Micol Colella

CURRENT POSITION

[09/2021 – Current] **Postdoctoral Research position with the BioEMLab (assegnista di ricerca vincitore di concorso Legge 240/2010)**
Department of Information Engineering, Electronics and Telecommunications (DIET),
University of Rome "La Sapienza", Rome, Italy

Managerial activities as Project Assistant for EU H2020-FET OPEN Project RISEUP (Nr. 964562).

Research activity focused on numerical modeling of electromagnetic fields:

(1) Numerical modelling and computational dosimetry of invasive and noninvasive, magnetic and electric stimulation of the central and peripheral nervous system, with standard and innovative techniques. The aim is to investigate their physiological effects on human and small animals.
(2) LF, RF and mmW computational modelling and numerical dosimetry for assessment of human body exposure.

WORK EXPERIENCE

[02/2021 – 08/2021] **External collaboration (ICE contract according to ART. 7, COMMA 6, D. LGS. 165/2001)**
Department of Information Engineering, Electronics and Telecommunications (DIET),
University of Rome "La Sapienza", Rome, Italy
Activity commissioned by the society Larimart SpA and dedicated to the numerical assessment of the human body exposure to a vehicular antenna in military scenarios. Activity carried out by means of computational tools for numerical dosimetry and numerical exposure assessment.

RESEARCH EXPERIENCE ABROAD

[09/2019 – 03/2020] **Graduate Research Assistant (Position 3098155)**
Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston, USA
Development and computational modelling of the second generation of miniaturized coil for ultra-focal transcranial magnetic stimulation. The activity consisted in carrying out computational electromagnetic studies to evaluate methodologies to improve the first generation of miniaturized coil for application on the central nervous system.

[05/2018 – 10/2018] **Graduate Research Assistant (Position 3054182)**
Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Boston, USA
Development and computational modelling of an ultra-focal TMS system for peripheral nerve stimulation. The activity consisted in carrying out combined Electromagnetic and neurofunctionalized computational studies in a multiphysics approach to evaluate several miniaturized coils geometries and select the most efficient one to achieve peripheral nerve stimulation. The most efficient coil geometry was realized, electrically characterized and tested on human healthy subjects.

EDUCATION

[11/2017 – 01/2021] **PhD in Information and Communication Technology (ICT)**
Department of Information Engineering, Electronics and Telecommunications (DIET),
University of Rome "La Sapienza", Rome, Italy
Thesis: Noninvasive electric and magnetic stimulation of the brain: numerical modeling and dosimetrical assessment | Grade: Excellent with honors | Supervisor: Prof. Micaela Liberti

[10/2015 – 07/2017] **Master Degree in Biomedical Engineering (LM-21)**
Interfaculty Industrial and Civil Engineering/Information Engineering, Informatics and Statistics
University of Rome "La Sapienza", Rome, Italy
Thesis: Variability factors in a computational model of a 1.5 T RF birdcage coil | Grade: 110/110 with honors | Supervisor: Prof. Micaela Liberti

[10/2012 – 11/2015] **Bachelor Degree in Clinical Engineering (L-9)**
Faculty of Industrial and Civil Engineering,
University of Rome "La Sapienza", Rome, Italy
Thesis: Thin film photosensors for Lab-on-Chip systems | Grade: 109/110 | Supervisor: Prof. Domenico Caputo

EDUCATIONAL TRAININGS

[08/2019 – 09/2019] **Visiting PhD student**
The Foundation for Research on Information Technologies in Society (IT'IS), Zurich, Switzerland
Training dedicated to the assessment of new neuronal models to study noninvasive stimulation techniques of the peripheral nervous system | ***Duration: Two weeks | Supervisor: Dr. Antonino M. Cassarà***

[12/2017 – 12/2017] **Visiting PhD student**
Operational Unit of Neuroradiology
Università Vita-Salute San Raffaele, Milan, Italy
Training dedicated to the segmentation of ischemic lesions from MR images of patients recruited in the I-NIC project | ***Duration: Two weeks | Supervisor: Prof. Nicoletta Anzalone***

Research Projects

[10/2023 – Current] **NEAT-MOVE: Cerebellar neuromodulation in ataxia: digital cerebellar twin to predict the movement rescue**
Funding Program: PRIN2022
Role: Investigator | Research Unit: UNIROMA1
Activity: Computational dosimetry of cerebellar TMS on neonatal mice for ataxia treatment. Assessment of optimal exposure condition and realization of a system for differential cerebellar exposure. Definition of EM quantities to simulate TMS in the cerebellar digital twin brain. Engineering support during experiments.

[11/2023 – 11/2024] **Hi-SILICO: Highly detailed Skin models for Improved Computational dosimetry**
Funding Program: Avvio alla Ricerca
Role: Principal Investigator
Activity: The project aims to overcome the limitations of existing computational models to assess numerically the exposure in the 5G-frequency band. At these frequencies, an accurate modelling of the skin layers is fundamental and requires improvements.

[05/2021 – 04/2025] **RISEUP: Regeneration of injured spinal cord by electro pulsed bio-hybrid approach**
Funding Program: H2020-Future and Emerging Technologies
Role: Project Assistant and Investigator for WP5 | Research Unit: UNIROMA1
Managerial Activity: Administrative support to the project coordinator Dr. Claudia Consales. The role of project assistant requires to schedule advancement meetings and report minutes; follow up each work package activity to ensure accomplishment of tasks and respect of deadlines; writing of reports, administrative and financial documents.
Scientific Activity: Numerical evaluation of the novel developed electro pulsed biohybrid (EPB) device for regeneration of injured spinal cord. By means of advanced dosimetric tool, the *in vivo* experiments carried out to assess the effectiveness of the EPB are numerically reproduced to evaluate the conditions that guarantee exposure levels necessary to achieve neuronal regeneration. Furthermore, engineeristic support have been provided during the *in vivo* experiments carried out at the Center de Investigacion Principe Felipe. The support consisted in ensuring the correct connection between the EPB device and the external voltage generator, by current, voltage and impedance measurements. This guaranteed the delivery of the correct stimulation parameters.

[03/2021 – 01/2024] **WPT4WID: Wireless Power Transfer for Wearable and Implantable Devices**
Funding Program: PRIN2017
Role: Investigator | Research Unit: UNIROMA1
Activity: Assessment of numerical approaches for accurate computational dosimetry at 5G frequency bands

[12/2020 – 02/2024] **HEPROSYS**

Funding Source: Lariamrt SpA

Role: Investigator | Research Unit: Activity commissioned to Dept. Information Engineering, Electronics and Telecommunications, Sapienza University of Rome.

Activity: Numerical evaluation of military operator exposure to vehicular antennas working at HF, VHF and UHF band, in realistic scenarios to assess compliance with regulatory guidelines (i.e., ICNIRP)

[06/2019 – 04/2021] **The Effective Navigated (En-)TMS**

Funding Program: POR-FESR LAZIO 2014-2022

Role: Investigator | Research Unit: UNIROMA1

Activity: Development of a software for EM dosimetry to be integrated in a system for navigated TMS. The aforementioned software builds anthropomorphic and anisotropic head models from processed magnetic resonance imaging (MRI) and tractography (DTI) data. It calculates the induced E-field by TMS using an improved version of the admittance method. By expoloiting DTI data it also extracts the E-field component along the axonal directions, i.e., the effective E-field (Eeff), to support the interpretation of the physiological response to TMS.

Other National and International collaborations

[04/2018 – Current] **Development and modeling of an ultra-focal TMS system for cortical and peripheral nerve stimulation**

Collaborating Institution: Athinoula A. Martinos Center for Biomedical Imaging (Boston, MA, USA).

Activity: Development of the first, second and third generation of ultra-focal coil for magnetic stimulation (mCoils) on human (first and second generation) and small animals (third generation). The mCoils are investigated numerically in a multiphysical approach to be optimized. These collaboration is carried out within the frame of NI

[04/2017 – Current] **Low-frequency Pulsed Electromagnetic Fields (ELF-MF) as Treatment for Acute Ischemic Stroke (I-NIC)**

Collaborator: IGEA Medical SpA, Carpi, Italy

ClinicalTrials.gov, NCT02767778, I-NIC project

Activity: Investigation of the neuroprotective effect of low frequency (LF) and low intensity (LI) pulsed magnetic fields (PMFs) on ischemic lesions of real patients, by means of a computational semi-specific head model.

[04/2017– 12/2020] **Study of MRI compatibility with partially implanted electrodes**

Collaborating Institution: U.S. Food and Drug Administration, Silver Spring, MD, USA.

Activity: Numerical evaluation of the compliance of commercial lead for interventional-MRI with exposure guidelines.

Organization of scientific meetings

Member of Local Organizing committees

2025- Final RISEUP Workshop “Cutting Edge Strategies for Spinal Cord Injury: The Journey and Results of the RISEUP Project” (21 March, 2025, ENEA Casaccia, Italy).

2024 - 5th World Congress of Electroporation (15-19 September 2024, Rome, Italy).

2024 - WIRS Young Scientist event: “Empowering waves: The radiant role of women in Radioscience” (February 16th 2024, Rome Italy)

2022 - European Microwave Week 2022 (25-30 September 2022, Milan, Italy), Supporting the Young Scientist Activity Chair in coordinating the Volunteer Staff

2021 - XXXIV URSI GASS (28 August - 4 September 2021, Rome, Italy), Supporting the Local Organizing Committee in coordinating the Volunteer Staff

Organization of workshops and scientific sessions

2025 - URSI-AP RASC 2025, Sydney, Australia: Session KD1 Wearable, Implantable and Ingestible Electronics for Biomedical Applications: from Numerical Models to Manufacturing | co-convener: Dr. G. Paolini.

2024 - International BIOEM Conference, Chania, Greece: Breakthroughs in numerical and experimental EMF exposure assessment: The contribution of BIOEM young scientists|co-chair: Dr. Giulia Sacco.

2024 - 5th World Congress of Electroporation, Rome, Italy: Special session S09 Treatment of spinal cord injury: novel strategies and updates from the RISEUP project | co-chair: Dr. Claudia Consales.

2024 - URSI-AT RASC 2024, Gran Canaria, Spain: Session KD1 RF wearable devices for body area network: from numerical modeling to manufacturing | co-convener: Dr. G. Paolini.

2024 - URSI-AT RASC 2024, Gran Canaria, Spain: Session K09 Breakthroughs in noninvasive brain stimulation: from numerical assessment to clinical application | co-convener: Dr. A. M. Cassarà.

2023 - International BIOEM Conference, Oxford, UK: Spinal cord injuries and possible strategies to repair them. New updates on the use of stem cells electrical stimulation for tissue regeneration| co-chair: Dr. Claudia Consales

2023 - URSI-GASS 2023, Sapporo, Japan: Session K12 Biomedical applications of static and low frequency EMF | co-conveners: Prof. Masaki Sekino, Prof. Akimasa Hirata

2022 - European Microwave Week 2022, Milan, Italy: Dosimetry and microdosimetry applied to emerging wireless technologies: from human to cell level | co-chair: Prof. Maxim Zhadobov

Presentations as invited speaker

2025 - Invited speaker for the Workshop "Innovative Applications of Electromagnetics: BioEM Young Scientists Leading the Way", International BIOEM Conference 2025, Rennes, France
Title of the talk: "A novel observable in TMS numerical dosimetry: the Effective Electric Field"

2024 - Invited speaker for Special Session "Electromagnetics in biomedical applications: advances in nervous system stimulation", International Conference on Electromagnetics in Advanced Applications (ICEAA) 2024, Lisbon, Portugal.
Title of the talk: "Towards the validation of the semi-specific model to assess PEMFs neuroprotective effect through numerical dosimetry"

2023 - Invited speaker for IEEE Young Professional Special Session "RF and Microwaves for Biomedical and eHealth Applications: Overview of the Recent Young Professionals Research Highlights", IEEE International Microwave Biomedical Conference (IMBioC) 2023, Leuven, Belgium
Title of the talk: "Towards the validation of the semi-specific model to assess PEMFs neuroprotective effect through numerical dosimetry"

2022 - Invited speaker for the Seminar "*WIE Seminar on Bioelectromagnetics*", University of Salento
Title of the talk: "Numerical dosimetry as a tool to assess standard and novel noninvasive brain stimulation techniques"

Honors and awards

2025 - **IEEE MTT-S Young Professional Outstanding Lecturer | Institution: IEEE Microwave Theory and Techniques Society**
Award to disseminate the talk entitled "*Boosting Electromagnetic Dosimetry at mmW Frequencies: a trade-off between Simplification and Accuracy*", following competitive selection based on CV, asbtract and flesh presentation.

2024 - **Young Scientist Best Paper Award - Roberto Sorrentino | Institution: URSI Italian National Committee**
Award for the paper entitled "*A novel observable in TMS numerical dosimetry: the Effective Electric Field*", following competitive selection based on paper and CV, and oral presentation of the work a the Annual Meeting of the URSI Italian National Committee, Viareggio (Lucca).

2024 - **Young Scientist Award | Institution: URSI International**
Award for the paper entitled "*Computational dosimetry on military crew exposed to HF vehicular antenna in near field condition"* at the URSI AT-RASC conference, Gran Canaria, Spain, following competitive selection based on paper and CV.

2023 - **Best Paper Award | Institution: IEEE Microwave Theory and Techniques Society**
Award as co-author for the paper entitled "*Neuro-Functionalized microdosimetric models for applications of electroporation*", at the international conference IMBioC, Leuven, Belgium.

2021 - **Young Scientist Award | Institution: URSI International**
Award for the paper entitled "*Miniaturized coils for noninvasive magnetic stimulation: a numerical comparison in terms of focality and penetration depth*" at the URSI GASS conference, Rome, Italy, following competitive selection based on paper and CV.

2019 - **1st Place Platform Award & Winner of Joseph James Morrissey Memorial Award | Institution: Bioelectromagnetic Society (BEMS) and European BioElectromagnetics Association (EBEA)**
Best oral presentation award for the work entitled "*A μTMS coil for ultra-focal noninvasive magnetic stimulation*" presented at the Annual Joint Meeting BioEM2019, Montpellier, France

2019 - **Student Travel Award | Institution: Bioelectromagnetic Society (BEMS) and European BioElectromagnetics Association (EBEA)**
Travel grant contribution to present the work entitled "A μTMS coil for ultra-focal noninvasive magnetic stimulation" at the Annual Joint Meeting BioEM2019, Montpellier, France

2019 - **Student paper competition open finalist | Institution: IEEE Engineering Medicine & Biology Society**
Qualified as finalist in the student paper competition and awarded a 500$ travel grant to present the work entitled "*Ultra-Focal Magnetic Stimulation Using A μTMS Coil: A Computational Study*" at the 41st EMB Conference, Berlin, Germany

2019 - **Student poster Travel Award | Institution: Biomedical Engineering Society (BMES) and the US Food and Drug Administration (FDA)**
Award to the work entitled "*RF-Exposure Conditions vs. Induced Heating with Interventional Catheters: A Computational Study*" accepted as poster at the BMES/FDA Frontiers in Medical Devices Conference, Washington, USA

Editorial Activity

[2025] **Topic Editor for Journal Frontiers in Antennas and Propagation**
Research topic title: Emerging Wireless Technologies, Wearable and In-Body Devices: Numerical and Experimental Approaches for Exposure Assessment and Efficient & Safe Design
Co-Editor: Prof. Cecilia Occhiuzzi (Torvergata University, Italy), Dr. Giulia Sacco (IETR, France), Dr. Giacomo Paolini (University of Bologna, Italy)

[2021– Current] **Reviewer for Peer reviewed Journals**
Frontiers in Neuroscience (2 papers)
Journal of neuronal engineering (6 papers)
IEEE Access (1 paper)
IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology (1 paper)
WILEY Bioelectromagnetics (1 paper)
IOP Physics in Medicine and Biology (6 papers)
IOP Biomedical Physics & Engineering Express (1 paper)

[2021– Current] **Reviewer for International Conferences**
BIOEM2025, Rennes, France
BIOEM2024, Chania, Greece
URSI-AT-RASC 2024, Gran Canaria, Spain
URSI-GASS 2023, Sapporo, Japan
European Microwave Week 2023, Berlin, Germany
European Microwave Week 2022, Milan, Italy

Memberships

[2023– Current] **URSI Italian Chapter of Women in Radioscience (WIRS)**
Founding member

[2023– Current] **IEEE Young Professionals**
Member

[2023– Current] **IEEE Microwave Theory and Technique Society**
Member

[2021– Current] **IEEE Union of Radioscience (URSI)**
Member

[2021– Current] **BIOEM Society**
Member

[2022– 2023] **European Microwave Association (EuMA)**
Member

[2019– 2021] **IEEE Engineering in Medicine and Biology Society**
Student member

[2019– 2021] **European Association of BioElectromagnetism**
Student member

Academic Services

[2021– Current] **Electromagnetic compatibility | Master Degree Course, Biomedical Engineering, Sapienza Univ. of Rome**
Member of exam commission

Tutoring

[2018– Current] **Co-supervisor of 30 Master Degree Students during their internship period**
Master course: Biomedical Engineering, Sapienza Univ. of Rome

[2017– Current] **Co-supervisor of 11 Bachelor Degree Students during their internship period**
Bachelor course: Clinical Engineering, Sapienza Univ. of Rome

[2020– Current] **Tutor for the course of Therapeutic applications of low frequency electromagnetic fields**
Master course: Biomedical Engineering, Sapienza Univ. of Rome

[04/2019– 09/2019] **Tutor (i.e. Domain expert) for the GamificationLab (DigiLab Department of Informatics, Sapienza University of Rome)**
For the development of a didactic game on non-invasive brain stimulation techniques.

[2018– 2019] **Tutor for the course of Electromagnetic Fields**
Bachelor course: Clinical Engineering, Sapienza Univ. of Rome

[2018– 2019] **Tutor for the course of Electromagnetic Fields and Nanosystems**
Master course: Nanotechnologies Engineering, Sapienza Univ. of Rome

Lecturing

[05/2025] **Lecture *"Electromagnetic Dosimetry at 5G-Frequencies: Interactions between the body and incident plane waves"***
Master course: Analisi dati e segnali biomedici e campi elettromagnetici (modulo Campi elettromagnetici) , Medicina HT, Sapienza Univ. of Rome

[05/2025] **Lecture *"Boosting Electromagnetic Dosimetry at mmW Frequencies: a trade-off between Simplification and Accuracy"***
Master course: Bioelectromagnetic Interaction Module I, Biomedical Engineering, Sapienza Univ. of Rome

[03/2025] **Lecture *"Numerical dosimetry of the neuroprotective effect of PEMFs through a patient semi-specific modeling"***
Master course: Therapeutic applications of low frequency electromagnetic fields, Biomedical Engineering, Sapienza Univ. of Rome

[03/2025] **Lecture *"Numerical dosimetry of the neuroprotective effect of PEMFs through a patient semi-specific modeling"***
Master course: Therapeutic applications of low frequency electromagnetic fields, Biomedical Engineering, Sapienza Univ. of Rome

[03/2024] **Lecture *"RISEUP: Regeneration of injured spinal cord by electro pulsed bio-hybrid device"***
Master course: Therapeutic applications of low frequency electromagnetic fields, Biomedical Engineering, Sapienza Univ. of Rome

[05/2020] **Lecture *"The m-Coil: a miniaturized coil for noninvasive magnetic stimulation"***
Master course: Therapeutic applications of low frequency electromagnetic fields, Biomedical Engineering, Sapienza Univ. of Rome

[2018– Current] **Yearly lecture *"Numerical evaluation of the RF-induced heating when in presence of interventional catheter during MRI exams"***
Master course: Electromagnetic Compatibility, Biomedical Engineering, Sapienza Univ. of Rome

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Rome, 2/07/2025