

**Giovedì 13 Maggio 2021, Ore: 9.00-10.30**  
**Sulla piattaforma Microsoft TEAMS,**  
**TEAM: "Seminari di Elettromagnetismo per Ing. Biomedica LM"**  
**Codice di accesso: wyesrid.**



**Dott.ssa Stefania Romeo**

**CNR – Institute for Electromagnetic Sensing of the Environment (IREA), Bioelectromagnetics Lab**

<https://www.irea.cnr.it>

## **Short and ultrashort, high voltage electric pulses for biological and medical applications**

The application of sufficiently intense and relatively short pulsed electric fields to mammalian cells is capable of inducing a significant increase of plasma membrane permeability (electroporation), allowing the passage of normally impermeant ions, macromolecules and drugs. In particular, pulsed electric fields (PEFs) of amplitude up to kV/m and duration in the ms to  $\mu$ s time scale are commonly employed to potentiate the efficacy of chemotherapeutic drugs in the clinical treatment of solid cancers (electrochemotherapy), or to promote the process of microbic deactivation in food and water treatments. More recently, taking advantages from the development of new technologies in the framework of

pulsed power systems, PEFs of higher electric field amplitude (MV/m) and ns durations (nsPEFs) have been developed. Such nsPEF have been demonstrated not only to target the plasma membrane but also to interact with intracellular structures, and induce several cell death pathways in cancer cells, paving the way to the development of new, non-thermal and drug free technologies for cancer treatment.

The seminar will cover the biophysical basis of electroporation, the main concepts for the generation of short, high voltage pulses, and the established and future applications of electroporation in the biomedical field.

Stefania Romeo, MSc in Biomedical Engineering (Univ. of Naples, 2008) and PhD in Electronic Engineering (Second Univ. of Naples, 2012), is Research Scientist with CNR-IREA since 2016. In 2010-2011 she was visiting scholar with USC Los Angeles, and in 2014 she was visiting scientist with the Univ. of Copenhagen. In 2015 she received the Young Researcher Award during the "1<sup>st</sup> World Congress on Electroporation and Pulsed Electric Fields for Biology, Medicine and Food & Environmental Technologies". The research activity of Stefania Romeo deals with the study of the interaction of electromagnetic fields and pulsed electric fields with mammalian cells with experimental and modeling approaches, the design and set up of *in vitro* exposure systems, the assessment of human exposure to electromagnetic fields.

Info: **Prof. Giuseppe Ruello** - tel. 081 7683512 – [ruello@unina.it](mailto:ruello@unina.it)  
**Prof.ssa Rita Massa** - tel. 081 676844 – [rita.massa@unina.it](mailto:rita.massa@unina.it)