



MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2023

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

CENIMAT/i3N, Materials Science Department, Nova School of Science and Technology, Caparica, Portugal

RESEARCH GROUP AND URL

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

SUPERVISOR (NAME AND E-MAIL)

Dr. Paula I. P. Soares – pi.soares@fct.unl.pt

SHORT CV OF THE SUPERVISOR

Paula is currently a Principal Researcher at Cenimat|i3N, in the Materials Science Department from NOVA School of Sciences & Technology, Universidade NOVA de Lisboa. Her main scientific activities are focused on the development of biomaterials for biomedical applications, particularly multifunctional magnetic devices for magnetic hyperthermia, magnetic resonance imaging, and controlled drug delivery. She has published 28 articles in peer-reviewed journals and 3 book chapters. Paula also supervises students during their Master thesis (21 as supervisor and 24 as co-supervisor) and Ph.D. thesis (3 as a supervisor, 2 as co-supervisor), and give support to theoretical and lab classes in the department, mainly Biomaterials, Biomaterials and Nanomedicine, Medical Imaging and Theranostics, 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 Nanoscience 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 the 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.

From 2017 to 2022, Paula was the Principal Investigator of a National Research Project, DREaMM (Ref. PTDC/CTM- REF/30623/2017, 238,421.63 €), which focuses 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 focuses on the development of a magnetic-responsive 3D printed scaffolds. She was also a member of other National research projects. 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

- Francisco J. T. M. Tavares, Paula I. P. Soares, Jorge Carvalho Silva, João Paulo Borges, Preparation and In Vitro Characterization of Magnetic CS/PVA/HA/pSPIONs Scaffolds for Bone Cancer Therapy and Regeneration, International Journal of Molecular Sciences 24(2), 1128, 2023.

- Adriana Gonçalves, Beatriz T. Simões, Filipe V. Almeida, Susete N. Fernandes, Manuel Valente, Tânia Vieira, Célia Henriques, João Paulo Borges, Paula I.P. Soares, Engineering dual-stimuli responsive poly(vinyl alcohol) nanofibrous membranes for cancer treatment by magnetic hyperthermia, *Biomaterials Advances* 145, 213275, 2023.
- Adriana Gonçalves, Filipe V. Almeida, João Paulo Borges and Paula 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.
- 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.

PROJECT TITLE AND SHORT DESCRIPTION

Project title: Engineering multifunctional magnetic scaffolds for cancer theranostics application

Description:

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 on 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 on 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 on 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)

***Scientific Area where the project fits best** – Please select/indicate the scientific area according to the panel evaluation areas: Chemistry (CHE) • Social Sciences and Humanities (SOC) • Economic Sciences (ECO) • Information Science and Engineering (ENG) • Environment and Geosciences (ENV) • Life Sciences (LIF) • Mathematics (MAT) • Physics (PHY)