

National Institute of Science Education & Research Bhubaneswar

Annual Report

and

Audited Statement of Accounts



भारत 2023 INDIA



2022-2023

Outreach Activities

NISER Outreach Brief Report 2022-23

The Outreach Program at NISER aims to communicate the importance and ideologies of science with the community. These programs are instrumental in promoting scientific literacy, inspiring future scientists, and bridging the gap between the scientific community and the public. These programs serve as a vital bridge, ensuring that the benefits of scientific knowledge are accessible to all, ultimately contributing to a more informed, innovative, and interconnected society.

Faculty members representing various schools at NISER have played an instrumental role in the NISER Outreach program. These dedicated individuals include:

- Dr. Debasmita P. Alone, Associate Professor, SBS
- Dr. U. Lourderaj, Associate Professor, SCS
- Dr. Pankaj V. Alone, Associate Professor, SBS
- Dr. Subhankar Mishra, Reader-F, SCPS
- Dr. Anupam Pal Choudhury, Assistant Professor, SMS
- Dr. Jayesh Goyal, Assistant Professor, SEPS; and
- Dr. Satyaprasad P. Senanayak, Assistant Professor, SPS

As a part of NISER's Outreach program, we conduct various science outreach activities throughout the year which are mentioned below:

Science Outreach Activities	No. of Events
Educational Visits to NISER	20
Outreach Talk Series	4
Popular Talks	5
Student Internship	1
Other events	5
Total Number of Outreach Events in the year 2022-23	35

Educational Visits 2022-23

Total Educational Visits for the year 2022-23: 20

About the Event: Educational Visits to a research laboratory are considered to be fundamentally enriching educational experiences. There are year-round visits of students and faculty from various institutions nationwide who get first-hand experience of a state-of-the-art Scientific Institution. The students are inspired through interactions with the NISER faculty, Scientific Officers, and its students. During their visits on any Friday (with a prior appointment), the school/college students are exposed to a few experiments and get to observe people's work-life balance at NISER. This helps in a better understanding of what is expected of oneself if the students undertake science as a career and enhance the scientific, social, and emotional development of all the participants. The students are left with a sense of imagination and a newfound interest in science.



Upon their arrival at the NISER campus, students undergo an initial orientation session by Dr. Debasmita P. Alone. During this session, they are familiarized with NISER's offerings, including its diverse range of courses, state-of-the-art facilities, and exciting array of extracurricular activities. Subsequently, they are guided to specific



In the year 2022-23, the Outreach cell has conducted a total of 20 such educational visits. These visits were from various schools and colleges in Odisha, where approximately 1200 students and 250 teachers participated. These educational institutes include GHVM School, Jupiter College, JNV Khurda School, School of Forensic Science, Centurion University, Jatni, Rajdhani College, Carmel School, KV Khurda Road, Sailabala Women's Autonomous College, Carmel School, GIET University, DPS Paradip Refinery, JNV Mundali, Cuttack, Mahamayee Mahila Mahavidyalaya, BJB High School, Odisha Adarsh Vidyalaya Sangathan, Saraswati Sishu Vidya Mandir, Cuttack, Odisha Adarsh Vidyalaya Sangathan, DPS Dhenkanal, Freedom International School, Cuttack, Rajdhani College, Pranath College (Autonomous), Khordha, NIIS Group of Institutions, BBSR, KV No. 3, BBSR.

Outreach Talk Series 2022-23

Total Outreach Talks for the year 2022-23: 4

About the Events: To celebrate the 75th year of Independence, a monthly NISER Outreach Talk Series was initiated at NISER for school students from Class IX to XII and First-year College students. The talks are based on relatable concepts and are structured to be interactive, emphasizing question-answer sessions. These talks are usually given by NISER faculty members from various schools and are online and offline or both.

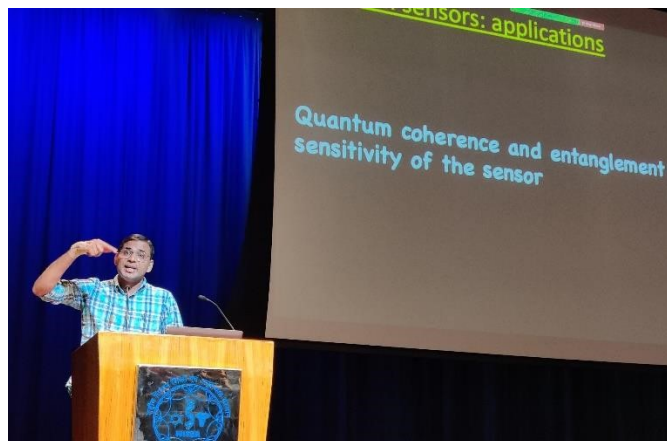
There were four talks conducted in the year 2023-24 in which approximately 600 students had participated.

Browning Reactions

Enzyme-catalyzed browning - browning of apples/vegetables

The diagram illustrates the chemical pathway of enzyme-catalyzed browning. It starts with Phenol (a benzene ring with one hydroxyl group). Polyphenol oxidase, using O₂, converts Phenol to Diphenol (a benzene ring with two hydroxyl groups). Further action of Polyphenol oxidase with O₂ converts Diphenol to Quinone (a six-membered ring with two carbonyl groups). Quinone then leads to the formation of Brown pigments (Melanin). An image of a sliced apple is shown to the left of the reaction scheme.

"Culinary Reactions" by Dr. U. Lourderaj, SCS



"Quantum Sensors" by Dr. Ashok Mohapatra, SPS

The 'spike' (S protein)

The image shows several 3D molecular models of the S protein spike. On the left is a spherical model of the entire spike. Next to it is a detailed view of the S1 and S2 subunits, with the S1-S2 cut site indicated. Labels include RBD (Receptor Binding Domain), S1, S2, and viral membrane. On the right, there are two more detailed views of the spike interacting with ACE2 and DPP4 receptors. Labels include ACE2, DPP4, S1-CTD, S1-NTD, S1/S2, and CEACAM1 (MHV) Sugars (BCoV3 & PEDV). A reference is cited: Nature volume 588, pages498-502 (2020).