

Curriculum Vitae



Dr. Dipak Bhowmik

Contact Information Dr. Dipak Bhowmik, Assistant Professor, Faculty of Physical Science, ES-102 1st Floor, South Asian University, Gaushala Rd, Maidan Garhi, Chhatarpur, New Delhi-110068, India.

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Date of Birth: 05th July 1991

Personal Webpage: <https://sites.google.com/view/dipakbhowmik/home?authuser=0>

Nationality Indian

Marrital status Married

Language Competencies English, Bengali (Mother Tongue), Hindi

Present Position: Assistant Professor at South Asian University, New Delhi

Work Experience (Total ~ 12 years, Post-PhD Experience ~ 6.5 years)

October, 2026 to Present	Assistant Professor, South Asian University, New Delhi
Oct, 2023 to Sept, 2026	Senior Researcher, University of Oldenburg, Germany
April, 2023 to Sept, 2023	Senior Postdoctoral Fellow, FCIPT, IPR Gandhinagar, India
Jan, 2020 to Jan, 2023	Postdoctoral Fellow, IIT Kanpur, Kanpur-208016, India
Oct, 2019 to Jan, 2020	Postdoctoral Fellow at ITER-India, IPR Gandhinagar
Sept, 2014 to Sept 2019	Senior Research Fellow, Variable Energy Cyclotron Centre Kolkata, India

Education

2014-2019	PhD in Physical Science from Homi Bhabha National Institute, India. Thesis Title: “Surface and interface modification by low energy ion beams”
2012- 2014	M.Sc in Physics (2 yrs) with cgpa (7.95 /10) from Indian Institute of Technology Kharagpur (IITKGP), Kharagpur, India.

2009- 2012 B.Sc (Honours) in Physics with 70.5% marks from A.B.N.Seal College,
North Bengal University, West Bengal, India.

Research Areas Nanoplastic research, Adhesion Property, Nanopatterning using FIB, Atomic Force Microscopy, Ion Beam Physics, Surface and interface science, Condensed matter physics, Material Science.

Thesis Work Ph.D. Thesis (2014 – 2019)
“Surface and interface modification by low energy ion beams”, under the supervision of Prof. Prasanta Karmakar from HBNI.
([Thesis Link](#))

M.Sc Thesis (2013 – 2014)
“Structural, Electrical and Optical properties of Fe-doped ZnO thin films”, under the supervision of Prof. Tapan Kumar Nath (Dept. of Physics, Indian Institute of Technology Kharagpur, Kharagpur, India)

Publications Total Publications: 25, First author: 18, As a co-author: 7

Publications (Peer Review Journals)

17. **Dipak Bhowmik**, Sergej Fatikow, Waldemar Klauser, “Nanoscale adhesion and friction behavior of individual nanoplastic particles under varying environmental conditions”, **Nano Research**, 19 (2026) 94908470. <https://doi.org/10.26599/NR.2026.94908470> (IF=9.4, Q1).
16. **Dipak Bhowmik**, “Morphological Evolution of Silicon Surfaces Nanopatterned by Focused Ion Beam Irradiation”, **Scientific Reports** 16 (2026) 4308. <https://doi.org/10.1038/s41598-025-33947-y> (IF=4.9, Q1).
15. Joy Mukherjee, **Dipak Bhowmik**, Sudip Bhowmick, Prasanta Karmakar, Sudeep Bhattacharjee, “Low energy ion-beam mediated tailoring of structural, optical, and electrical properties of ITO films” **Surfaces and Interfaces** 59 (2025) 105973. (<https://doi.org/10.1016/j.surfin.2025.105973>, IF=6.0, Q1).
14. **Dipak Bhowmik**, Joy Mukherjee, Prasanta Karmakar, Sudeep Bhattacharjee, “Oxidation dynamics of Cu thin film on Si surface by mass analyzed O⁺ ion implantation and study their electrical and optical properties” **Thin Solid Films** 787 (2023) 140144. ([10.1016/j.tsf.2023.140144](https://doi.org/10.1016/j.tsf.2023.140144), IF=2.4, Q2).
13. Joy Mukherjee, Sudip Bhowmick, Sabyasachi Karmakar, **Dipak Bhowmik**, Biswarup Satpati, Satyajit Hazra, Prasanta Karmakar, “Alteration and interrogation of ultra-thin layer of silicon by reactive molecular ion implantation” **Applied Surface Science** 637 (2023) 157837. ([10.1016/j.apsusc.2023.157837](https://doi.org/10.1016/j.apsusc.2023.157837), IF=6.6, Q1).
12. Joy Mukherjee, Madhavi H Dalsaniya, Sudip Bhowmick, **Dipak Bhowmik**, Prafulla Kumar Jha and Prasanta Karmakar, “Band gap engineering of the top layer of mica by organized defect formation” **Surfaces and Interfaces** 33 (2022) 102283. ([10.1016/j.surfin.2022.102283](https://doi.org/10.1016/j.surfin.2022.102283), IF=6.0, Q1).
11. **Dipak Bhowmik** and Sudeep Bhattacharjee, “Optical, structural, and electrical properties of modified indium-tin-oxide (ITO) film on glass surface by low energy ion implantation” **Applied Physics A** 128, 605 (2022). ([10.1007/s00339-022-05746-z](https://doi.org/10.1007/s00339-022-05746-z), IF= 3, Q2).

10. Joy Mukherjee, **Dipak Bhowmik**, Gourab Bhattacharyya, Biswarup Satpati and Prasanta Karmakar, “Spatially varying chemical phase formation on silicon nano ripple by low energy mixed ions bombardment” **Journal of Physics Condensed Matter** 34 (2022) 135001. ([10.1088/1361-648X/ac4937](https://doi.org/10.1088/1361-648X/ac4937), IF=2.9, Q2).
9. **Dipak Bhowmik** and Sudeep Bhattacharjee, “Optical band gap tailoring of muscovite mica via monolayer modification by ultra-low energy ion beam sputtering” **Physica B: Physics of Condensed Matter** 623 (2021) 413377. ([10.1016/j.physb.2021.413377](https://doi.org/10.1016/j.physb.2021.413377), IF=3.2, Q2).
8. **Dipak Bhowmik**, Joy Mukherjee, and Prasanta Karmakar, “Projectile mass dependent nano patterning and optical band gap tailoring of muscovite mica” **Radiation Physics and Chemistry** 187 (2021) 109568. ([10.1016/j.radphyschem.2021.109568](https://doi.org/10.1016/j.radphyschem.2021.109568); IF=3.5, Q2).
7. Joy Mukherjee, **Dipak Bhowmik**, Manabendra Mukherjee, Biswarup Satpati, and Prasanta Karmakar, “Alternating silicon oxy-nitride and silicon oxide stripe formation by nitric oxide (NO⁺) ion implantation” **Journal of Applied Physics** 127, 145302 (2020). ([10.1063/1.5144960](https://doi.org/10.1063/1.5144960) ; IF=2.7, Q2).
6. **Dipak Bhowmik** and Prasanta Karmakar, “Tuning wettability of Si surface by ion beam induced silicon nitride formation and nanopatternin” **Surface & Coatings Technology** 385 (2020) 125369. ([10.1016/j.surfcoat.2020.125369](https://doi.org/10.1016/j.surfcoat.2020.125369); IF=6.9, Q1).
5. **Dipak Bhowmik** and Prasanta Karmakar, “Tailoring and investigation of surface chemical nature of virgin and ion beam modified muscovite mica” **Surf. Interface Anal.** 51 (2019) 667–673. ([10.1002/sia.6636](https://doi.org/10.1002/sia.6636) ; IF=2.7, Q2).
4. **Dipak Bhowmik**, Manabendra Mukherjee and Prasanta Karmakar, “Presence of reactive impurities in Ar⁺ ion beam plays a key role for Si ripple formation” **Nuclear Inst, and Methods in Physics Research B** 444 (2019) 54–61. ([10.1016/j.nimb.2019.02.010](https://doi.org/10.1016/j.nimb.2019.02.010); IF=1.5, Q2).
3. **Dipak Bhowmik**, Debasree Chowdhury and Prasanta Karmakar, “Dynamic scaling behavior of mica ripples produced by low energy Ar⁺ ion erosion” **Surface Science** 679 (2019) 86. ([10.1016/j.susc.2018.08.016](https://doi.org/10.1016/j.susc.2018.08.016) ; IF=2.3, Q2).
2. **Dipak Bhowmik**, Prasanta Karmakar, “Physicochemical variation of mica surface by low energy ion beam irradiation” **Nuclear Inst, and Methods in Physics Research B** 422 (2018) 41–46. (<https://doi.org/10.1016/j.nimb.2018.02.030>; IF=1.5, Q2).
1. **D. Bhowmik**, S. Bhattacharjee, D. Lavanyakumar, V. Naik, B. Satpati, and P. Karmakar, “Synthesis of nano-patterned and Nickel Silicide embedded amorphous Si thin layer by ion implantation for higher efficiency solar devices” **Applied Surface Science** 422(2017) 11-16. ([10.1016/j.apsusc.2017.05.250](https://doi.org/10.1016/j.apsusc.2017.05.250) ; IF=6.6, Q1).

Publication (Book Chapter)

2. Joy Mukherjee, **Dipak Bhowmik**, Sudip Bhowmick, Paramita Patra, “Investigation of Vacancy Formation in Muscovite Mica by Different Projectile Ions” **RECENT TRENDS IN APPLIED PHYSICS AND MATERIAL SCIENCE** Edition: 1st, Publisher: CRC Press, Taylor & Francis Group, London, Oct 2025. (<https://doi.org/10.1201/9781003684718-124>).
1. **Dipak Bhowmik**, Joy Mukherjee and Prasanta Karmakar, “Band Gap Engineering and Nanopatterning of Muscovite Mica by Low-Energy Ion Beams Applicable for Futuristic Microelectronics” (Chapter of **Smart Materials for Science and Engineering**, 03 May, 2024, **Wiley Publisher**). ([10.1002/9781394186488.ch17](https://doi.org/10.1002/9781394186488.ch17)).

Publications (Scopus indexed Conference Proceedings)

6. **D. Bhowmik**, S. Fatikow, “Adhesion and Friction of Individual Nanoplastic Particle under Varying Salt Concentrations Studied by Colloidal Probe Atomic Force Microscopy”, 2026 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS), Hangzhou, China, 2026, pp.1-6. (<https://doi.org/10.1109/MARSS70227.2026.11655829>)
5. **D. Bhowmik** and S. Fatikow, “Probing Primary and Mechanically Degraded Nanoplastic Particles via Atomic Force Microscopy” 2025 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS), West Lafayette, IN, USA, 2025, pp. 1-6, **IEEE Explore** (<https://doi.org/10.1109/MARSS65887.2025.11072762>).
4. **Dipak Bhowmik**, and Joy Mukherjee, "Study of low energy ion beam induced sputtering parameters of muscovite mica $[KAl_2(Si_3Al)O_{10}(OH)_2]$ using Monte Carlo simulation" **Material Today: Proceedings** 47 (2021) 1515–1519. ([10.1016/j.matpr.2021.03.161](https://doi.org/10.1016/j.matpr.2021.03.161)).
3. Joy Mukherjee, **Dipak Bhowmik**, and Prasanta Karmakar, “Investigation on Chemical Instability & Optical Absorption of Ion Bombarded Si Surfaces” **AIP Conference Proceedings** 2369 (2021) 020038. ([10.1063/5.0060833](https://doi.org/10.1063/5.0060833)).
2. **Dipak Bhowmik**, Prasanta Karmakar, “Enhancement of optical absorption of Si (100) surfaces by low energy N^+ ion beam irradiation” **AIP Conference Proceedings** 1953, 100071 (2018). ([10.1063/1.5033007](https://doi.org/10.1063/1.5033007)).
1. **D. Bhowmik**, P. Karmakar, “Energy dependent ripple growth on Si (100) by N^+ ion beam irradiation” **AIP Conference Proceedings** 1832, 080019 (2017). ([10.1063/1.4980479](https://doi.org/10.1063/1.4980479)).

Conferences and School Presented/Attended = 18

Expertise and Skill

- **Characterization Technique:**

Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Focused Ion Beam, X-Ray Photoelectron Spectroscopy (XPS), Transmission Electron Microscopy (TEM), X-Ray diffraction (XRD), X- ray reflectivity (XRR), UV -Visible spectroscopy, Electrical characterization (Keithley 4200, Keithley 2450 and probe station).

- **Hand on expertise**

- a. AFM, SEM, FIB, EBID, XRD, XPS, UV-Vis.
- b. High Vacuum chamber and ECR ion source handling.
- c. Ion beam extraction operation and mass separation.
- d. Robotic nanomanipulation inside SEM for colloidal probe fabrication

Academic Visit

1. Visited Centre for Ion Beam Applications, National University of Singapore on January, 2019.
2. Visited on DAAD exchange programme Louisville Automation & Robotics Research Institute (LARRI), University of Lousville, USA on July, 2025.
3. Research visit at Advanced Technologies Institute, The University of Hong Kong on August, 2026.

Research Projects

1. Received approval of DFG individual project as a PI from German Research foundation in 2026 with total fund of 0.42 million Euro (~ Rs. 4.5 crore). (**Not Availled due to relocation in India**).

2. Supervising DAAD PPP Hong Kong project (2025-2027): This project was prepared and communicated by Dr. Bhowmik and was executed under the supervision of Prof. Fatikow of Division of Microrobotics and Control Engineering, University of Oldenburg. **(Project value ~ 24000 Euro/~Rs. 25 Lakh).**
 3. Supervising and working as a PI on a DFG funder project: The project was acquired by Prof. Fatikow and completely managed by Dr. Bhowmik. **(Project value ~ 300000 Euro/~Rs. 3.5 Crore).**
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Teaching and Guiding Experience

- Experience of taking laboratory courses (M.Sc Physics) during my Postdoc at IIT Kanpur as instructor.
 - Microrobotic II course at University of Oldenburg.
 - Guiding M.Sc projects and PhD students during my PhD and postdoc
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Reviewer

Applied Surface Science, Surface Science, Next Materials, Surface and Coating Technology, Material Today Proceedings, Radiation Physics and Chemistry, Material Today Communication, Journal of Micro and Bio-robotics, Environment Pollution etc.

Editorial Board Member

Scientific Reports and Scientific Review (**Springer Nature**)

Awards and Achievements

- Selected for DST international travel grant (2019).
 - Received international travel grant from HBNI in 2019 for attending conference.
 - Qualified CSIR-UGC NET for Assistant Professor in 2014 (June) and 2015 (June).
 - Qualified JEST for PhD admission (2014).
 - Qualified JAM organized by IIT Bombay for M.Sc admission in IIT (2012).
 - Received DST INSPIRE Scholarship by DST, Govt. of India during B.Sc to M.Sc (2009-2014).
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Professional Membership

Life Member of Ion Beam Society of India

Life Member of Physics Academy of the North East (PANE)
