

Vishnu Deo Mishra

Department of Applied Mechanics & Biomedical Engineering
Indian Institute of Technology, Madras
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Academic background

IIT Madras

Postdoctoral Fellow

Chennai, India

2024 – present

Raman Research Institute

Ph.D. in Physics (Advisor – Dr. Arun Roy)

Bengaluru, India

Aug. 2016 – 2024

Title – “Experimental Investigations on Phase Transitions and Nucleation-Growth Studies in Liquid Crystals”

- Identified and characterized new liquid crystalline phases exhibited by some bent-core (BC) molecules using various experimental techniques. Developed simple models to elucidate a number of distinct phase behavior exhibited by BC liquid crystals.
- Investigated the nucleation and growth dynamics during the phase ordering process of a liquid crystal phase in its isotropic melt on quenching.
- Collaborated on multiple projects, leading three of them while actively contributing to others.

D. D. U. Gorakhpur University

M.Sc. in Physics – Specializing in electronics

B.Sc. – Physics, Chemistry, and Math

Gorakhpur, India

Jul. 2012 – Jul. 2014

Jul. 2009 – Jul. 2012

Research Interest

- Self-organized structures, ordering, topological defects, electro-optical properties, emerged dynamics and statistical principles in passive and active soft matter systems, including the influence of external stimuli
- Evolution of macroscopic shape and structures in living systems that are often governed by microscopic ordering and defects
- Soft robotics
- Keen to learning new experimental and computational techniques and applying creative quantitative analysis

Publications ([ORCID](#))

- **Vishnu Deo Mishra**, G. Pratap, and Arun Roy; Glassy relaxation in de Vries smectic liquid crystal consisting of bent-core molecules; [Phys. Rev. E 109, 024703 \(2024\)](#)
- **Vishnu Deo Mishra**, H. T. Srinivasa, and Arun Roy; Leaning induced layer undulated tilted smectic phase of asymmetric bent-core liquid crystals; [J. Chem. Phys. 158, 074906 \(2023\)](#)
- A. A. Boopathi, Nitin P. Lobo, **Vishnu Deo Mishra**, Arun Roy, and T. Narasimhaswamy; Molecular organization and molecular order of two rod-like smectogens in mesophases; [Liquid Crystals \(2023\)](#)
- **Vishnu Deo Mishra**, and Arun Roy; Tilted smectic phase with fractal growth morphology of bent-core molecules; *Under review in Liquid Crystals*

Skills

TECHNICAL

- **Hands-on expertise** in handling experimental techniques such as Polarizing optical microscopy, SEM, cryo-SEM imaging, Confocal microscopy, X-ray diffraction, Dielectric spectroscopy, Electro-optic measurements, Video microscopy, Calorimetry, and Liquid crystal cell preparation
- Designed and implemented a homemade electro-optic setup to measure dielectric permittivity and optical transmittance of the samples of interest

SOFTWARE

- Developed and implemented LabVIEW–based automation systems for data acquisition and analysis
- Plotting and data analysis – MATLAB, Python, Origin, and Mathematica; Image analysis – MATLAB & ImageJ; Digital drawing and graphic design – Affinity Designer & Inkscape; Document preparation – L^AT_EX;

PROFESSIONAL

- Contributed to the institute's science outreach programs, engaging school kids and broader audiences to communicate scientific concepts
- Coordinated and organized an in-house institute conference as part of a team
- Guided junior students in their projects and managed the laboratory as a senior student researcher

Schools and Conferences

- **Soft and Living Matter: from Fundamental Concepts to New Material Design**, International Center for Theoretical Sciences, **Bengaluru, India** (07 Aug. – 25 Aug. 2023): Attended
- **National Conference on Liquid Crystals**, Christ University, **Bengaluru, India** (08–10 Dec. 2022): Presented talk on “Evidence of de Vries SmA comprised of bent-core molecules exhibiting glassy relaxation.”
- **28th International Liquid Crystal Conference, ILCC 2022**, Nova School of Science and Technology, **Lisbon, Portugal** (24–29 Jul. 2022): Presented poster online on “A novel oblique columnar liquid crystal phase ordering in asymmetric bent-core liquid crystals.”
- **Workshop** on “Topological matter: from liquid crystals to active materials,” organized by **Dr. Teresa Lopez-Leon**, GULLIVER Lab, ESPCI, **Paris, France** (20 Jul. 2022): Communicated and presented a talk online on “Layer undulated nonpolar liquid crystal phase comprised of asymmetric bent-core molecules.”
- Raman Research Institute **Inhouse Meetings** (2018, 2019, 2022, 2023): Delivered talks
- **Workshop and school** on “[Entropy, information and order in soft matter](#),” International Center for Theoretical Sciences, **Bengaluru, India** (27 Aug. – 02 Nov. 2018): Attended
- **Bangalore School on Statistical Physics IX**, International Center for Theoretical Sciences, **Bengaluru, India** (27 Jun. – 13 Jul. 2018): Attended

Awards and Honors

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| • Prof. A. P. N. Asthana medal, For securing 1 st rank in master’s program (Physics group) | 2014 |
| • All India Rank – 159, Joint Entrance Screening Test (JEST-Physics) | 2016 |
| • All India Rank – 187, Graduate Aptitude Test in Engineering (GATE-Physics) | 2016 |

References

- Dr. Arun Roy (Ph.D. Thesis Advisor)
Professor (Soft Condensed Matter Department), Raman Research Institute, Bengaluru, India
✉ aroy@rri.res.in, [Webpage](#)
- Dr. S Ganga Prasath (Postdoc Mentor)
Asst. Prof. (Department of Applied Mechanics & Biomedical Engineering), Indian Institute of Technology, Madras, Chennai, India
✉ sgangaprasath@smail.iitm.ac.in, [Webpage](#)
- Dr. V. A. Raghunathan
Senior Scientist (Soft Condensed Matter Department), Raman Research Institute, Bengaluru, India
✉ varaghu@rri.res.in, [Webpage](#)
- Dr. Yashodhan Hatwalne
Professor (Soft Condensed Matter Department), Raman Research Institute, Bengaluru, India
✉ yhat@rri.res.in,

Activities and Interests

Chess, Swimming, Cricket, Badminton, and Hiking