Sovanlal Mondal

Researcher

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Research areas:

Organic Electronic Devices , Bio sensors and healthcare devices, Scanning Probe Microscopy, Physics at Bio-interfaces

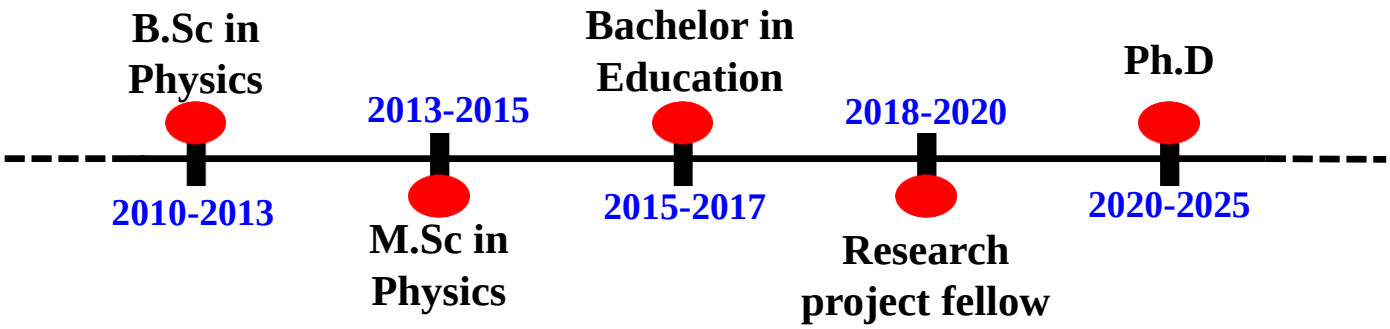
Research Experiences:

My research experiences lies in carbon-based nano-electronics and bioelectronics, focusing on charge transfer mechanisms between bacteria and electrodes for bio-current generation. I have worked extensively device fabrication, OFET-based biomedical sensors, thin film growth, and material characterization. My thesis work explores SWCNT functionalization, surface potential modulation, interfacial charge transport, and bacterial membrane interactions under electric fields, establishing pathways for nanoscale bio-current generation and understanding solvent-specific effects on bacterial membrane integrity and electrochemical behavior.

Instrumentation and Experimental training:

- ❑ Thin film deposition (Organic and Inorganic) by thermal evaporation, thin film coating, Plasma etching in solid and flexible substrates
- ❑ Electrical characterization of 2-terminal and 3-terminal device using Keithley 2450 and 4200
- ❑ Special surface characterization using AFM – Tapping and contact mode, KPFM, C-AFM, EFM, PFM, and MFM
- ❑ Spectroscopic characterization UV-VIS, PL, XPS and, RAMAN analysis
- ❑ Clean room (10,000 Class) with Photolithography

Academic background:



Teaching Experience:

Guest Lecturer(2017-2018) -

Burdwan Raj Collage, Aftab House, Frazer Avenue, Burdwan, 713104, West Bengal, India

National level qualification:

- **GATE 2018**
- **GATE 2019**
- **CSIR NET (JRF) 2018**

Publications (Year Wise):

1. **Mondal, S**.; Mandal, S.; Mandal, A.; Mallik, S.; Verma, S. P.; Sadhukhan, R.; Pramanik, S.; Goswami, D. K. Unraveling Packing-Dependent Surface Potential Contrast in a Single-Walled Carbon Nanotube Bundle Network. **Nanoscale 2025**. https://doi.org/10.1039/D5NR01512J.
2. **Mondal, S**.; Pradhan, A.; Mandal, S.; Verma, S. P.; Pramanik, S.; Mandal, A.; Banerjee, M.; Goswami, D. K. Electric Field-Driven Bacterial Membrane Disintegration with Real-Time Electrical Response in SWCNT Bioelectronic Platforms. **ACS Appl. Bio Mater. 2025**, 8 (10), 8794–8804. https://doi.org/10.1021/acsabm.5c00912.
3. Pramanik, S.; **Mondal, S**.; Sadhukhan, R.; Verma, S. P.; Mandal, A.; Sengupta, C.; Goswami, D. K. High-Performance Biocompatible Moisture-Enabled Nanogenerators Using a Gelatin-SnS 2 Composite for Sustainable Energy Harvesting. **ACS Appl. Mater. Interfaces 2025**, 17 (29), 41883–41892. https://doi.org/10.1021/acsami.5c04325.
4. Verma, S. P.; Dutta, M.; Ghosh, P.; Mallik, S.; Sadhukhan, R.; **Mondal, S**.; Das, S.; Chakraborty, P.; Goswami, D. K. Dielectric Transition-Instigated Extraordinary Capacitance Change with Successive Switching in Loss Tangent at the Spin Transition Temperatures of a Spin-Crossover Nanomaterial. **ACS Appl. Electron. Mater. 2024**. https://doi.org/10.1021/acsaelm.4c00842.

5. Sadhukhan, R.; Verma, S. P.; **Mondal, S**.; Das, A.; Banerjee, R.; Mandal, A.; Banerjee, M.; Goswami, D. K. Humidity-Induced Protein-Based Artificial Synaptic Devices for Neuroprosthetic Applications. **Small 2024**, 20 (24). https://doi.org/10.1002/smll.202307439.
6. Pramanik, S.; Sengupta, C.; Sharma, S.; **Mondal, S**.; Goswami, D. K.; Mondal, T. Advancement of 2D Material-Based Moisture-Enabled Nanogenerators. **ACS Appl. Electron. Mater. 2024**, 6 (12), 8689–8702. https://doi.org/10.1021/acsaelm.3c01860.
7. Mallik, S.; Chand Pal, S.; **Mondal, S**.; Kumar Guha, P.; Das, M. C.; Goswami, D. K. Stress-Driven Recrystallization of Pentacene Films via Diffusion-Induced Ingress of MOF Nanocrystals into the Grain Boundaries. **Appl. Surf. Sci. 2024**, 654, 159420. https://doi.org/10.1016/j.apsusc.2024.159420.
8. Pramanik, S.; Mandal, R.; Kuiri, B.; Sarkar, S. K.; **Mondal, S**.; Patra, A. S.; Nath, R.; Kuiri, P. K. Role of Plasmonic Layer with SnO2 Thin Film to Improve UV Photoluminescence and Photoresponse. **Surfaces and Interfaces 2024**, 51, 104617. https://doi.org/10.1016/j.surfin.2024.104617.
9. Sadhukhan, R.; Pradhan, A.; Rani, P.; **Mondal, S**.; Verma, S. P.; Das, A.; Banerjee, R.; Bansal, A.; Banerjee, M.; Goswami, D. K. Bioinspired Flexible and Low-Voltage Organic Synaptic Transistors for UV Light-Driven Vision Systems. **ACS Appl. Bio Mater. 2024**, 7 (10), 6405–6413. https://doi.org/10.1021/acsabm.4c00509.
10. Mandal, A.; Mandal, S.; Mallik, S.; **Mondal, S**.; Bag, S. S.; Goswami, D. K. Precise and Rapid Point-of-Care Quantification of Albumin Levels in Unspiked Blood Using Organic Field-Effect Transistors. **Nanoscale Adv. 2024**, 6 (2), 630–637. https://doi.org/10.1039/D3NA00564J.
11. Pramanik, S.; Kuiri, B.; Karmakar, R.; Mukherjee, S.; Das, S.; **Mondal, S**.; Meikap, A. K.; Patra, A. S.; Kuiri, P. K. Tuning the Bandgap of 2D Metallic Zn Nanostructures. J. **Appl. Phys. 2023**, 134 (16). https://doi.org/10.1063/5.0147754.
12. Mandal, A.; Mallik, S.; **Mondal, S**.; Subhadarshini, S.; Sadhukhan, R.; Ghoshal, T.; Mitra, S.; Manna, M.; Mandal, S.; Goswami, D. K. Diffusion-Induced Ingress of Angiotensin-Converting Enzyme 2 into the Charge Conducting Path of a Pentacene Channel for Efficient Detection of SARS-CoV-2 in Saliva Samples. **ACS Sensors 2022**, 7 (10), 3006–3013. https://doi.org/10.1021/acssensors.2c01287.
13. Pramanik, S.; **Mondal, S**.; Mandal, A. C.; Mukherjee, S.; Das, S.; Ghosh, T.; Nath, R.; Ghosh, M.; Kuiri, P. K. Role of Oxygen Vacancies on the Green Photoluminescence of Microwave-Assisted Grown ZnO Nanorods. **J. Alloys Compd. 2020**, 849, 156684. https://doi.org/10.1016/j.jallcom.2020.156684

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