

## Curriculum vitae

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### Education

University: Laurea degree (equivalent to BSc+MSc, 2003) in Computer Science with honors, University of Pavia, Italy. Final thesis: Experiments on electrical and magnetic stimulation of the peripheral nervous system.

Ph.D.: Degree in Electronics, Computer Science and Electrical Engineering in 2007. Final thesis: Inverse problems in bioelectromagnetism: experimental and theoretical aspects.

### Academic positions

Assistant professor ("A type", junior position) at the University of Pavia, Department of Electrical, Computer and Biomedical Engineering, SSD ING-IND/31 Elettrotecnica, from 1<sup>st</sup> December 2014 to 29<sup>th</sup> February 2020.

National habilitation for associate professorship, SSD ING-IND/31 Elettrotecnica, obtained in May 2019.

Assistant professor ("B type", senior position) at the University of Pavia, Department of Electrical, Computer and Biomedical Engineering, SSD ING-IND/31 Elettrotecnica, since 1<sup>st</sup> March 2020.

Associate professor at the University of Pavia, Department of Electrical, Computer and Biomedical Engineering, SSD ING-IND/31 Elettrotecnica, since 1<sup>st</sup> March 2023.

National habilitation for full professorship, SSD ING-IND/31 Elettrotecnica, obtained in October 2023.

### Research group and scientific cooperations

Research group: the research group deals with numerical methods for analysis and synthesis of static and quasi-static electromagnetic field problems. She is responsible of the CEMA Electromagnetic Environmental Compatibility Lab and cooperates with the CAD Laboratory for electric and magnetic devices (responsible Prof. Paolo Di Barba).

Recent cooperations with national groups:

- University of Padova, prof. Fabrizio Dughiero;
- University of Pisa, prof. Sami Barmada;
- Politecnico di Milano, prof. Luca Di Rienzo;
- University of Campania "Luigi Vanvitelli", prof. Alessandro Formisano;
- Istituto Neurologico Nazionale a Carattere Scientifico "C. Mondino", Pavia, prof. Giuseppe Cosentino (University of Pavia).

Recent cooperations with international groups:

- West Pomeranian University of Technology, Szczecin, Poland, prof. Ryszard Palka and prof. Marcin Ziolkowski;
- Lodz University of Technology, Lodz, Poland, prof. Slawomir Wiak;
- University of Southampton, Southampton, U.K., prof. Jan K. Sykulski;
- McGill University, Montreal, QC, Canada, prof. David A. Lowther.

## **Professional Experience**

### **Research activity up to 2014, before junior researcher position**

- March 2007 – December 2007: Biomag project performed in the frame of "INGENIO Project" granted by Regione Lombardia, Italy;
- July 2007 – July 2008: post-doc grant on "The magnetic stimulation of the peripheral nervous system: experiments and field models", University of Pavia (Italy);
- July 2008 – July 2009: post-doc grant on "Optimisation of energy-harvesting devices and circuits for electronic and electrical applications", University of Pavia (Italy);
- August 2009 – December 2009: post-doc grant on "Forward and inverse problems in electricity and magnetism", University of Pavia (Italy);
- November 2010 – April 2011: post-doc grant on "Optimisation of a submerged electric arc furnace for the production of ferro alloys", University of Padua (Italy);
- May 2011 – December 2011: post-doc grant on "Modelling and optimisation of an electric submerged arc furnace for the production of ferro alloys and development of a new system of furnace control", University of Pavia (Italy) in cooperation with Italghisa SpA (Brescia, Italy);
- February 2012 – August 2012: post-doc grant on "Finite element simulation of electric and magnetic fields generated by a coil system for electromagnetic stimulation of biological cells", University of Pavia (Italy);
- June 2012 – December 2012: post-doc grant on "Implementation of a prototype for the electrochemical separation of metals in the dust produced by electric furnaces for the production of ferro-alloys" University of Pavia (Italy) in cooperation with Italghisa SpA (Brescia, Italy);
- March 2013 - October 2014: post-doc grant on "Effects of electromagnetic fields on human health: in vitro models", University of Roma "La Sapienza" (Italy).

## **International projects**

- TEMPUS: Creation of the Third Cycle of Studies-Doctoral Studies in Metrology, 2011-2013, coordinated by Ss. Cyril & Methodius University, Skopje, Macedonia (participant);
- TEMPUS: Curricula Development for New Specialization: Master of Engineering in Microsystems Design, 2013-2016, coordinated by Lodz University of Technology, Poland (participant);
- ERASMUS+: ViMeLa project (Virtual Mechatronics Laboratory), 2017-2019, coordinated by Lodz University of Technology, Poland (participant and member of the steering committee).

## **National projects**

- PRIN 2022: PI of the project "Stochastic electromagnetic modeling and deep learning for an effective and personalized transcranial magnetic stimulation" STEM-DEEP, with participants I.R.C.C.S. Fondazione Mondino, Politecnico di Milano and University of Pisa;

### **Teaching experience**

- 2009-2012 adjunct professor: Circuit and Field Theory course (Italian language) for BSc students, University of Pavia, branch of Mantua;
- 2010-2013 adjunct professor: Electromagnetic Industrial Compatibility (Italian language) course for MSc students, University of Pavia;
- 2014-now assistant professor: Electromagnetic Environmental Compatibility (English language from A.Y 2021-2022) course for MSc students, University of Pavia;
- 2019-now assistant professor: Circuit Theory course (Italian language) for BSc students, University of Pavia;
- 2022-now assistant professor: Safety in Engineering and Technology course (English language) for MSc students starting in the second term A.Y. 2022/2023, University of Pavia.
  
- Supervisor of Dr Najmeh Rezaei, thesis title "Methods for Optimal Design of Innovative Switched Reluctance and Interior Permanent Magnet Motors", PhD in Electronics, Computer Science and Biomedical Engineering, University of Pavia, 2015-2019.
  
- Co-supervisor of Mr. Abderraouf Lalla, thesis title "Research and development of innovative magnetic sensors for pneumatic drives for industrial automation", PhD in Electronics, Computer Science and Biomedical Engineering, University of Pavia, 2022-now.

### **Other experiences in teaching and lecturing**

- on 14<sup>th</sup> May 2010: PhD Intensive Course titled "Analysis and synthesis of electromagnetic fields: numerical methods and computer codes", University of Padua;
- in the frame of the TEMPUS-158599 project "Creation of the Third Cycle of Studies-Doctoral Studies in Metrology" she was invited for a lecture on "Automated optimal design in electromagnetics: educational aspects in PhD curricula at the University of Pavia", on 19<sup>th</sup> March 2012 in Zagreb (Croatia);
- in the frame of the Erasmus+ program, she held two short courses at the West Pomeranian University of Technology in Szczecin (Poland) for Bachelor and PhD students titled "Optimization methods for solving inverse problems: applications in circuit theory" and "Automated optimal design in industrial electromagnetics", in the period 1-4 March 2016;
- in the frame of the Erasmus+ program, she held two short courses at the West Pomeranian University of Technology in Szczecin (Poland) for Bachelor and Master students titled "Optimization methods for solving inverse problems: applications in circuit theory" and "Multiobjective optimization in industrial electromagnetics", in the period 12-15 March 2017;
- June 2020 and June 2021: seminar titled "Environmental compatibility and human body exposure", in the frame of the Intensive School for Advanced Graduate Studies "A Smart Grid for Energy Management: the IoT approach", University of Pavia.

### **Position responsibility** (University of Pavia, Italy)

- Member of the Scientific Board of the PhD program in Electronics, Computer science and Electrical Engineering, since 2017 up to date;

- Member of the committee for the admission of the PhD candidates in Electronics, Computer Science and Electrical Engineering, XXXVI cycle, 2020;
- Member of the Board of the Department of Electrical, Computer and Biomedical Engineering, since 2021 up to date;
- Coordinator of the Quality Commission of the PhD program in Electronics, Computer science and Electrical Engineering, since 2022 up to date;
- Committee member, qualification to the profession of Electrical Engineer (2019–2020-2021).

### **Scientific organization and memberships**

- Secretary of the Organizing Committee of the XXIV National meeting of the Electrical Engineering Group, Pavia (Italy), June 2008;
- Member since 2016 of the Scientific Committee of the International Symposium on Applied Electromagnetics SAEM, which takes place every second year in Europe;
- Member since 2017 of the Steering Committee of the “International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering ISEF”, which takes place every second year in Europe;
- Member since 2017 of the Technical Programme of the “International Colloquium on Smart Grid Metrology SMAGRIMET”, which takes place every year in Europe;
- Organizer and co-chairperson of the Special Session "Electromagnetism in Medicine and Bioengineering" at the "19th International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering" ISEF 2019 conference;
- Chairperson in 2022 of the Scientific Committee of the PTZE Symposium on Applied Electromagnetism in Contemporary Engineering and Medicine, which takes place every year in Poland;
- Scientific Secretary of the "21st International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering" ISEF 2023 conference which took place in Pavia (Italy) in 12-15 September 2023.

### **Editorial Activity**

- Member of the Editorial Board of the Journal Przegląd Elektrotechniczny since 2016;
- Member of the Editorial Board of the "International Conference on Heating by Electromagnetic Sources" HES2016, Padova (Italy), May 2016 and HES 2019, Padova, May 2019;
- Guest Editor
  - of “The international journal for computation and mathematics in electrical and electronic engineering (COMPEL)” for the Special Issue “Recent advances in heating by electromagnetic sources”, published in 2020;
  - of the "International Journal of Applied Electromagnetics and Mechanics (IJAEM)" for the Special Issue ISEF2019, published in 2020;
  - of the "International Journal of Applied Electromagnetics and Mechanics (IJAEM)" for the "Special issue on electromagnetic fields in mechatronics, computer sciences, electrical and electronic engineering", published in 2022;
  - for the "International Journal of Applied Electromagnetics and Mechanics (IJAEM)" for the Special Issue "Deep learning for analysis and synthesis in electromagnetics", published in 2023;
  - of the "International Journal of Applied Electromagnetics and Mechanics (IJAEM)" for the "Special issue on electromagnetic fields in Mechatronics, Electrical and Electronic Engineering", to be published in 2024;

- of “The international journal for computation and mathematics in electrical and electronic engineering (COMPEL)” for the Special Issue “Recent advances in heating by electromagnetic sources”, to be published in 2024;
- Associate Editor of the "International Journal of Applied Electromagnetics and Mechanics (IJAEM)" since April 2022;

### **Scientific society memberships**

- IEEE member since 2016;
- International Compumag Society ICS member since 2022.

### **Prizes and awards**

- Third place for the best paper award with the paper "Remote detector of electric field of a 3kV DC traction line: A preliminary study" published on the Scopus-indexed journal “Ingegneria Ferroviaria” in 2019;
- Award for Outstanding Paper in the 2022 Emerald Literati Awards for the paper "Synthesizing sources in Magnetics: a Benchmark Problem" published on "The international journal for computation and mathematics in electrical and electronic engineering COMPEL" in 2022, DOI 10.1108/COMPEL-05-2021-0156.

### **Consultancy activity**

- measurements on electric and magnetic fields produced by an high-voltage transmission line placed above a parcel in which a school had to be built in Vellezzo Bellini (Pavia) in May 2009;
- preliminary study on electromagnetic field compatibility in both low and high frequency of a shopping center to be built in Borgarello (Pavia) in July 2010;
- measurements on electromagnetic exposure (low and high frequency) of working people in a farm producing ferro-alloys with electric arc furnaces in Brescia (Italy) in 2012;
- measurements on electromagnetic exposure (high frequency) of working people in offices of the Ministry of Internal Affairs, branch of Pavia (Italy), in 2012;
- study (calculations and measurements) on a radio-frequency antenna in Pavia, in 2012;
- measurements on electromagnetic exposure (low and high frequency) of working people in a farm bending super-pipes for oil and gas goods in Piacenza (Italy) in 2016;
- cooperation to design, construction and experimental testing of a remote detector of electric field of a 3kV DC traction line for RFI SpA (Italy). The study lasted about two years and the outcome was a functioning prototype of the sensor. Moreover, a paper describing this activity was published on "Ingegneria Ferroviaria" journal;
- evaluation of screens for the electromagnetic compatibility of a given model of train with axle counters in 2021-2022. The study was based on finite element simulations, compared with measurements;
- Co-responsible of the activity of design of innovative proximity sensors for a company in the field of industrial automation in 2023-2024;

- Co-responsible of the activity of design of a magnetic tool (on demand accessory) for a standard endoscope for a start-up working in the development of a new generation of medical devices in 2023.

### **Scientific Interests**

Her scientific interests are inverse problems and optimization applied to electromagnetism, in particular to bioelectromagnetism. Recently, she has worked in the field of deep learning techniques applied to forward and inverse problems in electromagnetism.

Pavia, 24<sup>th</sup> May 2024