Franco Pellegrini

Curriculum Vitae

Franco Pellegrini

Date of birth.
Citizenship

Employment

SISSA
2012-2018, Trieste, Italy

Postdoctoral Researcher (Assegnista di ricerca) mostly 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
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

Transferability of Neural Network Models Across Molecular Data
F. Pellegrini and E. Kucukbenli
In preparation (2019)

PANNA: Properties from Artificial Neural Network Architectures
R. Lot, F. Pellegrini, Y. Shaidu, and E. Kucukbenli
In preparation (2019)

24/5/2019

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)

Markov state modeling of sliding friction
F. Pellegrini, F.P. Landes, A. Laio, S. Prestipino, and E. Tosatti
Phys. Rev. E 94, 053001 (2016)

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)

Charge-density-wave surface phase slips and noncontact nanofriction
F. Pellegrini, G.E. Santoro, and E. Tosatti
Phys. Rev. B 89, 245416 (2014)

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)

Atomic Spin-Sensitive Dissipation on Magnetic Surfaces
F. Pellegrini, G.E. Santoro, and E. Tosatti
Phys. Rev. Lett. 105, 146103 (2010)

Adiabatic quenches through an extended quantum critical region
F. Pellegrini, S.Montangero, G.E. Santoro, and R. Fazio
Phys. Rev. B 77, 140404 (2008)

Skills

Scientific Experience
Numerical and analytical modeling of complex classical and quantum dynamical systems. Proficiency with various analytical approaches and numerical tools (master equation, Markov state modeling, neural networks, molecular dynamics, mean field theories, tight binding, path integral, DMRG). Neural networks and other machine learning and data driven approaches.
In parallel and independently of the above activities, I privately pursued and gained experience and skills in the exploration of software for computer vision, virtual reality devices, drones, and other systems, also using neural networks and machine learning techniques.

Software Experience

Programming in multiple languages and frameworks for low level and numerical applications (C/C++/C#, Fortran, Python, bash, Mathematica), web and networking (HTML, Javascript, PHP, Ajax, SQL, WebSocket), 3D graphics (OpenGL, WebGL). Computer graphics (Photoshop, GIMP, Blender), game engines (Unreal Engine, Unity), mobile development (Java, Android studio, Cocos2D), virtual reality (Oculus, Vive, WebVR), computer vision (openCV), neural networks (TensorFlow), robotics (Arduino).

Languages

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