europass

Jyoti Sharma

Work : Microscale Robotics Lab, The Biorobotics Institute, Sant'Anna, 56025, Pontedera, Italy

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Date of birth: 30/11/1991 **Nationality:** Indian

ABOUT ME

After earning my Ph.D from the Department of Physics, IIT Bombay, India, I moved to the Biorobotics Institute at Sant'Anna, Pisa, Italy, for a postdoctoral fellowship. During my PhD thesis, I extensively worked on self-propelled artificial swimmers known as camphor rotors. These centi-metre-sized self-moving particles interested me in the active matter at small scales. Currently, at the Microscale Robotics laboratory, I am working on micron-sized active particles. I am keen to know the self-organization of Janus colloids in the confinements and role of curved geometry on their steering. I am using Microfabrication techniques for the experiments and Active Brownian particle simulations in Julia to answer this question.

WORK EXPERIENCE

[01/08/2022 – Current]

Postdoctoral fellow

Scuola Superiore Sant'Anna

City: Pisa | **Country:** Italy

- Fabrication and experiments on micron-sized Janus particles
- Microfabrication for confinements
- Simulations on Active Brownian particles in Julia
- Analysis of active particles
- Mentoring Masters' students
- Organizing lab meetings
- Participating in conferences/Workshops
- Peer review and project reports

[13/10/2021 – 25/07/2022]

Postdoctoral fellow

Indian Institute of Technology, Bombay

City: Mumbai | **Country:** India

- Experiments on active camphor rods
- Experiments on active droplets at air-water interface
- Analysis of experimental data
- Mentoring Master's and Bachelors' students
- Assisting in peer review reports

SKILLS

[Current]

Instruments handled

Optical Microscope, Phase contrast Microscope, Scanning Electron Microscope, Sputtering Machine, Plasma cleaner, Spin coater, Function generator, Oscilloscope, Profilometer, ZetaSizer

Fabrication

Janus Pt-Pd/ Silica particles (1.1 um, 3um, 10um), Microwells on PDMS substrate, Centimeter sized camphor ribbons

Programming

Julia, C, MATLAB...

Software

MS Office, MS Powerpoint, MS Excel, MS Teams, Texmaker, Latex, Markdown, Visual Studio Code

Digital

GIthub, Web designing (HTML, CSS), Windows, Ubuntu

Teaching

Classical Mechanics(Undergraduate), Experimental Lab (Undergraduate), Astrophysics (Assistant, Undergraduate), Basic Physics(High School)

PUBLICATIONS

[2023] **In-phase and mixed-phase measure synchronization of camphor rotors**

Reference: R. Jain, J. Sharma, I. Tiwari, S D. Gadre, S. Kumarasamy, P. Parmananda, and A. Prasad

[2022] **Generation of aperiodic motion due to sporadic collisions of camphor ribbons**

Reference: R. Jain, J. Sharma, I. Tiwari, S D. Gadre, S. Kumarasamy, P. Parmananda, and A. Prasad

[2022] **Aperiodic bursting dynamics of active rotors**

Reference: Jyoti Sharma, Ishant Tiwari, P. Parmananda, and M. Rivera

[2021] **Chimeralike states in a minimal network of active camphor ribbons**

Reference: Jyoti Sharma, Ishant Tiwari, Dibyendu Das, and P. Parmananda

[2020] **Rotational synchronization of camphor ribbons in different geometries**

Reference: Jyoti Sharma, Ishant Tiwari, Dibyendu Das, P. Parmananda, and Véronique Pimienta

[2019] **Rotational synchronization of camphor ribbons**

Reference: Jyoti Sharma, Ishant Tiwari, Dibyendu Das, P. Parmananda, V. S. Akella, and Véronique Pimienta

PUBLIC REPOSITORIES

[28/07/2023 – Current] **Simulations Active Brownian Particles v1.0**

Simulate the dynamics of active Brownian particles moving in 2D (in Julia). The particles interact via hard sphere correction. Code can simulate both open (periodic) and closed hard boundary condition. When confined, particles are reflected from the boundary.

Link: https://github.com/microrobotlab/sim-active-brownian-particles

EDUCATION AND TRAINING

[30/12/2014 – 02/09/2021] **Ph.D**

Indian Institute of Technology, Bombay https://www.iitb.ac.in/

Address: Department of Physics, IIT Bombay, Powai, Mumbai, India, 400076, Mumbai, India | **Field(s) of study:** Non linear dynamics of Active particles | **Thesis:** Collective dynamics of self-propelled camphor rotors: Experiments and Simulations

CONFERENCES AND SEMINARS

[2024] **APS March meeting 2024** Minneapolis, USA

Links: https://meetings.aps.org/Meeting/MAR24/Session/Z35.6 | https://meetings.aps.org/Meeting/MAR24/Session/N00.312

[2024] **Active Polymers and Filaments: Organization and Dynamics** Leiden, The Netherlands

[2023] **PHYMOT2023- Physics of Mircobial Motility** Wurzburg, Germany

[2023] **AMSCE2023- Active Matter at Surfaces and in Complex Environments** Dresden, Germany

[2024] **Interchall2023- Interdisciplinary challenges: from non-equilibrium physics to life sciences**
Rome, Italy

[2022] **CMD29 (Hybrid), Division: Emergent Phenomenon in Driven Soft, Active and Biological Matter**
Manchester, UK

[2021] **ICSTCF- International Conference on Science and Technology on Complex Fluids (Virtual)**
University of Guanajuato, Mexico

[2021] **e-SMYIM (online)** Mumbai, India

Link: https://www.phy.iitb.ac.in/en/symphy

[2020] **SYMPHY** IIT Bombay, India

Link: http://home.phy.iitb.ac.in/symphy2020/

[2020] **CDSA- Complex Dynamical Systems and Applications** Central University, Rajasthan, India

[2019] **SYMPHY** IIT Bombay, India

Link: https://www.phy.iitb.ac.in/en/symphy

[2019] **CNSD- Conference on Nonlinear Systems and Dynamics** IIT Kanpur, India

[2018] **CNSD- Conference on Nonlinear Systems and Dynamics** JNU, New Delhi, India

[2018] **Hands-On Research in Complex Systems School** ICTP, Trieste, Italy

[2017] **CDSA- Complex Dynamical Systems and Applications** IIT Guwahati, India

[2018] **Bangalore School on Statistical Physics** ICTS, Banalore, India

LANGUAGE SKILLS

Mother tongue(s): Punjabi

Other language(s):

Hindi

LISTENING C2 **READING** C2 **WRITING** C1

SPOKEN PRODUCTION C2 **SPOKEN INTERACTION** C2

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Italian

LISTENING A1 **READING** A1 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user