Shashank Ravichandir

 shashankravichandir | shashankravichandir.github.io | ravichandir@ipfdd.de

EDUCATION

- **Lebniz Institute of Polymer Research** and **Technical University Dresden**   Aug'24 - Present
  Dresden, Saxony, Germany
  Ph.D. in Physics
  Advisors: Prof. Jens-Uwe Sommer and Prof. Abhinav Sharma

- **Jawaharlal Nehru Centre for Advanced Scientific Research**   Sep'20 - Aug'23
  Bengaluru, Karnataka, India
  MS (Engg.) in Fluid Mechanics (GPA : 9.15/10.0)
  Advisor : Prof. Meheboob Alam

- **National Institute of Technology Karnataka**   Aug'16 - Jun'20
  Surathkal, Karnataka, India
  B.Tech in Mechanical Engineering (GPA : 8.88/10.0)

RESEARCH EXPERIENCE

- **Leibniz Institute of Polymer Research**   Nov'23 - Present
  Dresden, Saxony, Germany
  Doctoral Researcher at the Institute Theory of Polymers
  Advisors: Prof. Jens-Uwe Sommer and Prof. Abhinav Sharma

  Important Projects
  - **Partially active polymers**
    * Studied the accumulation behaviour of active-passive hybrid polymers in activity gradients by considering active Brownian particles in a Rouse model using the coarse-grained Fokker Planck equation (theory) and Langevin dynamics (simulations).
    * Currently studying the conformational behaviour of such partially active polymers.
  - **Dynamics of odd systems**
    * Studying the dynamics of particles with "odd" diffusive terms using Langevin dynamics simulations.

- **Jawaharlal Nehru Centre for Advanced Scientific Research**   Jul'21 - Aug'23
  Bengaluru, Karnataka, India
  Graduate Researcher at the Engineering Mechanics Unit
  Advisor: Prof. Meheboob Alam

  Important Projects
  - **Study of dense granular flows**
    * Implemented a Fast Spectral code to numerically solve the Boltzmann and generalized Enskog collision operators to study various dilute and dense flows of molecular and granular gases.
    * Studied the hydrodynamics and rheology of various dense granular flows for a range of Knudsen numbers, coefficients of restitution and packing fractions.
  - **Study of rarefied dilute granular flows**
    * Developed a parallelized DSMC solver that can simulate a variety of rarefied granular flows.
    * Studied the hydrodynamics and rheology of granular Poiseuille flows for a range of Knudsen numbers and coefficients of restitution.

- **Indian Institute of Science**   May'19 - Jul'20
  Bengaluru, Karnataka, India
  Research Intern (part-time/remote) at the Department of Aerospace Engineering
  Advisor: Prof. S V Raghurama Rao

  Important Projects

- **Novel discrete kinetic flux splitting scheme for Euler equations**
  - Developed a novel finite volume scheme for the Euler equations based on velocity splitting of the Boltzmann equation and used upwinding at the mesoscopic scale for each flux.
  - Implemented and validated the scheme for the 1D equations and worked on implementing a truly multidimensional scheme by incorporating distinct multidimensional upwinding schemes for each flux.

SKILLS

Programming Languages	C/C++, Python, Matlab
Programming Techniques	Object Oriented Programming, Parallel computing, GPU Computing
Other Skills	Git, LaTeX, ParaView, COMSOL

AWARDS AND HONORS

DAAD	Doctoral Research Grant (2024 - Present)
DST India	Graduate Scholarship (2020-2023)

PUBLICATIONS

- **Transport of partially active polymers in chemical gradients** [link]
  S. Ravichandir, B. Valecha, P.L. Muzzeddu, J.U. Sommer, and A. Sharma | *Soft Matter (2025)*

- **Scale dependence and non-isochoric effects on the thermohydrodynamics of rarefied Poiseuille flow** [link]
  S. Ravichandir and. M Alam | *Journal of Fluid Mechanics 996, A30 (2024)*

- **Hydrodynamics, normal stress differences and heat transfer in rarefied pressure driven Poiseuille flow** [link]
  S. Ravichandir and M. Alam | *AIP Conference Proceedings. Vol. 2996. No. 1 (2024)*

- **Shear-induced heat transport and the relevance of generalized Fourier's law in granular Poiseuille flow** [link]
  M. Alam, R. Gupta and **S. Ravichandir** | *Physical Review Fluids 6.11 (2021)*

TALKS AND POSTERS

- **Chemotaxis of an active particle connected to a semiflexible cargo**
  S. Ravichandir, A. Sharma, and J.U. Sommer | *Talk at the DPG Spring Meeting, Berlin (2024)*

- **Active polymers in inhomogeneous environments**
  S. Ravichandir, A. Sharma, and J.U. Sommer | *Poster at the Conference on Dynamics of Interfaces, Augsburg (2024)*

- **Hydrodynamics and rheology of rarefied molecular and granular gases**
  S. Ravichandir and M. Alam | *Poster at Engineering Mechanics Unit, JNCASR, Bengaluru (2022)*

- **Hydrodynamics, normal stress differences and heat transport in rarefied pressure driven Poiseuille flow**
  S. Ravichandir and M. Alam | *Talk at the 32nd International Symposium on Rarefied Gas Dynamics, Seoul (2022)*

TEACHING

Applied Mathematics	Teaching Assistant at JNCASR (January 2023 - May 2023)