Dr. Amit Kumar Bhattacharjee

Contact Information

Department of Physics,
Asutosh College,
92 S.P.Mukherjee Road,
Kolkata 700 026, India.

Tel: +91 (033) 2455-4504
Fax: +91 (033) 248-3006
E-mail: a.k.bhattacharjee@gmail.com
Home: **https://amitbny.github.io/akb.github.io**

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

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

Honours & Awards

- Ranked 6^{th} 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 128^{th} in ***Joint Entrance Screening Test*** [**JEST**] ('04).
- Ranked 117^{th} (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 6^{th} in ***Admission Test for M.Sc.***, IIT Kharagpur ('02).
- ***"University Silver Medal"***, B.Sc. 2^{nd} rank in **University of Burdwan**, India ('02).
- DVC 1^{st} prize for performance in XII^{th} Board Examination, **WBCHSE**, India ('99).
- DVC 2^{nd} prize for **outstanding** performance in X^{th} Board Examination, **WBBSE**, India ('97).

Research Expertise

Soft Condensed Matter Theory & Computation: ***(a) Field theoretic methods*** (μm-m,μs-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:* **178**, *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:3.998].

- **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:3.998].

- **A.K. Bhattacharjee**. Inhmogeneous 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:2.991].

- 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:2.991].

- 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:2.296].

- **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:2.296].

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:2.991].

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:**38**, pages:22, ISSN:1089-7690, IF:2.991].

- 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:3.514].

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.

Teaching / Mentoring Experience

(a) Asutosh College, Kolkata:

2021

- Sem-*VI* (PHSA) : **Nonlinear Dynamics**, **Nonequilibrium Statistical Mechanics**, & **Statistical Mechanics (Practical)** (in Python).
- Sem-*IV* (PHSA) : **Special Relativity** & **Mathematical Physics III** (in Python).
- Sem-*II* (PHSA) : **Physical Optics (Diffraction & Waves)**.
- Sem-*IV* (PHSG) : **Waves & Diffraction**.
- Year-*III* (PHSA) : **Computer Laboratory** (in C).

2020

- Sem-*V* (PHSA) : **Solid State Physics**, **Holography & Nonlinear Optics**, & **Quantum Mechanics (Practical)**.
- Sem-*IV* (PHSA) : **Special Relativity** & **Mathematical Physics III** (in Python).
- Sem-*III* (PHSA) : **Thermal Physics** & **Mathematical Physics II** (in Python).
- Sem-*II* (PHSA) : **Physical Optics (Diffraction)**.
- Sem-*I* (PHSA) : **Mechanics & General Properties of Matter**.
- Sem-*V* (PHSG) : **Special Relativity**.
- Mentoring a U.G. student S.Paul (Asutosh College) in a project "Conserved & Nonconserved Systems" (Ongoing).

2019

- Year-*III* (PHSA) : **Solid State Physics** & **Computer Laboratory** (in C).
- Sem-*III* (PHSA) : **Thermal Physics** & **Mathematical Physics II** (in Python).
- Sem-*II* (PHSA) : **Physical Optics (Diffraction & Holography)**.
- Sem-*I* (PHSA) : **Mechanics & General Properties of Matter**.
- Sem-*II* (PHSG) : **Electrodynamics (Induction & Maxwell Equation)**.
- Sem-*I* (PHSG) : **Waves & Oscillations**.

2018

- Sem-*II* (PG)(ENVS) : **Environment & Energy**.
- Year-*III* (PHSA) : **Solid State Physics** & **Computer Laboratory** (in C).
- Year-*II* (PHSA) : **Thermal Physics II**.
- Sem-*I* (PHSA) : **Mechanics & General Properties of Matter**, & **Mathematical Physics I** (in Python).
- Year-*III* (PHSG) : **Computer Laboratory** (in C) & **Communication Theory**.
- Sem-*I* (PHSG) : **Oscillations & Elasticity**.
- Mentored a Ph.D. student S.Anand (IISER Bhopal) in a project "Electrically Driven Droplets" (6Months).

2017

- Year-*III* (PHSA) : **Solid State Physics** & **Computer Laboratory** (in C).
- Year-*II* (PHSA) : **Thermal Physics II**.
- Year-*I* (PHSA) : **Thermal Physics I**.
- Year-*III* (PHSG) : **Computer Laboratory** (in C) & **Communication Theory**.
- Year-*I* (PHSG) : **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-II (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 Hyedarabad, 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).
- 3^{rd} **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 ($19^{th} February$, 2021).
- National Webinar on Some Selected Topics on DSE Physics Course Under CBCS, CU, **Maulana Azad College** Kolkata ($23^{rd} - 24^{th} September$, 2020).
- National Webinar on Fundamental Physics, **Asutosh College** Kolkata ($27^{th}-28^{th} August$, 2020).
- Web Based Workshop on Teaching Physics at the UG & PG Level using Python, **Victoria Institution & UGC-DAE CSR** Kolkata ($6^{th} - 10^{th} July$, 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).
- 8^{th} **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 (5^{th} year)** on Hawaiian Guitar, Nikhil Bharat Sangeet Samiti, Kolkata, 1999.
- **Visharad** (5^{th} year) in Art, Pracheen Kala Kendra, Chandigarh, 1999.
- **Nature Photography & Birding**.
- **Travelogue**.