

Curriculum Vitae

Micol Colella

EDUCATIONAL BACKGROUND

- 2017 - 2020** PhD Course, University of Rome “La Sapienza”, Department of Information Engineering, Electronics and Telecommunications (DIET), Division of Electronic Engineer, Rome, Italy. **(Scholarship end date December 31st, 2020. Dissertation will be held by the end of May 2021)**
- 2015 - 2017** **M.Sc.** in Biomedical Engineering, University of Rome “La Sapienza”, master thesis at Department of Information Engineering, Electronics and Telecommunications (DIET), Rome, Italy
Thesis: “Variability factors in a computational model of a 1.5 T RF birdcage coil”
Grade 110 out of 110, cum laude
- 2012 - 2015** **B.S.** in Clinical Engineering, University of Rome “La Sapienza”, bachelor thesis at Department of Information Engineering, Electronics and Telecommunications (DIET), Rome, Italy
Thesis: “Thin film photosensors for Lab-on-Chip systems”
Grade 109 out of 110
- 2007 - 2012** **High school** for humanities “Eugenio Montale”, Rome, Italy, Subjects including Math’s, Science, English
Grade 98 out of 100

RESEARCH EXPERIENCES

- Period** 2017-2020 (Three years)
Institute Department of Information Engineering, Electronics and Telecommunications (DIET), University of Rome “La Sapienza”.
Position PhD student under supervision of Prof. Micaela Liberti (University of Rome “La Sapienza”).
Research activities **Numerical modeling of noninvasive magnetic and electric brain stimulation techniques to investigate their physiological effects on human brain.**
- Period** 2019-2020 (Six months)
Institute Athinoula A. Martinos Center for Biomedical Imaging (Boston, MA, USA).
Position Graduate Research Assistant under supervision of Prof. Giorgio Bonmassar (Harvard Medical School).
Research activities **Development of the second generation of miniaturized coil for ultra-focal transcranial magnetic stimulation.**
- Period** 2019 (Two weeks)
Institute IT’IS Foundation, Zurich, Switzerland
Position Visiting PhD student, under supervision of Dr. Antonino Cassarà (IT’IS Foundation).
Research activities **Assessment of new neuronal models to study noninvasive stimulation techniques of the peripheral nervous system.**
- Period** 2018 (Six months)
Institute Athinoula A. Martinos Center for Biomedical Imaging (Boston, MA, USA).
Position Graduate Research Assistant under supervision of Prof. Giorgio Bonmassar (Harvard Medical School).
Research activities **Development of an ultra-focal TMS system for peripheral nerve stimulation.**
- Period** 2017 (Two weeks)
Institute Neuro-radiology research laboratory, Ospedale San Raffaele, Milano, Italy.
Position Visiting PhD student under supervision of Prof. Nicoletta Anzalone (Università Vita-Salute, Scientific Institute San Raffaele).
Research activities **Segmentation of ischemic lesions from MR images of patients recruited in the I-NIC project - A double-blind, randomized, placebo-controlled, multicentric study to evaluate the efficacy of low-frequency pulsed electromagnetic field (ELF-MF) in patients suffering from acute ischemic stroke.**

RESEARCH PROJECTS

From – To

- 2020 - Present** **The Effective Navigated (En-)TMS project**, in collaboration with Sentech S.r.l., Info Solution S.p.a., and the department of Physiology and Pharmacology "Vittorio Erspamer", at University of Rome "La Sapienza".
- Jan. 2021 – Mar. 2021** **Heprosys project: Estimation of operator exposure to an antenna working in the range 2 – 30 MHz**, In collaboration with Larimart S.p.A
- 2018 - Present** **Development and modeling of an ultra-focal TMS system for cortical and peripheral nerve stimulation**, in collaboration with Athinoula A. Martinos Center for Biomedical Imaging (Boston, MA, USA).
- 2017 - Present** **Investigation 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, I-NIC project**, in collaboration with IGEA Medical, SPA and Università Campus Biomedico.
- 2017 - 2020** **Study of MRI compatibility with partially implanted electrodes**, in collaboration with the U.S. Food and Drug Administration (Silver Spring, MD, USA).

TECHNICAL SKILLS AND COMPETENCES

-3D modeling, data postprocessing, electric measurements-

- **Programming:** Matlab for data postprocessing, LabView for computer/instrument interface; C++ and Python.
- **Electromagnetic and electronic simulation softwares:** Sim4Life, Comsol Multiphysics, Ansys Maxwell, LT Spice.
- **Software platform for medical image processing and 3D modeling:** ITK-Snap, 3DSlicer, Seg3D, Autodesk 3ds Max.
- **Devices for electrical measurements:** Oscilloscope, digital multimeter, RLC meter, Network analyzer.

AWARDS AND TRAVEL SUPPORTS

Year	Conference
2021	URSI-GASS 2021: Young Scientist Award
2019	BioEM2019 Annual Joint Meeting, Montpellier, France: 1st place Platform Presentation Award and winner of Joseph James Morrissey Award.
2019	BioEM2019 Annual Joint Meeting, Montpellier, France: Student Travel Award.
2019	BMES/FDA Frontiers Conference, Washington DC, USA: Student Travel Award.
2019	41 st EMB Conference2019, Berlin, Germany: Open finalist (Entitled to receive student support).

PARTECIPATION AT NATIONAL AND INTERNATIONAL CONFERENCES

- Date** November 14th, 2020
Conference 7th International Conference on Non-Invasive Brain Stimulation, On-line Congress.
Presentation Poster
Title Ultra-focal magnetic stimulation: A numerical comparison between two different miniaturized coil.
- Date** June 1st, 2020
Conference 6th Annual BRAIN Initiative Investigators Meeting, Virtual Meeting.
Presentation Poster
Title Computational analysis of the new ultra-focal miniaturized coil for noninvasive transcranial magnetic stimulation.
- Date** July 26th, 2019
Conference EMBC, 41st Annual International Conference of IEEE-EMBS, Berlin, Germany.
Session Models of Organs and Medical Devices
Presentation Oral platform
Title Ultra-Focal Magnetic Stimulation Using a μ TMS Coil: A Computational Study.
- Date** July 26th, 2019
Conference EMBC, 41st Annual International Conference of IEEE-EMBS, Berlin, Germany.
Session Models of Organs and Medical Devices
Presentation Oral platform
Title Ultra-Focal Magnetic Stimulation Using a μ TMS Coil: A Computational Study.
- Date** July 25th, 2019
Conference EMBC, 41st Annual International Conference of IEEE-EMBS, Berlin, Germany.
Session Model Construction: Algorithms, Parameters and Sensitivity.
Presentation Poster
Title Influence of Anatomical Model and Skin Conductivity on the Electric Field Induced in the Head by Transcranial Magnetic Stimulation
- Date** June 24th, 2019
Conference BioEM2019 Annual Joint Meeting, Montpellier, France.
Session Electric and magnetic stimulation of the nervous system.
Presentation Oral platform
Title A μ TMS coil for ultra-focal noninvasive magnetic stimulation
- Date** June 24th, 2019
Conference BioEM2019 Annual Joint Meeting, Montpellier, France.

Presentation Poster

Title Numerical evaluation of the influence of RF-exposure conditions on heating induced by interventional catheters

Date June 25th, 2019

Conference BioEM2019 Annual Joint Meeting, Montpellier, France.

Presentation Poster

Title Influence of skin conductivity on the electric field induced in the head by noninvasive brain stimulation techniques.

Date February 26th, 2019

Conference 3rd International Brain Stimulation Conference, Vancouver, Canada.

Presentation Poster

Title Numerical evaluation of the induced electric field in techniques of transcranial brain stimulation: influence of the anatomic model and skin conductivity.

Date February 27th, 2019

Conference 3rd International Brain Stimulation Conference, Vancouver, Canada.

Presentation Poster

Title A microTMS System for Peripheral Nerve Stimulation.

Date February 27th, 2019

Conference 3rd International Brain Stimulation Conference, Vancouver, Canada.

Presentation Oral platform

Session Innovative techniques for non-invasive, low-energy, brain stimulation: from models to potential clinical applications.

Title Patient semi-specific computational modeling of electromagnetic stimulation.

Date November 29th, 2018

Conference 5th ICEmB National Congress, Salerno, Italy.

Presentation Oral platform

Session Biomedical applications

Title Patient semi-specific computational modeling of electromagnetic stimulation applied to regenerative treatments in acute ischemic stroke

SOCIETY MEMEBERSHIP

From

February 2020 Student member of the European Bioelectromagnetics Association (EBEA)

ACADEMIC SERVICES

- Date** From April 2019 to September 2019
- Institute** DigiLab, Department of Informatics, “La Sapienza” University of Rome, Rome, Italy.
- Activity** Tutor (*i.e. Domain expert*) for the GamificationLab students during the development of a didactic game on non-invasive brain stimulation techniques, under the supervision of Prof. Francesco Lutrario and Prof. Micaela Liberti.
- Date** May 2020
- Institute** Department of Information Engineering, Electronics and Telecommunications, “La Sapienza” University of Rome, Rome, Italy.
- Activity** Lecturer on “The m-Coil: a miniaturized coil for noninvasive magnetic stimulation”, for the class “Therapeutic applications of Low Frequency Electromagnetic fields”, under supervision of Prof. Micaela Liberti and Prof. Francesca Apollonio.
- Date** May 2020
- Institute** Department of Information Engineering, Electronics and Telecommunications, “La Sapienza” University of Rome, Rome, Italy.
- Activity** Lecturer on “Numerical evaluation of the RF-induced heating when in presence of interventional catheter during MRI exams”, for the course of Electromagnetic Compatibility under supervision of Dr. Alessandra Paffi
- Date** From January 2018 to present
- Institute** Department of Information Engineering, Electronics and Telecommunications, “La Sapienza” University of Rome, Rome, Italy.
- Activity** Trainer for nine bachelor students in Biomedical Engineering during their intern period, under the direction of Prof. Micaela Liberti and Dr. Alessandra Paffi. With thesis on:
- Numerical evaluation of the induced electric field in techniques of transcranial brain stimulation for human and animal applications;
 - Development of the 3D model of the cortex pain matrix to conduct numerical dosimetric evaluation on the nociceptive effect of non-invasive brain stimulation techniques.
 - Numerical evaluation of the RF-induced heating when in presence of interventional catheters.
- Date** From November 2017 to present
- Institute** Department of Information Engineering, Electronics and Telecommunications, “La Sapienza” University of Rome, Rome, Italy.
- Activity** Trainer for six bachelor students in Clinical Engineering during their intern period, under the direction of Prof. Micaela Liberti. With thesis on:
- Numerical evaluation of the exposure of ischemic tissue to LF-LI-PMF;
 - Investigation on the role of tissue heterogeneity in the highly detailed, multimodal image-based anatomical model of a human head and neck, namely the MIDA model.
 - Numerical evaluation of the induced electric field in techniques of transcranial brain stimulation.
- Tutor for the course of Electromagnetic Fields under the direction of Prof. Francesca Apollonio and

Prof. Micaela Liberti.

- Tutor for the course of Electromagnetic Fields and Nanosystems, under the direction of Prof. Micaela Liberti and Prof. Francesca Apollonio.
- Tutor for the course of Therapeutic applications of low frequency electromagnetic, fields under the direction of Prof. Micaela Liberti and Prof. Francesca Apollonio.

LANGUAGES

Mothertongue Italian

Other English: Fluent

PUBLICATIONS ON JOURNAL PAPERS AND BOOKS

Colella M., Camera, F., Capone, F. et al. "Patient Semi-specific Computational Modeling of Electromagnetic Stimulation Applied to Neuroprotective Treatments in Acute Ischemic Stroke." *Sci Rep* 10, 2945 (2020). <https://doi.org/10.1038/s41598-020-59471-9>

Colella M., Liberti M., Apollonio F., Bonmassar G., "A Miniaturized Ultra-Focal Magnetic Stimulator and Its Preliminary Application to the Peripheral Nervous System", In: Makarov S.N., Noetscher G.M., Nummenmaa A. (eds) *Brain and Human Body Modeling 2020*. Springer, Cham. https://doi.org/10.1007/978-3-030-45623-8_9

Colella M., Paffi A., De Santis V., Apollonio F., Liberti M., "Effect of Skin Conductivity on the Electric Field Induced by Transcranial Stimulation Techniques in Different Head Models.", *Phys. Med. Biol.* **66** 035010. <https://doi.org/10.1088/1361-6560/abcde7>

PUBLICATIONS ON INTERNATIONAL CONFERENCES

Colella M., Liberti M., Press D.Z., Apollonio F., Bonmassar G., "Miniaturized coils for noninvasive magnetic stimulation: a numerical comparison in terms of focality and penetration depth". Accepted to *URSI GASS 2021, Rome, Italy, 28 August - 4 September 2021* and winner of the Young Scientist Award.

Colella M., Lelli D., et al., "Numerical Computation of the TMS-Induced Electric Field in Rat Brain", Accepted to *URSI GASS 2021, Rome, Italy, 28 August - 4 September 2021*.

Colella M., Biscarini M., et al., "Modeling Human Body Exposure to the field emitted by a Vehicular Antenna". Accepted to *URSI GASS 2021, Rome, Italy, 28 August - 4 September 2021*

Colella M., Liberti M., Apollonio F., Bonmassar G., "Ultra-focal magnetic stimulation: A numerical comparison between two different miniaturized coils". In Abstract Collection, 7th International Conference on Non-Invasive Brain Stimulation, November 10-14, On-line Congress.

Colella M., Camera F., Capone F., Setti S., Cadossi R., di Lazzaro V., Apollonio F., Liberti M., "Numerical evaluation of electromagnetic stimulation applied to neuroprotective treatments in acute ischemic stroke using patient semi-specific modeling". In Abstract Collection, BioEM Conference, June 21-26, 2020, Oxford, UK.

Colella M., Paffi A., De Santis V., Apollonio F., Liberti M., "Influence of skin conductivity and anatomical head model: A numerical study on TMS and tDCS". In Abstract Collection, BioEM Conference, June 21-26, 2020, Oxford, UK.

Colella M., Liberti M., Press D.Z., Apollonio F., Bonmassar G., "A numerical comparison between two different ultra-focal miniaturized coils for noninvasive magnetic stimulation". In Abstract Collection, BioEM Conference, June 21-26, 2020, Oxford, UK.

Paffi A., Apollonio F., **Colella M.**, Carducci F., Pellegrini V., Bellizzi L., Pignani A., Liberti M., "Effect of the TMS coil orientation on the electric field induced along neuronal structures". In Abstract Collection, BioEM Conference, June 21-26, 2020, Oxford, UK.

Colella M., Liberti M., Apollonio F., Bonmassar G., "Computational analysis of the new ultra-focal miniaturized coil for noninvasive transcranial magnetic stimulation". In Abstract Collection, 6th Annual BRAIN Initiative Investigators Meeting, June 1st-3rd, Virtual Meeting.

Colella M., Laher R.M., Press D. Z., McIluff C.E., Rutkove S.B., Pascual-Leone A., Apollonio, F., Liberti M., Bonmassar, "Ultra-Focal Magnetic Stimulation Using a μ TMS Coil: A Computational Study", *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Berlin, Germany, 2019, pp. 3987-3990, doi: 10.1109/EMBC.2019.8857349.

Colella M., Paffi A., Fontana S., Rossano F., De Santis V., Apollonio F., Liberti M., "Influence of Anatomical Model and Skin Conductivity on the Electric Field Induced in the Head by Transcranial Magnetic Stimulation", *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Berlin, Germany, 2019, pp. 2917-2920, doi: 10.1109/EMBC.2019.8856354.

Colella M., Paffi A., Fontana S., Rossano F., De Santis V., Apollonio F., Liberti M., "Influence of skin conductivity on the electric field induced in the head by noninvasive brain stimulation techniques". In Abstract Collection, BioEM Conference, June 23-28, 2019, Montpellier, France.

Colella M., Lucano E., Apollonio F., Zeng Q., Liu J., Lloyd T., Wedan S., Chen J., Kainz W., Liberti W., Angelone L.M., "Numerical evaluation of the influence of RF-exposure conditions on heating induced by interventional catheters". In Abstract Collection, BioEM Conference, June 23-28, 2019, Montpellier, France.

Colella M., Laher R.M., Press D. Z., McIluff C.E., Rutkove S.B., Pascual-Leone A., Apollonio, F., Liberti M., Bonmassar, "A μ TMS coil for ultra-focal noninvasive magnetic stimulation". In Abstract Collection, BioEM Conference, June 23-28, 2019, Montpellier, France.

Galli, M., **Colella M.**, Paffi A., Thomas A., Apollonio F., Prato F. S., Liberti M., "Dosimetric analysis on the pain matrix exposed to low-intensity extremely low-frequency magnetic fields". In Abstract Collection, BioEM Conference, June 23-28, 2019, Montpellier, France.

Capone, F., **Colella M.**, Motolese F., Rossi M. G., Camera F., Apollonio F., Di Lazzaro V., Micaela Liberti, "Extremely low-frequency magnetic fields as neuroprotective treatment in acute ischemic stroke: models, mechanisms and clinical application". In Abstract Collection, BioEM Conference, June 23-28, 2019, Montpellier, France.

Colella M., Laher R.M., Press D. Z., McIluff C.E., Rutkove S.B., Pascual-Leone A., Apollonio, F., Liberti M., Bonmassar, "Non-invasive Magnetic Stimulation with a microTMS System: A Computational Study", In Abstract Collection, Photonics & Electromagnetics Research Symposium - PIERS, June 17-21, 2019, Rome, Italy.

Colella M., Lucano E., Apollonio F., Zeng Q., Liu J., Lloyd T., Wedan S., Chen J., Kainz W., Liberti W., Angelone L.M., "RF-Exposure Conditions vs. Induced Heating with Interventional Catheters: A Computational Study", In Abstract Collection of BMES/FDA Frontiers in Medical Devices Conference, March 19-21, 2019, Washington DC, USA.

Colella M., Camera F., Capone F., Setti S., Fusco R., Cadossi R., Apollonio F., di Lazzaro V., Liberti M., "Patient semi-specific computational modeling of electromagnetic stimulation", *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, Volume 12, Issue 2, 455.

Colella M., Laher R.M., Press D. Z., McIluff C.E., Rutkove S.B., Liberti M., Pascual-Leone A., Bonmassar, G. "A microTMS System for Peripheral Nerve Stimulation". *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, Volume 12, Issue 2, 521.

Paffi A., **Colella M.**, Mambrini M., Apollonio F., De Santis V., Liberti M., "Numerical evaluation of the induced electric field in techniques of transcranial brain stimulation: influence of the anatomic model and skin conductivity", *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, Volume 12, Issue 2, 493.

Colella M., Camera F., Capone F., Setti S., Fusco R., Cadossi R., Apollonio F., di Lazzaro V., Liberti M., "Patient semi-specific computational modeling of electromagnetic stimulation applied to regenerative treatments in acute ischemic stroke". In: Abstract collection ICEmB Congress, November 28-30 2018, Salerno, Italy.

Colella M., Lucano E., Apollonio F., Zeng Q., Liu J., Lloyd T., Wedan S., Chen J., Kainz W., Liberti W., Angelone L.M., "RF-field vs. Induced Heating with Interventional Catheters: a computational investigation". In Abstract Collection, 1st EMF-Med world Conference on Biomedical Applications of Electromagnetic Fields, September 10-13 2018, Split, Croatia

Colella M., Camera F., Capone F., Setti S., Fusco R., Cadossi R., Apollonio F., di Lazzaro V., Liberti M., "Patient semi-specific computational modeling of electromagnetic stimulation applied to regenerative treatments in acute ischemic stroke". In: Abstract collection of BioEM 2018 Conference, June 24-29 2018, Portoroz, Slovenia.

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Date

Signature

Rome, 11/05/2021

