Kamal Tripathi

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Education

Ph.D. Physics, The Institute of Mathematical Sciences, Chennai, India. 11 Aug 2021
Thesis: *'Confined Polymers in Biophysical Contexts'*

Master of Science (M.Sc.) Physics, Banaras Hindu University, India. 2012-2014
CGPA: 8.29/10, First class; Specialization: Solid State Physics
Master's project: *Kinetics of Phase Transition in Nematic Liquid Crystals.*

Bachelor of Science (B.Sc.), BND College, CSJM University, Kanpur, India. 2009-2012
First class, 67.11%

Skills

- Background in soft-matter and statistical physics.
- Extensive knowledge of Molecular Dynamics Simulations.
- Expertise in setting up simulations in LAMMPS.
- Exposure to NAMD, VMD, OVITO.
- Programming ability in python, tcl-tk.
- Competent in shell scripting.
- Willingness to work on multidisciplinary problems and learn new skills.
- Excellent communication skills and proven record of research outputs in peer-reviewed journals.

Experience

Post-Doctoral Research

- 3SR LAB, University of Grenoble-Alpes, France
  Post Doctoral Fellow *1 Jul 2023 - Present*
  - **Structure and mechanics of collagen gel networks**: A model to match the experimental trends of the collagen gel was developed and various equilibrium properties were measured.
- Institute of Mathematical Sciences, India
  Research Associate *28 Apr 2022 - 25 Jun 2023*
  - **Conformations and adsorption of semiflexible polymer near attractive surfaces**: The conformatiobal phase diagram of a crowded, confined and semiflexible neutral polymer was studied using molecular dynamics simulations.
  - **Phase diagram of crowded polyelectrolyte**: Detailed computational study of the phase diagram of a PE under crowded environment.
- **Doctoral Research** Institute of Mathematical Sciences, India
  PhD, Advisor: Prof. Gautam I. Menon, Co-advisor: Prof. S. Vemparala *Jul 2014 - Aug 2021*
  Ph.D. work addressed aspects of the behaviour of polymers under confinement.
  - **Modeling auxeticity in pluripotent nuclei of stem cells in transition state**: It concerns a novel mechanical property of the mouse embryonic stem cell nucleus exiting pluripotency, the property of auxeticity, studied using a combined biophysical and dynamical systems approach.
  - **Confined crowded polymers near attractive surfaces**: A general computational approach was used to understand confined polymers using large-scale coarse-grained molecular dynamics simulations.
  - **Diffusion of a tracer particle in polymer brush system**: In this problem, we studied the diffusive behaviour of a tracer particle in a crowded cylinder which has its inner surface grafted with polymers with coarse-grained molecular dynamics simulations.

Publications

- **Kamal Tripathi** & Gautam I. Menon. Chromatin compaction, auxeticity, and the epigenetic landscape of stem cells (2019). *Phys. Rev. X*, 9:041020. https://link.aps.org/doi/10.1103/PhysRevX.9.041020
- **Kamal Tripathi**, Gautam I. Menon, & Satyavani Vemparala. Confined crowded polymers near attractive surfaces (2019). *The Journal of Chemical Physics*, 151(24):244901. https://aip.scitation.org/doi/full/10.1063/1.5115284
- **Kamal Tripathi**, & Satyavani Vemparala. Conformational landscape of confined and crowded semiflexible polymers (2023). *Manuscript under preparation.*
- **Kamal Tripathi**, R. Rajesh, & Satyavani Vemparala. Phases in crowded polyelectrolyte systems (2023). *Manuscript under preparation.*
- **Kamal Tripathi**, Gautam I. Menon, & Satyavani Vemparala. Diffusion in crowded and grafted cylindrical tube (2023). *Manuscript under preparation.*

Honors and Awards

- **GATE** (Physics) - 2014, All India Rank 14.
- **CSIR-NET** (Physics) - 2013, All India Rank 48.

Conferences attended and talks/posters presented

- *3èmes Journées du GDR IDE - 2024*, 17-21 Jun 2024 Saint Martin d'Hères, France.
- Poster presentation titled "The auxetic phenotype in mouse embryonic stem cells exiting pluripotency". *2019 IMB Conference, IMB, Mainz, Germany*, held in Oct 2019.
- Oral presentation titled "Polymer Confomations in confined and crowded environment near attractive surfaces". *Institute Seminar Day, IMSc, Chennai, India*, held in Mar 2019.
- Oral presentation titled "The auxetic phenotype in mouse embryonic stem cells exiting pluripotency". *Computational Biology Group Annual Talk, IMSc, Chennai, India*, held in Mar 2018.
- *Mechano-Developmental Biology*, Feb 2019 at Coorg, India.
- *7th Indian Statistical Physics Community Meeting*, Feb 2019 at ICTS Bangalore, India.
- *One day symposium on Soft Matter*, Jan 2019 at IIT Madras, Chennai, India.
- *6th Indian Statistical Physics Community Meeting*, Feb 2018 at ICTS Bangalore, India.
- *Complex Fluids - CompFlu - 2017*, Dec 2017 at IIT Madras, Chennai, India.
- *VIIIth Bangalore School of Statistical Physics*, Jul 2017 at ICTS Bangalore, India.
- *EMBO - Experimental and Theoretical approaches to cell mechanics*, Apr 2017 at RRI and NCBS Bangalore, India.
- *Complex Fluids - CompFlu - 2016*, Dec 2016 at IIIT-Hyderabad, India.
- *VIIth Bangalore School of Statistical Physics*, Jul 2016 at ICTS Bangalore, India.

Professional experience

- **Teaching Assistant (TA)** — The Institute of Mathematical Sciences, India
  Soft Matter Physics Course. — 2018

Referees

Prof. Gautam I. Menon
Department of Physics,
Ashoka University, National Capital Region,
Sonepat - 131029, India
email: gautam.menon@ashoka.edu.in

Prof. Satyavani Vemparala
Theoretical Physics,
The Institute of Mathematical Sciences,
Chennai - 600113, India.
email: vani@imsc.res.in