Lab Courses

Tuesday, August 26, 2020
17^{30}-19^{30}

Lab Course 01: Young researchers: Present & Publish

M. Farle, Germany: *How to make a good scientific oral presentation*
***C. Bratsas, S. Zapounidou, Greece**: How to avoid predatory journals and plan your publication strategy*

Oral presentations at a conference or internal seminar are for sharing your research work with other scientists. They must convince the audience that the research presented is important, valid, and relevant to them. To this end, oral presentations must emphasize both the motivation for the work and the outcome of it, and they must present just enough evidence to establish the validity of this outcome. They are localized in space and time, they impose a sequence and rhythm to the audience, and they normally include some level of interaction.

Predatory publishing, sometimes called write-only publishing or deceptive publishing, is an exploitive academic publishing business model that involves charging publication fees to authors without checking articles for quality and legitimacy and without providing the other editorial and publishing services that legitimate academic journals provide, whether open access or not. They are regarded as predatory because scholars are tricked into publishing with them, although some authors may be aware that the journal is poor quality or even fraudulent. According to one study, 60% of articles published in predatory journals receive no citations over the five-year period *following publication.*

Wednesday, August 27, 2020
17^{30}-19^{30}

Lab Course 02: Young researchers: Propose & Manage

G. Brandon, Luxemburg: *H2020 MSCA Individual Fellowships for the young researchers*

What are the MSCA Individual Fellowships? Grants provided by Marie Skłodowska-Curie Actions are available for all stages of a researcher's career, irrespective of nationality. Fellows include PhD candidates and those carrying out more advanced research. Researchers working across all disciplines, from life-saving healthcare to 'blue-sky' science, are eligible for funding. Because they encourage individuals to work in other countries, the MSCA make the whole world a learning environment. They encourage collaboration and sharing of ideas between different industrial sectors and research disciplines – all to the benefit of the wider European economy. MSCA also back initiatives that break down barriers between academia, industry and business. By means of the MSCA Individual Fellowships scientists have the possibility to gain experience abroad and in the private sector, and to complete their training with competences or disciplines useful for their careers.

Thursday, August 26, 2020
17^{30}-19^{30}

Lab Course 03: Young researchers: Samples & Biomedicine

E. Myrovali & K. Kazeli, Greece: Hands on Samples for biomedical applications

Iron oxide nanoparticles (MNPs) have emerged as one of the primary nanomaterials for biomedical applications due to their long blood retention time, their biodegradability and their low toxicity. They can be used in technological applications, including clinical needs such as magnetic hyperthermia. Among the widely used synthesis routes used for synthesizing iron oxide MNPs are coprecipitation, thermal decomposition, microemulsion, and sol-gel methods. However, compared to other synthesis routes, the coprecipitation method is generally preferred due to its high yield and facile controls. More specifically, for the coprecipitation reaction, the concentration of precursors and the reaction temperature significantly affect the size, size distribution, phase and surface chemistry of resultant MNPs. First, we present the synthetic route using the aqueous chemical coprecipitation method. It has been highlighted as a cost-effective and fast process, easily expandable on an industrial level. Using the aqueous version of this method, we may avoid the use of hazardous solvents and reagents and high reaction temperatures or pressures. In that sense, aqueous coprecipitation can be considered to be eco-friendly. It is the simplest method to prepare MNPs from aqueous iron salt (Fe^{2+}, Fe^{+3}) solution. Next, we present the fabrication processes used to produce phantom with agarose solution. Gels and especially those from agarose, are routinely used as phantom models while they comprise the only transparent porous materials which successfully simulate animal tissues.

Friday, August 26, 2020
17^{30}-19^{30}

Lab Course 04: Young researchers: Magnetic Hyperthermia

A.R. Tsiapla, N. Maniotis, A. Makridis, Greece: *Hands on Magnetic Particle Hyperthermia: Experiment & Evaluation*

This Lab Course is focusing on the experiment as well as on the evaluation of Magnetic Particle Hyperthermia. After a brief introduction on the magnetic hyperthermia origin following a short presentation on the Magna Charta lab devices and equipment, the experimental process will be analyzed and presented in a real-time demonstration. Adjusted protocols and experimental strategies will be presented, targeting to the best heating results under harmless routes. Experimental part ends with the heating evaluation of the examined nanoparticle system.

Next, the computational approach of the aforementioned experiments will be presented. More specifically, recommended strategies on how to build numerical models for the description of the phenomena that take place in a Magnetic Hyperthermia *in vitro* system will be shown. In particular, we aim at the estimation of the spatial distribution of the magnetic field and the spatiotemporal temperature distribution by taking into account all the appropriate field and heat transfer boundary conditions. Moreover, we will demonstrate computationally a strategy, to mitigate eddy currents heating, by applying the external magnetic field intermittently (in an ON/OFF fashion), instead of the continuous mode typically used in Magnetic Hyperthermia studies.

Finally, a 3D-printed device for studying an alternative bio-application of applied magnetic fields on MNPs and cells, known as magnetomechanical effect, will be introduced and presented to participants.