

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
**DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Ad hoc course announcement

**Title: Radiofrequency ablations in liver surgery:
a multidisciplinary point of view**

Schedule:

Lecture	Date	Time	Topics	Lecturer
1	7 november 2023	15:00 – 17:00	Interaction between Electromagnetic Fields and Human Tissues	Giuseppe Ruello
2	9 november 2023	15:00 – 18:00	Electromagnetic Dosimetry	Rita Massa
3	13 november 2023	15:00 – 16:30	Fiber Optic Sensors for Thermal Monitoring of Tumor Ablation	Elena De Vita
4	13 november 2023	16:30-18:00	Radiofrequency Clinical applications in liver cancer	Francesco Izzo
	13 november 2023		Assessment test	

Lecturers:

Rita Massa

University of Napoli Federico II
Department of Physics Ettore Pancini
massa@unina.it

CV: Rita Massa is an Associate Professor of electromagnetic Fields at the Department of Physics “Ettore Pancini”, University of Naples Federico II, Italy. She is currently the Director of the Interuniversity Center for the Study of Interactions between Electromagnetic Fields and Biosystems (ICeMB, headquarters at University of Genoa). Her main research interests are in the framework of the interactions of electromagnetic fields and materials, dealing with the biological effects of Electromagnetic Fields, electromagnetic dosimetry/exposure assessment, therapeutic and industrial applications of Electromagnetic Fields, and nondestructive testing of materials.

Giuseppe Ruello

University of Napoli Federico II
Department of Electrical Engineering and Information Technology (DIETI)
ruello@unina.it

CV: Giuseppe Ruello is an Associate Professor of electromagnetic Fields at the Department of Electrical and Information Technology Engineering, University of Naples Federico II, Italy. His main research interests include SAR remote sensing, modelling of electromagnetic scattering from natural surfaces, fractal models, SAR raw signal simulation, modelling of electromagnetic field propagation in urban environment, modelling of electromagnetic field propagating in Magnetic resonance scanners.

Elena De Vita

University of Napoli Parthenope
Department of Engineering
elena.devita@uniparthenope.it

CV: Elena De Vita is a Postdoctoral Researcher with the Department of Engineering, University of Naples "Parthenope", Italy. Her research interests are focused on fiber optic sensors in biomedical and industrial fields for thermal and mechanical measurements. Her work currently involves the development and application of thermal monitoring systems for radiofrequency, laser, and microwave ablation for tumor treatment.

Francesco Izzo

IRCCS Fondazione Pascale INT, Napoli
Department of HPB Surgery
f.izzo@istitutotumori.na.it

CV: Francesco Izzo is a MD and Surgeon, actually Director and Chief of the Division of Abdominal Surgical Oncology, Hepatobiliary and Pancreatic Unit, Department of Surgical Oncology, National Cancer Institute of Naples, Fondazione "G. Pascale", Italy. Its clinical practice and research focuses on surgical oncology new treatments particularly for patients with Hepato-biliary, pancreatic and gastrointestinal tumors; to date he has performed over 7,000 cases of major surgical oncology procedures. Dr. Izzo with his clinical experience of over 25 years, has been a pioneer in designing new treatments for patients with liver tumors, including Radiofrequency ablation (RFA), microwave ablation (MWA), electrochemotherapy, Irreversible electroporation (IRE), improved techniques for surgical removal of liver cancers, and several types of direct tumor injection therapy.

Credits: 2 ECTS

Content

Lesson 1

– **Interaction between Electromagnetic Fields and Human Tissues:** Introduction to Maxwell's equations. The electromagnetic spectrum. Electromagnetic characterization of biological tissues. Propagation in free space and in complex media. Applications of radiofrequency and microwaves to biomedical problems.

Lesson 2

– **Electromagnetic Dosimetry:** The quantification of the magnitude and distribution of absorbed electromagnetic energy within RF exposed biological objects. The lesson will be enriched by a seminar on *Numerical Methods for Biomedical Applications*, given by Dr. Francesca Lodato.

Lesson 3

– **Fiber Optic Sensors for Thermal Monitoring of Tumor Ablation:** Introduction to fiber optic sensors. Fiber Bragg Gratings (FBGs). Tumor ablation scenarios: focus on radiofrequency, laser, and microwave ablation. Temperature monitoring need. FBGs for thermal measurements and mapping during tumor ablation. Experimental activities, setup, and results.

Lesson 4

– **Radiofrequency Clinical applications in liver cancer:** Clinical applications of liver ablation: focus on radiofrequency and microwave ablation. Indications for local treatment. Integrations in liver metastasis. Actual problem and new possible solutions. Applications in minimally invasive surgery. The lesson will be enriched by a seminar on *real life experience with radiofrequency ablation in liver surgery* given by Dr. Renato Patrone.

Venue

Sala riunioni Radiologia – piano 0 – palazzina degenze – INT Pascale di Napoli, IRCCS, Via Mariano Semmola, Napoli

Teams link: <https://teams.microsoft.com/l/meetup-join/19:3aed012c65964370adb4125c2bf1812c@thread.tacv2/1697829080832?context=%7B%22Tid%22:%222f9cfe26a-bb62-46b0-b1e3-28f9da0c45fd%22,%22Oid%22:%22cdd0192b-0800-4a3b-b9ca-5b86d7a439ed%22%7D>

For information: Prof. Giuseppe Ruello (DIETI, UniNA) – ruello@unina.it
Prof.ssa Rita Massa (Dip. Di Fisica, UniNA) – rita.massa@unina.it