Franco Pellegrini

Curriculum Vitae

Franco Pellegrini
[redacted]

Date of birth: [redacted]
Citizenship: Italian

Employment

SISSA
2022-present, Trieste, Italy
Researcher (Ricercatore a Tempo Determinato) on a “Research and Innovation” project for the development of interatomic potentials for material science applications

École normale supérieure
2019-2021, Paris, France
Postdoctoral Researcher on project “The Energy Landscape and Dynamics of Machine Learning Algorithms”

SISSA
2012-2018, Trieste, Italy
Postdoctoral Researcher (Assegnista di ricerca) on ERC Advanced Grant MODPHYSFRICT “Theory and Modeling of Frictional Phenomena in Nanosystems”

Education

SISSA / Ph.D. in Condensed Matter Theory
2007-2011, Trieste, Italy
Thesis: “Quantum Dissipation at the Nanoscale”
Supervisors: Prof. Erio Tosatti, Prof. Giuseppe Santoro

Scuola Normale Superiore &
University of Pisa / Master’s degree in Physics
2002-2007, Pisa, Italy
Thesis: “Dynamics of a Quantum Phase Transition in the XXZ Model”
Supervisor: Prof. Rosario Fazio - Final mark: cum laude

Teaching Experience

SISSA / Lecturer
2023, Trieste, Italy
Course: “Machine learning for material science: advanced architectures”

SISSA / Lecturer
2018, Trieste, Italy
Course: “Introduction to Machine Learning: an overview for physicists”

SISSA / Teaching Assistant
2012-2018, Trieste, Italy
Courses: “Solid State Problems” (Prof. Tosatti) and “Basic and Advanced Problems in Solid States Physics” (Prof. de Gironcoli)

Selected Scientific Publications

Neural Network Pruning Denoises the Features and Makes Local Connectivity Emerge in Visual Tasks
F. Pellegrini and G. Biroli
ICML 2022, PMLR 162:17601-17626, arXiv:2104.13343 (2022)

An analytic theory of shallow networks dynamics for hinge loss classification
F. Pellegrini and G. Biroli
NeurIPS 2020, J. Stat. Mech. 124005, arXiv:2006.11209 (2020)

PANNA: Properties from Artificial Neural Network Architectures
R. Lot, F. Pellegrini, Y. Shaidu, and E. Kucukbenli
Comp. Phys. Comm. 256, 107402 (2020)

Thermally assisted lubricity and negative work tails in sliding friction
F. Pellegrini, E. Panizon, G. E. Santoro, and E. Tosatti
Phys. Rev. B, 99, 075428 (2019)

Frictional lubricity enhanced by quantum mechanics
T. Zanca, F. Pellegrini, G. E. Santoro, and E. Tosatti
PNAS 115 (14), 3547-3550 (2018)

A Markov state modeling analysis of sliding dynamics of a 2D model
M. Teruzzi, F. Pellegrini, A. Laio, and E. Tosatti
J. Chem. Phys. 147, 152721 (2017)

Noncontact Atomic Force Microscope Dissipation Reveals a Central Peak of SrTiO3 Structural Phase Transition
M. Kisiel, F. Pellegrini, G.E. Santoro, et al.
Phys. Rev. Lett. 115, 046101 (2015)

Giant frictional dissipation peaks and charge-density-wave slips at the NbSe2 surface
M. Langer, M. Kisiel, R. Pawlak, F. Pellegrini, et al.
Nature materials 13 (2), 173 (2014)

Crossover from Adiabatic to Antiadiabatic Quantum Pumping with Dissipation
F. Pellegrini, C. Negri, F. Pistolesi, N. Manini, G.E. Santoro, E. Tosatti
Phys. Rev. Lett. 107, 060401 (2011)

Skills

Scientific Experience
Numerical and analytical modeling of complex classical and quantum dynamical and dissipative systems. Implementation and modeling of neural networks and other machine learning and data driven approaches.

Software Experience
Programming in multiple languages and frameworks for low level and numerical applications (C/C++, Python, bash), web and networking (HTML, Javascript, PHP, SQL), 3D graphics (OpenGL, WebGL), computer graphics (GIMP, Blender), game engines (Unreal Engine, Unity), virtual reality (WebVR), computer vision (openCV), neural networks (TensorFlow, JAX), robotics (Arduino).

Languages
Italian (native), English (fluent), French (basic), Spanish (basic)

L'originale compilato e sottoscritto è depositato presso gli Uffici dell'Ente