

## PERSONAL INFORMATION

**Barbara Malgorzata Mendecka**

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🌐 [Linkedin](#)

Gender Female | Date of birth 10/05/1986 | Nationality Polish

POSITION **Tenure Track Researcher in Fluid Machinery (SSD ING-IND/08)**

## PROFESSIONAL PROFILE

Assistant Professor in Machinery and Energy Systems at Niccolò Cusano University of Rome. My research focuses on the development of components and systems for energy conversion and storage, for both mobile and stationary applications, and on the integration of emerging technologies with renewable energy sources. I adopt a computer-aided and model-based design approach, extending from simulation to testing of complete devices, complemented by system-level analyses including exergy evaluation, life cycle assessment, and multi-criteria methodologies.

## BIBLIOMETRIC INDICATORS

(Updated April 2026, based on Scopus [Google Scholar]):

- Total publications: 50
- Citations: 750 [961]
- h-index: 18 [19]

## NATIONAL SCIENTIFIC QUALIFICATION

Italian National Scientific Qualification (ASN) – Associate Professor (II level), competition sector 09/C1 – Machines and Systems for Energy and the Environment. Valid 31/05/2021 – 31/05/2030.

## WORK EXPERIENCE

- Oct 2024 – Present **Tenure Track Researcher (RTT), ING-IND/08 Fluid Machinery**  
Department of Industrial Engineering, Università degli Studi Niccolò Cusano, Rome.
- Jul 2021 – Present **Scientific Collaborator, Member of the Technical and Scientific Committee**  
SCIRE – Scientific Consortium for the Industrial Research and Engineering.
- Oct 2021 – Sep 2024 **Fixed-term Researcher (art.24 c.3a), ING-IND/08 Fluid Machinery**  
Università degli Studi Niccolò Cusano, Rome.

- Jun 2020 – May 2021 **Post-doctoral Research Fellow**  
Università degli Studi della Tuscia, CINTEST, SSD ING-IND/11 Environmental Technical Physics.  
Research topic: Innovative bricks with waste materials.
- Jan 2017 – Dec 2019 **Post-doctoral Research Fellow**  
Università degli Studi di Firenze, D.I.E.F., SSD ING-IND/09 Systems for Energy and Environment.  
Research topic: Life cycle analysis of olive residues treatment alternatives.
- Jan 2016 – Dec 2016 **Post-doctoral Research Fellow**  
Università degli Studi di Firenze, D.I.E.F., SSD ING-IND/17 Industrial Mechanical Plants.  
Research topic: LCA-oriented methodologies for sustainable production and energy conversion processes.
- Jan 2011 – Jul 2016 **Founder and Scientific Director**  
Infracert start-up company (equivalent to ATECO 71.20, 71.12, 85.59.90).  
Objective: dissemination of academic competences and promotion of technology transfer from university to enterprises.

#### ACADEMIC APPOINTMENTS AND INSTITUTIONAL RESPONSIBILITIES

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- 27 Jan 2023 – Present **Member of the University Erasmus Committee**  
Università degli Studi Niccolò Cusano, Telematic University of Rome.
- 15 Dec 2023 – 6 Mar 2025 **Member of the Department Research and Third Mission Committee**  
Department of Engineering, Università degli Studi Niccolò Cusano, Telematic University of Rome.
- 6 Mar 2025 – Present **Member of the Department Quality Assurance Committee**  
Department of Engineering, Università degli Studi Niccolò Cusano, Telematic University of Rome.

#### MANDATORY MATERNITY LEAVE

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The candidate benefited from mandatory maternity leave before and after childbirth from 01/12/2019 to 01/05/2020 (5 months in total), and from 01/08/2023 to 01/01/2024 (5 months in total).

#### EDUCATION AND TRAINING

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- 2015 **PhD in Environmental Engineering**  
Silesian University of Technology, Faculty of Energy and Environmental Engineering, Institute of Thermal Technology.  
Thesis: *Multi-criteria optimization of renewable energy use in the municipal sector.*
- 2010 **MSc in Environmental Engineering, Energy track (5/5 cum laude)**  
Silesian University of Technology, Faculty of Energy and Environmental Engineering.

- 2009 **BSc in Environmental Engineering, Energy track (5/5 cum laude)**  
Silesian University of Technology, Faculty of Energy and Environmental Engineering.
- 2013 **Postgraduate Master: Innovation Manager**  
Silesian University of Technology, Faculty of Management.
- 2011 **Postgraduate Master: Energy Audits and Certification in Civil Engineering**  
Silesian University of Technology, Faculty of Energy and Environmental Engineering.

#### TEACHING ACTIVITIES

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- 2025 – Present **Course holder: *Fluid machinery* (9 CFU)**  
Bachelor in Industrial Engineering, Università degli Studi Niccolò Cusano, Rome.
- 2020 – Present **Course holder: *Machinery and Hospital Plants* (9 CFU)**  
Bachelor in Industrial Engineering, Università degli Studi Niccolò Cusano, Rome.
- 2010 – 2016 **Past teaching at Silesian University of Technology, Department of Energy and Environmental Engineering**  
Technical thermodynamics (30h exercises, 120h laboratory)  
Heat transfer (60h exercises, 30h laboratory)  
Basics of municipal energy systems (180h project)  
Financial engineering in the energy sector (30h project)  
Basics of metrology and experimental techniques (30h laboratory)  
Low emission combustion and flue gas control (15h laboratory)  
Environmental engineering in agriculture (60h project)  
Energy saving building design (60h laboratory)  
Trainer for the national programme *Energolider*: “Low-energy houses as the future in construction sector, LEED and BREEAM certification” (100h teaching, 320 participants).

#### ADDITIONAL INSTITUTIONAL TEACHING ACTIVITIES

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Since 2016, continuous supervision and co-supervision of 30 Bachelor’s and Master’s theses in the field of machinery and energy systems at Università degli Studi Niccolò Cusano, Telematic University of Rome, and Sapienza University of Rome.

Co-supervisor of 1 PhD thesis at Università degli Studi Niccolò Cusano, Telematic University of Rome.

#### PARTICIPATION IN RESEARCH PROJECTS

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- 30 Jun 2025 – Present **Scientific Coordinator of the SCIRE Consortium**  
HyAgroBox – Hybrid modular system for the production, storage and use of green hydrogen in decentralized agricultural contexts, funded by the Italian Ministry of the Environment and Energy Security (MASE), Mission Innovation 2.0. Formal appointment as Scientific Head of the SCIRE Consortium. Responsible for the scientific coordination of the SCIRE unit, methodological development, supervision of research activities, validation of results, and contribution to the overall project design and implementation.

- 1 Jun 2023 – Present **Scientific Coordinator of Local Unit**  
BRiC 2022 ID 03/2022 – Compact Tractor 4.0 – Development of a low-profile electric tractor aligned with Industry 4.0 technologies, funded under the BRIC 2022 collaborative research call (INAIL). Partners: Università degli Studi Niccolò Cusano, Università degli Studi della Tuscia, Università degli Studi di Milano, INAIL. Responsible for the scientific activities of the local unit, including modeling, system design and performance analysis.
- 1 Sep 2022 – Present **External Scientific Expert and Head of Local Unit**  
ATHLETE – Experimental and numerical investigation of thermal and mass separation within the Ranque–Hilsch vortex tube: from fundamental investigation to industrial applications, funded by the Polish Ministry of Science and Education. Responsible for coordination of the local research unit and contribution to scientific development and validation activities.
- 1 Sep 2022 – Present **Research collaborator**  
LIFE-C – Promoting life cycle thinking in higher education, Erasmus+ Programme 2021–2027 (Key Action 2). Partners include Silesian University of Technology, LUT University, NTUA, Valuedo Srl, Università degli Studi Niccolò Cusano. Contribution to LCA methodologies and integration in higher education frameworks.
- 1 Jan 2019 – 31 Mar 2021 **Research collaborator**  
GEOENVI – Tackling environmental concerns for deploying geothermal energy in Europe, Horizon 2020 Programme (H2020-LC-SC3-2018). Contribution to environmental impact assessment and sustainability analysis of geothermal systems.
- 1 Jan 2017 – 31 Dec 2020 **Research collaborator**  
PRIN – Development of a New Hydrothermal Carbonization Reactor with Renewable Energy Supply for Biomass Treatment (CREA). Contribution to life cycle and thermodynamic analysis of biomass conversion processes.
- 1 Mar 2013 – 31 Dec 2014 **Scientific Coordinator**  
“Optimization of energy and resources management in public buildings: influence of renewable energy use”, funded by the Polish Ministry of Science and Education (grant BKM527/RIE6/2013). Responsible for scientific coordination and project implementation.
- 1 Jan 2011 – 31 Dec 2012 **Research collaborator**  
National R&D Project: “Design and implementation of perimetric integrity evaluation system for a natural gas city gate station”, funded by the Polish National Centre for R&D.
- 1 Sep 2010 – 30 Apr 2013 **Research collaborator**  
Strategic Project: “Integrated System for Reducing Energy Consumption in Buildings”, task on renewable energy integration in the residential sector, funded by the Polish National Centre for R&D.

#### RESEARCH GROUPS AND SCIENTIFIC RESPONSIBILITIES

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- 1 Jan 2018 – Present **Research group member**  
Participation in the research group on thermal energy storage systems based on phase change materials, involving faculty members, researchers and PhD students from Università Niccolò Cusano, University of Rome Tor Vergata, and the SERG (Sustainable Energy Research Group) of the University of Florence.

**1 Jan 2018 – Present Research group member**

Participation in the research group on distributed energy generation systems involving faculty members, researchers and PhD students from Università Niccolò Cusano and the SERG (Sustainable Energy Research Group) of the University of Florence.

**1 Jan 2017 – 1 Jun 2020 Research group member**

Participation in the research group on exergo-environmental aspects of wind energy, involving faculty members, researchers and PhD students from Silesian University of Technology, Università Niccolò Cusano and the SERG (Sustainable Energy Research Group) of the University of Florence.

**1 Jan 2017 – Present Research group member**

Participation in the research group on integration of solar plants in energy recovery systems from waste, involving faculty members, researchers and PhD students from AGH University of Science and Technology, Università Niccolò Cusano and the SERG (Sustainable Energy Research Group) of the University of Florence.

**1 Jan 2016 – 1 Jun 2020 Research group member**

Participation in the research group on the sustainability of biodiesel production from waste materials, involving faculty members, researchers and PhD students from Silesian University of Technology, Università Niccolò Cusano and the SERG (Sustainable Energy Research Group) of the University of Florence.

**18 Mar 2015 – 10 Jun 2015 Scientific Coordinator**

Study: "Analysis of solar collectors efficiency improvement in municipality of Kroczyce" (title translated from the original Polish), commissioned by the Municipality of Kroczyce, Poland, under call UG-V.KW-00049/15.

**1 Mar 2013 – 31 Dec 2014 Scientific Coordinator**

Study: "Optimization of energy and resources management in public buildings: influence of renewable energy use" (title translated from the original Polish), grant BKM527/RIE6/2013, financed by the Polish Ministry of Science and Education under call E/367-M-2013 for young researchers, Silesian University of Technology.

**TECHNOLOGY TRANSFER**

Co-author of Polish patent: Koziol J., Gazda W., Mendecka B., Gladysz R. (2017). "Compressor-type cooling-and-heating machine with non-throttle recirculated medium expansion system". Ref. No: PL412141 (A1) / PL225728 (B1). Developed with Silesian University of Technology and ZECHiK Srl.

**EDITORIAL AND REVIEWING ACTIVITIES****2021 – Present Topic Board Editor**

Energies (ISSN 1996-1073), international peer-reviewed journal.

**Since 2021 Guest Editor**

Guest Editor of Special Issues in Energies (ISSN 1996-1073):

- "Performance and Optimization of Solar Thermal Energy Storage Systems"
- "Exergy Analysis of Renewable Energy Sources"

**Since 2021 Guest Editor**

Guest Editor of a Special Issue in Sustainability (ISSN 2071-1050):  
– "Advances in Energy Storage Systems: Design, Modeling and Applications"

**2013 – Present Reviewer for international journals**

Reviewer for several international journals, including: Energy, Applied Energy, Renewable Energy, European Journal of Operational Research, Energy Strategy Reviews, Journal of Cleaner Production, Sustainability, Wind Energy, and Wind Energy Science.

**Sep 2014 – Present Reviewer for international conferences**

Reviewer for contributions submitted to international conferences, including: ECOS (International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems), CPOTE (Contemporary Problems of Thermal Engineering), and SDEWES (Conference on Sustainable Development of Energy, Water and Environment Systems).

**Sep 2014 – Present Session chair and co-chair at international conferences**

Chair and co-chair roles in international conferences, including CPOTE, SDEWES, and ECOS.

**AWARDS AND INTERNATIONAL RECOGNITION**

- 2019 Best Poster Award for Young Researchers – ECOS 2019, conferred by the ECOS Award Committee for the paper: Micali F., Mendecka B., Lombardi L., De Risi A., Ferrara G. (2019). *Simplified kinetic model of HTC conversion of olive pomace*. In: ECOS 2019 - Proceedings of the 32nd International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems, pp. 4631–4639, ISBN: 978-836150651-5, Wroclaw, Poland, 23–28 June 2019.
- 2019 Most Cited Paper Award, Journal of Sustainable Development of Energy, Water and Environment Systems, conferred by the SDEWES Award Committee for the paper: Koziol J., Mendecka B. (2015). *Evaluation of Economic, Energy-environmental and Sociological Effects of Substituting Non-renewable Energy with Renewable Energy Sources*. Journal of Sustainable Development of Energy, Water and Environment Systems, 3, 333–343. doi:10.13044/j.sdewes.2015.03.0025. Award presented at the 14th Conference on Sustainable Development of Energy, Water and Environment Systems, Dubrovnik, Croatia, 1–6 October 2019.

**ORGANIZATION AND COORDINATION OF SCIENTIFIC INITIATIVES****28 Sep 2026 – 30 Sep 2026 Member of the Scientific Committee; Session Organizer**

CSM 2026 – Conference on Sustainable Mobility, Catania, Italy.

**18 Sep 2024 – 20 Sep 2024 Member of the Scientific Committee; Session Organizer**

CSM 2024 – 4th Conference on Sustainable Mobility, Catania, Italy.

**30 Aug 2026 – 3 Sep 2026 Member of the Scientific Advisory Board**

21st Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Gran Canaria, Spain.

**5 Oct 2025 – 10 Oct 2025 Member of the Scientific Advisory Board**

20th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Dubrovnik, Croatia.

8 Sep 2024 – 12 Sep 2024 **Member of the Scientific Advisory Board**

19th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Rome, Italy.

24 Sep 2023 – 29 Sep 2023 **Member of the Scientific Advisory Board**

18th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Dubrovnik, Croatia.

6 Nov 2022 – 10 Nov 2022 **Member of the Scientific Advisory Board**

17th Conference on Sustainable Development of Energy, Water and Environment Systems (SDEWES), Paphos, Cyprus.

15 Sep 2021 – 17 Sep 2021 **Member of the organizing committee of the thematic session**

“Sustainable energy systems”, 76th ATI National Congress, Rome, Italy.

28 Jun 2021 – 2 Jul 2021 **Member of the organizing committee**

34th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS), Taormina, Italy.

15 Oct 2014 – 17 Oct 2014 **Member of the organizing committee**

National Congress “Polish Energy Mix”, Ustroń, Poland.

18 Sep 2012 – 20 Sep 2012 **Member of the organizing committee**

3rd International Conference on Contemporary Problems of Thermal Engineering, Gliwice, Poland.

## STANDARDIZATION ACTIVITIES

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Member of IEC TC 117 – Solar Thermal Electric Plants.

Member of IEC Project Teams:

- PT 62862-1-5: Performance code test for solar thermal electric plants
- PT 62862-2-3: Protocol for testing sensible and latent thermal energy storage prototypes

## SELECTED PUBLICATIONS

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Mendecka, B., Lombardi, S., Tribioli, L., & Chiappini, D. (2026). *Exposing the hidden inefficiencies of electric quadricycles: An exergy-based analysis of real-world HVAC and battery thermal management under extreme weather conditions*. Energy Conversion and Management. doi:10.1016/j.enconman.2026.121214

Federici, L., Tribioli, L., Cozzolino, R., Mendecka, B., & De Santis, M. (2025). *Investigation on battery and fuel cell electric vehicle-to-grid potential for microgrid frequency regulation*. International Journal of Hydrogen Energy. doi:10.1016/j.ijhydene.2025.03.085

Mendecka, B. M., Tribioli, L., Lombardi, S., Federici, L., & Bella, G. (2024). *Environmental impacts of a low-profile full electric specialized tractor: A case study on different battery pack configurations*. SAE Technical Paper. doi:10.4271/2024-01-4318

Cecchini, M., Mendecka, B., et al. (2024). *Compact Tractor 4.0: An investigation for the development of a low-profile full electric specialized tractor*. In: Sustainable Agriculture and Energy Transition in Europe. Springer. doi:10.1007/978-3-031-63504-5\_17

Mendecka, B., Krastev, V. K., Serao, P., & Bella, G. (2023). *Experimental and numerical electro-thermal characterization of lithium-ion cells for vehicle battery pack applications*. SAE Technical Paper. doi:10.4271/2023-24-0159

Silvestri, L., De Santis, M., Mendecka, B., Bella, G. (2022). *Identification of the Optimal Storage Capacity for Battery Electric Vehicles From a Life Cycle Assessment Perspective*. SAE Technical Paper.

Mendecka, B., Di Ilio, G., Krastev, V.K., Bella, G. (2022). *Technical assessment of PCM thermal expansion for passive solar tracking in residential TES*. Journal of Energy Storage, 48, 103990. doi:10.1016/j.est.2022.103990

Mendecka, B., Di Ilio, G., Krastev, V.K., Bella, G. (2022). *Evaluating the potential of phase-change induced volumetric expansion in TES for passive solar tracking*. Applied Thermal Engineering, 212, 118561. doi:10.1016/j.applthermaleng.2022.118561

Mendecka, B., Chiappini, D., Tribioli, L., & Cozzolino, R. (2021). *A biogas-solar hybrid off-grid power plant with multiple storages for US commercial buildings*. Renewable Energy, 179, 705-722. doi:10.1016/j.renene.2021.07.078

Mendecka, B., Tribioli, L., & Cozzolino, R. (2020). *Life cycle assessment of a stand-alone solar-based polygeneration power plant in different climate zones*. Renewable Energy, 154, 1132-1143. doi:10.1016/j.renene.2020.03.063

Mendecka, B., Lombardi, L., & Koziol, J. (2020). *Probabilistic multi-criteria analysis for evaluation of biodiesel production technologies*. Renewable Energy, 147, 2542-2553. doi:10.1016/j.renene.2017.05.037

Mendecka, B., & Lombardi, L. (2019). *Life cycle environmental impacts of wind energy technologies: review and harmonization*. Renewable and Sustainable Energy Reviews, 111, 462-480. doi:10.1016/j.rser.2019.05.019

Mendecka, B., Cozzolino, R., Leveni, M., & Bella, G. (2019). *Energetic and exergetic performance evaluation of a solar cooling and heating system*. Energy, 176, 816-829. doi:10.1016/j.energy.2019.04.024

Leveni, M., Manfrida, G., Cozzolino, R., & Mendecka, B. (2019). *Energy and exergy analysis of cold and power production from Torre Alfina geothermal reservoir*. Energy, 180, 807-818. doi:10.1016/j.energy.2019.05.102

Mendecka, B., Lombardi, L., & Stanek, W. (2018). *Life cycle thermo-ecological cost of wind electricity and incentive mechanisms*. Energy Conversion and Management, 170, 73-81. doi:10.1016/j.enconman.2018.05.084

Lombardi, L., Mendecka, B., Carnevale, E., & Stanek, W. (2018). *Environmental impacts of micro wind turbines with vertical axis*. Renewable Energy, 128, 553-564. doi:10.1016/j.renene.2017.07.010

PERSONAL SKILLS

Mother tongue Polish

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2
Italian	C1/C2	C1/C2	C1/C2	C1/C2	C1/C2

Scientific and technical skills	<p>Advanced modeling and simulation of energy systems, including multi-domain dynamic modeling (MATLAB/Simulink) and system-level design of integrated energy solutions.</p> <p>Expertise in exergy and exergo-environmental analysis, with application to energy conversion systems, electric mobility, and thermal management.</p> <p>Strong background in life cycle assessment (LCA) and multi-criteria analysis, integrating environmental, energetic and economic indicators.</p> <p>Experience in the design and optimization of hybrid energy systems combining renewable sources, batteries and hydrogen technologies.</p>
Research and project management	<p>Experience in scientific coordination of research projects and local research units, including methodological development, supervision of research activities, and validation of results.</p> <p>Ability to manage interdisciplinary research teams and coordinate collaborations between academic and industrial partners.</p>
Research proposal development and funding acquisition	<p>Proven experience in the ideation and development of competitive research proposals, including the conception of project architectures, definition of scientific objectives, structuring of work packages, and coordination of interdisciplinary consortia.</p> <p>Active role in the preparation of funded projects at national and international level, with specific expertise in energy systems, hydrogen technologies and integrated renewable solutions.</p>
Standardization and technology transfer	<p>Active participation in international standardization activities (IEC, CEI), including contribution to testing protocols and technical guidelines.</p> <p>Experience in transferring research outcomes to applied contexts and supporting the development of technical standards.</p>
Digital and computational tools	<p>Advanced use of MATLAB/Simulink for modeling and simulation of energy systems.</p> <p>Experience with TRNSYS, COMSOL Multiphysics and AutoCAD.</p> <p>Excellent command of MS Office tools for scientific reporting and data analysis.</p>
Driving licence	B