is setting up the PRP@CERIC Entry Portal for Industrial Research explOitation (EPIRO), comprehensive of a searchable database where facilities and related expertise are organized by industrial application ("Browsable catalogue" – see Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

a searchable database where facilities and related expertise are organized by industrial application ("Browsable catalogue" – see Activity 4).
EPIRO access procedures are implemented digitally on Area Science Park website and linked to all PRP@CERIC partners websites) and consist in the following steps:
Preliminary request (Application) submission. Companies can continuously submit through EPIRO technical problems or innovation needs to be solved;
Liaison. Area Science Park collects the Applications and distributes them to the appropriate PRP@CERIC facilities, coordinating the exploratory meetings aimed at assessing if companies' needs could be addressed. At this stage Area Science Park will provide and ask the parties involved to sign a Non Disclosure Agreement (NDA);
Proposal definition. If the request is feasible, companies and scientists will work together on a detailed experimental working plan, including timing and costs of the required stations (Proposal) to be formally submitted;
Proposal submission with fixed deadlines, in order to let the Infrastructure Management and Monitoring Board (see WP 1) schedule the requested activities according to the agreed proportions of operation (see Activity 1).
Finally, the agreements for services (quotes or contracts) will be signed directly by the Partners involved, according to their internal rules, but anyway Area Science Park, if requested, may coordinate the negotiations and collect all the relevant information (technical and administrative), acting as "one door" for the companies, until the relevant agreements are signed. The contracts will also state case by case the Intellectual Property allocation, that, in general terms, will be assigned to the company for contract research and shared in a manner which adequately reflects the respective contributions for collaborative research.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: A Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.

The profile will contribute 3 PM month on activity 10.3 from M12 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N./A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.5 e. Indirect costs

2.383,92 €

Cost description: Travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Business Development

49 Activity short name

10.4

50 Activity Start month and duration

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

The aim of the Activity 4 is to define PRP@CERIC industrial target in order to establish contacts with potential users. As a matter of fact, the creation of a market-driven access channel doesn't automatically lead to the establishment of collaboration with industries, which need to be built, boosted and consolidated.
To reach this goal it's necessary to start defining the industrial applications of PRP@CERIC facilities (e.g. drug design and drug screening) and then identify within them more specific targets (e.g. companies developing antiviral drugs). This task can be performed by Area Science Park analysts conducting analysis mixing primary (information gathered from scientists) and secondary sources, including patent and business intelligence database and tools (see Activity 5).
The definition of the industrial applications of PRP@CERIC will be also the starting point to build the "Browsable catalogue" available on EPIRO, allowing companies to apply both for stand-alone services (e.g providing access to specific stations) and for a complete value chain of services (e.g. PRP@CERIC acting as a Contract Research Organization for drug discovery).
Furthermore, all these information could also be used to develop a marketing strategy to reach the business targets above identified and make them aware of the scientific and technological offer of PRP@CERIC.
Marketing and Business Development strategy will be implemented using both web channels than direct promotion to companies, and also through Area Science Park affiliation to networks providing support in searching business partners (e.g. international matchmaking events organized by Enterprise Europe Network alongside international trade fairs and conferences).

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.

The profile will contribute 3 PM month on activity 10.4 from M12 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

2.383,92 €

Cost description: Travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Intellectual Property and Market (IP&M) Helpdesk

49 Activity short name

10.5

50 Activity Start month and duration

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Activity Start month	3	Activity Duration	27

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

The PRP@CERIC broad range of expertise could allow to look for solutions to many challenges that health and life sciences are facing today. The relationship between scientific excellence, innovation and Intellectual Property Rights (IPRs) must therefore be addressed in order to assess and exploit PRP@CERIC own research results.
IPRs, especially Patents, play a crucial role in technology transfer, providing a framework to establish rightful relationships with partners capable to bring inventions to the market. To this aim, it's necessary to raise the awareness of PRP@CERIC scientists on how to transform research results into economically viable forms of technology.
Area Science Park PatLib Centre will act as "Helpdesk" within PRP@CERIC, providing information about patents, patentability and filing procedures; verifying the novelty of the results obtained conducting prior-art searches on patent documents and supporting PRP@CERIC IPRs management consistently with the Partners' regulatory framework.
All these activities are functional both to Business Development and Licensing, since searches conducted on patent documents (and on other reliable references, including business intelligence database and tools), as well as providing information about the state-of-the-art of technologies, can identify the relevant players on the market, which are possible PRP@CERIC users, licensees or partners.
In case of licensing, even if the contracts have to be signed by the Patent Applicants, Area Science Park, if requested, may coordinate the negotiations until the relevant agreements are signed.
Moreover, on the basis of the commercial potential highlighted by the abovementioned analysis, it will also be possible to identify the research results eligible to be commercialized via spin-off creation. This path would be further explored whereas scientists are motivated to exploit their inventions through entrepreneurial efforts and accordingly with their own institutions' rules.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: A Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.

The profile will contribute 3 PM month on activity 10.3 from M12 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

2.383,92 €

Cost description: travel

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Pilot action – call PRP4S3 (SMEs, Start Up and Spin Off)

49 Activity short name

10.6

50 Activity Start month and duration

Activity Start month	16	Activity Duration	14

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

One of the key barriers affecting the growth of biopharmaceutical newco are the high costs of R&D activities, including the set-up of labs with scientific equipment, especially in early stages when they face difficulties in accessing financial resources. To this aim, this Activity intends to test if PRP@CERIC could act as a Scientific and Technological Incubator, letting biopharmaceuticals newco access to a whole set of enabling technologies to overcome the well-known barrier of high costs of R&D activities.
A public notice for the presentation of expressions of interest to use the willing to PRP@CERIC facilities for the realization of projects finalized to the realization of prototypes, or of the minimum viable product, by small high-tech enterprises, spin-off and start-up companies will be launched by Area Science Park, customizing the public notice supporting scheme used for its "Fast Track COVID 19" initiative, which granted contributions in kind (e.g. personnel, free access to instrumentation and support services) for the development of research, development and innovation projects aimed at prevention, analysis and response to the epidemiological emergency by its Genomics Platform.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Platform.
This pilot action will involve only the PRP@CERIC Partners willing to make available for the initiative quotes of their 60% assigned to institutional and collaborative research, if consistent with their institutional mission.
The feasibility of the proposals received will be evaluated by a panel including representatives of the facilities involved, while the consequent scheduling of the selected proposal will be fixed by the Infrastructure Management and Monitoring Committee (see WP 1)
This activity is intended to be a first step towards the development of an active technology-based environment (PRP@CERIC "Agorà") leading to long term and stable collaboration with companies, and, also by this mean, to PRP@CERIC long term sustainability.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

34.056,00 €

Cost description: A Fixed Term technologist will be hired total month 12 to help and contribute to all the activities of the WP and in particular to define the industrial applications of PRP@CERIC facilities and identify within them more specific targets;
Develop a strategy to reach the business targets above identified;
Manage direct promotion actions to companies.
The position requires a STEM background, at least 1 year of experience in Project Management or Technology Transfer and standing communication skills.

The profile will contribute 3 PM month on activity 10.3 from M12 to M30

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

2.383,92 €

Cost description: Travel

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP10 - WP10 - User Access and Outreach]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
3	Recruitment of Personnel for WP11 activities, U.O. Area Basovizza	0,00	0,00
3	Activities of Personnel for WP11 activities, U.O. Area Padriciano_0	27.329,94	27.329,94
6	DECOS release 1	0,00	27.329,94
6	Activities of Personnel for WP11 activities, U.O. Area Padriciano_1	54.659,88	81.989,82
9	Activities of Personnel for WP11 activities, U.O. Area Padriciano_2	54.659,88	136.649,70
10	DECOS release 2 and Upgrade of the ORFEO Datacenter	2.030.549,70	2.167.199,40
12	Activities of Personnel for WP11 activities, U.O. Area Padriciano_3	54.659,88	2.221.859,28
14	DECOS release 3	0,00	2.221.859,28
15	Activities of Personnel for WP11 activities, U.O. Area Padriciano_4	54.659,88	2.276.519,16

36 WP title

WP11 - FAIR data approaches and advanced management services

37 WP number

WP11

38 Start month(relative to kick-off of the project) and **duration** (in month)

WP Start	1	WP Duration	29

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park

40 WP Leader

Alberto Cazzaniga (Area campus Padriciano)

41 Summary of the activities envisaged in the WP

This work package, starting from all WPs needs, aims to provide the Digital ECOsystem (DECOS) of Research Infrastructure (RI), for the benefit of all the scientific data management activities. The DECOS will be enabled by the upgrading of the existing ORFEO data centre hosted at the Area campus Basovizza and by a coordinated effort which will involve Operating Units (OUs) within all project's work packages as detailed below.
The overall ecosystem will be created in three different steps (each of them identified by specific activities). Such activities are all supervised by Area Science Park and will involve either the Basovizza or the Padriciano OU.
Activity 11.1 will provide the overall data infrastructure, by expanding consistently the ORFEO data center to provide storage capabilities and software infrastructure needed to deploy basic data services to store and manage all data produced.
Activity 11.2 will define and deploy the so-called interoperable layer that will be made available as on open interface to all upgraded facilities. Relevant guidelines will be provided to all other WPs to easy interact and interoperate with the basic services through the interoperable layer and will offer support to facilities.
Activity 11.3 will design and deploy data sharing services and tools that can be seamlessly interconnected with the European Science Cloud and provide virtual access as well.
The activity sketched above will give all the technical elements for all upgrading activities internally to each WP, to perform the activities specifically required to implement a FAIR-by-design approach on the respective experimental equipment within the updated PRP@CERIC infrastructure.
The process we plan to implement deals with the so-called 'intrinsic metadata' with respect to the 'user-defined' metadata. The former category are the metadata that should be constructed at data capture: in other words, they describe the metadata that is often automatically added to the data by the machine or work-flow that generated the data (e.g., instrument settings, file format, time/date stamps, and other features that are intrinsic to the data). Such metadata can be anticipated by the creator and added to be useful to Find, Access, Interoperate, and thus Reuse, the research object: this is the foreseen FAIR-by design approach we want to implement.
Therefore, FAIR-by-design software and hardware modules will be implemented on the experimental facilities managed by the OU.
Work will be done in strict collaboration with the data management team of Area that provides guidelines and input if needed.
The goals will be reached jointly, step-by-step, in a coordinated effort of all OUs and leaded by Area data management teams.
The steps we envisage go as follows:
-Warm-up
For a full successful outcome, the fundamental starting point is the educational program to train, increasing awareness and knowledge, all the people involved in the projects. In collaboration with WP12, appropriate tools, techniques, and best practices on FAIR data will be prepared and shared during educational events indexed in catalogued libraries. This will set the ground and create a shared language among all involved players, focusing also on Cybersecurity and Data Protection matters.
-First step
FAIRIFICATION processes will be based on identification of WPs needs and goals, under a FAIR point of view.
Data produced by selected installed instruments will be made FAIR-compliant, at least partially, to design one "draft metadata schema" for selected specific technique.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

for selected specific technique.
The outcome a collection of datasets and correlated metadata, associated with experimental techniques and their foreseen upgraded implementation.
-Second step:
OU's FAIR-by-design approach will be implemented. This means defining software procedures and, where needed, setting-up hardware tools on top of the upgraded experimental infrastructure to collect directly from the sources the metadata previously identified at step one and make them available automatically.
The ecosystem will allow users to have full access to mentioned set of data and metadata.
A set of controllers on the top will be deployed to have effective data protection designed and integrated into the processing of personal data, with appropriate default settings, in a Data Protection-by-design and by-default optic.
-Third step
Data and metadata collected from different facilities will be made interoperable among all OUs, to interact seamlessly with the data infrastructure available and fully satisfy FAIR principles.
-Fourth Step
To complete the WP, a series of "advanced services" for FAIR-data will be made available to the community and external users using the sharing platform and thus proving virtual access.
The activities aim to share FAIR data along with ad hoc and tailored services on specific techniques.
Further development will provide interoperability across scientific communities compliant with European Open Science Cloud (EOSC) pillars which are:
1.seamless access;
2.FAIR (Findability, Accessibility, Interoperability and Reusability) management;
3.reliable reuse of research data and all other digital objects produced along the research life cycle.
WP11 will therefore contribute to remove any barrier in the data sharing coming from all the upgraded platforms within the PRP@CERIC intervention and a wider scientific community.

Services to overcome such barrier range from the simplest ones to very sophisticated ones. Among the simplest we cite, for instance, easyDMP which is a PRP@CERIC-tailored version of the Area Data Management Plan (DMP) service. This will allow users to describe the handling of data both during the research project performed on the PRP@CERIC platform and after its completion. The DMP tool will be developed keeping in mind all the DECOS services exposed and presenting the easy and most natural way to interact with them.
On the opposite lies the MLOPs service, that includes a platform where to develop, calibrate and then validate ML algorithms on different collected datasets, to be accessed on DECOS in a transparent and easy way. Moreover, the service will favor its deployment on scientific instruments in a seamless way.

42 WP inter-relation with other WWPP

All WPs

43 Most relevant outcome:

To enable a full digital approach of the upgraded infrastructure a suitable data infrastructure is required, capable of facilitating efficient collection, data description in terms of metadata, and data sharing. The ambitious outcome of the WP will be a platform that frames, in a complete and distributed data ecosystem, the operations of PRP@CERIC upgraded RI.
The ecosystem will be an organic compound of three main pillars: the hardware, that provides the infrastructure, the software, that integrates many different services, and the so-called "brainware" component, i.e., the human resources that contribute to the development and deployment of the ecosystem and provide support to the research community.
DECOS will connect locally all the interoperable services towards all the PRP@CERIC experimental facilities, to implement a FAIR-by-design data collection.
DECOS software components are designed to be flexible, interoperable, modular, and easy to combine, to

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

DECOS software components are designed to be flexible, interoperable, modular, and easy to combine, to guarantee appropriate and easy to set up interfaces for the upgraded instruments and newly acquired experimental stations, during the project and beyond.
The external users will benefit also of a DECOS set of advanced data services to easily access and reuse all the data produced, including data provenance schema and metadata-specific schemas that will be defined in collaboration with PRP@CERIC implementation community. In addition, it will be possible to create DOIs for FAIR datasets.
The collection of a wide spectrum of metadata across the PRP@CERIC experimental stations will give the opportunity to construct powerful abstractions and will be the basis to creating new strategies for data-driven discovery.
Therefore, besides the existing text-based search, approaches for visual content exploitation as well as for visual search and discoverability of data assets will be evaluated and realized according to their applicability and feasibility for the user. The DECOS will further be fully compatible, interoperable, and linked to EOSC infrastructure, ensuring machine-readable policies and transparency, intervenability and user control tools.
To implement DECOS several important assets will be acquired:
The expansion of the ORFEO data center will be performed within activity 11.1. It will feature a significant amount of the storage component, especially on the long-term storage partition: this one will be built to be further enlarged when needed and easily upgraded and renovated in a few years, to guarantee operability of the storage services over the whole period of the operation of the RI. ORFEO will be also upgraded in its cloud/kubernetes partition to enlarge the software infrastructure needed to host all the advanced data services needed to the development of DECOS. The upgrade also involves the network components that will be enhanced to allow at least 10Gbit internal network among ORFEO data center and all the PRP@CERIC upgraded facilities within and among the campuses of Basovizza and Padriciano. Finally, the upgrade will also comprise the three separate HPC components to meet the needs of the activities of WP9, discussed iin that work package. All the internal components of the facility will be connected to the existing ones through an extension/integration of the InfiniBand network. The setup of the high-speed connectivity infrastructure within and across the Area campus paves the way to enable the distributed DECOS at a wider level.
The main investment, beside the HW, must be done on the human capital on three distinct actions:
1. an important training activity to raise the FAIR data approach among all scientists participating to the project by general and specific training events;
2. an enrollment action of several data-related profiles able to contribute, build, maintain and further develop the DECOS;
3. a broad range of training activities that promotes academic scientific curricula involved in the RI with modern scientific data management procedures.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Recruitment of Personnel for WP11 activities, U.O. Area Basovizza	3	N/A
Activities of Personnel for WP11 activities, U.O. Area Padriciano_0	3	six Month Report on the Personnel activities and associated time-sheets

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Padriciano_0		
DECOS release 1	6	Report on the Act. 11.1 a working status focused on DECOS release 1
Activities of Personnel for WP11 activities, U.O. Area Padriciano_1	6	Six month Report on the Personnel activities and associated time-sheets
Activities of Personnel for WP11 activities, U.O. Area Padriciano_2	9	Six month report on the Personnel activities and associated time-sheets
DECOS release 2 and Upgrade of the ORFEO Datacenter	10	Report on the Act. 11.2 working status focused on ORFEO upgrade and DECOS release 2
Activities of Personnel for WP11 activities, U.O. Area Padriciano_3	12	Six month Report on the Personnel activities and associated time-sheets
DECOS release 3	14	Report on the Act. 11.3 working status focused DECOS release 3
Activities of Personnel for WP11 activities, U.O. Area Padriciano_4	15	Final Report on the Personnel activities and associated time-sheets

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Recruitment of Personnel for WP11 activities, U.O. Area Basovizza	3	1-Number of signed contracts. The KPI target value is set to 2 at M6
Activities of Personnel for WP11 activities, U.O. Area Padriciano_0	3	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

DECOS release 1	6	- Number of data services available: KPI set to 2 (easydmp / datashare) - Training PRP@CERIC community on FAIR and Open data to be used in the RI: online meetings: 6 and 50 scientists as audience
Activities of Personnel for WP11 activities, U.O. Area Padriciano_1	6	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
Activities of Personnel for WP11 activities, U.O. Area Padriciano_2	9	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
DECOS release 2 and Upgrade of the ORFEO Datacenter	10	1- Number of cores obtained by the expansion: KPI > 1500 2- Increased capacity of storage : > 30% 3.- Number of data services available: 2
Activities of Personnel for WP11 activities, U.O. Area Padriciano_3	12	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO
DECOS release 3	14	1- Number of data services available: 4 2- Metadata schema for the experimental techniques identified: 5 FAIR-by-design local implementation completed on the instruments available at PRP@CERIC: 50%
Activities of Personnel for WP11 activities, U.O. Area Padriciano_4	15	Achievement of the technical and scientific competences according to the identified scientific responsible. KPI: YES/NO

46 WP Intermediate Objectives:

IO Title *Recruitment of Personnel for WP11 activities, U.O. Area Basovizza*

IO Bimestre *3* IO Costs *0,00*

IO Desciption

Recruitment of 2 Technologists (1 for 30 month and the other for 24 months for activity 11.1/2/3

IO Title *Activities of Personnel for WP11 activities, U.O. Area Padriciano_0*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*3*	IO Costs	*27.329,94*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP11 deliverables in particular activity 11.1

IO Title	*DECOS release 1*

IO Bimestre	*6*	IO Costs	*0,00*

IO Desciption

The first DECOS release will expose a first set of basic services on top of the existing ORFEO infrastructure. This is intended to be the core data infrastructure offering software data services (deployed on a Kubernetes Cluster to guarantee stability and redundancy) able to store and manage scientific data. Its usability is likely to be limited for non-experienced users.
This release will provide a first version of easyDMP, which is (i) a tool that allows to create custom data management plans and (ii) an editor for scientists, experimental station owners and deployers to create their metadata schema, useful to reduce the burden of implementing by themselves a FAIR-by-design approach.

IO Title	*Activities of Personnel for WP11 activities, U.O. Area Padriciano_1*

IO Bimestre	*6*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP11 deliverables.
More specifically: six month of a data engineering on activity 11.1 and six month of a data engineering on activity 11.2

IO Title	*Activities of Personnel for WP11 activities, U.O. Area Padriciano_2*

IO Bimestre	*9*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP11 deliverables.
More specifically: 2 data engineers on activity 11.2

IO Title	*DECOS release 2 and Upgrade of the ORFEO Datacenter*

IO Bimestre	*10*	IO Costs	*2.030.549,70*

IO Desciption

The existing Area Science Park infrastructure, ORFEO data center will be extended and DECOS second release will be operational.
The DECOS second release will provide the so-called interoperable layer, connecting experimental stations located at different

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

operational.
The DECOS second release will provide the so-called interoperable layer, connecting experimental stations located at different Operating Units. Such layer will expose an easy-to-use open interface to link software protocols and programs for data collection and management - developed within the OU - to the DECOS ecosystem, thus implementing the FAIR-by-design approach discussed above.
The interoperable layer will take care of data ingestion and wrangling (as much as possible in an automatic way) and will enforce light sanitization and uniformity of the source data, to support universally acknowledged policies, such as for example (i) usage of canonical data representations for certain sources and, (ii) monitoring the inbound data flow for completeness, consistency, and accuracy.
DECOS will also expose, in its second release, a search engine that harvests and index metadata available on DECOS and/or on compatible data repositories, providing a search interface. From this phase on, it will be also possible to progressively enrich the "standard" metadata with sophisticated metadata created with AI-techniques provided by WP9. An example would be, e.g., for images, a set of labels created by clustering techniques on low-dimensional embeddings, which are semantically more meaningful than raw data and can be used for advanced search

IO Title	*Activities of Personnel for WP11 activities, U.O. Area Padriciano_3*		
IO Bimestre	*12*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP11 deliverables.
More specifically: 2 data engineers on activity 11.3

IO Title	*DECOS release 3*		
IO Bimestre	*14*	IO Costs	*0,00*

IO Desciption

The DECOS third release comprises the updated version of all services installed before and provides the final form of the digital ecosystem. This release integrates the components that allow users to transparently use the AI and simulation-augmented data ecosystem developed in WP9 and can offer some of such services, developed for specific experimental stations, as virtual access for the interested users.

IO Title	*Activities of Personnel for WP11 activities, U.O. Area Padriciano_4*		
IO Bimestre	*15*	IO Costs	*54.659,88*

IO Desciption

Technical and Scientific activities of the personnel for the fulfillment of WP11 deliverables.
More specifically: 2 data engineers on activity 11.3

47 WP budget description

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Scientific instrumentation and technological equipment, software licenses and patent

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description: N/A

48 Activity title

Setup of the first release of PRP@CERIC DECOS

49 Activity short name

11.1

50 Activity Start month and duration

Activity Start month	1	Activity Duration	12

51 OU in charge of the Activity

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 11.1 aims at setup the data infrastructure and the associated data services, the so-called PRP@CERIC DECOS that will be made available to PRP@CERIC macro-platform and facility. This will be established within the ORFEO data center at Area Science Park by means of a storage and hardware expansion as detailed in the budget. The hardware expansion needs to be integrated by several software services that will be developed, tested, and validated on the existing infrastructure and then deployed once the hardware expansion has been installed.
Hardware definition and tender release:
In the first phase of the activity, requirements of the general architecture and hardware components of the expansion will be gathered and compared with the market best match alternatives in terms of performance, flexibility, and integration.
This action will be performed in the first bimester (B1) to be able to release the tender within second bimester (B2).
Hardware installation and configuration:
This phase integrates the expansion of hardware components on the ORFEO data center and relevant software configurations to run services, setting storage infrastructures and related software layers (B10).
Data services developed and deployed:
Once data services will be developed, tested, and validated, last phase consists of deployment of the first release of the PRP@CERIC DECOS on the storage infrastructure. This will start from M4 and plans to be concluded by M12.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

51.084,00 €

Cost description: Two fixed time development scientists. The profile is a data engineer with a sound competence in the field of software engineering, high performance computing, development of data services and data-centric-AI and MLOP.
Profile 1 will work full time from M1 to M12 on activity 11.1

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

1.897.710,00 €

Cost description: The existing Area Science Park infrastructure, ORFEO data centre will be extended with the following equipment:
Expansion of the storage capabilities in both the parallel CEPH component and the long term storage with a possible net increase of about one petabyte row
Expansion with the doubling of the number of nodes for the cloud/kubernetes infrastructure
Upgrade of connectivity infrastructures on Area Campuses (switches/ routers) to provide 10Gbit connection and possible 100Gbit link between ORFEO datacenter and Elettra ones
Upgrade of the three HPC partitions: partition 1 with an estimate of about 1500 core of two socket HPC server with at least 48 cores each and no less that 512GB RAM. Partition 2 with two socket server each of them equipped with two last generation GPUs at least 255GB RAM.Partition 3: at least two 8 GPU multicore servers for intensive AI applications
Acquiring an additional container to host the new equipment.
Expanding the internal 25Gbit network infrastructure and the 100Gbit one to have all the server connected at the same speed.

54.3 c. Open Access, Transnational Access, FAIR principle implementation

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

136.415,58 €

Cost description: Indirect cost will be used for :
Management, running and access costs of the facility,
maintenance, discrepancy between standard and tabulated costs for personnel, travel, Tender related expenses.

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

Interoperable layer. Second release of PRP@CERIC DECO6

49 Activity short name

11.2

50 Activity Start month and duration

Activity Start month	6	Activity Duration	12

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

Activity 11.2 involves all the actions required to the establishment of the "interoperable layer" as a fundamental tool for all the OU to interact with the PRP@CERIC DECOS. The different actions are listed below and can start at M6, once the first set of data services has been deployed at least on the original ORFEO data infrastructure.
Collection of specific MetaData schema
In this phase, identified as FAIRification, data produced by already present instruments will be made fair- compliant, at least partially, to identify and sketch a first metadata schema for each specific technique. The outcome of this first phase is to obtain several examples of data and metadata associated to several experimental techniques and their foreseen upgraded implementation and will be conducted in

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

data and metadata associated to several experimental techniques and their foreseen upgraded implementation and will be conducted in strict cooperation with operating units implementing new stations and or facilities.
Design of the interoperable layer:
The interoperable layer will be designed by collecting requirements from all OUs and the basic services. It will be then developed by means of a modular approach that allows an easy integration of further modules once new instruments will be added at later stage on the whole infrastructure
Deployment and validation of the layer:
This phase deploys the interoperable layer and the first set of modules that make interoperable the already available instruments and the first set of the upgraded ones.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

76.626,00 €

Cost description: Two fixed time development scientists. The profile is a data engineer with a sound competence in the field of software engineering, high performance computing, development of data services and data-centric-AI and MLOP.
Profile 1 will work full time from M12 to M18 on 11.2
Profile 2 will work full time from M6 to M18 on 11.2

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

5.363,82 €

Cost description: travel expenses

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

48 Activity title

Advanced services for sharing FAIR data and software and virtual access. Third release of PRP@CERIC

49 Activity short name

11.3

50 Activity Start month and duration

Activity Start month	18	Activity Duration	12

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

52 Activity description

The activity will contribute to the third release of DECOS at month 28. DECOS will include all data services and modules developed in collaboration with WP9. The goals are the following:
Provide an interoperable metadata catalogue to browse data collections and provide easy search- and-access mechanisms.
Provide repositories to keep track of software packages developed and made available in the project, for correct management of data provenance, not only at experimental stations, but also at different processing stages. Consequently, the repository will contain, besides metadata schema, the AI-based software, with references to the training datasets obtained in WP9 and made available on DECOS.
Enable advanced data services strictly connected to the already stored scientific data resources on the DECOS shared storage infrastructure. DECOS in its third version will expose virtual access services that can be classified in two broad categories:
Data Services developed within specific, well defined experimental/computational techniques, beneficial for users of such technique.
Data Services developed at more general level thought to address the need of specific class of scientific data, i.e., images, 3D archives and so on

DECOS services will be available to scientific users immediately and without any need of data transfer and/or uploading/downloading heavy data set.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

102.168,00 €

Cost description: Two fixed time development scientists. The profile is a data engineer with a sound competence in the field of software engineering, high performance computing, development of data services and data-centric-AI and MLOP.
Profile 1 will work full time from M18 to M30 on 11.3 Profile 2 will work full time from M18 to M30 on 11.3

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP11 - WP11 - FAIR data approaches and advanced management services]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

7.151,76 €

Cost description: Travel expenses

54.6 f. Training activities

0,00 €

Cost description: N/A

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

33 Timing of the different work packages: See documents uploaded

34 WP inter-relation with other WPs: See documents uploaded

35 Costs Scheduling according with the Intermediate Objectives:

Bimester	Title	Costs	**Cumulative Costs**
7	Coordination of the dissemination actions for the recruitment phase for Maestro training progtsm	21.400,00	21.400,00
10	Common Module1@Area Science Park	288.900,00	310.300,00
11	Schools at University of Salerno (DIFARMA, Area SUD and DIEM)	0,00	310.300,00
12	School at University of Salento	0,00	310.300,00
13	School at CNR: spectroscopy and microscopy in biology.	0,00	310.300,00
14	School at University of Naples Federico II: "Bioelectronics and Biodevices"	0,00	310.300,00
15	MAESTRO final workshop	10.700,00	321.000,00
15	Module2@UniSalerno: Training course at the University of Salerno at DIFARMA.	321.000,00	642.000,00
15	Module2@Area: Training course at Area Science Park	0,00	642.000,00
15	Module2@UniSalento: Training course at the University of Salento	321.000,00	963.000,00
15	Module2@CNR: Training course at CNR	321.000,00	1.284.000,00
15	Module2@UniNA: Training course of the Bioelectronics Task Force of University of Naples Federico II	321.000,00	1.605.000,00

36 WP title

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

WP12 - Training and Education

37 WP number

WP12

38 Start month(relative to kick-off of the project) and duration (in month)

WP Start	3	WP Duration	28

39 OU(s) participating to the WP

OU Short Name	OU Name	Applicant
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park
Basovizza	Area campus Basovizza	APPLICANT: Area Science Park
DIFARMA	Department of Pharmacy (DIFARMA)	CO-APPLICANT: Università degli Studi di Salerno
UniSalento	Department of Mathematics and Physics "Ennio De Giorgi"	CO-APPLICANT: Università degli Studi del Salento
CNR-IOM	Istituto Officina dei Materiali del CNR	CO-APPLICANT: Consiglio Nazionale per le Ricerche
UniNapoli	Bioelectronics Task Force at University of Naples Federico II	CO-APPLICANT: Università degli Studi di Napoli Federico II
Padriciano	Area campus Padriciano	APPLICANT: Area Science Park

40 WP Leader

Gianluca Quarta (UniSalento)

41 Summary of the activities envisaged in the WP

WP12 major focus is on the organization of the master course "MAstEr training on reSearch InfrasTRucture Offer", MAESTRO from here on, which proposes an original and ambitious training and education model aiming to answer the unmet needs of hands-on knowledge of RI, expressed by the new generation of graduated students, from both the user and the RI scientist perspectives. The project's partners agreed to invest on the implementation of fifteen months training course addressed to graduate students interested in developing their scientific carrier as RI scientific staff or to improve basic knowledge as an external user from both academic and industrial sectors. This education and training action is propaedeutic to prepare a new EU generation of scientists that have intimate knowledge of the opportunities offered by RIs, and CERIC-ERIC specifically, in excellent research, innovative technologies, management and career opportunities. Having a direct knowledge can better guide the future choices and can be spent in both academic and industrial sectors, for example adhering to academic or industrial PhD programs built in tight synergies with RIs. Each partner of PRP@CERIC can boast PhD programs and/or actions to support PhD programs, and CERIC-ERIC as well: in 2020, CERIC launched a call for PhD grants in collaboration with the CERIC Partner Facilities and ten universities in Austria, the Czech Republic, Italy, Romania and Slovenia. Among the fourteen selected candidates, seven of them are carrying out their research within the CERIC internal project INTEGRA – The first step to enhance CERIC's life science capabilities (https://www.ceric-eric.eu/2020/10/21/integra-the-first-step-to-enhance-cerics-life-science-capabilities/). Five of them already perform their activities at Elettra facility, at the

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

step-to-enhance-cerics-life-science-capabilities/). Five of them already perform their activities at Elettra facility, at the beamlines/laboratories involved in the PRP@CERIC upgrade.
Nevertheless, finding candidates with the sufficient level of maturity for fully profiting from the valuable interconnected network that a RI proposes, and PRP@CERIC further strengthen, is challenging, especially for forefront scientific topics at the intersection of many disciplines.
On one end, the access to a RI, as a user, requires a fair knowledge of advantages and disadvantages of every technology offered by different RI platforms. On the other end, from the perspective of the RI scientist, the understanding of the needs of the users is necessary, which can be achieved by an active interfacing with the user in order to plan, develop, optimize and run the RI instrumental stations in the most profitable way, providing support in data analysis. This "knowledge and language" gap is still open and needs to be filled.
MAESTRO will offer high-end scientific training in a comprehensive multidisciplinary environment, where life science scientific competences are tightly interconnected with cutting-edge technological solutions, and will provide to the students the robust decision-making basis for developing their scientific carrier as RI users or RI scientist, scientific profiles that both will grow in number and relevance in the next decades. MAESTRO ambition is to position at international level and to provide the students with a basic common scientific background and more specialized technical/hands-on skills on the PRP@CERIC project pillars, contributing to the long-term sustainability of PRP@CERIC ecosystem in terms of both user-base and operation.
MAESTRO will be dedicated to the education and training of 25 graduated students to which a fellowship will be awarded. Each of the five project partners will participate with its OUs to WP12, while the selection of the candidates will be organized through just one OU per partner, and specifically Area campus Padriciano, CNR-IOM, UniSalerno, UniSalento and UniNapoli (See Activities 2-6 for more details). Italian and foreign graduate students with different background including Physics, Mathematics, Chemistry, Pharmacy, Biology, Engineering, Computer science, Environmental sciences and Medicine will be eligible. The calls, opened by the different OUs, will be advertised in a coordinated way by Area Science Park (activity 12.1). The committees will carry on the candidate's selection based on submitted CVs and motivation letters for attending MAESTRO, followed by an interview held in English, the official language of the master. The fellowship award (5 fellows for each recruiting OU) will be based on merit, skills and interests of the candidates and will be guided by gender equality principles.
MAESTRO will be organized according to the following scheme:
1-All students will attend a first, common-to-all, education 3-months module (Module 1- Activity 12.2), organized and held at the Trieste node, OU Area Campus Padriciano. The aim of this first module is to provide all the selected students with basic knowledge and a common background on the transversal concepts expressed by PRP@CERIC: what's an RI? How does it operate? How can you access it (open access and proprietary access)? How should my data be managed and how can I extract useful information from them? Safety procedures and many others. The specific focus will be on PRP@CERIC, on the ambition of the project, on the platforms and macro-platforms enabled to pathogen research. Courses will be co-taught by all the partners, for the specific area of competence, and external teachers as well. The common module, to be attended in presence if allowed by the regulations, will also provide the opportunity for direct interaction and knowledge sharing among the participants. Module 1 will be an intensive 3-months module.
2-According to the OUs offer, each of the 5 groups of 5 fellows will be trained-on-the-job for 12 months at the facilities of the project partners (Module 2). Module 2 of MAESTRO will have the specific focus described in Activities 12.3-12.7, with more specialized classes and extensive practical trainings on specific scientific aspects and instrumental facilities of PRP@CERIC platforms.
3-In order to keep transversal-interest and multidisciplinary, as in the spirit of PRP@CERIC, a common multidisciplinary preparation is ensured by the attendance of the students to dedicated seminars and to 5 thematic schools organized by the PRP@CERIC network, each at the site of the project partners. Courses and seminars will be given by researchers involved in the different project activities as well as by leading scientists and experts in the different fields.
4-At the end of the training-on-the-job module, each student will be asked to prepare a report on her/his activities, which will be then evaluated by each of the five OUs. A joint workshop (activity 12.8) will be then organized at the Trieste node, during which each fellow will present, in the form of a short seminar, the activities carried out during her/his training. During the conclusive WS a ceremony for the awarding of the master attendance certificates is organized. This final WS will be also an effective way to disseminate the outcome of MAESTRO and PRP@CERIC as well.

42 WP inter-relation with other WWPP

All WPs

43 Most relevant outcome:

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

The main expected outcome of the WP12 activity is to set the qualification requirements and the methodology for the education of a new scientist profile, that is one able to fully profit from the RI capabilities, both as a user and a RI scientist. The complexity, the dimension and the running costs of modern equipment encourage the adoption of a sharing policy and the creation of open access infrastructures. This approach, first implemented in particle physics at CERN in 1954, was then extended to material science with neutron accelerators and synchrotrons, and starting from 2002, with the European decision of establishing ESFRI, is successfully implemented in life sciences areas like molecular biology and pharmaceutical research. The ultimate challenge is to create strong synergies between different scientific areas for developing truly multidisciplinary platforms where the out-of-context use of instruments and technical resources can facilitate finding the answer to complex scientific problems. In PRP@CERIC, traditional techniques of biotechnology and molecular biology research will be coupled to advanced facilities like CryoEM and synchrotron beamlines, both of the structural and hyperspectral imaging domains, where the access and easier exploitation of the RI will be facilitated by the digital framing of the resources.
With about 50 RIs being part of the European landscape drawn by ESFRI and CERIC-ERIC one of the three with the hub in Italy, the need for experienced RI users and RI scientists is steadily growing. A RI scientist is required to have a solid knowledge of facility instrumentation, the ability to set and carry on a new experiment from scratch, to acquire and to interpret the data. This, unavoidably, requires his/her involvement also in the scientific aspects of the experiments and therefore the ability to establish good communication with the user. On the other hand, a user with a fair knowledge of the instrumentation capabilities and able to translate his/her scientific request into technological and instrumental demand would greatly support the RI scientists. Clearly, the efforts must be mutual and synergic and to achieve the goal both figures must be trained.
MAESTRO aims at exactly that. Not all the students will choose this career, but for those who accept the challenge, a new world of opportunities will open.
We plan to provide an extensive hands-on training to young, graduated students on the research and work at a RI and in particular on the topics and the equipment that characterize PRP@CERIC-ERIC. The selected students will have the unique possibility to follow a dedicated training period as well as all the different phases of the installation of the acquired instruments, the setting-up of the different experimental platforms, their scientific commissioning. This training will represent a solid investment for the CERIC-ERIC long term sustainability, if a significant percentage of the enrolled students decide to continue in this career, and will also generate a knowledge kit useful for academic courses.

44 List of WP deliverables that will be available according with the timing set by the Intermediate Objectives:

Title	Bimester	Deliverables
Coordination of the dissemination actions for the recruitment phase for Maestro training progtsm	7	Report on the Act. 12.1 working status focused the dissemination activity for MAESTRO program and the recruitment process. It includes a list of students selected.
Common Module1@Area Science Park	10	Report on the Act. 12.2 working status focused on the common training activity of module 1
Schools at University of Salerno (DIFARMA, Area SUD and	11	Report on the Act. 12.4 focused on the outcome the schools

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

(DIFARMA, Area SUD and DIEM)		
School at University of Salento	12	Report on the Act. 12.5 focused on the outcome the school
School at CNR: spectroscopy and microscopy in biology.	13	Report on the Act. 12.6 focused on the outcome the school at CNR
School at University of Naples Federico II: "Bioelectronics and Biodevices"	14	Report on the Act. 12.7 focused on the outcome the school
MAESTRO final workshop	15	Number of MAESTRO fellows who attended the final workshop KPI >23 Number of talks presented by the students attending the workshop KPI > 23
Module2@UniSalerno: Training course at the University of Salerno at DIFARMA.	15	Report on the Act. 12.4 focused on the outcome the training activity
Module2@Area: Training course at Area Science Park	15	Report on the Act. 12.3 focused on the outcome of the training activity.
Module2@UniSalento: Training course at the University of Salento	15	Report on the Act. 12.5 focused on the outcome the training activity
Module2@CNR: Training course at CNR	15	Report on the Act. 12.6 focused on the outcome the training activity at CNR
Module2@UniNA: Training course of the Bioelectronics Task Force of University of Naples Federico II	15	Report on the Act. 12.7 focused on the outcome the training activity at UniNA

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

45 Objective, quantitative, and measurable indicators relevant to the monitoring and ex-post assessment of the expected results:

Title	Bimester	Objective, quantitative, and measurable indicators
Coordination of the dissemination actions for the recruitment phase for Maestro training progtsm	7	Number of presented applications. The KPI target value is set to >35 Number of selected students. The KPI target value is set to >20
Common Module1@Area Science Park	10	1.Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers The KPI target value is set to > 23
Schools at University of Salerno (DIFARMA, Area SUD and DIEM)	11	Number of MAESTRO fellows who attended the schools: KPI >20
School at University of Salento	12	Number of MAESTRO fellows who attended the schools: KPI >20
School at CNR: spectroscopy and microscopy in biology.	13	Number of MAESTRO fellows who attended the schools: KPI >20
School at University of Naples Federico II: "Bioelectronics and Biodevices"	14	Number of MAESTRO fellows who attended the schools: KPI >20
MAESTRO final workshop	15	Number of MAESTRO fellows who attended the final workshop KPI >23 Number of talks presented by the students attending the workshop KPI > 23
Module2@UniSalerno: Training course at the University of Salerno at DIFARMA.	15	1. Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Salerno at DIFARMA.		by module teachers The KPI target value is set to > 23
Module2@Area: Training course at Area Science Park	15	1. Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers The KPI target value is set to > 23
Module2@UniSalento: Training course at the University of Salento	15	1. Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers The KPI target value is set to > 23
Module2@CNR: Training course at CNR	15	1. Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers The KPI target value is set to > 23
Module2@UniNA: Training course of the Bioelectronics Task Force of University of Naples Federico II	15	1. Number of fellows who attended more than 90% of the lectures The KPI target value is set to > 23 2. Number of successful reports prepared by the students and positively evaluated by module teachers The KPI target value is set to > 23

46 WP Intermediate Objectives:

IO Title *Coordination of the dissemination actions for the recruitment phase for Maestro training progtsm*

IO Bimestre *7* IO Costs *21.400,00*

IO Desciption

Activity 12.1 will address coordination of the dissemination of the calls for fellowships, and of recruitment process carried out by the participating partners (Activity 12.2-12.7). Delivery 12.1 is the awareness of the fellowships by the partners (5 each) at M9 and to have completed the selection procedure by month 16 (september 2023).

IO Title *Common Module1@Area Science Park*

IO Bimestre *10* IO Costs *288.900,00*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*10*	IO Costs	*288.900,00*

IO Desciption

Activity 12.2 will deliver the first theoretical-practical module, that is foreseen to start at M14.
The module is organized by Area and it is common to all the fellows. It addresses the most relevant aspect of the PRP@CERIC digital ecosystem in CERIC-ERIC. The details are in the description of Activity 12.2.

IO Title	*Schools at University of Salerno (DIFARMA, Area SUD and DIEM)*

IO Bimestre	*11*	IO Costs	*0,00*

IO Desciption

The first 5-days school for all MAESTRO students will be organized at the DIFARMA department of UniSalerno on "Modern Mass spectrometry and NGS in Multi-omics". The main topics of the school will be focused on: Mass spectrometry and NGS and single cell basics, MS and NGS in multi-omics, when and how, Role of chemometrics and multi-omics data analysis.
Just after, a second 5-days school will be organized by the DIEM department at UniSalerno on "Using GPU computing infrastructure for image based omic data analysis", with the aim of introducing the students to define, configure, deploy, test and validate deep learning models. The student will receive a dataset and a specific task, and they must define, train and validate the deep network for solving the task.

IO Title	*School at University of Salento*

IO Bimestre	*12*	IO Costs	*0,00*

IO Desciption

A one-week school for all MAESTRO students is organized at the University of Salento on "Electron microscopy and complementary techniques for biological systems". The school, set across five days from Monday to Friday, will provide students with a mix oflectures, case discussions, practical sessions and live microscope and sample preparation demonstration sessions.

IO Title	*School at CNR: spectroscopy and microscopy in biology.*

IO Bimestre	*13*	IO Costs	*0,00*

IO Desciption

A one-week workshop for all MAESTRO students is organized by CNR on spectroscopy and microscopy in biology. The workshop, set across five days from Monday to Friday, will be organized in 5 morning session, with lectures provided by the international leaders in the field and afternoon session with students oral presentation and posters and an open space for discussion and exchange promoted around round tables. Each day will deal with a specific aspect of protein science: i) structure determination A - EM; ii) structure determination B – XRD; iii) vibrational spectroscopy; iv) molecular dynamics; v) scanning probe microscopy,

IO Title	*School at University of Naples Federico II: "Bioelectronics and Biodevices"*

IO Bimestre	*14*	IO Costs	*0,00*

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Bimestre	*14*	IO Costs	*0,00*

IO Desciption

A 5-days school will be organized by the Bioelectronics Task Force at the University of Naples Federico II. The training aims at preparing the students to approach design, characterization and deployment of biosensors and biodevices, from material analysis to biointerfaces characterization and device read-out. The lessons will cover theoretical and experimental frameworks of bioelectronics, biosensors design and characterization, electronics read-out. The school will provide the students with the foundations to bridge the gap between biology/bio-tech aspects of the research, electrical signal formation and transmission and eventually the read- out with low-noise electronics.

IO Title	*MAESTRO final workshop*		
IO Bimestre	*15*	IO Costs	*10.700,00*

IO Desciption

A conclusive 3-days workshop will be organized by Area Science Park in Trieste. The aim of the workshop is to present the outcomes of MAESTRO, allowing fellows to share the acquired experience and expertise. During the workshop each fellow will present in a talk the project carried out during the training in one of the OUs. A ceremony for the delivery of the attendance certificate will also be organized.

IO Title	*Module2@UniSalerno: Training course at the University of Salerno at DIFARMA.*		
IO Bimestre	*15*	IO Costs	*321.000,00*

IO Desciption

A one-year training course will be organized at the DIFARMA department of the University of Salerno for five students. The course will be divided into three different modules, comprising basic and advanced theoretical lessons and practical (hands-on) sessions, the last hosted in the Bio Open Lab-MS facility and Multi-omics-NGS facility at Area SUD. The course topic will be focused in the application of Mass spectrometry-based multi- omics in the biomedical, clinical and pharmaceutical fields. A dedicated focus on multi-omics NGS-based assays and analysis of related multi-omic data will be held between Bio open lab-MS and Area SUD-NGS facilities.

IO Title	*Module2@Area: Training course at Area Science Park*		
IO Bimestre	*15*	IO Costs	*0,00*

IO Desciption

Area will organize a 1-year training course for 5 students exploiting the labs, services and infrastructures available at both Padriciano and Basovizza campus, namely the LAGE lab, Elettra/FERMI and the ICGEB. Training activities will comprise theoretical lectures, given by experts in the field and experienced on-site researchers. The hands-on training programme envisages the selection of 5 case studies, which can be tackled by a combination of experimental techniques available on-site (Elettra facility, LAGE facility and ICGEB facility). Fellows will learn how to design an optimised experiment, how to carry it out and how to analyse the data.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

IO Title	*Module2@UniSalento: Training course at the University of Salento*		
IO Bimestre	*15*	IO Costs	*321.000,00*

IO Desciption

A twelve-month training course is organized at the University of Salento for five students. The course will be structured in different didactic modules: specialistic training, practical session (hands-on) training, and a final reporting and evaluation module. The HOLO-TEM station, the FE-SEM facility will be used to train the students on the use of advanced electron microscopy and imaging methodologies for the study of bio/organic and radiation sensitive samples. At the same time the high resolution, ultrasensitive BAMS (Bio-Accelerator Mass Spectrometry) instrument will be available to the students to develop skills and familiarize with the use o f this technique in drug development.

IO Title	*Module2@CNR: Training course at CNR*		
IO Bimestre	*15*	IO Costs	*321.000,00*

IO Desciption

The overall scope of the activity will be an introduction to the main biophysical and molecular experimental techniques in the field of structural biology and molecular biophysics. During the 12 months of internship the students will be introduced to research activity at RI laboratories. They will first follow the installation procedures and then will operate directly on state-of-the-art large-scale instrumentation, in order to provide a general view of the different techniques; they will be trained to operate autonomously on a specific one that mostly fits with their inclinations.

IO Title	*Module2@UniNA: Training course of the Bioelectronics Task Force of University of Naples Federico II*		
IO Bimestre	*15*	IO Costs	*321.000,00*

IO Desciption

The twelve-months course is structured in four modules. The first three modules consist in frontal lectures on theoretical and experimental frameworks, biosensors design and characterization, Bioelectronics and Biodevices, Electronics Read-out. Each module has a duration of two months and is intended to give to the fellows base and advanced concepts related to chemical manipulation of substrates and thin films, sample preparation for NMR, HLPC and optical and electron microscopy analyses, electronics read-out. The fourth module is dedicated to hand-on training. During this module the students will be trained in the different instruments offered by the Bioelectronics Task force.

47 WP budget description

Cost of fixed term personnel specifically hired for the project

Cost description: N/A

Scientific instrumentation and technological equipment, software licenses and patent

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

Open Access, Transnational Access, FAIR principle implementation

Cost description: N/A

Civil infrastructures and related systems

Cost description: N/A

Indirect costs

Cost description: The description of the cost is detailed in the each specific activity of the Work package, as well as in the intermediate objectives.

Training activities

Cost description:

25 fellowship of about 40k Euro each (includes travel and lodging expenses over the period to attend topic schools), 5 for each partner.
Cost for organizing MAESTRO activities for each partner that comprises:
external teacher travel expenses
MAESTRO organization expenses
MAESTRO advertisement
MAESTRO final workshop

48 Activity title

Dissemination of the call for MAESTRO fellowships

49 Activity short name

12.1

50 Activity Start month and duration

Activity Start month	3	Activity Duration	12

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Dedicated sessions with all the partners will be called in by Area to optimize the dissemination of the call. Specific aspects will cover:
Finer identification of the target audience for MAESTRO training (education level, discipline, …);
Contents and characteristics of the MAESTRO web-site (functional, user-friendly, fast, choice of the contents,…);
Contents of the video promoting MAESTRO;

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Contents of the video promoting MAESTRO;
Use of social media/ setting up a community;
Use of testimonials;
Choice of the right timing for the advertainment of the call;
Provide statistics and info during the year of training and at the end, linked with the organization of the final event;
Dissemination will also address scientific networks and communities, both national and international, with special care to support also in this action gender equality. The ESFRI and European RIs distribution channels, which contain the data-bases of RIs users, will be used, with special care to address the CERIC-ERIC and Elettra users.
With input from all the partners, the guidelines of the selection procedure of the 25 students will be defined and distributed to the OUs that will carry out the selection. The guidelines as well as the results of the selection will be made public using the dedicated website.
After the selection, a period of 3 months is envisaged before MAESTRO starts, to give students the possibility to find accommodation first at Trieste, for the common Module 1@Area (Activity 12.2), and finally at the destination of the training-on-the-job Module 2. Five modules are defined, as Module2@Area, Module2@UniSalerno, Module2@UniSalento, Module2@UniNapoli and Module2@CNR., as described in Activities 12.3-12.7.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

1.400,00 €

Cost description: Travel of evaluators

54.6 f. Training activities

20.000,00 €

Cost description: Organization of the activities and action for promotion.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

48 Activity title

MAESTRO Common Module1@Area

49 Activity short name

12.2

50 Activity Start month and duration

Activity Start month	14	Activity Duration	6

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

Common Module1@Area will be organized by Area with the contribution of all the project partners. The goal is to provide students with the basic knowledge needed for the second phase, laying the basis of a common language. The module is foreseen more theoretical (frontal lessons) than practical (Training-on-the-job), despite on-site visits and short training periods are foreseen at the Trieste node PRP@CERIC facilities.
In short, the contents of the common Module1@Area are summarized below. T stays for class lessons, P for practical.

T1_ Open access infrastructure (in collaboration with CERIC-ERIC)
T2_Fundamentals of scientific data management (in collaboration with Area)
T3_PRP@CERIC: Scientific ambition and digital ecosystem implementation
T4_Pathogen's research introduction (in collaboration with ICGEB facility at Area campus Padriciano)
T5_Working with pathogens: safety constraints and the PRP@CERIC strategy for enabling pathogen research (in collaboration with ICGEB facility)
T6_ Structural drug-discovery pipeline: Structural determination techniques, with focus on macromolecular crystallography and cryoEM (in collaboration with CNR-IOM and Elettra facility)
T7_ Structural drug-discovery pipeline(in collaboration with CNR-IC and Elettra facility)
T8_Phenotyping drug-discovery pipeline: High Throuput drug Screening approaches (in collaboration with ICGEB)
T9_Phenotyping and hyperspectral imaging: fundamentals of bio-spectroscopy with synchrotron radiation and Free Electron laser sources (in collaboration with Elettra facility)
T10_Functional and dynamic phenotyping: (in collaboration with UniSalento, CNR-IOM and Elettra facility)
T11_Multi-omic phenotyping: Fundamentals in omic-sciences: genomic, proteomic and matbolomic (in collaboration with Area and UniSalerno-DIFARMA)

T12_AI and innovative data analysis approaches (In collaboration con UniSalerno)
T13_Laboratory management (all partners)
P1_Short practical training at LAGE
P2_ Short practical at Elettra

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

18.900,00 €

Cost description: Travel of evaluators

54.6 f. Training activities

270.000,00 €

Cost description: Organization of the common activities and fellowship for the students.

48 Activity title

MAESTRO Module2@Area

49 Activity short name

12.3

50 Activity Start month and duration

Activity Start month	19	Activity Duration	12

51 OU in charge of the Activity

OU short name	Basovizza	Participant	Area Science Park

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

52 Activity description

Area, with Padriciano and Basovizza campus, has a large choice of instruments, facilities and services that can be offered to students for practical activities, also thanks to the long-standing and close collaboration with Elettra/FERMI, the ICGEB and CERIC-ERIC.
The 1-year training activities for 5 students will be structured in 5 modules each comprising theoretical lectures (Specialistic training) and experimental training (On-site training). All the students will attend the specialist training and schools and receive the same theoretical training, while the experimental training will focus on diverse research projects requiring use of different although complementary techniques.
Specialized training: Students will be introduced to the fundamentals of pathogens and genomics. A series of lectures will explore the potential of the different experimental techniques to provide answer to typical scientific case-studies relevant to PRP@CERIC.
In particular, the techniques of pathogen safe handling, genome sequencing and bio-informatic analysis, X-ray scattering in bio-systems and macromolecules, and light spectroscopies will be explored more in depth.
On-site training: Five case studies will be presented to the students, each describing a scientific problem related to PRP@CERIC and outlining the research strategy to tackle it. Each student will be assigned with a case study and invited to follow the experimental training in the specific labs. Each student will be assigned to a tutor during the experimental session.
Possible case studies:
Case study 1: From Protein purification to structural determination by X-ray macromolecular crystallography (Elettra facility)
Case study 2: IR and UVRR phenotyping: hyperspectral imaging contribution to the scientific commissioning of the imaging stations at Elettra
Case study 3: Atomic force and IR nanoscopies:
Case study 3: Genomic: single cells metabolomic approach
Case study 4: Data analysis: Innovatie approaches with AI

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: n/a

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

54.6 f. Training activities

0,00 €

Cost description: N/A

48 Activity title

MAESTRO Module2@UniSalerno and UniSalerno schools

49 Activity short name

12.4

50 Activity Start month and duration

Activity Start month	19	Activity Duration	12

51 OU in charge of the Activity

OU short name	DIFARMA	Participant	Università degli Studi di Salerno

52 Activity description

The recruitment will be done according to the guidelines of each Partner Institution within M12. The course is structured in modules:

Module 1: Basic and advanced training. The module provides basic knowledge in sample preparation strategies for multi-omics: The participants will improve their skills in sample-prep for metabolomics, lipidomics and proteomics as well as MALDI-imaging and DMPK applications. Specialized strategies will be highlighted for bio, clinical, pharma applications and treating different bio-specimens, such as plasma, tissues and cells. The module also provides students with advanced knowledge on MS and hyphenated methods for clinical and pharmaceutical applications: The ultimate techniques in the MS field will be extensively illustrated, the pros and cons of MS analyzers and related techniques in the fields of multi-omics, pharmacokinetics and MALDI imaging, as well as MS Data analysis and Chemometrics for clinical and pharma fields such as the aspects of identification, quantification and statistics in MS-based omics. The module is articulated in frontal lectures and specialistic seminars by renewed international experts in each field.
A school on "Modern Mass spectrometry in Multi-omics and Using GPU computing infrastructure for image based omic data analysis" is organized. It will give a holistic overview of the role of mass spectrometry in multi-omics approaches, show the development and successful case studies on real-world application.
Module 2. On-site training. The students will visit the DIFARMA Bio Open Lab-MS facilities. Practical session with hands-on different MS instruments from different vendors will be organized and specialistic seminars by international experts. The student will then spend a training period with a supervisor of each activity, and afterwards, each student will have a project to accomplish.
Module 3. Final evaluation: The students will prepare a final report concerning both theoretical and practical application.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

21.000,00 €

Cost description: Training and school organization costs, travels for external teachers

54.6 f. Training activities

300.000,00 €

Cost description: Organization of MAESTRO Module2 and fellowships for the students.

48 Activity title

MAESTRO Module2@UniSalento and UniSalento school

49 Activity short name

12.5

50 Activity Start month and duration

Activity Start month	19	Activity Duration	12

51 OU in charge of the Activity

OU short name	UniSalento	Participant	Università degli Studi del Salento

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Salento

52 Activity description

The recruitment will be done according to the guidelines of each Partner Institution within M12. The course is structured in modules: Module 2.1. Specialistic training. The module provides students with specialistic knowledge in Biophysics, sample preparation techniques for high resolution EM, Spectroscopic and Accelerator Mass Spectrometry Techniques, Electron Microscopy, vacuum systems, , Image processing, data analysis, Accelerator Physics, nanooptics, nanomechanics. The module is articulated in frontal lectures and specialistic seminars.
Module 2.2. On-site training. The students spend a training on the job period in one of the participating research groups. Practical session with hands-on different instruments (HOLO-TEM station, BAMS, FE-SEM station for correlative analysis, station for single-cell flow cytometry and sub-100nm imaging, BAMS instrument). Specialistic seminars by international experts are organized. During this period each student will have a project to accomplish either on ongoing instrumental developments or applications.
A school on "Electron microscopy and complementary techniques for biological systems" is organized. It gives an overview of last TEM developments for biological systems. It includes lectures on Geometric and Wave Optic, Electron Sources, Image formation in EM, coherent and incoherent high resolution, Digital Imaging, Cryo-microscopy, advanced preparation of biological samples, ultramicrotome techniques, SEM, X- ray Microanalysis, Correlative microscopy. Applications of advanced electron microscopies on biological systems.
Module 2.3. Reporting and evaluation. During the module each student prepares a report about his activities, a workshop is organized to present the outcome of the training project and the final evaluation of the participants is organized.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

21.000,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: Training and school organization costs, travels for external teachers

54.6 f. Training activities

300.000,00 €

Cost description: Organization of MAESTRO Module2 and fellowships for the students.

48 Activity title

MAESTRO Module2@CNR and CNR school

49 Activity short name

12.6

50 Activity Start month and duration

Activity Start month	19	Activity Duration	12

51 OU in charge of the Activity

OU short name	CNR-IOM	Participant	Consiglio Nazionale per le Ricerche

52 Activity description

The recruitment will be done according to the guidelines of each Partner Institution within M12.
A 12-month training activity will be organized at the CNR-IOM and CNR-IC for five students. The course is structured in modules:
Module 2.1. Specialistic training. The scope of the activity will be an introduction to the main biophysical and molecular experimental techniques in the field of structural biology and molecular biophysics.
Module 2.2. on-site training. A training on the job module will be possible on four different thematics
Electron microscopy, CryoFIB/SEM, Cryotomography
Electron microscopy, protein expression and purification for SP analysis
Electron microscopy, single particle TEM imaging
Single particle handling and biophysical interaction analysis.
Plasmonics and microfluidics nanofabrication
Each student will be invited to select one of these topics according to his/her inclinations and interests.
The students will then have the opportunity to select three two-weeks stages that will be organized for each student to get in closer contact with parent technologies. The offer of short stages will comprise:
Protein crystallization
X-ray diffraction
Atomic Force microscopy
Raman spectroscopy
Infrared spectroscopy
Micro and nanofabrication
Electron microscopy
Plasmonic spectroscopy
Module 2.3. Reporting and evaluation. The students will prepare a final report which will be evaluated by the scientific committee.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Module 2.3. Reporting and evaluation. The students will prepare a final report which will be evaluated by the scientific committee. A one-week school on "Spectroscopy and microscopy in biology" is organized. The school will provide the students with the opportunity to interact with experienced scientists in the field, and be inspired by their experience. The workshop will take place in winter and will be hosted in a hotel to offer accommodation and conference space at the same location so that the interaction will continue beyond the official program. The workshop will be open also to 25 researchers and students working at the project partners other than the trained students.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

21.000,00 €

Cost description: Training and school organization costs, travels for external teachers

54.6 f. Training activities

300.000,00 €

Cost description: Organization of MAESTRO Module2 and fellowships for the students.

48 Activity title

MAESTRO Module2@UniNapoli and UniNapoli school

49 Activity short name

12.7

50 Activity Start month and duration

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

50 Activity Start month and duration

Activity Start month	19	Activity Duration	12

51 OU in charge of the Activity

OU short name	UniNapoli	Participant	Università degli Studi di Napoli Federico II

52 Activity description

The recruitment will be done according to the guidelines of each Partner Institution within M12. The one-year course is structured in 3 modules:
Module 1: Basic and specialist training on:
Theoretical and experimental frameworks. Basic processing tools are presented for chemical manipulation of substrates and thin films; sample preparation for solid state NMR and optical and electron microscopy. Basic elements of clean room working and maintenance will also be acquired. Several techniques for chemical analysis by HLPC are introduced. Specialistic seminars will be held by international experts
Biosensors design and characterization. Advanced knowledge on FET and organic electrochemical transistor (OECT) design and fabrication; bio-printing techniques and instruments; application and use of instruments for Photonic Immobilization Technique (PIT), PCR and electro-chemical impedance spectroscopy (EIS).
Electronics Read-out. Advanced knowledge on electronics read-out, including design and interfacing with low- noise amplifiers, data acquisition systems and loggers, noise analyzers and other lab-grade instruments for signal analysis in time and frequency domains. Guarding and shielding issues in sensor read-out are covered. A one-week School on Bioelectronics and Biodevices. The school introduces the fellows to the design, characterization and deployment of biosensors and biodevices, from material analysis to biointerfaces characterization, electrical characterization and device read-out.
Module 2. On-site training. The fellows will get in touch with the facilities offered by the Bioelectronics Task Force. Practical sessions with hands-on on different equipment will be organized. The fellows will then spend a training period with a supervisor of each activity. Afterwards, each fellow will have a project to accomplish related to the activities that have been run on-site.
Module 3. Final evaluation: The students will prepare a final report which will be evaluated.

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

21.000,00 €

Cost description: Training and school organization costs, travels for external teachers

54.6 f. Training activities

300.000,00 €

Cost description: Organization of MAESTRO Module2 and fellowships for the students.

48 Activity title

MAESTRO Final WorkShop

49 Activity short name

12.8

50 Activity Start month and duration

Activity Start month	27	Activity Duration	3

51 OU in charge of the Activity

OU short name	Padriciano	Participant	Area Science Park

52 Activity description

A final 3-days' workshop will be organized at the Area Science Park premises in Trieste. The aim of the workshop is to disseminate the outcomes of MAESTRO, allowing all the students to share their experiences and the results of their training. Each student will prepare a written dissertation, under the supervision of a scientist, in the form of a compact essay, according with the standard of a scientific publication. All the contributions prepared by the students will be then edited and collected in volume in the form of "proceedings" of the training course.
During the workshop each fellow will present the results of his project to all the other fellows, the scientist involved in the training and research activities of PRP@CERIC-ERIC in the form of a talks. In this way each fellow will have the possibility to share his/her experience and have an idea of the work performed by the colleagues. Discussion among participants will be encouraged.
A round table between representatives of the different institutions involved in the research and training activities, of research infrastructures and stakeholders will also be held, to plan future actions in the direction of a second edition of MAESTRO.
A ceremony during which the certification of attendance will be delivered to fellows will close the workshop.

d) PROJECT WORK BREAKDOWN STRUCTURE - [WP12 - WP12 - Training and Education]

(The information provided in this section will be evaluated with reference to criteria C1-C5)

54 Activity budget

54.1 a. Cost of fixed term personnel specifically hired for the project

0,00 €

Cost description: N/A

54.2 b. Scientific instrumentation and technological equipment, software licenses and patent

0,00 €

Cost description: N/A

54.3 c. Open Access, Transnational Access, FAIR principle implementation

0,00 €

Cost description: N/A

54.4 d. Civil infrastructures and related systems

0,00 €

Cost description: N/A

54.5 e. Indirect costs

700,00 €

Cost description: Travels for external teachers

54.6 f. Training activities

10.000,00 €

Cost description: Organization of MAESTRO Final Workshop.

The Scientific Coordinator	The legal representative for the applicant
(Digital Signature)	(Digital Signature)

PRP@CERIC

Allegato B - sub 31.1.3.1 – sub 31.1.3.2 - Economic and financial plan for the operation of the infrastructure

31.1.3.1 Managements Costs

nfrastructure(s) in its ex-post configuration	Person months	Estimated total amount in € in the 10 years starting from the final payment
- Administrative personnel	1320	5.940.000,00
- Technical personnel	3000	15.000.000,00
- utilities, insurance, and any taxation routinely charged to		
- ordinary maintenance		35.200.000,00
- extra-ordinary maintenance		2.200.000,00
- consumables		15.000.000,00
Total Running Costs		98.340.000,00

31.1.3.2 Revenues[2]

rastructure(s) in its post-project configuration	Estimated total amount in € in the 10 years starting from the final payment
- grants from competitive calls (national or European projects)	21 Meuro
- institutional endowments from public bodies	65 Meuro
- revenue from commercial contracts (for goods and R&D services)	13 Meuro
- revenue from commercial contracts (rent of space and facilities)	-
Total Revenues	**99 Meuro**

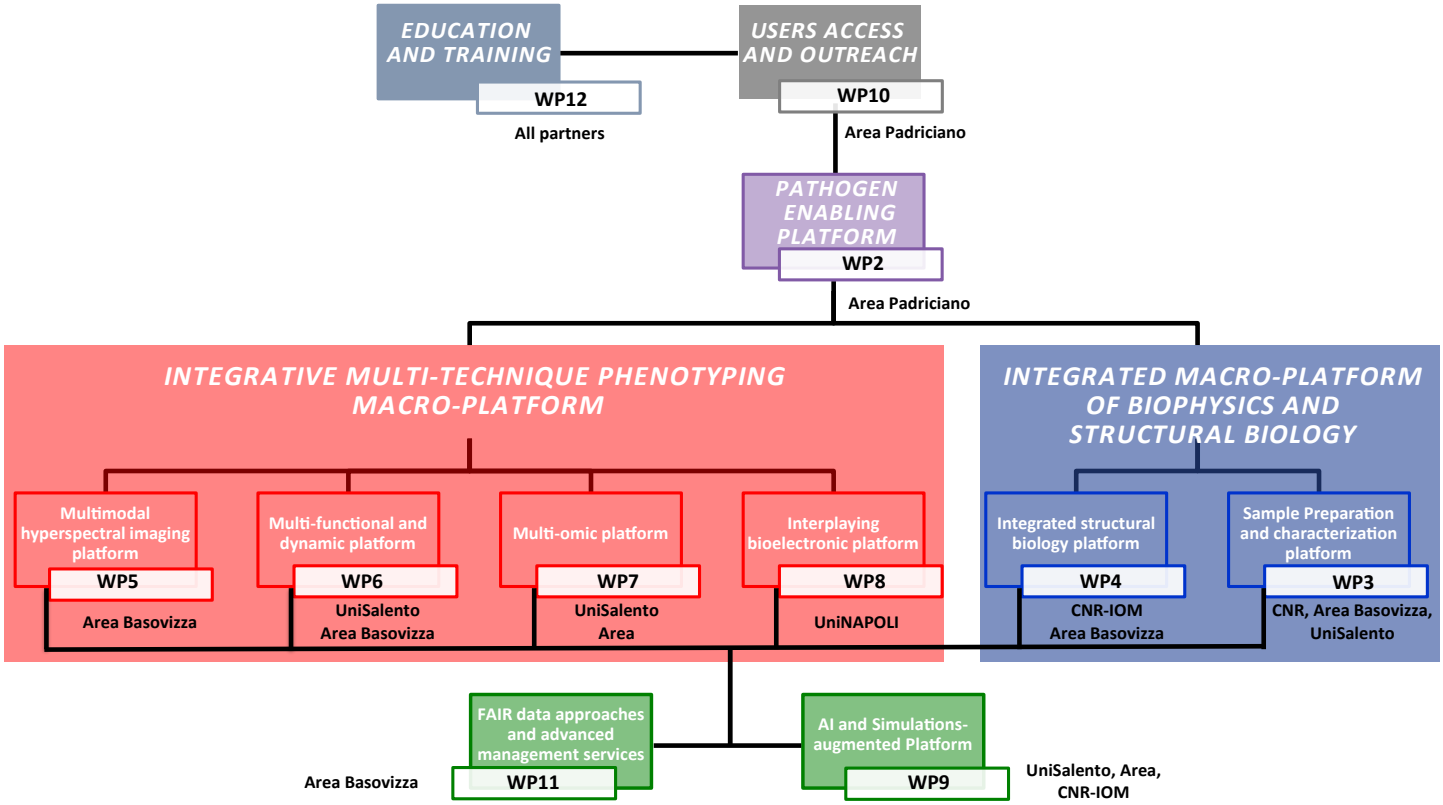
33WP GANNT CHART

Legend: for each WP activity, lighter colors refer to the bimester of acquisiton, installation and payment of the PRP@CERIC hardware and software instruments; darker colours refer to the scientific commissioning and/or opening to the users of the PRP@CERIC stations.

		BIMESTERS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WP	2	***PATHOGEN ENABLING PLATFORM***															
ACTIVITY	2.1	Biosafety Level 3 Laboratory Module 1															
ACTIVITY	2.2	HTS Stations															
WPs	3-4	***INTEGRATED MACRO-PLATFORM OF BIOPHYSICS AND STRUCTURAL BIOLOGY***															
WP	3	SAMPLE PREPARATION AND CHARACHTERIZATION PLATFORM FOR HEALT AND DRUG DISCOVERY															
ACTIVITY	3.1	Protein Production and Characterization															
ACTIVITY	3.2	Protein Crystallization															
ACTIVITY	3.3	Drug-target interaction modelling: lead compound identification															
ACTIVITY	3.4	Biophysical investigation of target-ligand interactions															
WP	4	INTEGRATED STRUCTURAL BIOLOGY PLATFORM															
ACTIVITY	4.1	Establishment of a state-of-the-art CryoEM facility for particle analysis															
WPs	5-6-7-8	***INTEGRATIVE MULTI-TECHNIQUE PHENOTYPING MACRO-PLATFORM***															
WP	5	MULTIMODAL HYPERSPECTRAL IMAGING PLATFORM															
ACTIVITY	5.1	IRSR SISSI-Bio and SISSI-Bio OFFline far-field microscopy stations (Micro SISSI-Bio)															
ACTIVITY	5.2	SISSI-Bio OFFline imaging station at submicrometric lateral resolution (SubMicro SISSI-Bio)															
ACTIVITY	5.3	IRSR and offline nanoscopy stations at SISSI-Bio (Nano SISSI-Bio)															
ACTIVITY	5.4	Multi-wavelengths UVRR Microscopy station															
ACTIVITY	5.5	FIR-THz low-energy molecular vibrations: motility and flexibility of key infection mediators															
WP	6	MULTI FUNCTIONAL AND DYNAMIC PLATFORM															
ACTIVITY	6.1	Biological sample preparation and investigation station for HOLO-TEM															
ACTIVITY	6.2	Single-cell flow cytometry and imaging characterisations															
ACTIVITY	6.3	ACTIVITY 4 - Real-time deformability cytometry and cythomechanics															
ACTIVITY	6.4	Atomic Force Microscopy setup for high-speed high-resolution imaging and nanomechanics															
WP	7	MULTI-OMIC PLATFORM															
ACTIVITY	7.1	Multi-omics-MS based upgrade for host-pathogen interaction studies and biomarker discovery:															
ACTIVITY	7.2	Multimodal mass spectrometry imaging platform upgrade for Spatial-omics															
ACTIVITY	7.3	Automation upgrade for multi-omics-MS based sample preparation															
ACTIVITY	7.4	BIO-AMS – Implementation of high sensitivity isotope marker spectrometry for drug development															
ACTIVITY	7.5	Updating of Sequencing facility for Singe Cell, Multi-omics-based Sequencing (AREA)															
ACTIVITY	7.6	Updating of Sequencing facility for high number, multi-omics Sample preparations. (AREA SALERNO)															
ACTIVITY	7.7	Optical based diagnostic: ATR-FTIR for pathogens identification and phenotyping															
ACTIVITY	7.8	Optical based diagnostic for Pathogen identification: UV identification and inactivation of pathogens															
WP	8	INTERPLAYING BIOELECTRONIC PLATFORM															
ACTIVITY	8.1	Molecular and supramolecular characterization															
ACTIVITY	8.2	Multimodal optical, electrical and electrochemical analysis															
ACTIVITY	8.3	Bionterfaces development and biotesting															
ACTIVITY	8.4	One Helth Veterinary and Agricolture (OHVA) pathogen handling and identification															
ACTIVITY	8.5	Human clinic facilities															

		BIMESTERS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
WPs	9-11	*DIGITAL INTEGRATION*															
WP	9	AI AND SIMULATIONS-AUGMENTED INFRASTRUCTURE															
ACTIVITY	9.1	AI-augmented research infrastructure															
ACTIVITY	9.2	AI Infrastructure for image analysis and interpretation															
ACTIVITY	9.3	Simulation tools for PRP@CERIC															
WP	11	FAIR DATA APPROACHES AND ADVANCED MANAGEMENT SERVICES															
ACTIVITY	11.1	Setup of the first release of PRP@CERIC DECOS															
ACTIVITY	11.2	Interoperable layer. Second release of PRP@CERIC DECOS															
ACTIVITY	11.3	Advanced services for sharing FAIR data and software and virtual access. Third release of PRP@CERIC DECOS															
WPs	1-10-12	*TRASVERSAL ACTIVITIES*															
WP	1	MANAGEMENT															
ACTIVITY	1.1	Definition of decision-making bodies and overall project management															
ACTIVITY	1.2	Management of public procurement procedure for scientific and technical instrumentation															
ACTIVITY	1.3	Recruitment procedure for the Infrastructure Manager, researchers, project and administrative managers															
ACTIVITY	1.4	Digital monitoring of research infrastructures															
WP	10	USERS ACCESS AND OUTREACH															
ACTIVITY	10.1	Access Policy Framework Definition															
ACTIVITY	10.2	CERIC-ERIC Open Access Offer Integration															
ACTIVITY	10.3	Entry Portal for Industrial Research exploitation (EPIRO) set up															
ACTIVITY	10.4	Business Development															
ACTIVITY	10.5	IP&M Helpdesk															
ACTIVITY	10.6	Call PRP4S3															
WP	12	MASTER TRAINING IN RESERACH INFRASTRUCTURE OPERATION AND MANAGEMENT (MAESTRO)															
ACTIVITY	12.1	Dissemination of the call for MAESTRO fellowships															
ACTIVITY	12.2	MAESTRO Common Module1@Area															
ACTIVITY	12.3	MAESTRO Module2@Area															
ACTIVITY	12.4	MAESTRO Module2@UniSalerno and UniSalerno schools															
ACTIVITY	12.5	MAESTRO Module2@UniSalento and UniSalento school															
ACTIVITY	12.6	MAESTRO Module2@CNR and CNR school															
ACTIVITY	12.7	MAESTRO Module2@UniNapoli and UniNapoli school															
ACTIVITY	12.8	MAESTRO Final WorkShop															

@PRP@CERIC Breakdown structure



Finanziato dall'Unione europea
NextGenerationEU

MUR
Ministero dell'Università e della Ricerca

I 3.1, "Fund for the creation of an integrated system of research and innovation infrastructures", Action 3.1.1 " Creation of new IR or strengthening of existing IR involved in the Horizon Europe Scientific Excellence objectives and the establishment of networks "

Piano delle Erogazioni associato al Piano degli Obiettivi Intermedi come da Proposta definitiva

IR0000028 - CERIC-ERIC - AREA - PRP@CERIC (Rnk: 12)

Bimestre	# Obiettivi Intermedi	Valore	Cumulativo
1	4	€ 0,00	€ 0,00
3	18	€ 348.984,78	€ 348.984,78
4	1	€ 0,00	€ 348.984,78
5	4	€ 434.697,80	€ 783.682,58
6	21	€ 1.424.391,46	€ 2.208.074,04
7	5	€ 2.574.487,77	€ 4.782.561,81
8	1	€ 32.112,84	€ 4.814.674,65
9	23	€ 3.107.085,25	€ 7.921.759,90
10	7	€ 3.944.037,42	€ 11.865.797,32
11	8	€ 3.916.974,66	€ 15.782.771,98
12	29	€ 9.236.966,40	€ 25.019.738,38
13	4	€ 1.451.294,50	€ 26.471.032,88
14	2	€ 0,00	€ 26.471.032,88
15	33	€ 14.519.483,81	€ 40.990.516,69
Totale	**160**	**€ 40.990.516,69**	**€ 40.990.516,69**