

## PERSONAL INFORMATION

**Luciano Colombo** – last update: May 5th, 2026



📍 Dept. of Physics - University of Cagliari, Cittadella Universitaria, 09042 Monserrato (Ca), Italy

☎ +39 070 675 4871

📞 +39 320 19 37 645

✉ [luciano.colombo@unica.it](mailto:luciano.colombo@unica.it)

🆔 0000-0001-5335-4652

🌐 [https://web.unica.it/unica/page/en/luciano\\_colombo](https://web.unica.it/unica/page/en/luciano_colombo)

Sex male | Date of birth August 6, 1960 | Nationality Italian

PhD date January 27, 1989	<input type="checkbox"/> <10 years from the date of the first PhD	<input checked="" type="checkbox"/> >10 years from the date of the first PhD
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Enterprise	University	EPR
<input type="checkbox"/> Management Level	<input checked="" type="checkbox"/> Full professor	<input type="checkbox"/> Research Director and 1st level Technologist / First Researcher and 2nd level Technologist / Principal Investigator
<input type="checkbox"/> Mid-Management Level	<input type="checkbox"/> Associate Professor	<input type="checkbox"/> Level III Researcher and Technologist
<input type="checkbox"/> Employee / worker level	<input type="checkbox"/> Researcher	<input type="checkbox"/> Researcher and Technologist of IV, V, VI and VII level / Technical collaborator

## EMPLOYMENTS

### Current position(s)

- Full professor of theoretical condensed matter physics
- Vice-rector for Research, University of Cagliari (Italy)
- Fellow of the "Istituto Lombardo – Accademia di Scienze e Lettere" (Milano, Italy)

### Previous positions(s)

- 2002-current: full professor, University of Cagliari (Italy)
- 1999-2002: associate professor, University of Cagliari (Italy)
- 1996-1999: assistant professor, University of Milano-Bicocca (Italy)
- 1990-1996: assistant professor, University of Milano (Italy)

## EDUCATION AND ACADEMIC DEGREES

- 1990: post-doc research associate, International School for Advanced Studies (Trieste, Italy)
- 1989-1990: post-doc research fellow, École Polytechnique Fédérale de Lausanne (CH)
- 1985-1989: Ph.D. student in physics, University of Pavia (Italy)
- 1979-1984: M.Sc. student in physics, University of Pavia (Italy)
- 1979-1983: alumnus Almo Collegio Borromeo (Pavia, Italy)

## ACHIEVEMENTS AND AWARD

### Awards

- 2015: Fellow of the "Istituto Lombardo – Accademia di Scienze e Lettere"
- 2013: "Excellent Researcher Grant (REG)" awarded by the European Metrology Research Project (EMRP-kNOW) under the initiative "Towards a new definition of the kilogram"
- 1995: "Advanced Research Grant" awarded by NATO
- 1994 Gordon-Bell prize of the IEEE Computer Society (co-recipient with S. Goedecker of the Cornell Theory Center) with the motivation: "In recognition of their effort in practical parallel processing research" [See paper: S. Goedecker, L. Colombo, Efficient linear scaling algorithm for tight-binding molecular dynamics, Phys. Rev. Lett. **73**, 122 (1994)]

## PUBLICATIONS

### Bibliometric parameters

- Total number of publications in peer-review journals: 318 (source: Scopus)
- Total number of citations: 8160 (source: Scopus) – 11147 (Google Scholar)
- H index: 45 (source: Scopus) - 54 (Google Scholar)

### Publications highlights (last 5 years)

1. "Tailoring the transport coefficients and thermoelectric properties of Cs<sub>2</sub>NaYbCl<sub>6</sub> perovskite by doping and nanoengineering: A first-principles based theoretical approach", **Physical Reviews Materials** (DOI: [10.1103/729y-m77y](https://doi.org/10.1103/729y-m77y))
2. "Coherent phonon transport in 2D layered Cu<sub>3</sub>BHT metal organic frameworks", **Scientific Reports**, (DOI: [10.1038/s41598-025-25225-8](https://doi.org/10.1038/s41598-025-25225-8))
3. "Understanding hydrogen and heat diffusion across c-Si/a-Si:H heterojunctions for improved thermal management in solar cells fabrication", **Nanotechnology**, (DOI: [10.1088/1361-6528/adb8f3](https://doi.org/10.1088/1361-6528/adb8f3))
4. "An In Situ TEM Study of the Diffusivity of Gold Atoms in Nanocomposite Thin Films by Zirconia Co-Deposition: Implication for Neuromorphic Computing", **Applied Nano Materials** (DOI: [10.1021/acsnm.4c05993](https://doi.org/10.1021/acsnm.4c05993))
5. "Introducing the concept of generalized thermal diffusivity to understand coupled heat-charge transport in ionic solutions", **Applied Physics Letters** **2024** (DOI: [10.1063/5.0201444](https://doi.org/10.1063/5.0201444))
6. "Strong anharmonicity at the origin of anomalous thermal conductivity in double perovskite Cs<sub>2</sub>NaYbCl<sub>6</sub>", **Advanced Science** **2023** (DOI: [10.1002/adv.202305861](https://doi.org/10.1002/adv.202305861))
7. "Thermally Promoted Cation Exchange at the Solid State in the Transmission Electron Microscope: How It Actually Works", **ACS Nano** **2023** (DOI: [10.1021/acsnano.3c04516](https://doi.org/10.1021/acsnano.3c04516))
8. "Molecular Dynamics simulations of Thermal Transport in Solids", **Comprehensive Computational Chemistry** **2023** (DOI: [10.1016/B978-0-12-821978-2.00095-7](https://doi.org/10.1016/B978-0-12-821978-2.00095-7))
9. "Observation of second sound in a rapidly varying temperature field", **Science Advances** **2021** (DOI: [10.1126/sciadv.abg4677](https://doi.org/10.1126/sciadv.abg4677))
10. "Intrinsic thermoelectric figure of merit of bulk compositional SiGe alloys - A first-principles study", **Physical Review Materials** **2021** (DOI: [10.1103/PhysRevMaterials.5.065403](https://doi.org/10.1103/PhysRevMaterials.5.065403))

### Monographs

- 8 authored books
- 4 edited books

## RESEARCH

### Research interests

My research is theoretical/computational in character, it is mainly focused on novel (nano)materials, and it is primarily addressed at improving our fundamental understanding of their structural, transport, functional, and mechanical properties for energy production & harvesting, information technology, advanced functional and structural applications, and biomedical applications.

I am also interested in developing/applying new theoretical and computational methods and algorithms for large scale atomistic simulations.

Highlights of my research include:

- thermal and electronic transport in nanostructured and low-dimensional materials for thermoelectric applications
- nanostructured semiconductor and hybrid systems for solar energy harvesting and photovoltaics
- thermal, transport, and mechanical properties of 2-dimensional atomic sheets (in particular, graphene, TDMS, and related materials)
- physical properties of granular materials for neuromorphic computing
- porous nanomaterials
- organic glasses: growth, stability, and transport properties
- methods for atomistic simulations in condensed matter systems
- algorithms for large-scale atomistic simulations in materials physics.

### Project leadership

- 2023-present: NextGenerationEU (Italian PNRR) call for Extended Partnership, project "Network 4 Energy Sustainable Transition" (PE-NEST) Spoke 2 WP "Energy harvesting" – role: group leader at the University of Cagliari
- 2023-present: NextGenerationEU (Italian PNRR) call for Ecosystems of Innovation, project "Ecosystem of Innovation for Next generation Sardinia" (e.INS) Spoke 7 WP "New materials for photovoltaics" – role: group leader at the University of Cagliari
- 2022-2023: Horizon Europe, MSCA-2022-Citizens action, project "SHARing Researchers' Passion for Enhanced Roadmaps - The European Researchers' Night in Italy 2022-2023" (SHARPER) - role: principal investigator @ University of Cagliari
- 2021-2022: NextGenerationEU (Italian PNRR) call for Research Infrastructures, project "Einstein Telescope Infrastructure Consortium" – role: leader of the research unity at the University of Cagliari

- 2021: Horizon 2020, MSCA-Night action, project "Sharing Researchers' Passion for Engaging Responsiveness - The European Researchers' Night in Italy" (SHARPER) - role: principal investigator @ University of Cagliari
- 2019-2022: PON 2014-2020 call, project Attraction&International Mobility "Theoretical design of SiGe nanostructures for efficient thermoelectric conversion" – role: project leader
- 2019-2022: "Brains to South" call, project "GRANular matter for NEuromorphic Computing" (GRANECO) – role: project supervisor for University of Cagliari
- 2019-2022: call "Progetti ricerca di base - Fondazione di Sardegna", project "ADVanced Nanoporous materials for Cutting-edge engineerING" (ADVANCING) - role: leader of a research unit.
- 2018-2021: EU FLAG-ERA call, project "MECHANIC" (P.I. A. Isaacson) – role: leader of a research unit
- 2015-2018: "Progetti ricerca di base – Regione Autonoma Sardegna", project "Porous silicon for energy applications" – role: project leader
- 2012-2015: MiUR-PRIN project "Frontiers in Graphene Research: understanding and controlling Advanced Functionalities" – role: leader of a research unit
- 2012-2014: "Progetti ricerca industriale – Regione Autonoma Sardegna", project "Stretchable electronics for biomedical applications" – role: leader of a research unit
- 2010-2013: "Progetti ricerca di base – Regione Autonoma Sardegna", project "Multiscale Modeling of Mechanical properties of Materials" – role: project leader
- 2005-2009: EU-PON project "A cyberinfrastructure for science and technology" – leader of the activity "Computational hard- and soft-matter physics"
- 2004-2008: EU-STREP FP-6 project "Nanocrystalline silicon for photovoltaic and optoelectronic applications" – role: leader of a research unit
- 2003-2006: MiUR-FIRB project "Modeling and structural characterization of ion radiation induced defects in crystalline silicon" – role: leader of a research unit
- 2002-2006: MiUR-FIST project "Design, processing, and modeling of novel ceramic composites and coatings" – role: leader of a research unit
- 2002-2004: MiUR-PRIN project "Bridging molecular dynamics to continuum mechanics: a multiscale description of mechanical properties of materials" – role: leader of a research unit
- 2000-2002: INFM project "An hybrid classical/quantum simulation scheme for modeling silicon bulk processing" – role: project leader
- 2000-2002: MiUR-PRIN project "Multiscale approach to the unification of micro- and macro-mechanics of linear and nonlinear materials" – role: leader of a research unit
- 1998-1999: MiUR-PRIN project "Ion-induced microstructural evolution: a computational approach" – role: leader of a research unit
- 1995-1998: NATO-CRG project "Molecular dynamics studies of defect properties and dopant diffusion in silicon" – role: project leader

## ADDITIONAL INFORMATION

### Institutional responsibilities

- 2024-present: Head of the Task Force for the implementation of the "Human Research Strategy for Research" (EU-HRS4R) of the University of Cagliari
- 2023-present: Official delegate of the University of Cagliari in the Coalition for an Agreement on Research Assessment (CoARA)
- 2021-present: Vice-Rector for Research of the University of Cagliari
- 2020-2021: Member of the Committee for the evaluation of the seniority shooting records for professors and researchers enrolled at the University of Cagliari
- 2020-present: member of the Scientific Steering Committee of the University college "S. Efisio College"
- 2018-2021: Member of the Disciplinary Board of the University of Cagliari
- 2017-2019: Member of the Committee for the evaluation of the seniority shooting records for professors and researchers enrolled at the University of Cagliari
- 2011-2015: Head of the Department of Physics of University of Cagliari
- 2009-2011: Coordinator of the "Physics and Mathematics Section" of the Faculty of Engineering at the University of Cagliari
- 2009-2010: Director of the "Sardinian Laboratory for Computational Materials Science" (CNR-SLACS)
- 2003-2007: Coordinator of the Ph.D. Program in Physics of University of Cagliari

### Commission of trust

- 2024-present: member of the Scientific Committee for Italian SuperComputing Resource Allocation (ISCRA)

- 2023-present: member of the Scientific and Technical Committee of the PNRR NEST Partnership
  - 2022-present: Member of Monitoring Committee of the PNRR National Center for Gene Therapy
  - 2006-2011: Member of the Scientific Board of the CYBERSAR supercomputing center, Cagliari
  - 2005-2010: Member of the Scientific Board of the CASPUR supercomputing center, Rome
  - 2002-2004: Chair of the Steering Committee for High Performance computing of the National Institute for the Physics of Matter
- Mentorship of students/young researchers/fellows**
- 88+ master and Ph. D. Theses in Physics and Engineering
  - 18 post-doc and tenure-track research associates
- Organisation of conferences/scientific meetings**
- E-MRS Symposium "Computer modelling of thermal transport at the nanoscale" (2017 Spring Meeting, May 22-26, 2017, Strasbourg, France)
  - MRS Symposium "Advances in materials theory – bridging over multiple length and time scales" (2001 Spring Meeting, April 16-20, 2001, San Francisco, USA)
  - MRS Symposium "Tight-binding approach to computational materials science" (1997 Fall Meeting, December 1-3, 1997, Boston, USA)
- Major invited presentations**
- 80+ at international conferences, workshops, and schools (including, but not limited to: March Meeting of the American Physical Society; General Conference of the Condensed Matter Division of the European Physical Society; workshops at the Centre Européen de Calcul Atomique et Moléculaire; International Centre for Theoretical Physics; European Materials Research Society)
- Editorial and Reviewing activities**
- 2021-2024: Managing Editor of "The European Physical Journal Plus", the "open access" official journal of the European Physical Society (EPS)
  - 2019-2021: Member of the Editorial Board of the "Rivista del Nuovo Cimento" (Italian Physical Society)
  - 2018-present: Member of the Steering Committee of the "Cagliari University Press" (the official publisher of the University of Cagliari)
  - 2012-2015: Colloquia&Reviews Editor of the "European Physical Journal B – Condensed matter physics and complex systems" (EPJ-B) of the European Physical Society (EPS)
  - 2008-2012: Editor-in-Chief of the "European Physical Journal B – Condensed matter physics and complex systems" (EPJ-B) of the European Physical Society (EPS)
  - 2006-2008: co-Editor of "Applied Physics A"
  - Reviewer of several journals covering materials science, condensed matter physics, and chemical physics

"According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV "

Date and signature

Luciano Colombo  
Cagliari, May 5<sup>th</sup>, 2026 – *digitally signed*