

Samapika Mallik

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Academic Credentials:

- **2025- continue:** Assistant Professor, Dept. of Physics, Indian Institute of Technology (Indian school of mines) Dhanbad.
- **2024- 2025: Post-doctoral research.** Research Center for Neuromorphic AI Hardware, Kyushu Institute of Technology, Kitakyushu, Japan.
- **2022- 2024: Post-doctoral research.** Research Center for Materials Nanoarchitectonics, National Institute for Material Science, Tsukuba , Japan.
- **2016-2021: Ph.D.** Department of Physics, Indian Institute of Technology Patna, Bihta, Bihar, India.
Thesis **entitled “INVESTIGATIONS ON THE SUPRAMOLECULAR ASSEMBLY OF ORGANIC MATERIALS AT INTERFACES”**
- **2015-2016: M.Phil.** in Physics, Utkal University, VaniVihar, Bhubaneswar. M. Phil.
- **2012-2014: Masters in Science (Physics major), Ravenshaw University, Cuttack**
- **2009-2012: Bachelor in Science (Physics, Honours), M.P.C autonomous college, Baripada.**

Current Research Interests:

Broad area: Neuromorphic devices, In-materio reservoir computing, Atomic switch, Memristors, Thin films, Scanning probe microscopy, Resistive switching.

Awards and Memberships:

- Qualified **CSIR/UGC National Eligibility Test (NET-2016).**
- Qualified **Graduate Aptitude Test in Engineering (GATE-2016).**
- **Best oral presentation, National Science Day, IIT Patna, India (2020)**

- **JSPS Postdoctoral Fellowship, Japan (2025)**
Awarded by the Japan Society for the Promotion of Science (JSPS) for postdoctoral research.
- **Women Researcher Award, IACWR 2026**

Publications:

1. **Hardware-Oriented Visual Information Edge Detection, Based on Proton Migration-Driven Lateral Inhibition**, Samapika Mallik, Kazuya Terabe, Tohru Tsuruoka, *Advanced Functional Materials*, 2025, e23757.
2. **Bias Sweep-Induced Analog Memristor Behavior, Using a Cuprous Iodide Thin Film, for Neuromorphic Computing**, Rajesh Deb, Samapika Mallik, Yaminee kanta Mishra, Roshan Padhan, Satyaprakash Sahoo, Kazuya Terabe, Tohru Tsuruoka and Saumya R. Mohapatra, *ACS Appl. Electron. Mater.*, 2025.
3. **Sub-Millisecond and Energy-Efficient Electrochemical Synaptic Transistors with a Partially Reduced Graphene Oxide Channel**, Samapika Mallik, Kazuya Terabe, and Tohru Tsuruoka, *ACS Appl. Mater. Interfaces*, 17, 17, 25674–25683, 2025.
4. **Effects of Plasma Reactants on Atomic Layer Deposition of Lithium Phosphate and Lithium Phosphorus Oxynitride Electrolyte Films**, Tohru Tsuruoka, Samapika Mallik, Takuji Tsujita, Yuu Inatomi and Kazuya Terabe, *Chem. Mater.*, 36, 12, 6193–6204, 2024.
5. **Effects of Mg Doping to a LiCoO₂ Channel on the Synaptic Plasticity of Li Ion-Gated Transistors**, Samapika Mallik, Tohru Tsuruoka, Takashi Tsuchiya, and Kazuya Terabe, *ACS Appl. Mater. Interfaces*, 15, 47184, 2023.
6. **Quantized Conductance Behaviour Observed in an Atomic Switch using Triptycene-based Polymer**, Samapika Mallik, Anwesha Mahapatra, Itishree Pradhan, Mosim Ansari, Neeladri Das, Puneet Mishra, Tohru Tsuruoka, Kazuya Terabe, Alpana Nayak, *J. Mater. Chem. C*, 10, 13225, 2022.
7. **Unambiguous determination of electrostatically driven molecular packing in a triphenylene – surfactant complex monolayer**, Samapika Mallik, Shakkira Erimban, K.

Swamynathan, Sandeep Kumar, Snehasis Daschakraborty, Alpana Nayak, **Adv. Mater. Interfaces** **8**, 2100187, 2021.

8. **DNA-mediated molecular assembly of a triphenylene–surfactant complex monolayer**, Samapika Mallik, K. Swamynathan, Sandeep Kumar, Alpana Nayak, **Journal of Colloid and Surface A**, **630**, 127569, 2021.
9. **Photoresponsive Polymers with Dangling Triptycene units as Efficient Receptor for Fullerene-C₆₀**, Mosim Ansari, Samapika Mallik, Achintya Jana, Alpana Nayak, Neeladri Das, **Journal of Polymer Science**, 2021.
10. **Redox Modifications of Carbon Dots Shape Their Optoelectronics**, Ranjan Kumar Behera, Abhishek Sau, Leepsa Mishra, Kallol Bera, Samapika Mallik, Alpana Nayak, Samita Basu, Manas Kumar Sarangi, **J. Phys. Chem. C**, **123**, 27937, 2019.
11. **Supramolecular Self-Assembly of Ionic Discotic Liquid Crystalline Dimer with DNA at Interfaces**, Samapika Mallik, Alpana Nayak, Snehasis Daschakraborty, Sandeep Kumar, Kattera A. Suresh, **Chemistry Select** **3**, 7318, 2018.
12. **Triptycene-based fluorescent polymers with pendant alkyl chains: interaction with fullerenes and morphology of thin films**, Mosim Ansari, Samapika Mallik, Snehasish Mondal, Ranajit Bera, Achintya Jana, Alpana Nayak, Neeladri Das, **Polym Int** **68**, 481, 2018.

Conferences/workshop

1. Oral presentation at the **72nd JSAP spring meeting 2025 held in March 14-17, Tokyo, Japan**. Title- “Transition from Short-Term to Long-Term Memory in an Ag-Ag₂S Atomic Switch Network”.
2. Poster presentation at the **6th International Symposium on Neuromorphic AI Hardware, 3-4 March 2025, Kitakyushu, Japan**. Title: “In-Materio Reservoir Computing Based on Tantalum Oxide (Ta₂O₅) Films”.
3. Poster presentation at the **22nd BNC Symposium, 1st March 2025, Toyo University, Kawagoe, Japan**. Title: “Demonstration of Hippocampus model using Ag-Ag₂S nano particles network.”.
4. Invited presentation at **Asia-Pacific Conference on Condensed Matter Physics 2024, Patna, India, 8th-11th December, 2024**. Title: “Atomic Switch Networks of Ag-Ag₂S Core-Shell Nanoparticles for Neuromorphic Computing”.

5. Poster presentation at the **15th ISAJ Symposium on Transformative Technologies for a Sustainable Future**, 29th **October 2024**, Embassy of India, Tokyo, Japan. Title: “Quantized Conductance Atomic Switch Network based on Ag-Ag₂S Core-Shell Nanoparticles”
6. Invited talk at the **12th International Symposium on Applied Engineering and Sciences (SAES2024)**, Kitakyushu, Japan, **November 14th-15th 2024**. Title-“Controlling the Synaptic Plasticity in an Atomic Switch Network Using Ag-Ag₂S Core-Shell Nanoparticles”.
7. Poster presentation at the **5th International Symposium on Neuromorphic AI Hardware**, **1-2 March 2024**, Kitakyushu, Japan. Title: “Ion-Gated Neuromorphic Devices for AI Hardware Systems”
8. Oral presentation at the **36th International Microprocesses and Nanotechnology (MNC) Conference held in NOV. 14-17, 2023**, Sapporo, Japan. Title-“ Lateral inhibition for edge enhancement in signal processing, emulated by a proton-based multi-channel device”.
9. Poster presentation at the **MANA International Symposium on Nanoarchitectonics and Quantum Materials held in NOV. 9-10, 2023**, NIMS, Japan. Title-“ Effects of Mg doping to a LiCoO₂ Channel on the synaptic plasticity of Li ion-gated transistors”.
10. Poster presentation at the **International conference on Solid State Devices and Materials (SSDM) held in Sept. 5-8, 2023**, Nagoya, Japan. Title-“ Improved Synaptic Plasticity of Li Ion-Gated Transistors with Mg Doped LiCoO₂ Channel for Neuromorphic Computing”.
11. Poster presentation at **International Conference on “Memristive Materials, Devices & Systems (MEMRISYS)”** held in NOV. 1-4, 2021, Virtual mode. Title-“ Quantized Conductance Atomic Switch Device using Triptycene-based Azo Polymer”.
12. Oral presentation at National conference on **“Advance materials and nuclear science” (AMNS)** held in Feb. 27-29, 2020, Gaya, Bihar. Title-“Ionic self-assembled discotic liquid crystal complex at interfaces”.
13. Oral presentation at the **International conference on Advanced Materials (ICAM 2019)** held in Jun12-14, 2019, Kerala, India. Title- “Self-Assembly of Ionic Discotic Liquid Crystals at Air-water and Air-solid Interfaces”.
14. Poster presentation at **“3rd International conference on condense matter and applied physics” (ICC 2019)** held in Oct. 14-15, 2019, Bikaner, Rajasthan. Title-“Effect of chain length on self-assembly of triptycene based polymer films”.

15. Poster presentation at the **24th National conference on Liquid Crystal (NCLC 2017) held in Oct. 11-13, 2017**, IISER Mohali, India. Title-“Complex formation of DNA with discotic liquid-crystalline dimer at air-water and air-solid interfaces”.