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ABOUT ME

I am a UKRI Guarantee Marie Curie Fellow in the Department of Physics at University of Oxford. My research focuses on the understanding of complex systems in soft matter and biophysics where collective behavior leads to emerging phenomena. Particularly, I have been successful in applying statistical physics tools and numerical modelling to study systems ranging from epithelial monolayers to colloidal patchy particles.

EDUCATION AND TRAINING

15/09/2012 – 30/07/2015 Lisbon, Portugal **BSC** University of Lisbon

Website https://ciencias.ulisboa.pt/

15/09/2015 – 15/05/2017 Lisbon, Portugal **MSC** University of Lisbon

Website https://ciencias.ulisboa.pt/

01/10/2017 – 18/02/2022 Lisbon, Portugal **PHD** University of Lisbon

Website https://ciencias.ulisboa.pt/

WORK EXPERIENCE

01/10/2024 – CURRENT Oxford, United Kingdom UKRI HORIZON EUROPE GUARANTEE MSCA POSTDOCTORAL FELLOW UNIVERSITY OF OXFORD

Under the supervision of Prof. Julia Yeomans, within the UKRI Horizon Europe Guarantee MSCA Postdoctoral Fellowship award reference EP/Z002761/1.

01/12/2021 – 30/09/2024 Rome, Italy **POSTDOCTORAL RESEARCHER** UNIVERSITY OF ROME" LA SAPIENZA"

Under the supervision of Prof. John Russo, within the European Research Council Grant SOFTWATER at the University of Rome" La Sapienza" and Prof. Francesco Sciortino under MIUR-PRIN Grant No. 2022JWAF7Y.

2016 – 2020 Lisbon, Portugal HIGHER EDUCATION TEACHING ASSISTANT UNIVERSITY OF LISBON

At the Faculty of Sciences, University of Lisbon (2016-2020), I have participated as a teaching assistant in several undergraduate courses, ranging from lab work (Experimental Physics II and Optics and Electromagnetism for Computer Science) to problem solving classes (Electromagnetism and Physics for Computer Science). Particularly, during the fall of 2017, 2019, and 2020, I was teaching assistant of Numerical Methods (lab work), which served as introduction, for second-year Physics students, to the use of computational techniques in solving mathematical and physics problems.

CONFERENCES AND SEMINARS

09/2024 – 09/2024 Vienna, Austria Failure in soft materials: from yielding to fracture Workshop

Oral Communication

07/2024 – 07/2024 Florence, Italy 6th Italian Soft Matter Days

Oral Communication. Awarded Soft Matter presentation prize by the Royal Society of Chemistry.

09/2023 – 09/2023 Osaka, Japan **7th International Soft Matter Conference**

Oral Communication

03/2023 – 03/2023 Lisbon, Portugal **3rd Condensed Matter Physics National Conference**

Oral Communication

08/2020 – 08/2020 Madrid, Spain (Online) CMD2020GEFES

Oral Communication

06/2018 – 06/2018 Faro, Portugal 13º Encontro Nacional de Química-Física

Oral Communication

01/2018 – 01/2018 Lisbon, Portugal **Flowing Matter 2018**

Oral Communication

07/2017 – 07/2017 Lisbon, Portugal **Ciência 2017**

Oral Communication

01/2017 – 01/2017 Porto, Portugal Flowing Matter 2017

Oral Communication

06/2022 – 06/2022 Rome, Italy From Water To Colloidal Water

Poster Presentation. Awarded Soft Matter poster prize by the Royal Society of Chemistry.

07/2021 – 07/2021 Prague, Czech Republic (Online) **11th Liquid Matter Conference**

Poster Presentation

05/2019 – 05/2019 Porto, Portugal 2nd Portuguese Condensed Matter Physics Meeting

Poster Presentation

12/2017 – 12/2017 Barcelona, Spain Dynamics of self-organization: from colloids to biomaterials Workshop

Poster Presentation

HONOURS AND AWARDS

2024

Marie Skłodowska-Curie European Postdoctoral Fellowship – European Commission

Fellowship granted by the European Commission, with seal of excellence, for project RheoCell under call HORIZON-MSCA-2023-PF-01-01 — MSCA Postdoctoral Fellowships 2023.

2024

Presentation Prize winner – Royal Society of Chemistry

Awarded Soft Matter presentation prize by the Royal Society of Chemistry during the 6th Italian Soft Matter Days

2022

Poster prize winner - Royal Society of Chemistry

Awarded Soft Matter poster prize by the Royal Society of Chemistry during the From Water To Colloidal Water conference

2017

PhD individual fellowship - Portuguese Foundation for Science and Technology

Fellowship granted by Portuguese Foundation for Science and Technology (FCT) under contract no. SFRH/BD/ 131158/2017

2015

ERASMUS+ grant - European Commission

Monthly salary granted by the European Commission to develop research activities at the University of Zaragosa.

MANAGEMENT AND LEADERSHIP SKILLS

Co-supervisor of MSc thesis project

Co-supervisor of MSc thesis project from Niccoló Tedeschi: A graph theory approach to the inverse self-assembly problem, leading to graduation with full honors (maximum grade)

Co-supervisor of MSc thesis project

Co-supervisor of MSc thesis project from Enrico DiCenso: Hexagonal crystal nucleation and growth using patchy particles through the SAT-assembly strategy, leading to graduation with full honors (maximum grade).

Assisting with PhD supervision

Assisting Prof. John Russo with PhD supervision of Camilla Beneduce: Nucleation of binary mixtures of patchy particles into diamond cubic structures, resulting in poster and oral presentations at international and national conferences (7th ISMC and 6th ISoDays respectively) and a peer-reviewed paper (Beneduce et al, J. Chem. Phys. 158, 154502 (2023)).

PUBLICATIONS

2024

Automating Blueprints for Colloidal Quasicrystal Assembly

We propose a novel automated method to self-assemble aperiodic structures in 3D, like quasi-crystals, using directional interactions with colour specificity between particle bonds.

arXiv preprint arXiv:2407.19968 (2023)

2024

Inverse design of self-folding 3D shells

We introduce a novel inverse design technique which allows one to switch between competing 3D shells by controlling the self-folding pathway of 2D planar nets.

Phys. Rev. Lett. 132, 118201 (2023).

2023

Design strategies for the self-assembly of polyhedral shells

A novel inverse design technique (SAT-assembly) is used to efficiently self-assemble patchy particles into polyhedral shells, leading to increased yields and greater control over the final structure.

PNAS 120, e2219458120 (2023).

2023

Two-step nucleation in a binary mixture of Patchy Particles

Simulations and mean-field theory of patchy particles show that the azeotropic point in binary mixtures enhances nucleation rates

J. Chem. Phys 158, 154502 (2023)

2022

Cell motility in confluent tissues induced by substrate disorder

Computer simulations of epithelial monolayers highlight how substrate heterogeneity changes tissue rigidity depending on the ratio between the characteristic length scale of heterogeneity and the typical cell size

Phys. Rev. Res. 4, 023186 (2022).

2022

Hierarchical structure of the energy landscape in the Voronoi model of dense tissue

Write here the description...An epithelial monolayer model is shown to have a crossover between two rigid states with different energy landscapes, like highly compressed glasses

Phys. Rev. Res. 4, 023187 (2022).

2020

The Cell Adaptation Time Sets a Minimum Length Scale for Patterned Substrates

The use of substrate patterns to compartmentalize epithelial monolayers can be compromised by the typical adaptation time scale of cells. Through simulations and a mean-field model, a maximum length scale for substrate patterning is proposed

Byophys. J. 119, 2299 (2020).

2018

Random sequential adsorption on mobile patches

The surface coverage of a substrate with mobile patches is controlled by the ratio between the particle's adsorption flux and patch diffusion. Moreover, patch density and particle size set a crossover between uncorrelated and correlated adsorption

Phys. Rev. E 98, 012125 (2018).

2016

Kinetic control of the coverage of oil droplets by DNA-functionalised colloids

A protocol is proposed for the adsorption of DNA-coated colloidal particles on the surface of oil droplets leading to full control over the coverage and fully ergodic colloidal dynamics on the droplets

Sci. Adv. 2, e1600881 (2016).

ATTESTAZIONE

Attestazione

Autorizzo il **trattamento** dei miei **dati personali** ai sensi del Decreto Legislativo 196/2003, coordinato con il Decreto Legislativo 101/2018, e dell'art. 13 del GDPR (Regolamento UE 2016/679) ai fini della pubblicazione in Trasparenza Ateneo - Sapienza come da normativa vigente.