

**2022 European Microwave Week: Workshop/Short Course Proposal**

**Note: the deadline for submission of the proposals is February 28, 2022.**

**Organizer(s) information:**

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|  | **First name** | **Family name** | **Affiliation** | **e-mail** | **Telephone** |
| **Organizer 1** | Lourdes | Farrugia | Department of Physics, Faculty of Science, University of Malta, Msida, Malta | lourdes.farrugia@um.edu.mt |  |
| **Organizer 2 (if present)** | Laura | Caramazza | Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome, Rome, Italy | laura.caramazza@uniroma1.it |  |

**Event information:**

Please choose by marking the desired options.

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| **Event type[[1]](#footnote-1)** | **Workshop (WS)** | X |
| **Short Course (SC)** |  |
| **Duration** | **Half day** |  |
| **Full day** | X |
| **Conference[[2]](#footnote-2)** | **EuMC** | X |
| **EuMIC** |  |
| **EuRAD** |  |

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| **Workshop/Short Course title** | **Nanoparticles in medicine: from diagnosis to treatment** |
| **Topic** | **Future perspectives of nanotechnologies remotely controlled by electromagnetic fields for therapeutic and diagnostic techniques** |
| **Expected attendance** | **20 people** |
| **Workshop abstract (*max 250 words*)** | Recent advancements and applications of nanoscience are revolutionizing the fields of biology and medicine and in recent years there has been a growing interest in nanomedicine, where nanotechnologies are applied to biomedical applications. Nanomedicine holds great potential to improve and/or develop rapid and portable diagnostic and therapeutic technologies; more efficient drug delivery and targeting, as well as personalized nanomedicine where a drug is administered to a patient based on their genetic profile. This has been explored through the combination of electromagnetic (EM) fields and nanoscience, since EM fields at low frequencies can interact with biological systems up to a molecular level. In this regard, there have been significant advances, all contributing towards the transformative role of nanomedicine in the 21st century.  Taking a multidisciplinary approach, this workshop will include researchers from the field of nanotechnology, nanoscience and electromagnetics to address various technological aspects related to the use of nanotechnologies for more effective and improved EM therapeutic and diagnostic technologies. Topics related to the nanoparticles and/or nanosystems preparation as drug delivery carriers and EM fields transducers and their EM characterization, the non-invasive application of EM fields, and finally the cell manipulation and characterization will be discussed, providing the audience with up-to-date knowledge in this field. The workshop will take a multidisciplinarity approach to present these topics by providing experimental and numerical studies, and will give an extensive overview covering the main key-points for cutting edge technologies in this area. |

**Important information:**

- Accepted workshops/short courses will be scheduled for one of the workshops days of the EuMW 2022 mainly on Sunday, Monday and Friday. The assigned date and time slot cannot be disputed and the organizers are expected to inform the speakers accordingly.

- It is the responsibility of the organizers to upload the presentation slides, including the presentation slides of ALL speakers, before the deadline specified in the conference website (1 color slide per A4 page in pdf format).

- Workshop fee waivers will be granted to the workshop organizers (maximum two) and workshop speakers (one per presentation) upon reception of the final presentation slides. The maximum number of speakers allowed for a half day workshops/short courses is four, and for a full day workshops/short courses is eight. The fee waivers will not be granted if the final presentation slides are not uploaded before the deadline.

- Please note that the fee waiver applies ONLY to the specific workshop and NOT to other events taking place during the week. Therefore, workshop speakers and workshop organizers must register and pay the fees for the other events they wish to attend (EuMC, EuMIC, EuRAD, DSS forum, other WS/SC etc.).

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| **I have read and understood the above important information and shared this information with all the Speakers who also understood (Yes/No):** | **YES** |

***Please complete the rest of the form only if your answer to the above question is “Yes”.***

**Speakers information:**

Add the information of all the speakers. More lines can be added if needed.

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|  | **Confirmed? (Yes/no)** | **First name** | **Family name** | **Affiliation** | **e-mail** | **Presentation Title** | **Summary**  **(2-3 sentences)** |
| **Speaker**  **1** | **Yes** | Thanh | Nguyen | University College London, UK | ntk.thanh@ucl.ac.uk | **Plasmonic and Magnetic nanoparticles for biomedical applications** | In collaboration with physicists, material scientists, chemical engineers she has produced the next generation of nanoparticles with very high magnetic moment, fine tuning Au nanorods, Ag nanoparticles, novel hybrid and multifunctional nanostructures. Detailed mechanistic studies of their formation by sophisticated and advanced analysis of the nanostructure allows tuning of the physical properties at the nanoscale; these can subsequently be exploited for diagnosis and treatment of various diseases in collaboration with biologists, biochemists, pharmaceutical scientists, and clinicians. |
| **Speaker**  **2** | **Yes** | Maria | Thanou | King’s College London, UK | maya.thanou@kcl.ac.uk | **Nanoparticles for sensing and treating tumors using Microwave devices** | Nanoparticles can be used for enhance the microwave imaging contrast. These nanoparticles can affect the dielectric constant of a tissue and therefore they can operate as contrast enhancing agent. These nanoparticles can also enhance microwave hyperthermia effects on tissues and promoting therapeutic effect of radiotherapy and chemotherapy in tumours. |
| **Speaker**  **3** | **Yes** | Gianni | Ciofani | Istituto Italiano di Tecnologia, Smart Bio-Interfaces, Viale Rinaldo Piaggio 34, 56025 Pontedera, Italy | gianni.ciofani@iit.it | **Remotely-triggered cancer therapy: The role of smart nanoparticles** | In recent years, localized hyperthermic treatments against different typologies of cancer displayed promising results in terms of therapeutic outcomes; at this regard, nanocomposite materials based on superparamagnetic iron oxide nanoparticles (SPIONs) are widely exploited for their ability to generate heat upon alternated magnetic field (AMF) stimulation. Here, we report on “smart” magnetic nanostructured lipid carriers, designed to deliver chemotherapy drugs and intra-cellular hyperthermia in glioma cells. |
| **Speaker**  **4** | **Yes** | Matteo Bruno | Lodi | Department of Electrical and Electronic Engineering  University of Cagliari  Cagliari, Italy | matteobrunolodi94@gmail.com | **Theranostic Magnetic Scaffolds: Advances and Challenges** | For empowering biomedicine, and enabling new therapeutics or diagnostics/monitoring approaches, the use of magnetic nanoparticles to functionalize biomaterials to be implanted in vivo is gaining significant attention. The hyperthermia treatment of bone tumors, through radiofrequency and microwave fields, has been proposed. Several research challenges and issues for translating these multifunctional electromagneto-responsive materials into theranostic agents have to be faced. |
| **Speaker**  **5** | **Yes** | David | Serrantes | Applied Physics Department,  University of Santiago de Compostela,  15782 Santiago de Compostela (Galicia, Spain) | david.serantes@usc.es | **Some materials' science challenges to overcome towards successful application of magnetic nanoparticle hyperthermia in medicine** | Despite the promising perspectives of using magnetic nanoparticles activated by remote AC fields for biomedical applications arisen in the last years (mainly for hyperthermia cancer treatment or drug release, but also novel applications as the remote control of cellular activities -magnetogenetics-), the success in reaching routine clinical practice is very scarce. From the physics point of view, a main difficulty is the lack of theoretical models able to describe the behavior of the particles in the viscous biological environment, what results in the absence of accurate tools able to guide the experiments. In this talk I will summarize several key factors involved in the failure of current models, and outline some related necessary improvements. |
| **Speaker**  **6** | **Yes** | Nicola | Tirelli | Division of Pharmacy and Optometry, School of Health Science, University of Manchester, United Kingdom  &  Laboratory of Polymers and Biomaterials, Fondazione Istituto Italiano di Tecnologia, Genova, Italy | nicola.tirelli@iit.it | **Cell/tissue targeting with nanoparticles. The hidden issues of receptor binding** | The talk focuses on issues that underpin the capacity for a nanoparticle carrier to recognize a specific cellular target, chiefly separating the process of initial binding to a cell surface from that of internalization.  Nanoparticles displaying hyaluronic acid on their surface will be used as a model system, which is typically assumed to target the cell membrane protein CD44 (the best known receptor for hyaluronic acid). The talk will review the evidence related to the processes presiding to their in vitro and in vivo selective accumulation. |

**Special requests:**

Please indicate any additional information or special requests here.

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1. Workshops are intended to address state-of-the-art topics with an expert audience, whereas short courses have an educational purpose and are directed also to non-expert audience members. [↑](#footnote-ref-1)
2. In case of a joint workshop/short course, please cross all applicable conferences. [↑](#footnote-ref-2)