Erik **Piatti**

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PROFILE

I am currently assistant professor (RTT) in the group of Superconductivity and Magnetism in Innovative Materials at the Department of Applied Science and Technology of Politecnico di Torino. My research work is grounded in condensed matter physics, studying the electronic properties of advanced materials at low temperatures and under the application of extremely high electric fields.
My current main lines of research focus on: the control of exotic quantum phases – such as superconductivity and charge-density waves – by means of electrostatic and electrochemical charge doping; the investigation of the low-frequency electric transport properties of advanced materials and composites; the study of the fundamental properties of unconventional superconductors via point-contact Andreev-reflection spectroscopy; and the characterization of the surface physical properties (morphological, electrical, thermal and infrared optical) of advanced materials via various scanning probe microscopy techniques.

EDUCATION

Doctor of Philosophy in Physics Jan 2014 – Apr 2017
Politecnico di Torino, Italy – graduated *cum laude*
Thesis: Electrochemical gating for superconductivity engineering in materials towards the 2D limit

Master of Science in Nanotechnologies for ICTs Oct 2011 – Oct 2013
Politecnico di Torino, Italy – 110/110 *cum laude*
Thesis: Fabrication of graphene-on-boron nitride heterostructures for scanning tunnelling microscopy

Bachelor of Science in Physical Engineering Oct 2009 – Jul 2011
Politecnico di Torino, Italy – 110/110 *cum laude*
Thesis: Optical, infrared, and Raman spectroscopy characterization of multilayer graphene

RESEARCH POSITIONS AND FELLOWSHIPS

Fixed-term tenured assistant professor (RTT) Feb 2026 – Present
Department of Applied Science and Technology, Politecnico di Torino, Italy
Main topics: Control of quantum phases via gate-driven electric fields and ion intercalation; low-frequency electric characterization of materials and composites; point-contact Andreev-reflection spectroscopy of superconductors; scanning probe microscopy for physics and engineering

Research scholarship Nov 2024 – Jan 2026
Department of Applied Science and Technology, Politecnico di Torino, Italy
Grant: Study of the electrical properties of materials for device packaging
Supervisor: prof. Sergio Ferrero

Assistant professor with time contract (RTDa) Nov 2022 – Oct 2025
Department of Applied Science and Technology, Politecnico di Torino, Italy
Main topic: Control of quantum phases in superconductors and layered materials via ionic gating

Research scholarship Feb 2022 – Oct 2022
Department of Applied Science and Technology, Politecnico di Torino, Italy
Grant: Low-temperature electrical characterization of two-dimensional electronic systems
Supervisor: prof. Renato S. Gonnelli

Postdoctoral research assistant Feb 2021 – Feb 2022
Department of Applied Science and Technology, Politecnico di Torino, Italy
Grant: Hydrogen intercalation by electrochemical gating in layered physical systems (HIEROGLYPH)
Supervisor: prof. Dario Daghero

Postdoctoral research assistant Feb 2018 – Feb 2021
Department of Applied Science and Technology, Politecnico di Torino, Italy
Grant: Cryogenic temperature electrical characterization of 2D electronic systems (CRYOTECH2D)
Supervisor: prof. Dario Daghero

Research assistant Feb 2017 – Jan 2018
Department of Applied Science and Technology, Politecnico di Torino, Italy
Grant: Electrical and thermal characterization of 2-dimensional electronic systems (ELTHECH2D)
Supervisor: prof. Renato S. Gonnelli

VISITING RESEARCH POSITIONS

Academic visitor May 2017 – Jun 2017
Cambridge Graphene Centre, University of Cambridge, United Kingdom
Main topic: Induction of superconductivity in 2D materials via ionic gating
Host PI: prof. Andrea C. Ferrari

Academic visitor Jun 2016 – Jul 2016
Cambridge Graphene Centre, University of Cambridge, United Kingdom
Main topic: Induction of superconductivity in 2D materials via ionic gating
Host PI: prof. Andrea C. Ferrari

Visiting researcher Sep 2015 – Dec 2015
Zernike Institute for Advanced Materials, University of Groningen, The Netherlands
Main topic: Induction of superconductivity in 2D materials via gate-driven ion intercalation
Host PI: prof. Jianting Ye

Visiting student researcher Feb 2013 – Sep 2013
Department of Physics, University of California Berkeley, USA
Main topic: Graphene-on-boron nitride heterostructures fabrication for scanning tunneling microscopy
Host PI: prof. Michael F. Crommie

Visiting student researcher Mar 2011 – Jul 2011
National Institute of Metrological Research (INRiM), Italy
Main topic: Raman and infrared characterization of rhombohedral graphene
Host PI: dr. Stefano Borini

HONORS AND AWARDS

2025: **National Scientific Qualification as Full Professor** in Experimental Physics of Matter awarded by the Italian Ministry of University and Research (MUR)
2023: **Outstanding Referee** awarded by the Editorial Board of *Communications Materials*
2022: **National Scientific Qualification as Associate Professor** in Experimental Physics of Matter awarded by the Italian Ministry of University and Research (MUR)
2020: 1st prize in the "**Best Young Researcher** Contribution Contest" awarded by the scientific committee of the conference *Solid State Surfaces and Interfaces 2020*
2019: 1st prize in the "**Best Young Researcher** Contribution Contest" awarded by the scientific committee of the conference *Progress in Applied Surface, Interface and Thin Film Science 2019*
2019: **Outstanding Referee** awarded by the Editorial Board of *Communications Physics*
2012: *Premio Optime* for the best **Bachelor's Degree laureates** awarded by Unione Industriale di Torino

RESEARCH PROJECTS AND CONTRACTS

PNRR M1C2 project "SVINBO" 2025 – 2026
Team member of the Politecnico di Torino research unit in PNRR M1C2 - 5.2 Filiere produttive "Microelettronica e semiconduttori" project "SVINBO 8.0 – Silicon Valley 8.0 in Piemonte for a Green and Smart Mobility" (2025-2026)

PRIN 2022 PNRR project "THERmIR" 2023 – 2025
Associate Principal Investigator of the Politecnico di Torino research unit in PRIN 2022 PNRR project P2022AHXE5 "THERmIR – Continuous THERmal monitoring with wearable mid-InfraRed sensors". I was in charge of Milestone 1.3, devoted to the nanoscale characterization of the mid-IR absorption of graphene Salisbury screen structures via nano-infrared microscopy.

PRIN 2017 project "Quantum2D" 2019 – 2023
Team member of the Politecnico di Torino research unit in PRIN 2017 project P017Z8TS5B "Quantum2D – Tuning and understanding quantum phases in 2D materials".

Research contract with ENI S.p.A. 2018 – 2019
Team member of the research unit in a commercial contract between Politecnico di Torino and ENI S.p.A. for the development of a Superconducting Magnetic Energy Storage device based on MgB2 wires.

Joint Project for the Internationalization of Research 2015 2016 – 2017
Team member of the joint project between Politecnico di Torino and University of Cambridge "Synthetic superconductivity by EDL gating in single- and few-layer metal chalcogenides", funded by Politecnico di Torino and Compagnia di San Paolo.

PRIN 2012 project "RIDEIRON" 2012 – 2015
Team member of the Politecnico di Torino research unit in PRIN 2012 project 2012X3YFZ2 "RIDEIRON - Using controlled disorder to investigate the mechanisms of iron-based superconductors".

SELECTED PUBLICATIONS

- E. Piatti et al. Direct evidence for two-gap superconductivity in hydrogen-intercalated titanium diselenide. *Materials Today Physics* **59**, 101883 (2025)
- G. Gavello, E. Piatti et al. Facile synthesis of palladium hydride via ionic gate-driven protonation using a deep eutectic solvent. *Journal of Molecular Liquids* **420**, 126826 (2025)
- E. Piatti et al. Superconductivity induced by gate-driven hydrogen intercalation in the charge-density-wave compound 1*T*-$TiSe_2$. *Communications Physics* **6**, 202 (2023)

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- E. Piatti et al. Reversible tuning of superconductivity in ion-gated NbN ultrathin films by Self-encapsulation with a high-k dielectric layer. *Physical Review Applied* **18**, 054023 (2022)
- E. Piatti et al. Ionic liquids for electrochemical applications: Correlation between molecular structure and electrochemical stability window. *Journal of Molecular Liquids* **364**, 120001 (2022)
- D. Torsello, E. Piatti et al. Nodal multigap superconductivity in the anisotropic iron-based compound $RbCa_2Fe_4As_4F_2$. *npj Quantum Materials* **7**, 10 (2022)
- E. Piatti et al. Charge transport mechanisms in inkjet-printed thin-film transistors based on two-dimensional materials. *Nature Electronics* **4**, 893 (2021)
- E. Piatti et al. Possible charge-density-wave signatures in the anomalous resistivity of Li-intercalated multilayer MoS_2. *Applied Surface Science* **461**, 269 (2018)
- E. Piatti et al. Multi-valley superconductivity in ion-gated MoS_2 layers. *Nano Letters* **18**, 4821 (2018)
- E. Piatti et al. Control of bulk superconductivity in a BCS superconductor by surface charge doping via electrochemical gating. *Physical Review B* **95**, 140501 (2017)

ORGANIZATION OF CONFERENCES AND WORSHOPS

2023: Member of the **Organizing Committee** and the **Scientific Committee** for Minicolloquium "MC45 – Superconductivity in two-dimensional and layered materials" of the 31st edition of international conference "Condensed Matter Division of the European Physical Society (CMD31)"

2021: Member of the **Scientific Committee** of international conference "Progress in Applied Surface, Interface and Thin Film Science - Solar Renewable Energy News (SURFINT-SREN VII)"

INVITED TALKS

- Sep 2026. 112th National Conference of the Italian Physical Society (SIF 2026). Florence, Italy.
- Jun 2026. 16th International Ceramics Congress (CIMTEC 2026). Perugia, Italy.
- Sep 2025. Imperial College London Early Career Research Seminar Series. London, United Kingdom.
- Jun 2024. Superstripes 2024 – Quantum in Complex Matter. Ischia, Italy.
- Sep 2023. FisMat 2023 – CMD30 Joint Conference. Milan, Italy.
- Jun 2023. Superstripes 2023 – Quantum in Complex Matter. Ischia, Italy.
- Jun 2022. 15th International Ceramics Congress (CIMTEC 2022). Perugia, Italy.
- Nov 2021. Progress in Applied Surface, Interface and Thin Film Science – Solar Energy News 2021 (SurfInt-SREN VII). Smolenice, Slovakia.
- Nov 2020. 11th International Conference on Solid State Surfaces and Interfaces (SSSI 2020). Smolenice, Slovakia.
- Nov 2019. Progress in Applied Surface, Interface and Thin Film Science – Solar Energy News 2019 (SurfInt-SREN VI). Florence, Italy.

EDITORIAL AND REVIEWER ACTIVITIES

2023 – 2025: Guest Editor for *Nanomaterials* (MDPI)
Special Issue: "Superconductivity and Magnetism in Two-Dimensional and Layered Materials"

2024 – Present: Review Editor for *Frontiers in Electronic Materials* (Frontiers)
2015 – Present: Peer reviewer for several international journals, including *Nature Physics Reviews, Nature Communications, Physical Review Letters, Nano Letters, Communications Materials, Communications Physics, npj Quantum Materials, Nanoscale*, and others.

TEACHING ACTIVITIES AT POLITECNICO DI TORINO

Co-supervision of PhD students 2018 – Present
PhD in Physics: G. Gavello (2022-2025), F. Galanti (2018-2020).

Co-supervision of MSc students 2015 – Present
MSc in Quantum Engineering: L. Barbati (2025)
MSc in Automotive Engineering: A. Nerici (2025)
MSc in Physics of Complex Systems: F. Marsi (2026), C. Tomaselli (2025), D. Ferraris (2023), J. Montagna Bozzone (2022), A. M. Bashar (2015)
MSc in Materials Engineering: F. Breccia (2024)
MSc in Materials Science: T. Nemati (2023)
MSc in Physics: F. Galanti (2016)

Supervision of BSc students 2025 – Present
BSc in Physical Engineering: F. Fagnano (2026), G. Spedicato (2025)

Physics II 2018 – Present
a.y. 2026-2027: BSc Energy Engineering (2° year), exercises, 15h
a.y. 2022-2023: BSc Engineering and Management (2° year), exercises, 30h
a.y. 2021-2022: BSc Engineering and Management (2° year), exercises, 15h
a.y. 2020-2021: BSc Engineering and Management (2° year), exercises, 15h
a.y. 2019-2020: BSc Engineering and Management (2° year), exercises, 15h
a.y. 2018-2019: BSc Engineering and Management (2° year), exercises, 15h

Technologies for Nanoscience 2019 – Present
a.y. 2025-2026: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2024-2025: BSc Physical Engineering (3° year), laboratories, 11.5h
a.y. 2023-2024: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2022-2023: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2021-2022: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2020-2021: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2019-2020: BSc Physical Engineering (3° year), laboratories, 15h
a.y. 2018-2019: BSc Physical Engineering (3° year), laboratories, 15h

Advanced Experimental Physics 2019 – 2025
a.y. 2024-2025: MSc Physics of Complex Systems (1° year), laboratories, 30h
a.y. 2023-2024: MSc Physics of Complex Systems (1° year), laboratories, 30h
a.y. 2022-2023: MSc Physics of Complex Systems (1° year), laboratories, 30.5h
a.y. 2021-2022: MSc Physics of Complex Systems (1° year), laboratories, 33h
a.y. 2020-2021: MSc Physics of Complex Systems (1° year), laboratories, 33h
a.y. 2019-2020: MSc Physics of Complex Systems (1° year), laboratories, 30h
a.y. 2018-2019: MSc Physics of Complex Systems (1° year), laboratories, 18h

Quantum Condensed Matter Physics 2023 – Present
a.y. 2026-2027: MSc Quantum Engineering (1° year), lectures, 10.5h
a.y. 2025-2026: MSc Quantum Engineering (1° year), lectures, 10.5h
a.y. 2024-2025: MSc Quantum Engineering (1° year), lectures, 10.5h
a.y. 2023-2024: MSc Quantum Engineering (1° year), lectures, 10.5h

Scanning Probe Microscopy for Physics and Engineering 2017 – Present
a.y. 2025-2026: PhD school of Politecnico di Torino, laboratories, 12h
a.y. 2024-2025: PhD school of Politecnico di Torino, laboratories, 6h
a.y. 2023-2024: PhD school of Politecnico di Torino, laboratories, 12h
a.y. 2022-2023: PhD school of Politecnico di Torino, laboratories, 9h

a.y. 2021-2022: PhD school of Politecnico di Torino, laboratories, 12h
a.y. 2020-2021: PhD school of Politecnico di Torino, laboratories, 12h
a.y. 2019-2020: PhD school of Politecnico di Torino, laboratories, 6h
a.y. 2018-2019: PhD school of Politecnico di Torino, laboratories, 12h
a.y. 2017-2018: PhD school of Politecnico di Torino, laboratories, 12h

f.to: Erik Piatti

Politecnico di Torino

Data: 27/08/2026 13:09:31 CEST

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