

ABOUT THE 2ND ATMSE WORKSHOP

The 2nd edition of the International Workshop on "Advances of the Material Science and Engineering" (ATMSE), 2026 is a premier academic event scheduled to be held on the 09th and 10th of March, 2026. The workshop is jointly organized by the Department of Physics and the Department of Mechanical Engineering at the National Institute of Technology Durgapur.

This high-impact programme is fully sponsored by the Scheme for Promotion of Academic and Research Collaboration (SPARC), Ministry of Education, Govt. of India, under the ongoing SPARC Project (P4015) titled "Hybrid Nano-Pillar Dielectric Stacks for III-V & III-N MOS Platforms".

Vision and Objectives

The primary aim of this workshop is to promote environmentally safe and economically sustainable material technology. It is designed to create a robust theoretical base for the utilization and implementation of material science sources for next-generation technological applications.

In alignment with the inclusive vision of the SPARC initiative, the 2nd ATMSE Workshop is an entirely free-to-attend programme. It specifically aims to empower students and researchers from Tier-II and Tier-III cities, ensuring that the benefits of top-tier academic exposure are democratized across the region.

Key Highlights and Programme Structure

- **International Collaboration:** A major highlight of ATMSE 2026 is the active participation of the foreign delegate, Prof. Aleksei Tameev from the National Research University Higher School of Economics (HSE), Moscow, Russia. Prof. Tameev serves as the International Co-PI of the SPARC project and will grace the event as the Chief Guest and a Key Speaker.
- **Eminent Speakers:** The workshop boasts a truly multidisciplinary platform, featuring invited talks from renowned professors representing premier Indian institutes, including IIT Delhi, IIT Patna, IIT (ISM) Dhanbad, the University of Calcutta, and The University of Burdwan.
- **Participant Presentations:** A core component of the workshop is fostering young talent. Up to 30 selected candidates (from PG to Post-Doc levels) will deliver short oral presentations, strictly capped at 10 minutes each, including interaction.
- **Awards and Recognition:** To encourage academic excellence, the top 3 student presenters will be awarded special prizes and certificates of merit.
- **Extensive Schedule:** The two-day itinerary includes an inaugural programme, eight comprehensive invited talks, intensive oral presentation sessions, a cultural programme, and an exclusive laboratory visit to the Optical Sensor and Opto-mechatronics Laboratories.

The ATMSE 2026 workshop stands as a vital conduit for knowledge transfer, bringing together global expertise and the brightest minds of the nation to catalyse impactful research in material science.

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ABSTRACT BOOK FOR 2ND INTERNATIONAL WORKSHOP ON ADVANCES OF THE MATERIAL SCIENCE AND ENGINEERING (ATMSE), 2026

FOR PG, PHD, AND POST-DOC STUDENTS OF ANY DISCIPLINE

09th – 10th March, 2026 (2 days)

NAB-401 & Seminar Room 1 (Administrative building), NIT Durgapur

Sponsored by
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Organised by
Dept. of Physics and Dept. Mechanical Engineering,
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P14: Physicochemical Characterization and Quantification of Microplastics in Water and Sediment Samples from Sagar Island, Indian Sundarbans

Nairit Panday¹, Arunodaya Gautam^{2*}

^{1,2}*Ecotoxicology, Estuarine and Coastal Studies Foundation, Flat:303,112, Deshapran Shasmal Road, Kadam Tala, Howrah, West Bengal 711101, India*

**Corresponding Author E-mail: arunodaya.ecotax@gmail.com*

Abstract

Marine pollution involves the introduction of anthropogenic contaminants into oceanic environments, resulting in loss of marine biodiversity. Among these pollutants, microplastics have emerged as pervasive and persistent threats to coastal systems. The Indian Sundarbans, a UNESCO World Heritage mangrove biosphere, is particularly susceptible to microplastic contamination due to intense anthropogenic pressure and dynamic tidal regimes. This study provides the first comprehensive assessment of microplastics in surface waters and intertidal sediments of Sagar Island, located at the southernmost boundary of the Sundarbans. Samples collected from experimental stations with varying human influence were processed through digestion, density separation, and filtration. Microplastics were classified by morphology (fibres, fragments, films) and size (<0.3–5 mm), and examined using bright-field microscopy and Field Emission Scanning Electron Microscopy (FESEM). Polymer composition was determined through Fourier Transform Infrared (FTIR) and Raman spectroscopy. Microplastics were detected across all sampling sites, with higher abundance in sediments compared to surface waters. Fibres dominated, followed by fragments, indicating unregulated fishing activities as a primary source. Polystyrene ($30.8 \pm 2.95\%$) and polyethylene ($18.75 \pm 1.9\%$) were the most prevalent polymers, reflecting strong anthropogenic influence, particularly from tourism. SEM-EDX analyses revealed weathering features and chemical adsorption of metals on particle surfaces. High ecological risk indices (28313 at site 2 and 27865 at site 3) underscore significant environmental stress and pollutant retention driven by tidal deposition. This baseline study identifies Sagar Island as a microplastic contamination hotspot and provides critical insight for future monitoring and coastal management initiatives in the Sundarbans.

Keywords: Marine pollution, Microplastics, Coastal ecosystems.