Curriculum Vitae

Academic Details

Biplab Bhattacherjee,
(Profile on Google Scholar)
Research Scientist,
Laboratory for Physical Biology,
BDR, RIKEN, Japan.

Personal Details

Date of Birth:	17.01.1988
Gender:	Male
Nationality:	Indian
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Education and Research

Nov'20-Ongoing:	Research Scientist, Laboratory for Physical Biology, BDR, RIKEN, Japan.
Aug'18-Aug'20:	Post Doctoral Research, Institute of Physics (IOP), Bhubaneswar, India.
2011-2017:	PhD, S. N. Bose National Center for Basic Sciences, India (degree awarded in April 2019).
2011:	Master of Science in Physics, S. N. Bose National Center for Basic Sciences, India (DGPA 7.6).
2009:	Bachelor of Science in Physics (Honors), Durgapur Govt. College, University of Burdwan, India (66
2006:	Higher Secondary, West Bengal Council of Higher Secondary Education(84.2 %).
2004:	Secondary, West Bengal Board of Secondary Education (86 %).

Computer Skills

- Full working proficiency in Fortran programming language.
- Learning Python.
- Accustomed with Linux and Windows Operating System.
- Basic knowledge of html.
- Habituated in writing articles using LaTeX.

Technical Skills

- Full working proficiency on Monte Carlo simulations.
- Molecular Dynamics simulations of active and equilibrum Brownian systems.
- Agent based modelling and Hamiltonian dynamical simulation.
- OpenMp parallelisation,
- Full proficiency of Statistical analysis: time series analysis, auto and temporal correlations, probability distributions etc.
- Characterization of phases, phase transitions and criticality.
- Full proficiency of using Fortran language for statistical analysis.
- Theoretical analysis using probability theory and hydrodynamic descriptions.
- Basic theoritcal framework of non-equilibrium systems.

Research Interest

Biologically motivated active systems; physio-biological modelling; Active and passive rods in presence of interacting/non-interacting crowders; Active system under confinement; Collective dynamics and Flocking; Motility Induced Phase Separation(MIPS); Activity induced melting; Stochastic resetting, MPCD fluid, Microtubules; Polymers etc.

Research Achievements

Brownian systems:

• Currently I am working on an active overdamped Brownian system under nematic alignment dynamics[6]. In the model, we have observed a re-entrant Motility Induced Phase Separation (MIPS) and many other interesting features like defect formation, K-T like isotropic-nematic transition, gliding and laning, etc. We have construced a complete phase diagram of such a system and quantitaviley analysed each phase and phase transiton in details.
• The study of the steady state and transient dynamics of the same model is under process[7].
• I have been working on many other systems incorporating active rods, MPCD fluid etc.

Vicsek like systems

• I had worked on a Vicsek like system with topological neighbourhood under open boundary conditions[2]. We have observed a flocking state even in open boundary and also observed for the first time, a cyclic state of flocks.
• I had worked on another model with a tunable length dependent binary interaction mechanism incorporated in Vicsek like systems[3]. We gave some insight on the contradictory nature of the order-disorder transition for metric and topology based interaction scheme and shown an interesting correlation between the density fluctuation driven instabilities and the order of transition.
• In one model of quenched neighbourhood in Vicsek like systems[5], we showed that band with different orientations are possible.

Naming Game

• We have introduced a new and more realistic model of the Naming Game problem introducing symmetric interaction[1] and variable vocabulary sizes[4] with full characterisation of the system.
• A more realistic model with short term memory is under process[8].

Research Experience

Post Doctoral Fellow at Institute of Physics, Bhubaneswar,

August 2018 - August 2020.

Short term visits at Institute of Physics, Bhubaneswar,

April 2018 - August 2018, January 2018-February 2018, September 2017-November 2017.

Senior Research Fellow at S. N. Bose National Center for Basic Sciences, Kolkata,

August 2013–July 2017.

Junior Research Fellow at S. N. Bose National Center for Basic Sciences, Kolkata,

August 2011–July 2013.

Visiting Research Fellow at Department of Computer Sciences, IIT Kharagpur,

July 2013.

Masters Projects

June-July 2010:	Dynamics In Low Dimensions, Supervisor: Prof. Jayanta K. Bhattacharjee.
August-December 2010:	Collective Motion and Pattern Formation, Supervisor: Prof. S. S. Manna.
January-June 2011:	Theoretical Approach to Flocking in Continuum, Supervisor: Prof. Jayanta K. Bhattacharjee,

Awards and Certificates

November 2019:	Best poster award for presenting *Re-entrant phase separation in nematically aligning active polar particles* **StatPhys Kolkata X**, Presidency University, Kolkata, West Bengal, India.
December 2015:	Excellent poster award for presenting *Topological-distance-dependent transition in flocks with binary interactions* **CCP2015**, IIT Guwahati, Guwahati, Assam, India.
January 2014:	Best Oral Presentation award for presenting *Cyclic and coherent states in flocks with topological distance* **BOSE FEST-2014**, S. N. Bose National Centre for Basic Sciences , Kolkata, India.
March 2009:	Qualified Joint Entrance Screening Test (**JEST**).

Research Presentations

1. Presented poster on *'Re-entrant phase separation in nematically aligning active polar particles'*,
   Recent Topics in Statistical Mechanics,
   NISER, Bhubaneswar, India (December 2019).
2. Presented poster on *'Re-entrant phase separation in nematically aligning active polar particles'*,
   CompFlu 2019,
   IISER Bhopal, Bhopal, India (December 2019).
3. Presented poster on *'Re-entrant phase separation in nematically aligning active polar particles'*,
   StatPhys Kolkata X,
   Presidency University, Kolkata, India (November 2019).
4. Oral Presentation on *'Re-entrant motility induced phase separation in nematically algning polar active brownian particles'*,
   ISPCM 2019-Indian Statistical Physics Community Meeting,
   International Center for Theoretical Sciences(ICTS), Bangalore, India (February 2019).
5. Presented poster on *'Structural and Phase behaviour of active nematic'*,
   EPCQS 2018-Emergent Phenomenon in Classical and Quantum Systems,
   S. N. Bose National Center for Basic Sciences, Kolkata, India (February 2018).
6. Presented poster on *'Structural and Phase behaviour of active nematic'*,
   ISPCM 2018-Indian Statistical Physics Community Meeting,
   International Center for Theoretical Sciences(ICTS), Bangalore, India (February 2018).

7. Oral presentation on *'Dynamics and phase behaviour of active particles '*,
   Institute of Physics (IOP), Bhubaneswar (8th Feb. 2018).
8. Oral presentation on *'Spontaneous Evolution of Long Range Correlations in Dynamical Systems'*,
   Institute of Physics (IOP), Bhubaneswar (2nd Nov. 2016).
9. Presented poster on *'Topological-distance-dependent transition in flocks with binary interactions'*,
   CCP2015- XXVII IUPAP Conference on Computational Physics,
   Indian Institute of Technology Guwahati, Assam, India, (December 2015) .
10. Presented oral presentation on *'Cyclic and coherent states in flocks with topological distance'*,
    BOSEFEST 2014,
    S. N. Bose National Centre for Basic Sciences, Kolkata, India, (January 2014) .
11. Presented invited talk on *'Information sharing and sorting in a community'*,
    Indian Institute of Technology (IIT), Kharagpur, India, (July 2013).
12. Presented oral presentation on *'Information sharing and sorting in a community'*,
    BOSEFEST 2013,
    S. N. Bose National Centre for Basic Sciences, Kolkata, India, (January 2013) .
13. Presented poster on *'Explosive Percolation'*,
    BOSEFEST 2012,
    S. N. Bose National Centre for Basic Sciences, Kolkata, India, (January 2012) .

Attended Schools/Conferences

1. *Recent Topics in Statistical Mechanics, 2019*, NISER, Bhubaneswar, India (December 2019).
2. *CompFlu, 2019*, IISER Bhopal, Bhopal, India (December 2019).
3. *StatPhys Kolkata X, 2019*, Presidency University, Kolkata, India (November 2019).
4. *Indian Statistical Physics Community Meeting (ISPCM) 2019*, International Center for Theoretical Sciences, Bangalore, India (February 2019).
5. *Emergent Phenomenon in Classical and Quantum Systems (EPCQS) 2018*, S. N. Bose National Center for Basic Sciences, Kolkata, India (February 2018).
6. *Indian Statistical Physics Community Meeting (ISPCM) 2018*, International Center for Theoretical Sciences, Bangalore, India (February 2018).
7. *XXVII IUPAP Conference on Computational Physics (CCP2015)*, IIT Guwahati, Guwahati, Assam, India, (December 2015).
8. *Emerging Patterns*, Nanyang Technological University, Singapore, (March 2015).
9. *NTU-Warwick Winter School on Introduction to Complexity Science*, Nanyang Technological University, Singapore, (February 2015).
10. *STATPHYS-Kolkata VIII*, December 2014, S N Bose National Center for Basic Sciences, Kolkata, India, (December 2014).
11. *Bangalore School on Statistical Physics-V*, RRI Bangalore, (March-April 2014).
12. *Diversity and Complexity: Realm of Today's Statistical Physics*, Saha Institute of Nuclear Physics, Kolkata, (January 2014).

13. International School and Conference on *'Networks in Biology, Social Science and Engineering'*, Indian Institute of Science, Bangalore, India, (July 2012).
14. International Conference on *Statistical Physics and Non Linear Dynamics*, S N Bose National Center for Basic Sciences, Kolkata, India, (March 2012).

List of Publications

1. **B. Bhattacherjee and Debasish Chaudhuri**,
   Kinetics of active nematics,
   (in preparation)
2. **B. Bhattacherjee and Amitava Datta**,
   Symmetric naming game with finite and short-term memory,
   (in preparation)
3. **B. Bhattacherjee, Debasish Chaudhuri**,
   Re-entrant phase separation in nematically aligning active polar particles,
   Soft Matter: 2019,15, 8483-8495. Pdf
4. **B. Bhattacherjee** and S. S. Manna,
   Band structure in collective motion with quenched range of interaction,
   Physica A: Statistical Mechanics and its Applications Volume 531, 2019, 121733. Pdf
5. **B. Bhattacherjee**, A. Datta and S. S. Manna,
   Asymptotic properties of restricted naming games,
   Physica A (2017), http://dx.doi.org/10.1016/j.physa.2017.02.070. Pdf
6. **B. Bhattacherjee**, S. Mishra and S. S. Manna,
   Topological-distance-dependent transition in flocks with binary interactions,
   Phys. Rev. E **92**, 062134 (2015). Pdf
7. **B. Bhattacherjee**, K.Bhattacharya and S. S. Manna,
   Cyclic and Coherent States in Flocks with Topological Distance,
   Frontier in Phys. **1**, (2013). Pdf
8. **B. Bhattacherjee**, S. S. Manna and Animesh Mukherjee,
   Information sharing and sorting in a community,
   Phys. Rev. **87**, 062808, June 2013. Pdf