



## 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

Soft and Biofunctional Materials group

URL: <https://www.cenimat.fct.unl.pt/rd-id-teams/soft-and-biofunctional-materials-group/soft-and-biofunctional-materials-group-sbmg>

#### SUPERVISOR (NAME AND E-MAIL)

Susete Nogueira Fernandes

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#### SHORT CV OF THE SUPERVISOR

Susete Fernandes (SF), PhD in Chemical Engineering, with an emphasis in polymer science, recently has become an Invited Assistant Professor of the Materials Science Department at the Nova School of Science and Technology, NOVA University Lisbon, and the associated Materials Research Centre (CENIMAT), a hub of the Associated Laboratory Institute of Nanostructures, Nanomodelling and Nanofabrication (i3N). In this Research centre, she was a PhD Researcher since late 2018; in November 2019, her peers elected her the researchers' representative in the Department of Materials Science Council. Joining the Soft and Biofunctional Materials group in late 2010 as a post-doctoral fellow, she was able to participate as author/co-author of several journal articles, publish a patent, and is involved in submitting two others. She participated in several national and international projects and received funding for one national project in 2017 (NanoCell2SEC, classified with A by the evaluators). Since the beginning, she has been involved in teaching activities, mainly practical, in classes where a background in polymer science was needed. She has also been involved in theoretical or theoretical-practical lessons in the last ten years. Mentoring international and national PhD students, Master's students, and Undergraduate Projects, she disseminates her passion for polymer science and mainly her knowledge of natural-based systems such as cellulose nanocrystals, cellulose derivatives, and chitin. Founder and treasurer of the Portuguese Liquid Crystal Society, and committee member of an Interest group of the prestigious Royal Chemical Society, focused on nanoscience and nanotechnology, she prepares several international conferences and symposiums. SF has published peer-reviewed papers in WoS-indexed international journals, including high-impact factor journals such as three Advanced Materials and one Advanced Functional Materials. Some of this work was internationally recognized by editors with the invitation to produce eight covers of the journals.

**Skills, Research Interests, and Future Perspectives:** Susete Fernandes has extensive experience in polymers' syntheses and their functionalization (as polyolefins, cellulose nanocrystalline, and natural polymers) and presents skills in several characterization techniques of these materials. In recent years, she has devoted her research interest to cellulosic-based materials, mainly from cellulose nanocrystals derived from liquid crystalline phases to produce colour-generation systems with bio-inspired responses. These systems allow obtaining cutting-edge products to satisfy the demands of end-users' comfort using sustainable approaches. She intends to continue working in materials science, emphasising polymer science, with systems mainly derived with nanoparticles from polysaccharide-based systems with a particular interest in cellulose, chitin, chitosan, alginate, gelatin, and its derivatives. She expects to develop sustainable multifunctional responsive composite systems. In addition, teaching is one of her passions, allowing sharing the knowledge acquired throughout the years while learning, a crucial tool that drives her to fulfill the tasks in sight.

#### 5 SELECTED PUBLICATIONS

- da Rosa, R. R., Silva, P. E. S., Saraiva, D. V., Kumar, A., de Sousa, A. P. M., Sebastião, P., Fernandes, S. N. & Godinho, M. H.; Cellulose Nanocrystal Aqueous Colloidal Suspensions: Evidence of Density Inversion at the Isotropic-Liquid Crystal Phase Transition. *Adv. Mater.* **34**, 2108227, doi:<https://doi.org/10.1002/adma.202108227> (2022).
- Saraiva, D. V., Chagas, R., Abreu, B. M. d., Gouveia, C. N., Silva, P. E. S., Godinho, M. H. & Fernandes, S. N.; Flexible and Structural Coloured Composite Films from Cellulose Nanocrystals/Hydroxypropyl Cellulose Lyotropic Suspensions. *Crystals* **10**, 122, doi:10.3390/cryst10020122 (2020).
- Fernandes, S. N., Lopes, L. F. & Godinho, M. H.; Recent advances in the manipulation of circularly polarised light with cellulose nanocrystal films. *Curr. Opin. Solid State Mater. Sci.* **23**, 63-73, doi:<https://doi.org/10.1016/j.cossms.2018.11.004> (2019).
- Fernandes, S. N., Almeida, P. L., Monge, N., Aguirre, L. E., Reis, D., de Oliveira, C. L. P., Neto, A. M. F., Pieranski, P. & Godinho, M. H.; Mind the Microgap in Iridescent Cellulose Nanocrystal Films. *Adv. Mater.* **29**, 1603560, doi:10.1002/adma.201603560 (2017).
- Fernandes, S. N., Geng, Y., Vignolini, S., Glover, B. J., Trindade, A. C., Canejo, J. P., Almeida, P. L., Brogueira, P. & Godinho, M. H.; Macromol. Chem. Phys. 1/2013. *Macromolecular Chemistry and Physics* **214**, 1-1, doi:10.1002/macp.201370001 (2013).

## PROJECT TITLE AND SHORT DESCRIPTION

### Title:

3D self-assembly anisotropic structures from natural polymers– can they be part of the future of biomaterials?

### Description:

Combining the ability that certain polysaccharides nanoparticles have to self-assemble into a liquid crystalline phase, that resemble what is seen in some tissues of our body or some plants and other animals, with its biodegradability, biocompatibility is the goal of this study. Using the group's ability to produce anisotropic structures and using nanoparticles derived from natural polymers 3D structures will be produced and characterized.

## 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)