





# Vikki Anand Varma

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 vikkivarma16


 Indian

## Computational skills —

-  Monte Carlo
-  Molecular dynamics
-  Brownian dynamics

## Programming skills —

 C, python, Fortran



 Unix bash scripting




 Parallel processing



 Open-mp 

 GPU: Cuda-C 

## Utility software —

 Simulation software-  
 Lammmps, hoomdblue


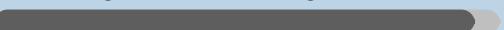
 Visualization-  
 Gnuplot  
 Paraview

 Others-  
 Latex, MS-office

## Interests —


 Philosophy 


 Singing 

 Long-distance running 




## References —

 Prof. Sujin B. Babu

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## Education

- 2018 – 2023 **Ph.D** **Department of Physics, IIT Delhi**  
 New-Delhi India  
Coursework CGPA: 8.25  
**Title:** A study on dynamics and self-assembly of spheroidal colloids.  
**Advisor:** Prof. Sujin B. Babu
- 2015 – 2017 **M.Sc** **Department of Physics, BHU Varanasi**  
 U.P. India  
Percentage: 74.9%  
**Specialization:** Condensed matter physics  
**Elective Papers:** Nano-science and technology, Solid state physics: Many particle system
- 2012 – 2015 **B.Sc** **VBSPU, Jaunpur**  
 U.P. India  
Percentage: 65.7%  
**Subject:** Physics, Mathematics

## Other academic achievements

UGC NET (JRF)- 149(2017), 241(2018) , GATE -Qualified, UGC NET (SRF), RETA

## Research interest

### Soft-matter: Theory and Simulation

- ▶ Dynamics and aggregation kinetics in the colloidal systems. Phase-transitions, thermodynamic stability, meta-stability, nucleation and growth kinetics in the self-assembly. Phase separation, percolation, fluid-fluid coexistence, gelation, binodal, spinodal decomposition and the universality classes.
- ▶ Designing smart materials inspired by biological systems. Patchy particle models. Study of protein folding, looping and packing in chromosomes. Mechanical properties of DNA. Phase transition in the polymer solutions, self-assembly in block copolymer melts. Modelling cell division and growth.
- ▶ Dynamics in active particle system at low Reynolds number. Study of propulsion in biological system. Dynamics in the presence of obstacles. Effect of the change in surface energy close to interface boundary. Thermodynamics, kinetics and equilibrium phases in Non-equilibrium active particle systems with low Peclet number.
- ▶ Self-assembly and emergent behaviour in the active particle system.
- ▶ Dynamics in hard-core system: Role of shape-anisotropy. Study of glasses, granular materials, and rheology. Phases shown in multi-component hard-core system: Study of liquid-glass and liquid-crystals.
- ▶ Study of hydrodynamic properties of fluids, vortices, in bulk and confinement, and its effect on diffusivity. Magnetic fluids. The Collective phenomenon, e.g., the flocking of birds, Vicsek Model.

## Publications

- **Design and control parameters for the growth of cylindrical cages using coloured patches**  
*Vikki Anand Varma and Sujin B. Babu*  
Manuscript under preparation
- **Diffusivity and nematic alignment in the presence of cylindrical obstacles and confinement**  
*Vikki Anand Varma and Sujin B. Babu*  
Communicated
- **Breaking the size constraint for nano cages using annular patchy particles**  
*Vikki Anand Varma, Simmie Jaglan, Mohd. Yasir Khan and Sujin B. Babu*  
*Phys. Chem. Chem. Phys.*, 26, 138, 2024



Github link for Codes

- **Self Assembly of Patchy Anisotropic Particle Forming Free Standing Monolayer Film**  
*Vikki Anand Varma, Kritika, Jaskaran and Sujin B. Babu*  
*Advanced Theory and Simulations. 6.3, 2200666, 2022*
- **Enhancement in the diffusivity of Brownian spheroids in the presence of spheres**  
*Vikki Anand Varma, Isha Malhotra and Sujin B. Babu*  
*Phys. Rev. E 106, 014602, 2022*

## Conferences

- **Breaking the size constraint of the nano-cages**  
*Vikki Anand Varma, Sujin B. Babu*  
Mesoscale modelling of driven disordered materials, CECAM-HQ-EPFL, Lausanne, Switzerland, May- 2023
- **Self-assembly of patchy spheroids**  
*Vikki Anand Varma and Sujin B. Babu*  
16th Complex Fluids Symposium IIT Kharagpur Dec- 2022
- **Dynamics in the binary system of spheroids**  
*Vikki Anand Varma, Isha Malhotra and Sujin B. Babu*  
5th International conference on Soft Materials , Jaipur Dec-2022

## Other positions of responsibility

- Mentoring M.Sc projects: On the study of self assembly, Surface energy calculation close to Nematic-isotropic interface in the presence of obstacles.
- Teaching Assistant for one semester in B.Tech laboratory.

## Experience

- Early postdoc research fellow, IIT Delhi, March 2024 - May 2024