

Dr. Amit Kumar Bhattacharjee

CONTACT INFORMATION

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EDUCATION

- ♣ Ph.D. (Theoretical Physics), **Institute of Mathematical Sciences**, Chennai, India ('04-'10)
[Registered: 01/09/06, Submitted: 28/02/10, Defended: 05/12/11, Awarded: 15/02/13].
- ♣ M.Sc. (Physics), **Indian Institute of Technology**, Kharagpur, India ('02-'04).
- ♣ B.Sc. (Physics Honours), **B.B. College**, University of Burdwan, India ('99-'02).
- ♣ X^{th} & XII^{th} , DVC HS School, **W.B.B.S.E.** & **W.B.C.H.S.E.**, India ('97,'99).

APPOINTMENT

- Assistant Professor, **Asutosh College**, Kolkata, India ('17 onwards).
- DST-INSPIRE Faculty, **Asutosh College**, Kolkata ('17-'20) & **Indian Institute of Science**, Bangalore, India ('15-'17).
- Visiting Researcher, **Institute of Mathematical Sciences**, Chennai, India ('15, 3 months).
- Assistant Researcher in Applied Mathematics, **Courant Institute**, New York, USA ('13-'15).
- Helmholtz-University Young Investigator, **University of Konstanz**, Germany ('12-'13).
- DLR-DAAD Post Doctoral Fellow, **German Aerospace Center** Köln, Germany ('10-'12).

PROFESSIONAL COURSES

- ‡ 1st Online Refresher Course in Physics, **HRDC, Gujarat University**, Ahmedabad (7th – 20th September, 2020).
- ‡ 30th Orientation Course (Online), **HRDC, Mizoram University**, Aizawl (28th July–17th August, 2020).

HONOURS & AWARDS

- § Ranked 6th in **College Service Examination**, West Bengal State ('17).
- § Work featured in **NewsRX (Science Letter)** stating “**Researchers from IISc report findings in Science**” ('17),
- § Awarded **DST-INSPIRE Faculty** from **INSA-DST**, Govt. of India ('15-'20).
- § Work selected for “**Francois Naftali Frenkiel Award**” by *Physics of Fluids* ('15) & featured in **Phys.org** highlighting “**Mathematicians model fluids at the mesoscale**”.
- § **Research Scientist**, Courant Institute of Math. Sciences, New York University, USA ('13).
- § Work selected for “**Special Topics in Glass Transition**” issue by *J. Chem. Phys.* ('13).
- § **Helmholtz-University Young Investigator** at University of Konstanz, Germany ('12).
- § **DLR-DAAD** award from German Aerospace Centre Köln, Germany ('10).
- § Ranked 128th in **Joint Entrance Screening Test [JEST]** ('04).
- § Ranked 117th (95.79%) in **Graduate Aptitude Test in Engineering [GATE]** ('04).
- § Awarded CSIR-JRF & LS in **Joint CSIR-UGC JRF (NET) & LS**, Govt. of India ('04).
- § **DST-Summer Research** fellow at SN Bose National Centre for Basic Science, India ('03).
- § **National Scholarship** from **Department of Education**, Govt. of India ('03).
- § Ranked 6th in **Admission Test for M.Sc.**, IIT Kharagpur ('02).
- § “**University Silver Medal**”, B.Sc. 2nd rank in **University of Burdwan**, India ('02).
- § DVC 1st prize for performance in XII^{th} Board Examination, **WBCHSE**, India ('99).
- § DVC 2nd prize for **outstanding** performance in X^{th} Board Examination, **WBBSE**, India ('97).

RESEARCH EXPERTISE

Soft Condensed Matter Theory & Computation: (a) **Field theoretic methods** ($\mu\text{m-m}, \mu\text{s-hr}$): (i) Fluctuating hydrodynamics with Projection methods, (ii) hybrid Lattice-Boltzmann method, (iii) Landau-de Gennes energy landscape method, (b) **Particle based methods** (pm-nm, ps-ns): (iv) Molecular dynamics simulation, (v) Kinetic monte carlo methods, (c) **Multiscale methods**: (vi) Dissipative particle dynamics simulations, (vii) High performance computation (HPC).

PEER REVIEWED
PUBLICATIONS [*h-index: 7*,
Citations: 180,
Scopus ID: 56556042400,
ORCID ID: 0000-0002-1475-743X,
Web of Science : AAB-1030-2020]

LIQUID CRYSTALS :

- **A.K. Bhattacharjee.** Controlling motile disclinations in a thick nematogenic material with an electric field, *Nature (Scientific Reports)*, **8**, 2517 (2018), [citation:**1**, pages:18, ISSN:2045-2322, IF:4.379].
- **A.K. Bhattacharjee.** Stochastic kinetics reveal imperative role of anisotropic interfacial tension to determine morphology and evolution of nucleated droplets in nematogenic films, *Nature (Scientific Reports)*, **7**, 40059 (2017), (Highlighted in “**Review Article**” & featured in “**NewsRX (Science Letter)**”), [citation:**6**, pages:17, ISSN:2045-2322, IF:4.379].
- **A.K. Bhattacharjee.** Inhomogeneous Phenomena in Nematic Liquid Crystals, *Homi Bhabha National Institute* (2013), [citation:**3**, pages:124, PhD Thesis].
- **A.K. Bhattacharjee**, Gautam I. Menon and R. Adhikari. Fluctuating dynamics of nematic liquid crystals using the stochastic method of lines, *J. Chem. Phys.* **133**, 044112 (2010), [citation:**24**, pages:7, ISSN:1089-7690, IF:3.48].
- S.M. Kamil, **A.K. Bhattacharjee**, R. Adhikari and Gautam I. Menon. The isotropic-nematic interface with an oblique anchoring condition, *J. Chem. Phys.* **131**, 174701 (2009), [citation:**9**, pages:10, ISSN:1089-7690, IF:3.48].
- S.M. Kamil, **A.K. Bhattacharjee**, R. Adhikari and Gautam I. Menon. Biaxiality at the isotropic - nematic interface with planar anchoring, *Phys. Rev. E* **80**, 041705 (2009), [citation:**13**, pages:5, ISSN:2470-0053, IF:2.529].
- **A.K. Bhattacharjee**, Gautam I. Menon and R. Adhikari. Numerical method of lines for the relaxational dynamics of nematic liquid crystals, *Phys. Rev. E* **78**, 026707 (2008), [citation:**28**, pages:10, ISSN:2470-0053, IF:2.529].

COLLOIDAL GLASS :

- **A.K. Bhattacharjee.** Stress-structure relation in dense colloidal melt under forward and instantaneous reversal of shear. *Soft Matter (Royal Society of Chemistry)*, **11**, 5697 (2015), [citation:**2**, pages:8, ISSN:1744-6848, IF:3.399].
- F. Frahsa, **A.K. Bhattacharjee**, J. Horbach, M. Fuchs and Th. Voigtmann. On the Bauschinger effect in supercooled melts under shear: results from MCT and molecular dynamics simulation, *J. Chem. Phys.* **138**, 12A513 (2013), (Appeared in “**Special Topics in Glass Transition**”), [citation:**22**, pages:14, ISSN:1089-7690, IF:3.48].

LIQUIDS & GASES :

- **A.K. Bhattacharjee**, K. Balakrishnan, A. L. Garcia, J.B. Bell and A. Donev. Fluctuating hydrodynamics of multispecies reactive mixtures. *J. Chem. Phys.*, **142**, 224107 (2015), [citation:**40**, pages:22, ISSN:1089-7690, IF:3.48].
- A. Donev, A.J. Nonaka, **A. K. Bhattacharjee**, A. L. Garcia and J. B. Bell. Low Mach Number Fluctuating Hydrodynamics of Multispecies Liquid Mixtures. *Physics of Fluids* **27**, 037103 (2015), (Selected for “**Francois Naftali Frenkiel Award**” & featured in “**Phys.org**”), [citation:**32**, pages:34, ISSN:1089-7666, IF:3.521].

INVITED REVIEWER ¶ Journal reviewer: **Soft Matter (RSC)**, **Physical Review**, **Reviews of Modern Physics**.
 ¶ Proposal reviewer of **Netherlands Organisation for Scientific Research (NWO)**.
 ¶ Editor of **Centurion Teachers Council Journal**, Asutosh College, Kolkata, India.

¶ Biographical interview by **Deutsche Welle** at DLR, Germany.

(a) Asutosh College, Kolkata:

2021

- Sem-VI (PHSA) : (i) **Advanced Classical Dynamics**, (ii) **Advanced Statistical Mechanics**, & (iii) **Statistical Mechanics** (Python).
- Sem-V (PHSA) : (i) **Laser & Fiber Optics** (Holography & Nonlinear Optics), & (ii) **Statistical Mechanics** (Python).
- Sem-IV (PHSA) : Mathematical Physics III: (i) **Special Relativity** & (ii) **Python**.
- Sem-III (PHSA) : (i) **Thermal Physics**, (ii) **Mathematical Physics II** (Python) & (iii) **Scientific Writing** (L^AT_EX).
- Sem-II (PHSA) : **Physical Optics** (Diffraction & Waves).
- Sem-I (PHSA) : **Mechanics** (Noninertial Frame & Fluid Mechanics).
- ¶ Sem-V (PHSG) : **Modern Physics** (Special Relativity).
- ¶ Sem-IV (PHSG) : **Physical Optics** (Polarization & Diffraction).
- ¶ Sem-III (PHSG) : **Scientific Writing** (L^AT_EX).
- Year-III (PHSA) : **Computer Laboratory** (in C).

2020

- Sem-V (PHSA) : (i) **Solid State Physics**, (ii) **Laser & Fiber Optics** (Holography & Nonlinear Optics), & (iii) **Quantum Mechanics** (Python).
- Sem-IV (PHSA) : Mathematical Physics III: (i) **Special Relativity** & (ii) **Python**.
- Sem-III (PHSA) : (i) **Thermal Physics** & (ii) **Mathematical Physics II** (Python).
- Sem-II (PHSA) : **Physical Optics** (Diffraction).
- Sem-I (PHSA) : **Mechanics** (Noninertial Frame & Fluid Mechanics).
- ¶ Sem-V (PHSG) : **Modern Physics** (Special Relativity).
- ¶ Sem-I (PHSG) : **Mechanics** (Oscillations).
- Mentored U.G. student S.Paul (Asutosh College) in a project “Computational study of Conserved & Nonconserved Systems”.

2019

- Year-III (PHSA) : (i) **Solid State Physics**, & (ii) **Computer Laboratory** (in C).
- Sem-III (PHSA) : (i) **Thermal Physics** & (ii) **Mathematical Physics II** (Python).
- Sem-II (PHSA) : **Physical Optics** (Diffraction & Holography).
- Sem-I (PHSA) : **Mechanics** (Noninertial Frame & Fluid Mechanics).
- ¶ Sem-II (PHSG) : **Electrodynamics** (Induction & Maxwell’s Equation).
- ¶ Sem-I (PHSG) : **Mechanics** (Oscillations & Elasticity).

2018

- Sem-II (**PG**) (ENVS) : **Environment & Energy**.
- Year-III (PHSA) : (i) **Solid State Physics**, & (ii) **Computer Laboratory** (in C).
- Year-II (PHSA) : **Thermal Physics II**.
- Sem-I (PHSA) : (i) **Mechanics** (Noninertial Frame & Fluid Mechanics), & (ii) **Mathematical Physics I** (Python).
- ¶ Year-III (PHSG) : (i) **Computer Laboratory** (in C) & (ii) **Communication Theory**.
- ¶ Sem-I (PHSG) : **Mechanics** (Oscillations & Elasticity).
- Mentored Ph.D. student S. Anand (IISER Bhopal) in a project “Electrically Driven Droplets”.

2017

- Year-III (PHSA) : (i) **Solid State Physics**, & (ii) **Computer Laboratory** (in C).
- Year-II (PHSA) : **Thermal Physics II**.
- Year-I (PHSA) : **Thermal Physics I**.
- ¶ Year-III (PHSG) : (i) **Computer Laboratory** (in C) & (ii) **Communication Theory**.
- ¶ Year-I (PHSG) : **Mechanics** (Waves & Oscillations).

(b) Indian Institute of Science, Bangalore:

2016

- Mentored a Ph.D. student (P.J.Bhuiyan) in a project “Emergent Structures in Colloidal Membranes” (Fall).
- Mentored a U.G. student (A.Shetty, IIT Bombay) in a project “Nematic Rheochaos in 2D” (Summer).

(c) Universität Konstanz, Konstanz:

2012

- Mentored M.Sc. student (M.Everts) towards “**Ausarbeitung**” in the course **Materie und Ordnung** (Spring).
- Bilingual Teaching Assistant/Grader (German & English) in the course **Classical Field Theory** (Fall).

EXAMINER/PAPER-
SETTER/SCRUTINIER/
REVIEWER

(UNIVERSITY OF
CALCUTTA)

E: Examined,

S: Scrutinized,

R: Reviewed,

P: Paper-Setter,

In: Internal,

Tu: Tutorial,

Th: Theory]

Examiner & Scrutinier (Theory)

2021

- Sem-VI (PHSA) : Paper-DSE A2(B) (Advanced Dynamics) {In,Tu,Th}[E=34, S=34].
- Sem-VI (PHSA) : Paper-DSE B2(B) (Non-eq. Statistical Mechanics){In,Tu,Th}[E=34, S=34].
- Sem-IV (PHSA) : Paper-CC8 (Mathematical Physics-III){In,Th}[E=47, S=47].
- Sem-II (PHSA) : Paper-CC4 (Waves & Optics){In,Th}[E=42, S=42].
- Sem-IV (PHSG) : Paper-CC4/GE4 (Waves & Optics) [E=154, S=154].
- Year-III (PHSA) : Paper-6 (Nuclear & Solid State Physics) [E=9, S=9].
- Sem-V (PHSA) : Paper-DSE A1(B) (Laser & Fiber Optics){In,Tu,Th}[E=34, S=34].
- Sem-V (PHSA) : Paper-CC12 (Solid State Physics){In,Th}[E=34, S=34].
- Sem-III (PHSA) : Paper-CC6 (Thermal Physics){In,Th}[E=46, S=46].
- Sem-I (PHSA) : Paper-CC2 (Mechanics){In,Th}[E=60, S=60].
- Sem-V (PHSG) : Paper-DSE A(2) (Modern Physics){In,Th}[E=46, S=46].

2020

- Year-III (PHSA) : Paper-6 (Nuclear & Solid State Physics) [E=80, S=80].
- Sem-IV (PHSA) : Paper-CC8 (Mathematical Physics-III){In,Th}[E=34, S=34].
- Sem-III (PHSA) : Paper-CC6 (Thermal Physics){In,Th}[E=44, S=47].
- Sem-II (PHSA) : Paper-CC4 (Waves & Optics){In,Th}[E=48, S=48].
- Year-II (PHSG) : Paper-IIIA (Optics Electronics, Modern Physics) [E=71, S=71].

2019

- Year-I (PHSG) : Paper-I (Math.Methods, Geom.Optics & Electronics) [E=20, S=20].
- Sem-II (PHSG) : Paper-GE/CC2 (EM Theory) [E=11, S=16].
- Sem-I (PHSG) : Paper-GE/CC1 (Mechanics) [E=37, S=49].

2018

- Sem-II (PG) (ENVS) : Paper-ENVC – 24 (Energy & Environment) [E=P=25].
- Year-III (PHSA) : Paper-VI (Nuclear & Solid State Physics) [E=33, S=37].
- Year-III (PHSG) : Paper-IVA (Thermodynamics, Electronics) [E=55, S=53].
- Year-II (PHSG) : Paper-IIIA (Optics, Electronics, Modern Physics) [E=44, S=49].

2017

- Year-III (PHSG) : Paper-IVA (Thermodynamics, Electronics) [E=31, S=50].
- Year-II (PHSG) : Paper-IIIA (Optics, Electronics, Modern Physics) [E=50, S=71].
- Year-I (PHSG) : Paper-I (Mechanics, GPM, Oscillations, Optics) [E=67, S=76].

Internal Examiner & Scrutinier (Experiment)

- Sem-I (PHSG) : Paper-GE/CC1 (2020) [E=96].
- Year-II (PHSG) : Paper-IIIB (Optics Electronics, Modern Physics) (2020) [E=71].
- Year-II (PHSG) : Paper-IIA (2019) [E=92].
- Year-III (PHSG) : Paper-IIA (2018) [E=105].
- Year-III (PHSG) : Paper-IVA (2017) [E=100].

External Examiner & Scrutinier (Computer)

- Sem-VI (PHSA) : Paper-CC14 (Statistical Mechanics) (2021) [E=34].
- Sem-IV (PHSA) : Paper-CC8 (Mathematical Physics-III) (2021) [E=47].
- Sem-III (PHSA) : Paper-CC5 (Mathematical Physics-II) (2021) [E=46].
- Year-III (PHSA) : Paper-VIIIB (Computer Laboratory) (in C) (2021) [E=9].
- Sem-IV (PHSA) : Paper-CC8 (Mathematical Physics-III) (2020) [E=34].
- Year-III (PHSA) : Paper-VIIIB (Computer Laboratory) (in C) (2020) [E=80, S=80].
- Sem-I (PHSA) : Paper-CC1 (Heritage College) (2020) [E=19].
- Sem-I (PHSA) : Paper-CC1 (Heritage College) (2018) [E=19, S=120].

INVITED SPEAKER

- ♠ **Centre for Computational & Data Sciences**, IIT Kharagpur, India (December 2018).
- ♠ **Complex Fluids - CompFlu-2017**, IIT Madras, India (December 2017).
- ♠ **Complex Fluids - CompFlu-2016**, IIIT Hyderabad, India (December 2016).
- ♠ Institute Seminar, RRI Bangalore, India (September 2016).
- ♠ **Theoretical Science Unit, JNCASR Bangalore, India (March 2016)**.
- ♠ Thematic Unit of Excellence in Computational Material Science, SNBNCBS Kolkata, India (January 2016).
- ♠ Department of Physics, IIT Delhi, India (January 2016).
- ♠ **3rd Soft Matter Young Investigator Meet, Pondicherry, India (December 2015)**.
- ♠ Journal Club, The Institute of Mathematical Sciences, Chennai, India (July 2015).
- ♠ Department of Physics, IISER Mohali, India (April 2015).
- ♠ **School of Physical Sciences, JNU New Delhi, India (April 2015)**.
- ♠ Department of Physics, IISER Bhopal, India (April 2015).
- ♠ Workshop Bartholomäberg, Vorarlberg, Austria (August 2012).
- ♠ **Konstanzer Kolloidal Klub, Universität Konstanz, Konstanz, Germany (June 2012)**.
- ♠ Fachbereich Physik, Universität Konstanz, Konstanz, Germany (February 2012).
- ♠ Institut für Theoretische Physik, Heinrich-Heine-Universität Düsseldorf, Germany (October 2011).
- ♠ Institut für Materialphysik im Weltraum, DLR Köln, Germany (April 2011).
- ♠ **Journal Club, The Institute of Mathematical Sciences, Chennai, India (April 2009)**.
- ♠ Mahabaleswar Seminar on Modern Biology, TIFR, Mumbai, India (January 2008).

ATTENDED CONFERENCES/ WORKSHOPS / WEBINARS

- Faculty Development Program on Quantum Mechanics in Python, **Prabhu Jagatbandhu College** Howrah (19th February, 2021).
- National Webinar on Some Selected Topics on DSE Physics Course Under CBCS, CU, **Maulana Azad College** Kolkata (23rd – 24th September, 2020).
- National Webinar on Fundamental Physics, **Asutosh College** Kolkata (27th–28th August, 2020).
- Web Based Workshop on Teaching Physics at the UG & PG Level using Python, **Victoria Institution & UGC-DAE CSR** Kolkata (6th – 10th July, 2020).
- Indian Statistical Physics Community Meeting, ICTS Bangalore, India (2016).
- Growing Length Scale Phenomena, JNCASR Bangalore, India (2015).
- **Kurt Binder honorary workshop, Johannes Gutenberg-Universität Mainz, Germany (2012)**.
- SimBioMa2011, Universität Konstanz, Konstanz, Germany (2011).
- School on Nonlinear Response to Vitrification, Universität Konstanz, Konstanz, Germany (2011).
- Glastag, Universität Marburg, Marburg, Germany (2011).
- **8th Liquid Matter Conference, Universität Wien, Vienna, Austria (2011)**.
- SERC School cum Symposium on Rheology of Complex Fluids, IIT Madras, India (2010).
- **Disorder, Complexity & Biology II, BHU Varanasi, India (2009)**.
- The Interface of Life, IIT Madras, India (2008).
- School on Understanding Molecular Simulation, JNCASR Bangalore, India (2007).
- Assembly Organization & Propulsion in Complex Systems, IIT Madras, India (2007).
- SERC School on Nonlinear Dynamics & Pattern Formation, IACS Kolkata, India (2006).
- Common Trends in Traffic: Physical & Computational Models in Transportation Engineering &

- Biological Sciences, IIT Kanpur, India (2006).
- Discussion Meeting on Statistical Physics, Vardanahalli, India (2005).

STUDENT
OUTREACH
ACTIVITY

- Judged & evaluated “**Chhatra Yuba Bigyan Mela**” at Beltala Girls High School, Kolkata (September '19).
- Conducted Heat & Annual Sports “**Krira**”, Asutosh College (December 2019, January 2019 & February 2018).
- **Seminar on “Computational Science**” at PG Department of Physics, B.B.College, Asansol (December 2009).
- Question-Answer session with students of X^{th} std. at DVC High School, Maithan (April 2015).

EXTRACURRICULAR
ACTIVITY

- (✕) **Visharad (5th year)** on Hawaiian Guitar, Nikhil Bharat Sangeet Samiti, Kolkata, 1999.
- (✕) **Visharad (5th year)** in Art, Pracheen Kala Kendra, Chandigarh, 1999.
- (✕) **Nature Photography & Birding.**
- (✕) **Travelogue.**