

**CURRICULUM VITAE**

Born in Milano, 30/11/1974  
 Civil status: married, two children  
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I am an Associate Professor at Politecnico di Milano since 2014, working on novel materials and phenomena related to **spin-electronics**, research motivated by the willingness to exploit the spin of carriers in innovative electronic devices in the field of memories and detectors with performances overcoming the actual technology.

My scientific activity, started in 2002 as PhD student, is mainly devoted to the realization and characterization of magnetic heterostructures and devices, with applications in the fields of spin electronics, in particular **semiconductor spintronics**, **spin-optoelectronics** and **antiferromagnetic spintronics**, and **nano-biotechnology**. This activity has been mainly carried at the interuniversity [L-NESS centre](#), Como, until 2014, and at [PoliFab](#), the new facility for micro and nanofabrication of Politecnico di Milano, since December 2014, where I am the responsible for the [Nanomagnetism](#) laboratory, where advanced magnetic and electrical characterizations of films and devices are carried on.

In the first part of my career, I explored the physics of optical spin orientation and spin transport in germanium, leading the group that developed the first prototype of a Ge-based **spin-photodiode**, i.e. a detector in the near IR-visible range sensible to the degree of light helicity, exploiting spin filtering.

Later, I led a project on nano-biotechnology (Magnetically Controlled Single Molecule Delivery, **MCSMD**), granted by Politecnico di Milano under a 5x1000 grant for social purposes, and then a project on Magnetic Information Storage in Antiferromagnet Spintronic Devices (**MAGISTER**), granted by Cariplo Foundation, that gave a strong advance in revealing the role of Chromium and related oxides in antiferromagnetic-based devices for green electronics.

The idea of a **green** – low cost, low dissipation – electronics drove my research since this point, first playing with the ferroic order to combine ferroelectricity and spin physics in composite systems, made by different materials interfaced each other (ferroelectric BaTiO<sub>3</sub> + ferromagnetic Co or CoFeB), then moving to all-in-one materials such as **GeTe**, **SnTe** and their combination **GeSnTe**, to which the last part of my scientific activity was devoted. Beyond reducing the Joule dissipation by playing with voltages, instead than currents, to store information, the intrinsic **neuromorphic** capabilities of these materials fit very well with my former background, acquired during my *M.Sc.* experience, on soft computing techniques for data analysis and real-time control, such as neural networks and genetic algorithms.

To actively pursue this scope, I designed and managed the acquisition of a high-performances deposition tool for **chalcogenides**, of which there are few examples in Italy, expressly dedicated to the above-mentioned materials, to move the fabrication capability of our group to high-quality samples over 2" diameter, going to meet industrial partners and investors.

**EDUCATION**

2002 – 2005	<i>PhD</i>	Physics, Department of Physics, Politecnico di Milano, Milan, Italy Dissertation: <i>Ferromagnet/semiconductor interfaces for spin electronics.</i> <i>Supervisor:</i> Prof. Franco Ciccacci
1993 – 1999	<i>M.Sc.</i>	Nuclear Engineering, Department of Nuclear Engineering, Politecnico di Milano, Milan, Italy Dissertation: Genetic algorithms for the optimal plant design <i>Supervisor:</i> Prof. Marzio Marseguerra <b>cum laude (top 12% of the students)</b>

**CURRENT POSITION**

2014 - 2024 **Associate professor** @ Department of Physics, Politecnico di Milano

**PREVIOUS POSITIONS**

2008 – 2014	<i>Assistant professor</i> @ Department of Physics, Politecnico di Milano
2009	<i>Visiting researcher</i> @ INESC-MN - Portugal
2005 – 2008	<i>Postdoctoral Fellow</i> @ Department of Physics, Politecnico di Milano
2000 – 2002	Process engineer @ Corning-OTI (Italy)
1999	Collaborator @ Department of Nuclear Engineering, Politecnico di Milano

**SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

- 2008 - now    *As a professor:* 2 PhD / 12 Master students  
                   *As a project leader:* 1 Postdoc  
 2005 – 2008: *As a postdoc* (day-by-day supervisor): 3 Master students

**TEACHING ACTIVITIES**

- 2023            Professor in charge – PhD course in ferroelectrics (“Playing with ferroic materials”)  
 2023 - now    Professor in charge – M.Sc. course in quantum mechanics (“Elements of modern physics”)  
 2019 – 2023   Professor in charge and co-tutor– M.Sc. course in advanced micro and nanofabrication  
 2018            Professor in charge – PhD course in fundamentals of micro and nanofabrication  
 2015 – 2016   Professor in charge – bachelor course on wave physics  
 2009 – 2023   Professor in charge – bachelor course on mechanics and thermodynamics  
 2004 – 2014   Teaching assistant in mechanics, thermodynamics, electromagnetism, and wave physics

**ORGANISATION OF SCIENTIFIC MEETINGS**

- 2024            Organizing committee, SpinCom satellite event of ICM 2024, Milano, Italy  
 2023            Organizing committee, Italian School of Magnetism (Information processing in spin-based systems), Milano, Italy  
 2020            Organizing committee, *Electric control of spin transport* workshop supported by the IEEE Magnetic Society, Milano, Italy  
 2012            Organizing committee, Conference on Superconductivity and Functional Oxides (SuperFOx, Como, Italy)

**INSTITUTIONAL RESPONSIBILITIES**

- 2017 – now    Member of the safety commission of Physics department, Politecnico di Milano, Italy  
 2017 – now    Member of the educational commission of Physics department, Politecnico di Milano, Italy  
 2019-2023    Associated member of the National Research Council Institute of Photonics and Nanotechnology (CNR-IFN), Italy

**REVIEWING ACTIVITIES**

- 2024 – now    Editorial Board, journal *Frontier in Electronic Materials* (MDPI, ISSN 2673-9895)  
 2021 – now    Editorial Board, journal *Materials* (MDPI, ISSN 1996-1944)  
 2019 – 2021   Editorial Board (special topic: Spintronics), journal *Electronics* (MDPI, ISSN 2079-9292)  
 2008 – 2024   More than 80 *peer reviews* for *Nano Letters*, *IEEE Magn. Lett.*, *APL*, *APL Materials*, *npg Asia Materials* and *npj Materials* (Nature family), *Appl. Surf. Sci.*, *JAP* and others

**MAJOR COLLABORATIONS**

- 2015 – present Dr. M. Taheri, Johns Hopkins, Baltimore, USA  
 2008 – present Dr. I. Pallecchi, Consiglio Nazionale delle Ricerche (CNR-SPIN), Genova, Italy  
 2007 – present Prof. P. Vavassori, cigNanoGUNE, Donostia-San Sebastian, Spain  
 2005 – present Dr. S. Picozzi, Consiglio Nazionale delle Ricerche (CNR-SPIN), Chieti, Italy  
 2003 – present G. Panaccione, J. Fujii and P. Torelli, CNR-IOM Elettra Synchrotron of Trieste, Italy

**AUTHOR RECORD**

- 99 *publications* in peer-reviewed journals [including 1 *Nature Electronics*, 3 *Adv. Mater.*, 2 *Nature Commun.*, 1 *Nano Letters*, 1 *Phys. Rev. Lett.*, 3 *Adv. Mater.* family, 1 single-author paper, 1 invited *APL Mater.*]; *H-index*: 22 ([Scopus/WoS](#)), 25 ([Google Scholar](#)); ~2000 *citations* (excluding self-citations), 14 *publications* as first author, 8 as leading (last) author.  
 4 *italians patent applications*  
 1 *book chapter* in “Ultra-High-Density Magnetic Recording”, Stanford, 2016  
 1 *textbook* (as single author) and 3 *contributions to textbooks* on fundamental physics

**GRANTS**

- 2023 – 2025    Partenariato Infrastrutture - Piano Nazionale di Ripresa e Resilienza (PNRR) - 5 M€ | Responsible for the acquisition of an ultra-high vacuum cluster tool for MBE deposition and sample transfer to other station (>600 k€), and for FAIR data protocol implementation and managing under the NFFA-DI network.  
 2018 – 2021    Development of an integrated spin detector for ARPES, granted by CNR-IOM. **Principal investigator**  
 2014 - 2017    Magnetic Information Storage in Antiferromagnet Spintronic Devices (MAGISTER), granted by Cariplo Foundation. **Principal investigator**  
 2011 - 2013    Magnetically Controlled Single Molecule Delivery (MCSMD), granted by Politecnico di Milano **Principal investigator**