

IRENE EGIDI

PH.D. STUDENT BIOPHYSICS
BIOMEDICAL ENGINEER

SCIENTIFIC INTERESTS AND ACTIVITY

During my Bachelor's degree at Sapienza University of Rome, I developed an interest in tools and methods for medical application fields. My bachelor thesis concerned the study of a non-invasive way to detect vocal folds pathologies: electroglottography [3].

For my master's degree, I decided to focus on rehabilitation techniques, and I had the opportunity to acquire deep knowledge of the following subjects: Medical Physics, Biomechanics, Tissue Engineering and Biomaterials, Industrial Neuroscience, Biomedical signals processing, Biomedical Instrumentation, Advanced Methods in Biomedical Data Analysis, Laboratory of Electrical Measures, and the following software: MATLAB and Simulink, ImageJ, ITK-SNAP, LabVIEW.

For my master thesis, I chose the Medical physics field. I joined the Applied Physic Group (ARPG) which involves members of INFN, Sapienza University (Physics and SBAI departments) and CREF (Centro Ricerche Enrico Fermi). My activity has been focused on the validation of a new technique to monitor morphological changes in Hadrontherapy treatments through the detection of secondary charged fragments to support the medical team's decision to replan the treatment.

I analysed the data of 4 patients treated at the National Center for Oncological Hadrontherapy (CNAO) with carbon ions and included in the INSIDE ("Innovative Solution for Dosimetry in Hadrontherapy") project. The new method I implemented is based on the inter-fraction comparison among 3D emission maps of secondary fragments using the gamma-index parameter, which can recognize the dissimilar voxels between the two compared maps correlated to modifications in the density of the tissues crossed by the secondary fragments. This method has turned out to be a promising way to monitor and detect morphological variations such as the inflammatory process of biological tissues caused by the treatment itself. My thesis work has been presented at the 59th Annual Conference of the Particle Therapy Co-Operative Group, and, currently, we are working on the submission of an article for the journal Scientific Reports of Nature [1]. Currently I am working as a Ph.D. student with MARBILAB group at Fondazione Santa Lucia of Rome. My work will regard an unconventional MRI method using sodium ions for the monitoring of patients affected by Multiple Sclerosis.



PERSONAL INFORMATION

Date of birth: 13/10/1996

Nationality: Italian

CONTACTS

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LANGUAGES

- Italian: native
- English: upper-intermediate (B2)
- Spanish: Pre-Intermediate (A2/B1)

RESEARCH EXPERIENCE

RESEARCH FELLOW

Centro ricerche Enrico Fermi

16/08/2021 - currently

THESIS INTERNSHIP

SBAI department - Sapienza University of Rome

26/10/2020 - 26/05/2021

CONFERENCES CONTRIBUTIONS

INSIDE INTERNAL MEETING

"Monitoring of Hadrontherapy Treatments by secondary fragments detection"

16/04/2021

ARPG INTERNAL MEETING

"Monitoring of Hadrontherapy Treatments by secondary fragments detection (3D studies update)"

17/03/2021

EDUCATION

SAPIENZA UNIVERSITY OF ROME

Ph.D in Biophysics (Morphogenesis and Tissue Engineering)

- 11/21 - currently

Supervisor: Prof. Federico Giove

SAPIENZA UNIVERSITY OF ROME

Master's degree in Biomedical Engineering

- 2018 -2020

- Thesis: "Studio delle modifiche morfologiche in trattamenti effettuati utilizzando ioni carbonio mediante la rivelazione di protoni secondari".

Supervisor: Prof. Alessio Sarti, Coadvisor: Dott. Giacomo Traini.

SAPIENZA UNIVERSITY OF ROME

Bachelor's degree in Clinical Engineering

- 2015 -2018

- Thesis: "Elettroglottografia e tracciato elettroglottografico: possibili applicazioni cliniche".

Supervisor: Prof. Mauro Biagi

TECHNICAL SKILLS

- Strong knowledge of MATLAB
- Basic knowledge of C++, LabView and ROOT
- Good knowledge of ITK-SNAP and ImageJ.
- Graphic design and video editing (Photoshop, Final Cut Pro X).
- Strong knowledge of Windows, LINUX and IOS operating systems.
- Strong knowledge of Office package and good knowledge of LateX.

SOFT SKILLS

Teamwork, Communication.

PERSONAL INTERESTS

Musical Theatre, Acting, Singing, Craftsmanship.

COURSES

"BIOMATERIALS, TISSUE REGENERATION METHODS, INSTRUMENTATION AND TOOLS FOR ODONTOLOGY, ORAL AND MAXILLOFACIAL SURGERY AND ORTHOPAEDICS"

Istituto Superiore di sanità

2019

LABORATORY ACTIVITY

ELECTRICAL MEASURES

Development of an electrocardiograph (on a breadboard).

24/09/2018- 23/12/2018

MEDICAL PHYSICS LABORATORY

Measurement of environmental and a source of Na-22 radioactivity.

1/03/2019 - 31/05/2019

BIOMECHANICS AND TISSUE ENGINEERING

A study of biomechanical characteristics of murine bone tissue, connective tissue and muscle tissue. (ONLINE activity because of COVID-19 emergency)

1/03/2020 - 31/05/2020

MASTER THESIS PROJECT

Monitoring of morphological variations in Hadrontherapy treatments through the detection of secondary charged fragments.

26/10/2020 - 26/05/2021

PUBLICATIONS

[1] "Detection of inter-fraction morphological variations in carbon therapy: 3D analysis of the data collected during a clinical trial performed at CNAO" article in preparation for Scientific Reports of Nature.

[2] Master's degree thesis: "Studio delle modifiche morfologiche in trattamenti effettuati utilizzando ioni carbonio mediante la rivelazione di protoni secondari", <http://arpg-serv.ing2.uniroma1.it/arpg-site/index.php/state-of-art/thesis>;

[3] Bachelor's degree thesis: "Elettroglottografia e tracciato elettroglottografico: possibili applicazioni cliniche."