Carmen Pisano

Summary

I am a PhD Candidate in ICT enrolled in research projects with a strong focus on nanoscale electromagnetic interactions.
Currently in my third year of doctoral studies, I investigate the interaction of radiofrequency electromagnetic fields at the microscopic level through both computational and experimental approaches. My research interests include the development of innovative and optimized exposure systems for electrophysiology experiments, as well as the implementation of molecular dynamics simulations to explore the effects of 5G signals on membrane receptors.

Education

[01-12-2022 – Current] **PhD Candidate in Information and Communication Technologies (ICT)**

Department of Information, Electronic and Telecommunications Engineering (DIET)

Sapienza University of Rome, Italy

Thesis: Microscopic mechanism of RF electromagnetic fields interactions

[31-10-2022] **Masted Degree in Biomedical Engineering**

Master Thesis Trainee at the Department of Information Engineering, Electronics and Telecommunications (DIET)

Sapienza University of Rome, Italy

Thesis: Transcranial magnetic stimulation of the cerebellum: a dosimetric study for treatment optimization

Final grade: 110/110 cum laude

[28-02-2020] **Bachelor's Degree in Medical Engineer**

Tor Vergata University of Rome, Italy

Final grade: 92/110

RESEARCH/WORKING EXPERIENCE

Projects

[2022 – Current] **GOLIAT (5G expOsure, causaL effects, and rIsk perception through citizen engAgemenT)**
Project: EU-Funded HORIZON-HLTH-2021-ENVHLTH-02-01

[2023 – Current] **MOTHERR (Numerical MOdelling of RF interaction with THERmal Receptors)**
Project: ANSES, programme national de recherche "Environnement Santé Travail"

[2024 – Current] **5G - SMILE**
Project: PRIN2022

Research fellowship

[2023 – Current] **Fellowship funded by MOTHERR and GOLIAT projects**
Research activity title: Investigation of the Interaction Mechanisms between RF-EMF (e.g., 5G Technology) and Biological Systems with a Numerical Simulation Approach

Coordination and Mobility Activities

[2024 – Current] **Coordination of experimental activities – GOLIAT project**
Department of Physics and Astronomy (DIFA), Alma Mater Studiorum – University of Bologna
Coordination of experimental research activities within the EU-funded GOLIAT project. Responsibilities included planning, overseeing experimental procedures, and managing collaboration with local teams at DIFA for the investigation of biological effects of RF-EMF exposure

[2024 – Current] **Coordination of experimental Activities – Drug Delivery Research**
Department of Chemistry and Drug Technologies, Sapienza University of Rome
Coordination of experimental activities in studies on magnetically responsive hydrogel-based systems for controlled drug release. Tasks included supervising lab procedures and organizing experimental data collection and interpretation.

[2025 – Current] **Research Mobility – Alma Mater Studiorum – University of Bologna**
Approx. one month (non-continuous) of research stay at the *Department of Physics and Astronomy* (DIFA), *Alma Mater Studiorum – University of Bologna*, as part of the GOLIAT project. This activity focused on experimental investigations and coordination of on-site procedures in collaboration with the local research group, specifically in electrophysiological experiments on cells to investigate potential RF-EMF effects.

Courses

[May 2025] Upcoming participation in the **11th Course: "Advances in Electroporation-Based Therapy: from Principles to Clinical Applications"**
Ettore Majorana Centre for Scientific Culture, Erice, Italy
International course organized by the *International School of Bioelectromagnetism "Alessandro Chiabrera"* focusing on the principles and clinical applications of electroporation-based therapies. The program includes lectures, hands-on sessions, and expert discussions on treatment planning, experimental protocols, and translational research.

[2024] Participation in the **"EIC T2M – Bootcamp for innovative research"**
European Innovation Council (EIC)
I attended five days course based on online collective workshops, with sessions and individual coaching meetings with field experts, to explore in depth all major entrepreneurial skills to be mastered by a deep tech founder (value proposition, team, roadmap, pitch and much more).

[2023] Participation in the **Python course**
CINECA
I learned how to use Python in many fields, enabling the automation of tasks, data analysis, and the development of simple applications.

[2021] Partecipation in **Masterclass Excellent in Excel**
Tutored
I learned how to use advanced Excel functions, enabling process automation, complex data analysis, and efficient data management.

[2021] Participation to the course **MODIFICHE AL NUOVO REGOLAMENTO DEI DISPOSITIVI MEDICI – (MDR)**
Area ISO
This course covers the key changes introduced by the European Medical Device Regulation (MDR), with a focus on ISO standards, enabling compliance with updated regulatory requirements and improving quality management practices.

[2020] Participation in **MATLAB Fundamentals Course**
BEST Rome e Università Sapienza di Roma
I learned the fundamentals of MATLAB, focusing on data analysis, programming, and the development of algorithms, enabling me to apply these skills in various technical and engineering fields.

[2020] Participation in the course **Sicurezza in risonanza magnetica: progettazione, valutazione del rischio e gestione sicura del sito RM**
AIIC Associazione Italiana Ingegneri Medici
The course focuses on the design, risk assessment, and safe management of MRI sites, focusing on ensuring compliance with safety standards and minimizing risks associated with MRI technology.

RELEVANT RESEARCH GRANTS, SCHOLARSHIPS OR AWARDS

Awards

[2024] Winner of the PhD Initiative
2024 IEEE MTT-S International Microwave Biomedical Conference - IMBioC 2024
Montreal, Canada

PUBLICATIONS

Indexed conference papers

- Liberti M., Apollonio F., Caramazza L., Colella M., D'Agostino S., Dolciotti N., Fontana S., Paffi A., Pisano C., "The Challenge of 5G technology: Cooperative Research, Innovative Techniques and Microscopic Models in Bioelectromagnetics". 2023 IEEE MTT-S International Microwave Biomedical Conference (IMBioC), Leuven, Belgium, 2023, pp. 163-165, doi: 10.1109/IMBioC56839.2023.10304884.
- Pisano C., Dolciotti N., Paffi A., Liberti M., Apollonio F., "Real-time 5G exposure system for the electrophysiological experiments on cells". 2023 IEEE Conference on Antenna Measurements and Applications (CAMA), Genoa, Italy, 2023, pp. 962-964, doi: 10.1109/CAMA57522.2023.10352725.
- Pisano C., Dolciotti N., Fumarola E., Marasà A., Benedetti F., Valeriani D., Paffi A., Liberti M., Apollonio F., "Exposure System for Real-time 5G Electrophysiology Experiments: Numerical and Experimental Characterization". 2024 IEEE MTT-S International Microwave Biomedical Conference (IMBioC), Montreal, QC, Canada, 2024, pp. 155-

157, doi: 10.1109/IMBioC60287.2024.10590365.

Non-indexed conference papers (peer-reviewed)

- Paffi A., Caramazza L., Pisano C., Dolciotti N., Liberti M., Apollonio F., “CPW transmission line: an enabling technology in the bioelectromagnetic research”. 2023 IEEE MTT-S International Microwave Biomedical Conference (IMBioC).
- Pisano C., Dolciotti N., Bellosono L., Paffi A., Liberti M., Apollonio F., “Real-time 5G exposure system for the electrophysiological experiments on cells: numerical study and experimental validation». BIOEM 2024, third annual meeting, June 18-23 Oxford, UK.
- Apollonio F., Caramazza L., Pisano C., Marracino P., Del Signore F., Liberti M., “Modeling TRP receptors exposure to RF EM fields”. AT-RASC 2024, May 19-24 Gran Canaria, Spain.
- Caramazza L., Pisano C., Marracino P., Del Signore F., Liberti M., Apollonio F., “RF EM Fields effects on Transient Receptor Potential Channels: A Computational Approach”. BIOEM 2024, third annual meeting, June 16-21 Chania, Greece.
- Pisano C., Dolciotti N., Fumarola E., Marasà A., Benedetti F., Valeriani D., Paffi A., Liberti M., Apollonio F., “Exposure System for Real-time 5G Electrophysiology Experiments: Numerical and Experimental Characterization”. BIOEM 2024, third annual meeting, June 16-21 Chania, Greece.
- Caramazza L., Pisano C., Marracino P., Del Signore F., Liberti M., Apollonio F., “RF EM Fields Effects on Transient Receptor Potential Channels: A Computational Approach”. BIOEM 2024, third annual meeting, June 16-21 Chania, Greece.
- Innamorati G., Camera F., Fernandes R., Vallet L., Fontana S., Dolciotti N., Pisano C., Merla C., Andre F., Consales C., “Effects of microsecond electrical pulses on cells of the immune system”. BIOEM 2024, third annual meeting, June 16-21 Chania, Greece.
- Pisano C., Caramazza L., Marracino P., Del Signore F., Liberti M., Apollonio F., “Effects of Intense Electric field on TRPV4 ion channel: a Molecular Dynamic study”. WCE 2024, September 15-19 Rome, Italy.
- Apollonio F., Pisano C., Dolciotti N., Paffi A., Liberti M., “The Evolution of MW Exposure Systems: Laboratory Experiments in the Era of 5G Technology”. EUMW2024, September 22-27, 2024, Paris, France.

Submitted Conference Papers

- Pisano C., Caramazza L., Ferri L., Alvieri N., Marracino P., Del Signore F., Liberti M., Apollonio F., “Effects of RF Electromagnetic Fields on TRPM8 Receptors: A Molecular Dynamics Approach”. BioEM2025, 22 – 27 June 2025, Rennes, France – **accepted.**
- Pisano C., Caramazza L., Pappa I., Dipierro B., Marracino P., Del Signore F., Liberti M., Apollonio F., “Effects of Intense Electric Fields on TRPV4 Ion Channels: investigating the role of water with a molecular dynamic approach”. BioEM2025, 22 – 27 June 2025, Rennes, France – **accepted**.
- Pisano C., Caramazza L., Ferri L., Alvieri N., Marracino P., Del Signore F., Liberti M., Apollonio F., “RF Electromagnetic Fields on TRPM8 Receptors: A Molecular Dynamics Approach”. URSI AP-RASC 2025, 17-22 August, Sydney, Australia – **accepted**.
- Pisano C., Caramazza L., Pappa I., Dipierro B., Marracino P., Del

Signore F., Liberti M., Apollonio F., " Effects of Intense Electric Fields on TRPV4 Ion Channels: investigating the role of water with a molecular dynamic approach". URSI AP-RASC 2025, 17-22 August, Sydney, Australia – **accepted**.

- Pisano C., Caramazza L., Isoldi V., Giulia R., Paffi A., Apollonio F., Liberti M., "Modeling Electroporation Dynamics in Liposomes and Cells Exposed to Nanosecond Pulsed Electric Fields for Optimized Drug Delivery". IEEE-ICEAA2025, 8-12 September 2025, Palermo, Italy – **submitted.**
- Pisano C., Caramazza L., Ferri L., Alvieri N., Marracino P., Del Signore F., Liberti M., Apollonio F., "Effects of 3.5 GHz RF-EMF on TRPM8 Ion Channel: A Computational Study". IEEE-ICEAA2025, 8-12 September 2025, Palermo, Italy – **submitted.**

Monography

- Fontana S., Caramazza L., D'Agostino S., Dolciotti N., Pisano C., Alfonsi L., De Franceschi G., Russo P., Apollonio F., Costanzo A., Liberti M., Colella M., "Formazione ed attività del nuovo Chapter Women in RadioScience nell'ambito della Commissione Italiana URSI".

CONFERENCES/WORKSHOPS/etc.

Conference participation

[September 2024]	**WCE2024** *Rome*, Italy Oral presentation: "Effects of Intense Electric field on TRPV4 ion channel: Molecular Dynamic study"
[September 2024]	**NanoInnovation 2024** *Rome*, Italy
[June 2024]	**IMBioC 2024** Montreal, Canada Oral presentation: "Exposure System for Real-time 5G Electrophysiology Experiments: Numerical and Experimental Characterization"
[February 2024]	**Young Scientist Event-WIRS URSI-Italy** *Rome*, Italy
[November 2023]	**IEEE CAMA 2023** *Genoa*, Italy Oral presentation: "Real-time 5G exposure system for the electrophysiological experiments on cells"
[June 2023]	**BIOEM2023** Oxford, UK Poster presentation: "Real-time 5G exposure system for the electrophysiological experiments on cells: numerical study and experimental validation"
[February 2023]	**Kick-off workshop of the URSI-Italy WIRS Chapter** *Rome*, Italy
[March 2023]	**EuCAP2023** *Florence,* Italy
[May 2021]	**FORM 2021-7° Convegno Nazionale del Forum On Regenerative Methods** Istituto Superiore di Sanità (ISS) - Online

[November 2020] **XX CONVEGNO NAZIONALE AIIC**
Emergenza SSN: ripartiamo insieme da competenze, tecnologie, organizzazione

Invited Speaker

[September 2025] **IEEE-ICEAA2025**
Palermo, Italy
Special ICEAA session organized by Micaela Liberti and Francesca Apollonio
Title: **"**Effects of 3.5 GHz RF-EMF on TRPM8 Ion Channel: A Computational Study**"** (submitted)

[September 2024] **WCE2024**
Rome, Italy
Session: "S20 PhD Students as important bricks in the wall of funded projects and
basic research"
Title: "Effects of Intense Electric field on TRPV4 ion channel: a Molecular Dynamic study"

Supporting of National & International conferences

[Mar-Sept 2024] **WCE2024**
Rome, Italy
Member of the Local Organizing Committee (LOC) with the role of Social Media Manager, promoting the conference on ISEBTT social media channels.

[June 2024] **IMBioC2024**
Montreal, Canada
Student Staff Volunteer

[Dec 2023 – Feb 2024] **Young Scientist Event-WIRS URSI-Italy**
Rome, Italy
With the role of organizer and steering committee of the event tiled "Empowering waves: the radiant role of women in radio science" held at the Faculty of Engineering of Sapienza University of Rome.

[Febuary 2023] **Kick-off workshop of the URSI-Italy WIRS Chapter**
Rome, Italy
Student Staff Volunteer

[March 2023] **EuCAP2023**
Florence, Italy
Student Staff Volunteer

Membership

[2023 – Current] Member of the Italy Chapter Women in Radio Science (WIRS) in the framework of the URSI Italy

[2023 – Current] Student Member of the BioEM society

[2023 – Current] Student Member of IEEE and IEEE MTTS

OTHER RELEVANT ACTIVITIES

Other academic activities

Tutor Activities

[2023 – Current]

Conducted practical lessons for the following Master's courses under the supervision of Prof. Micaela Liberti and Prof. Francesca Apollonio:

- Electromagnetic Fields and Nanosystems – MSc in Nanotechnology Engineering
- Bioelectromagnetic Interaction I – MSc in Biomedical Engineering
- Bioelectromagnetic Interaction II – MSc in Biomedical Engineering

[2023 – Current]

Conducted practical lessons for the following Bachelor's course under the supervision of Prof. Micaela Liberti and Prof. Francesca Apollonio

- Campi elettromagnetici - BSc in Clinical Engineering

Thesis Supervision (as External Trainer)

[2023 – Current]

Biomedical Engineering – Master's Theses (under Profs. F. Apollonio & M. Liberti):

- Coplanar Exposure System for Patch-Clamp Experiments: Numerical-Experimental Characterization at 5G Frequencies (under the supervision of Profs. F. Apollonio, M. Liberti, and A. Paffi)
- Characterization of an Exposure System Based on CPW for Electrophysiology Experiments at 5G Frequencies: Modeling of the Patch-Clamp Electrode
- Exposure System Based on Coplanar Waveguide at 5G Frequencies: Numerical-Experimental Characterization of the Electric Field and Design of an Automated Data Acquisition System
- Computational Approach for the Characterization of a Coplanar Waveguide Exposure System at 5G Frequencies: Thermal Modeling and Automation of Data Acquisition
- Electrophysiology Experiments with MEA Technology: Design of an Exposure System for Real-Time Recordings at 5G Frequencies
- Design of an Exposure System for Real-Time Patch-Clamp Experiments at the 26 GHz Frequency Band of 5G Technology
- Optimization of a Laboratory Exposure System for Drug Delivery Applications Mediated by Nanosecond Pulsed Electric Fields (nsPEF)
- Role of Water Molecules at the Interface with Membrane Ion Channels: the Case of TRPV4 in the Context of Electroporation
- Multiphysics modeling of electroporation in a liposome sample exposed to nsPEF: effect of dielectric dispersion on membrane response
- Computational Insights into TRPM8 Ion Channel: Unraveling Structural Dynamics Under Radiofrequency EM Fields

Nanotechnology Engineering – Master's Theses:

- *nsPEF Treatment for Astaxanthin Extraction from Haematococcus pluvialis*: Characterization and Preliminary Exposure Experiments* *(in collaboration with Prof. Marco Bravi; under the supervision of Prof. F. Apollonio)*

- *Transmembrane Receptor TRPV4 Response to Intense Electric Fields: A Molecular Dynamics Study*
- *Effects of 5G Signals on the Transmembrane Receptor TRPM8: A Molecular Dynamics Study (under the supervision of Prof. F. Apollonio)*

Pharmaceutical Chemistry and Technology – Master's Thesis (in collaboration with Prof. Stefania Petralito; under the supervision of Profs. F. Apollonio & M. Liberti)**:**

- *Magnetic Hybrid Hydrogels Based on Gelatin and Magnetic Nanoparticles: A Potential System for Controlled Drug Release via Static Magnetic Fields*

Clinical Engineering – Bachelor's Theses:

- *Mini-review: Exposure Systems for Electrophysiological Experiments at 26 GHz (under the supervision of Prof. F. Apollonio*

Language Skills

Italian	Mother language
English	English – B2 (Upper-Intermediate) Listening: B2 Reading: B2 Writing: B2 Spoken Production: B2
French	French – A1 (Beginner) Listening: A1 Reading: A1 Writing: A1 Spoken Production: A1

Technical Skills

Simulation tools	COMSOL Multiphysics GROMACS HFSS Sim4Life
Programming	Python MATLAB
Additional software	Canva Adobe: Photoshop and Illustrator Microsoft Office Package
Experimental techniques	Development of characterization bench of nsPEF and RF-EMF exposure systems

Communication and Interpersonal Skills

- Strong inclination toward information sharing and collaborative work
- Ability to adapt quickly to new working and cultural environments

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