CURRICULUM VITAE – MATTEO GHERARDI

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EDUCATION AND PROFESSIONAL CAREER

10/2004-10/2007	Bachelor in Energy and Nuclear Engineering cum laude, Università di Bologna
10/2007-10/2009	Master in Energy and Nuclear Engineering cum laude, Università di Bologna
1/2010-12/2012	PhD in Mechanical Engineering, Alma Mater Studiorum - University of Bologna. *PhD dissertation: Integrated analysis and design of optimization and up-scaling of inductively coupled plasma synthesis of nanoparticles*.
1/2013-3/2015	Postdoctoral fellow, Department of Industrial Engineering, Università di Bologna.
2-7/2013 and 2-7/2015	Adjunct professor for the course *Laboratory of Industrial Applications of Plasmas*, master degree in Energy Engineering, Università di Bologna
5/2013-to date	Founder and member of advisory board (up to 2019) of *AlmaPlasma srl*, spin-off company of Università di Bologna
4/2015-3/2018	Junior assistant professor, Department of Industrial Engineering, Università di Bologna
4/2018-3/2021	Senior assistant professor, Department of Industrial Engineering, Università di Bologna
2021-to date	Associate professor in Nuclear Ractor Physics, Department of Industrial Engineering, Università di Bologna

RESEARCH ACTIVITIES

Research interests

- Nuclear core design
- Nuclear fuel performance
- Nuclear reactor physics
- Nuclear fuel cycle
- Plasma technology
- Surface engineering

Funded research projects

Years	Funded research projects and covered role
From: 2023 To: active	**newMAT4CEC - Devices for extracorporeal circulation: new intelligent membranes for the prevention of neurological complications.** Role covered: UniBO team leader; team budget: 110k€
From: 2022 To: active	**NRPP-NextGeneration ECOSISTER - Territorial Innovation Ecosystem of Emilia-Romagna.** Role covered: participant (Novel materials for energy applications); overall budget: 110 M€
From: 2022 To: active	**NRPP-NextGeneration EUONFOODS - Research and innovation network on food and nutrition Sustainability, Safety and Security – Working ON Foods.** Role covered: task leader (Innovative technologies for sanitization of fresh food products); overall budget: 128.5M€
From: 2023 To: active	**HORIZON-EIC, PULSE - Plasma reconfigUrabLe metaSurface tEchnologies.** ID 101099313. Role covered: UniBO team leader; budget: 400 k€
From: 2023 To: active	**INDUSTRIAL PROJECT**. Topic: plasma technologies for the surface activation of cellulose based materials. Role covered: project leader; budget: 10 k€
From: 2022 To: 2023	**ALMAIDEA DEMOPLASMA.** Topic: plasma decontamination of foods. ID: J33C22001420001. Role covered: project leader; budget: 24 k€
From: 2022 To: 2023	**INDUSTRIAL PROJECT**. Topic: techno-economic analysis of plasma assisted processes for hydrogen production and CCUS. Role covered: project leader; budget: 35 k€
From: 2022 To: 2022	**INDUSTRIAL PROJECT**. Topic: aerosol-assisted plasma deposition of fluorinated silicon-containing coatings for antibacterial applications. Role covered: project leader; budget: 12 k€
From: 2021 To: 2021	**INDUSTRIAL PROJECT**. Topic: design-oriented modeling for the optimization of components of plasma arc cut torches. Role covered: project leader; budget: 25 k€
From: 2020 To: 2024	**COST ACTION CA19110 Plasma applications for smart and sustainable agriculture**, european networking project. Topic: investigate the potential of low temperature plasmas (cold plasmas) as i) a green alternative to conventional chemicals in agriculture to improve yields, increase size and robustness of plants and to reduce (or eliminate) the need for antifungal agents and as ii) an innovative technology in the food processing chain for the treatment of food and packaging. Role: MC member and work group leader

From: 2020 To: 2021	**VIrus KIller: dispositivo di sanificazione a contrasto del trasporto indoor di bioaerosol** Topic: development of plasma technologies for the microbial inactivation of bioaersols. ID: J41F20000090009. Role covered: participant and project leader; budget: 117 k€
From: 2020 To: 2020	**EIT FOOD PASS plasma-assisted sanitation systems** Topic: design of plasma-assisted sanitation systems for packaging, equipment and tools used in the processing and handling of food products as a barrier to viruses and bacteria. Role covered: participant and DIN project leader; budget: 144 k€
From: 2019 To: 2024	**H2020-MSCA-RISE-2019 – "GREEN MAP"** Topic: Novel Green polymeric materials for medical packaging and disposables to improve hospital sustainability. Role covered: UniBO team leader; budget: 35k€
From: 2019 To: 2023	**Atmospheric low temperature plasmas (LTPs) activation of water for agricultural applications and food processing**, Projects for exchange of researchers selected within the frame of the executive programme of scientific and technological cooperation between the Italian republic and the republic of Serbia for the years 2019-2021. ID: M03156. Role covered: project coordinator
From: 2019 To: 2022	**PLASMAFOOD**, PRIN 2017 national project. Topic: study and optimization of cold atmospheric plasma treatment for food safety and quality improvement. Role: participant
From: 2018 To: 2019	**INDUSTRIAL PROJECT**. Topic: deposition of SiO_2-like films for improving the barrier properties of polymeric packaging. Role covered: project leader; budget: 24 k€
From: 2016 To: 2019	**COST ACTION CA15114 Anti-MIcrobial Coating Innovations to prevent infectious diseases (AMICI)**, european networking project. Topic: Evaluate the impact of introducing anti-microbial coatings in healthcare on the spread of infections and on the efficacy in fighting HealthCare Associated Infection and bacterial resistance to current antibiotics. Role: MC substitute
From: 2016 To: 2019	**ECOPACKLAB**, POR-FESR 2014-2020 regional project. Topic: Design and realisation of a laboratory for the study of advanced technologies for the production of active and ecosustainable packaging. Role: participant
From: 2016 To: 2019	**TECNO_EN-P**, POR-FESR 2014-2020 regional project. Topic: Design and realisation of a system to generate smart materials for biomedical devices to selectively remove cells and soluble or suspended matter in biological fluids. Role: participant
From: 2015 To: 2019	**NOTHEPIAS**, SIR 2014 national project. Topic: Evaluation of non-thermal plasma as an innovative anticancer strategy Role: participant
From: 2015 To: 2019	**INDUSTRIAL PROJECT**. Topic: Electrical, physical and chemical characterization and analysis of the antibacterial effectiveness of lab-scale atmospheric plasma sources for the decontamination of packaging films. Role: project leader; budget: 200 k€
From: 2015 To: 2019	**INSPIRED**, european H2020 grant. Topic: Scale up to an industrial scale of the plasma assisted production of nanomaterials for nano-inks. The opening of the assistant professorship is related to the project approval by the EU. Role: participant
From: 2013 To: 2017	**COST ACTION TD1208 Electrical discharges with liquids for future applications**, european networking project. Topic: Investigate the fundamental mechanisms of the interaction between plasma and liquids and develop innovative and interdisciplinary applications. Role: MC substitute
From: 2013 To: 2016	**PLASMAT**, FARB grant (fundamental research funding from Alma Mater Studiorum - Università di Bologna). Topic: Intensify the understanding of the fundamental mechanisms of plasma interaction with molecular and macromolecular materials (both in solid and liquid phase). Develop innovative and interdisciplinary applications. Role: participant
From: 2012 To: 2015	**COST ACTION MP1101 Bio-Plasma**, european networking project. Topic: Intensify the knowledge base relevant to medical and biomedical applications of atmospheric pressure plasma technology. Role: participant
From: 2009 To: 2012	**SIMBA**, european 7th Framework Program grant. Topic: Optimization and scale-up to the industrial level of RF plasma systems for nanoparticle synthesis through modeling, diagnostics and experiments. Role: participant

PUBLICATIONS AND PATENTS SUMMARY

- 102 papers, 29 h-index, 2541 citations (source Scopus).
- 5 patents:
    - Italian patent n. 102020000031277: equipment for sanitizing containers and instruments
    - European patent EP2961438A1: device and method for generating cold plasma
    - Italian paten ITBO20130334A1: method for the creation of a solid material with nanoadditives from a liquid phase polymer matrix
    - Italian patent ITBO20130364A1: method for producing a multi-layer material
    - European patent EP3031306B1: device and method for generating reactive species by means of plasma at atmospheric pressure

AFFILIATIONS

- Member of the International Plasma Chemistry Society (2011 – to date)
- Member of the International Society of Plasma Medicine (2012 – to date)
- Member of the Interdepartmental Center for Industrial Research: CIRI - Advanced Applications in Mechanical Engineering and Materials Technology at Alma Mater Studiorum – Università di Bologna (2015 – to date)
- Member of the Interdepartmental Center for Industrial Research: CIRI - Agrifood at Alma Mater Studiorum – Università di Bologna (2021 – to date)

HONORS, AWARDS AND INVITATIONS FOR SEMINARS/CONFERENCES

- 2018 - Early Career Plasma Medicine Award (ECPMA) from the International Society on Plasma Medicine (ISPM)
- 2014 - Early Career Presentation Award (ECPA) at the 5th International Conference on Plasma Medicine (ICPM5)
- 16 Plenary/keynote/invited lectures at international conferences and at international training schools
    - 2025, 9th Asia-Pacific Conference on Plasma Physics (AAPPS); invited lecture
    - 2023, Technical Meeting on Emerging Applications of Plasma Science and Technology (IAEA); invited lecture
    - 2022, 12th International Symposium on Plasma Bioscience (ISPB12); invited lecture
    - 2022, Gaseous Electronic Conference (2022 GEC); invited lecture
    - 2022, 9th International Conference on Plasma Medicine (ICPM9) summer school; invited lecture
    - 2022, European Materials Research Society Spring meeting (2022 eMRS Spring Meeting); invited lecture
    - 2021, 30th International Toki conference on plasma and fusion research (ITC30); invited lecture
    - 2021, International conference on plasma medicine 8 (ICPM8); invited lecture
    - 2018, 2nd International workshop on plasma agriculture (IWOPA-2); invited lecture
    - 2018, 10th International symposium on advanced plasma science and its applications for nitrides and nanomaterials (ISPlasma2018); invited lecture
    - 2017, Nanocontact conference – Potential application of plasma and nanomaterials; invited lecture
    - 2017, 17th Conference on plasma physics and applications; invited lecture
    - 2016, International conference on plasma medicine 6 (ICPM6); plenary lecture
    - 2016, Training school on advanced diagnostics of discharges with liquids and plasma treated liquid phase; invited lecture
    - 2016, MRS Spring symposium on surfaces and interfaces for biomedical applications; invited lecture
    - 2016, EMN biomaterials meeting; invited lecture
    - 2016, Workshop on application of advanced plasma technologies in CE agriculture; invited lecture

INDICATORS OF ESTEEM/EDITORIAL ACTIVITIES

- Member of the International Advisory Board of Plasma Processes and Polymers (Wiley)
- Associate Editor in Frontiers in Physics – Low Temperature Plasma Physics
- Member of the Editorial Board of Applied Sciences (MDPI)
- Editor of the Plasma Chemistry and Plasma Processing special issue on the 24th International Symposium on Plasma Chemistry; published in 2020
- Editor of the Applied Sciences special issue *Cold Plasma Treatment for Food Safety and Quality*; published in 2019
- Editor of the Plasma Processes and Polymers special issue *Plasma and agriculture*; published in 2018
- Editor of the Plasma Medicine special issue *Bioplasmas and Plasmas with Liquids* dedicated the Joint Conference of COST ACTIONS CMST TD1208 'Electrical Discharges in Liquids for Future Applications' & MPNS MP1101 'Biomedical Applications of Atmospheric Pressure Plasma Technology'; published in 2016
- Editor of the Journal of Physics Conference Series special issue dedicated to the 12th European Plasma Conference - High-Tech Plasma Processes; published in 2012
- Referee for the journals: *Plasma Processes and Polymers, Journal of Applied Physics, Biomatter, Journal of Nanoparticle Research, Biointerphases, Plasma Medicine, Acta Biomaterialia, Scientific Reports, The European Physical Journal - Applied Physics, Plasma Sources Science and Technology, Journal of Biophotonics, Journal of Physics D: Applied Physics, Biomaterials, Materials and Design, Innovative Food Science and Emerging Technologies, Applied Physics Letters, IEEE Transactions on Plasma Science, JVST-B, Polymers, Surfaces and Interfaces, Reviews of Modern Plasma Physics, Advanced Materials Interfaces, Physics of Plasmas*. Evaluator of book proposals for *Wiley*, *Springer*.
- Awarded the IOP Trusted Reviewer status
- Evaluator for international foundations grants: European Union (European Innovation Council), USA (Department of Energy - Office of Fusion Energy Sciences), Belgium (The Research Foundation – Flanders, FWO), The Netherlands (Netherlands Organisation for Scientific Research, NWO), France (Institut National de la Santé et de la Recherche médicale - INSERM), Cyprus (Cyprus Research Promotion Foundation), Estonia (Estonian Research Council), Czech Republic (Czech Science Foundation), Canada (Fonds de recherche Nature et technologies Québec)
- External referee for doctoral thesis: Program in Materials Science and Engineering of the Universitat Politècnica de Catalunya; Program in Advanced Materials and Nanosciences of the Masaryk University, Brno; Program in Molecular and Chemical Sciences of the Università degli Studi di Bari Aldo Moro

TEACHING AND MENTORING EXPERIENCE

Summary

- Teaching: nuclear engineering, plasma technology, numerical analysis (bachelor/master/doctoral level)
- Mentoring: co-supervisor of 15 PhD students (7 completed, 10 ongoing); currently supervising 2 post-docs; supervisor of 22 MS thesis and 29 Bachelor thesis; co-supervisor of more than 75 MS/BS thesis

Year	PhD
Expected 2028	Saverio Quaranta, *Design of the core of a lead cooled fast reactor, optimized for closing the fuel cycle in energy systems with different initial fuel availability*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2028	Assia Mauro, *Manufacturing functional surfaces through the combination of atmospheric pressure non-equilibrium plasma deposition and laser texturing*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2027	Michele Vasile, *Additive manufacturing processes for the creation of microplasmas*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2027	Andrea Formosi, *Calibration and validation of a pin fuel thermomechanics code*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2026	Andrea Marchetti, *Design oriented modelling of plasma assisted methane pyrolysis*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2026	Mariachiara Grande, *Development and implementation of forecasting, model predictive control and image analysis tools in plasma and nuclear reactor physics*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
Expected 2026	Caterina Maccaferri, *Plasma assisted systems for packaging decontamination*; PhD in Health and Technology, Università di Bologna. Role: assistant supervisor
Expected 2026	Francesco Tomelleri, *Plasma assisted technologies to support innovative and sustainable sanitization processes in the agri-food sector*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor
Expected 2026	Ilaria Maria Paponetti, *Applicazione di tecnologie digitali avanzate e rappresentazione della conoscenza nell'ingegneria e nelle scienze applicate*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor
Expected 2026	Edoardo Ugolini *Applicazione di tecnologie digitali avanzate e rappresentazione della conoscenza nell'ingegneria e nelle scienze applicate*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor
2025	Roberto Montalbetti, *Development, optimization and engineering of non-equilibrium plasma sources at atmospheric pressure for the microbial inactivation of bioaerosols*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor
2025	Pasquale Isabelli, *Design, development and functional characterization of Cold Plasma Systems to reduce airborne transmission of Hospital Acquired Infections & COVID-19*; PhD in Health and Technology, Università di Bologna. Role: assistant supervisor
2023	Cristiana Bucci, *Exploitation of PALS (Plasma Activated Liquids) for antineoplastic pro-drugs activation through exogenous reactive oxygen and nitrogen species*; PhD in Health and Technology, Università di Bologna. Role: assistant supervisor
2023	Giulia Laghi, *Functional characterization of plasma sources for material processing and biomedical applications*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
2021	Alina Bisag, *Development and optimization of techniques and design parameters for the engineering of atmospheric pressure plasma devices*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor
2020	Federica Barletta, *Deposition of thin films by a non-equilibrium atmospheric pressure Plasma Jet: a poly-diagnostic study*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: principal supervisor
2020	Tommaso Gallingani, *Non-equilibrium atmospheric plasma as a novel route to nanomaterial synthesis and processing for biomedical applications*; PhD in Mechanics and Advanced Engineering Sciences, Università di Bologna. Role: assistant supervisor

INSTITUTIONAL AND ORGANIZATIONAL ACTIVITIES

Years	Academic duty
From 2024 To: active	Member of the Teaching Commission of the Department of Industrial Engineering, Università di Bologna
From 2024 To: active	Member of the Executive Committee of the PhD school in Mechanics and Advanced Engineering Sciences (DIMSAI), Università di Bologna
From 2022 To: active	Director of First and Second Cycle Degree in Energy Engineering, Università di Bologna
From 2019 To: active	Responsible for the PhD education and training program of the PhD school in Mechanics and Advanced Engineering Sciences (DIMSAI), Università di Bologna
From 2018 To: active	Member of the Executive Committee of the PhD school in Mechanics and Advanced Engineering Sciences (DIMSAI), Università di Bologna
From 2022 To: 2024	Member of the Executive Committee of the Interdepartmental Center for Industrial Research: CIRI - Advanced Applications in Mechanical Engineering and Materials Technology, Università di Bologna
From 2021 To: 2022	Member of the Scientific Board of the Collegio Superiore (Institute for Higher Studies), Università di Bologna
From 2021 To: 2022	Member of the committee of the State Exams for the qualification to the engineering profession, Università di Bologna
From 2021 To: 2021	Member of the final examination committee for the ITS Maker Foundation
From 2021 To: 2022	Member of the High Quality Committee of the Master and Bachelor courses of Energy Engineering, Università di Bologna
From 2019 To: 2022	Responsible for student exchange programs for the Master and Bachelor courses of Energy Engineering, Università di Bologna
From 2018 To: 2021	Member of work group for the implementation of the strategic development plan of the Department of Industrial Engineering, Università di Bologna
From 2018 To: 2021	Member of the Executive Committee of the Department of Industrial Engineering, Università di Bologna

Years	Conference/Society and covered role
2026	PHYSOR 2026 – International Conference on the Physics of Reactors; role: member of the Technical Program Committee
2025	2025 E-MRS spring meeting symposium T; role: member of the International Scientific Committee
2024	1st International Workshop on Cold-plasma and pulse power technologies for Food, Health and Agriculture (COFHA-2024): Member of the International Advisory Committee
2024	4th Workshop on Plasma Applications for Smart and Sustainable Agriculture: Member of the International Program Committee
2024-active	Member of the European Joint Committee for Plasma and Ion Surface Engineering EJC/PISE
2024	12th IWM Workshop on microplasmas; role: member of the International Scientific Committee
2023-active	Member of the Board of Directors of the International Society for Plasma Medicine
2023	3rd Workshop on Plasma Applications for Smart and Sustainable Agriculture; role: International Program Committee
2023	International Symposium on Plasma Chemistry (ISPC25); role: member of the International Scientific Committee
2022	9th International Conference on Plasma Medicine; role: member of the Local Organizing Committee
2021	1st Workshop on plasma applications for smart and sustainable agriculture; role: member of the International Scientific Committee
2019	International Symposium on Plasma Chemistry (ISPC24); role: co-chair
2019	ISPlasma2019/IC-PLANTS2019; role: program committee member
2016	14th European Plasma Conference - High-Tech Plasma Processes (HTPP14); role: member of the International Scientific Committee
2016	Gordon Research Seminar on Plasma Processing Science; role: co-chair
2015	Bioplasmas and Plasmas with Liquids – Joint conference of COST actions CMST TD1208 and MPNS MP1101; role: secretary
2012	*12th European Plasma* Conference - *High-Tech Plasma Processes* (HTPP12); role: member of the Local Organizing Committee and of the Scientific secretariat

Bologna, 22/05/2025

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