MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2021

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

NOVA University Lisbon | School of Science and Technology
CENIMAT/I3N

RESEARCH GROUP AND URL

Biomaterials Group from Soft and Biofunctional Materials Group (SBMG)
https://sites.fct.unl.pt/biomat/

SUPERVISOR (NAME AND E-MAIL)

Paula I. P. Soares
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SHORT CV OF THE SUPERVISOR

Paula is currently a Researcher at Cenimat|i3N, in the Materials Science Department from NOVA School of Sciences & Technology, Universidade NOVA de Lisboa. Paula is a member of the Biomaterials group, led by Prof. João Paulo Borges. Her main scientific activities are focused on the development of multifunctional magnetic devices for biomedical applications, namely magnetic hyperthermia, magnetic resonance imaging, and controlled drug delivery systems. She has published 19 articles in peer-reviewed journals and 3 book chapters. Paula also supervises students during their Master thesis (14 as supervisor and 18 as co-supervisor) and Ph.D. thesis (2 as a supervisor, 2 as co-supervisor), and give support to theorical and lab classes in the department, mainly Biomaterials and Introduction to biomaterials. Paula received her Master degree in Pharmaceutical Sciences from Faculdade de Farmácia da Universidade de Lisboa in 2009. She worked as a Pharmacist in a community pharmacy for two and a half years where her main activities were related to customer service, recipes monitoring and vaccine administration. In 2012, Paula started her Ph.D. in Nanotechnologies and Nanosciences at Cenimat, supervised by Professor João Paulo Borges, Prof. Isabel Ferreira and Prof. Dr. Carlos Novo from IHMT. Her Ph.D. work focused on the development of multifunctional nanoparticles suitable for cancer theranostics. More specifically, Paula extensively studied the synthesis and stabilization of iron oxide nanoparticles, their coating with a biopolymer, chitosan, and the application of these multifunctional nanoparticles in the biomedical field: magnetic hyperthermia, controlled drug delivery systems, and magnetic resonance imaging. Currently, her main research interests are related to development of new multifunctional magnetic systems for cancer theranostics application including magnetic hyperthermia, MRI and drug delivery. Other interests also include thermoresponsive microgels and colloidal electrospinning to produce multi-stimuli responsive magnetic membranes.
Since 2017, Paula is the Principal Investigator of a National Research Project, DREaMM (Ref. PTDC/CTM-REF/30623/2017, 238,421.63 €), which focus on the development of dual-stimuli responsive magnetic membranes for cancer theranostics application. In 2020 she was also funded in Programa Pessoa – Translational Cooperation between Portugal and France in collaboration with Dr. Sebastian Blanquer from the Institut Charles Gerhardt Montpellier, Université de Montpellier, France. The project focus on the development of a magnetic-responsive 3D printed scaffolds. She is also a member of the research team of project NanoCell2SEC (Ref. PTDC/CTM-REF/30529/2017) and InPaCTus a co-promotion project by “The Navigator Company” (Raiz, Coimbra University and Aveiro University). Paula develops her research work in collaboration with colleagues from CENIMAT|i3N and international research teams in parallel projects (IMM and CEDOC in Lisbon, CSIC in Madrid, Institut Charles Gerhardt Montpellier, Université de Montpellier in France, UMCU in The Netherlands).
In 2020, Paula was awarded with a Junior Research Contract under the Individual Call to Scientific Employment Stimulus - 3rd Edition sponsored by Fundação para a Ciência e Tecnologia.

5 SELECTED PUBLICATIONS

- Adriana Gonçalves, Filipe V. Almeida, João Paulo Borges and Paula I. P. Soares, Incorporation of dual-stimuli responsive microgels in nanofibrous membranes for cancer treatment by magnetic hyperthermia, Gels, 7(1), 28, 2021.

- Paula Soares, Joana Romão, Ricardo Matos, Jorge Carvalho Silva, João Paulo Borges. Design and engineering of magneto-responsive devices for cancer theranostics: Nano to macro perspective. Progress in Materials Science, 116: 100742, 2021.

- Ricardo J. Matos, Catarina I. P. Chaparro, Jorge C. Silva, Manuel A. Valente, João Paulo Borges, Paula Soares, Electrospun composite cellulose acetate/iron oxide nanoparticles non-woven membranes for magnetic hyperthermia applications, Carbohydrate polymers, 198, 9-16, 2018.

- Paula Soares, Ana Isabel Sousa, Isabel Ferreira, Carlos Novo, João Paulo Borges. Towards the development of multifunctional chitosan-based iron oxide nanoparticles: Optimization and modelling of doxorubicin release. Carbohydrate polymers, 153, 212-221, 2016.

- Paula Soares, Diana Machado, César Laia, Laura Pereira, Joana Coutinho, Isabel Ferreira, Carlos Novo, João Paulo Borges. Thermal and magnetic properties of chitosan-iron oxide nanoparticles. Carbohydrate polymers, 149, 382-390, 2016.

PROJECT TITLE AND SHORT DESCRIPTION

Engineering multifunctional magnetic scaffolds for cancer theranostics application

The proposed project fits in the Biomaterials research area, particularly in Materials Science and Engineering. The research group has extensive experience in developing magnetic nanoparticles for cancer theranostics applications, particularly as contrast agents for magnetic resonance imaging, and treatment through magnetic hyperthermia and controlled drug delivery. Currently, we are focused in incorporating magnetic nanoparticles in complex 3D structures to produce a multifunctional scaffold able to respond to an external magnetic field in addition to other external stimuli (temperature, pH). This magnetic scaffold will be produced by additive manufacturing techniques, using the most adequate materials, primarily focusing in biodegradable and biocompatible polymers. The project includes the design, engineering and extensive characterization of the magnetic scaffolds, followed by in vitro characterization using cancer cells lines. This last step focuses in evaluation of the feasibility for cancer treatment through magnetic hyperthermia, drug delivery studies, and contrast agents for diagnostic through magnetic resonance imaging.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

Information Science and Engineering (ENG)