

ANNUAL REPORT

and Audited Statement
of Accounts

2024-25



National Institute of Science
Education and Research
Bhubaneswar



ANNUAL REPORT & Audited Statement of Accounts 2024-2025



National Institute of Science Education and Research Bhubaneswar

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Board of Governors



Board of Governors



Chairman

Dr. Ajit Kumar Mohanty,
Secretary, Department of Atomic Energy and Chairman, Atomic Energy Commission

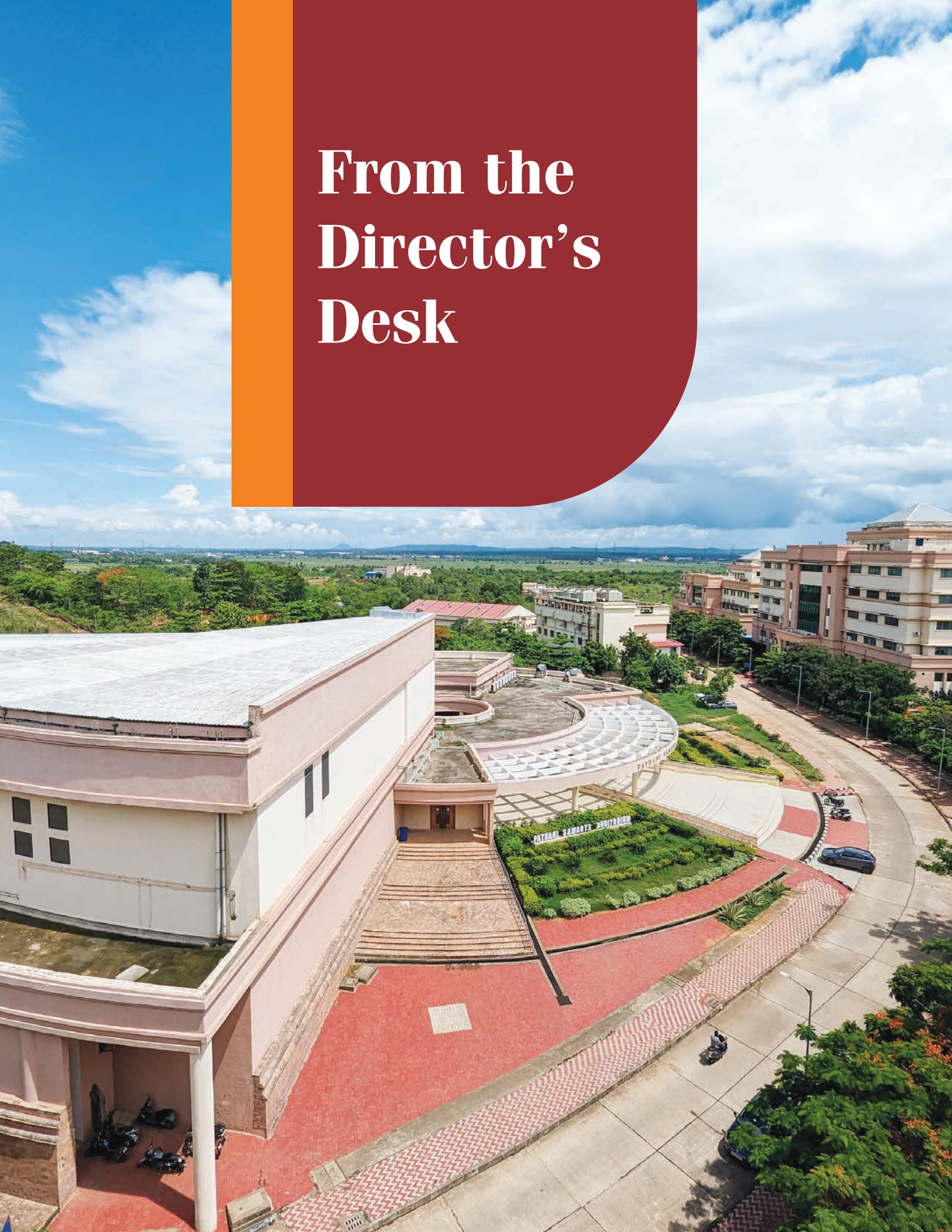
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Dr. Pranaya Kumar Swain, Act. Registrar, NISER Bhubaneswar

From the Director's Desk



From the Director's Desk



This edition of the Annual Report reflects a year of exceptional academic rigour and institutional growth at NISER. The year has been marked by outstanding academic progress, pioneering research contributions, and meaningful outreach activities that continue to strengthen NISER's position as a premier centre for science education and research. NISER remains committed to its mission of nurturing scientific curiosity, fostering creativity, and enabling world-class research and education across the disciplines.

The inaugural DAE Conclave 2024, hosted at NISER Bhubaneswar as part of the DAE Platinum Jubilee celebrations, was a landmark achievement for the institute. The event brought together over 500 scientists, engineers, and experts from across the country, with focused discussions on energy security, healthcare, food security, waste management and cutting edge technologies. Featuring more than 300 poster presentations, 50 exhibitors, and active participation from leading DAE institutions such as BARC, TIFR, IGCAR, TMC, IMSc, HRI, SINP, RRCAT, IPR, VECC, AMD, NFC, CEBS, ICTS, NCBS, DCSEM, NCPW, HWB, NPCIL, and IREL the Conclave showcased DAE's scientific achievements and plan for the future. It provided a vital platform for collaboration, industry-research partnerships, and knowledge sharing,

reinforcing India's vision of sustainability and self-reliance while positioning NISER as a key hub for scientific dialogue.

Another momentous occasion was the 13th Graduation Ceremony held on 9 July 2024, which witnessed the Hon'ble President of India, Smt. Droupadi Murmu delivering the graduation address.. In this graduating batch, 157 Integrated M.Sc. students, 13 Integrated MSc-Ph.D. students, 68 Ph.D. students, and 10 Medical and Radiological Physics students received their respective degrees. Alongside, NISER hosted several prestigious scientific events, including the 90th Annual Meeting of the Indian Academy of Sciences, the Indo-German Kick-Off Workshop on Topological Magnetism, the Ultrafast Sciences (UFS) 2024, the EMBO Workshop on Neuropeptides and Behavioural Flexibility, the 47th All India Cell Biology Conference, and the International Conference on Hybrid Halide Perovskite 2024 (HyPe-24), to name of as few. These gatherings fostered collaborations and reinforced NISER's positioning as a vibrant hub of scientific exchange and innovation.

This year also witnessed significant progress in research and development. New age facilities such as *Semi-Anechoic Chamber* for acoustic research, *Argon Ion*

Miller and Metallization system for nanoscale device fabrication, and *Step Profiler* for thin-film analysis were established. Our researchers developed five production-grade CMS silicon tracker modules for CERN, while impactful projects such as the Rainbow Diet in Keonjhar advanced societal well-being. Interdisciplinary research in *radiation chemistry, advanced materials, spectroscopy, and crustal evolution* continues to strengthen our global footprint, complemented by new partnerships like the Max Planck India Partner Group in Chemical Sciences.

Our faculty have brought laurels through prestigious recognitions. Prof. Bedangadas Mohanty received the *Samanta Chandra Sekhar Award 2023* and the *Odisha Citizens Award 2024 in Education*; Dr. Amarendra Das was honoured with the *Times Icons of Odisha Award 2024*; Dr. V. Badireenath Konkimalla earned the *ACS/Labs Best Research Award 2024*; and Dr. Priyadarshi Chowdhury received the *Mineralogical Society of America Award*. Other recognitions include Mr. A. Anandaraman's Elite Certification in High Performance Scientific Computing, Dr. Najmul Haque's renewed Alexander von Humboldt Fellowship, Dr. Anamitra Mukherjee's SERB-MATRICS Fellowship, Dr. Satyaprasad P. Senanayak's selection as an Emerging Investigator by the Royal Society of Chemistry (UK), and Prof. Palok Aich's patent for predicting microbes using host metabolites.

Equally noteworthy was the recognition of faculty as Fellows and Associates of prestigious academies, including the Indian National Science Academy, the Indian Academy of Sciences, the Royal Astronomical Society (FRAS), and international bodies such as the *ICTP, Trieste* and the *Inter-University Centre for Astronomy and Astrophysics*. These honours underscore the global recognition of NISER's scientific leadership.

We also celebrate the achievements of our students and doctoral researchers, who continue to excel nationally and internationally. Dr. Tusar Kanta Acharya, Dr. Shyam Kumar Banjare, Dr. Samapan Bhadury, and Dr. Ashish Pandav received the *HBNI Outstanding Doctoral Student*

Award. In addition, Dr. Ashish Pandav was conferred the *RHIC & AGS Thesis Award 2024*, an international honour for outstanding doctoral work, as well as the *Rahul Basu Memorial Award* for the most exceptional Ph.D. thesis in high-energy physics in India. These recognitions highlight the academic strength and global competitiveness of our doctoral training.

Our alumni and students continue to make us proud, advancing to leading positions in academia and research worldwide, while our outreach activities remain central to our mission. Scores of outreach activities involving thousands of students and teachers, exemplifies our commitment to nurturing curiosity among young learners, aptly complemented by teacher workshops and community initiatives.

This year also marked important developments in campus infrastructure. Construction is underway for the new School of Computer Sciences building, designed as an extension of the School of Mathematical Sciences with modern classrooms, seminar halls, and laboratories. A Class 1000 cleanroom facility was established at the Centre for Medical and Radiation Physics to support precision-driven research in medical and radiation sciences. In addition, progress was made on the National Centre for Animal Research and Experimentation (NCARE), with critical HVAC and chiller installations underway to support pre-clinical research capabilities. These infrastructural enhancements are vital investments in NISER's long-term growth and research excellence.

As we look ahead, NISER remains dedicated to advancing science education, enhancing interdisciplinary research, fostering international collaborations, and strengthening its role as a centre of excellence in science education. With the dedication of our faculty, staff, students, and alumni, and the continued support of the Department of Atomic Energy, and Homi Bhabha National Institute, NISER will continue to contribute meaningfully to the nation's scientific progress and to the global knowledge community.

Professor Hirendra Nath Ghosh
Director, NISER

About the Institute



About the Institute

History

National Institute of Science Education and Research (NISER), Bhubaneswar, is a unique institution in India, committed to generation, dissemination and preservation of knowledge in basic sciences, integrated with the goal to create a zeal and fervor in minds of the young buds of the nation towards scientific temper. The Institute is affiliated with Homi Bhabha National Institute (HBNI), Mumbai, a deemed research university that oversees academic programs at Institutions that are part of the Department of Atomic Energy (DAE) structure.

The activities at NISER can be broadly classified into three categories:



Science Education:

1. NISER serves as a centre of excellence for undergraduate and postgraduate education in basic sciences by providing a flexible curriculum and a student to teacher ratio of 8:1. NISER currently offers following programmes in science education for bright and meritorious students selected on all-India basis:

- An integrated 5-year M.Sc. programme in the core and emerging branches of Basic Sciences to students after their 10+2 Higher Secondary schooling. This in turn will be integrated with Ph.D. programme on the one hand and employment in various R & D organizations and industry in the country on the other.
- Integrated M.Sc.+ Ph.D programme
- Ph.D. programme

The principal goal of NISER is to provide excellent environment for the students to foster creativity, imagination and innovation, paving way for a career in scientific research in academic institutes, national & international research & development labs, industries etc.

2. **Scientific Research:** NISER encourages both

theoretical and experimental research in frontier areas in all branches of science. NISER currently has seven separate schools specializing in different areas of science. They are as follows:

School of Biological Sciences

School of Chemical Sciences

School of Computer Sciences

School of Earth and Planetary Sciences

School of Humanities and Social Sciences

School of Mathematical Sciences

School of Physical Sciences

In addition there are also two centres i.e. Centre for Medical and Radiation Physics and Centre for Interdisciplinary Sciences.

Science Outreach & Policy: NISER actively participates in the dissemination of scientific knowledge to public and school students with the aim to foster scientific temper, motivation and inspiration for education and career in science. The faculty members of the institute are also members of various governmental committees that develop science policies for the country.

Vision

The academic programmes at NISER are designed to provide strong foundations to students, through core courses, before they embark at the threshold of research in the field of their choice. However, NISER's curriculum ensures that every student is introduced to excitements in the frontiers of knowledge in other branches of fundamental sciences. Therefore, NISER creates an environment of scientific culture where every member will excel in any field they desire to pursue.

NISER recognizes that modern scientific research is carried out in a domain without any boundaries. This entails encouraging a new scientific culture where members of our community attain to an intellectual agility unconstrained by the limitations of disciplinary conventions from the past. The students and research scholars at NISER flourish in the ambience of this scientific culture. In this perspective, the faculty members from different schools try to establish centres of research in inter-disciplinary areas while discharging their teaching duties of core courses of the respective schools.

NISER provides all the basic modern facilities for the overall development of its students, staff, faculty and research scholars. For e.g. a modern library with plethora of books, journals, vast reading areas and electronic means to access various sources, computer centre with high performance computing resources and wireless network all over the campus, modern laboratories to acquire skills to perform experiments, to innovate, to fabricate and to conceive new experimental techniques, gymnasium, meditation center, etc. The students learn through their course works, seminars, mutual discussions and by informal interactions with faculty members. The extensive national and international collaborations of its faculty members, gives research scholars and students at NISER, exposure to cutting edge research across the world. In summary, NISER represents an integrated system to acquire knowledge and explore the uncharted frontiers.

Academic Overview



Academic Overview

To deliver on the promise NISER initiated efforts in 4 major areas of science by establishing School of Biological Sciences (SBS), School of Chemical Sciences (SCS), School of Mathematical (SMS) and School of Physical Sciences (SPS). A School of Humanities and Social Sciences (SHSS) has also been established to understand the positionality of science in a socio-cultural context.

At NISER, students are admitted for a 5 year Integrated MSc (iMSc) program or for a Ph.D program. In the Integrated M.Sc. program, students learn all core subjects in basic sciences and specific courses in the humanities in the first year, following which they select their stream of choice in the basic sciences. Each school has its own program of core and elective courses and a student can finally graduate with one major and two minors in the areas of their choice. NISER has also added two more schools, one in Computer Sciences and other one being Earth and Planetary Sciences.



Curriculum

The academic curriculum, including the structure of courses, laboratory hours, emphasis to study interdisciplinary subjects etc. have been framed with a vision that NISER will provide strong foundations in subjects of specialization with a broad perspective in fundamental sciences.

In addition to the established programmes in Chemistry, Physics, Mathematics and Biology, NISER has initiated new programmes in Computer Science and Earth and Planetary Sciences. With the help of eminent scientists drawn from across the country, NISER has drawn a road map that will allow it progressively to initiate these new schools and their academic programmes.

NISER recognizes that modern scientific research is carried out in a domain transcending conventional academic boundaries. The undergraduate students and research scholars are being nurtured in the ambience of this scientific culture. Going forward, there would be many centres of research in interdisciplinary areas opening more and bigger windows for cutting edge scientific research. NISER is offering an integrated integrated MSc. PhD programme in all basic sciences viz. Physics, Chemistry, Mathematics and Biology.

School of Biological Sciences

The School of Biological Sciences (SBS) has been involved in mixing and imparting traditional wisdom with modern technology by developing a research program along with a vibrant teaching curriculum. SBS promotes scholarly and innovative thinking to conduct cutting edge research in diverse areas ranging from molecular to organismic biology. To facilitate the process, the school offers 5-year integrated MSc programme, Integrated Ph. D program and Ph. D programme and Post-Doctoral programme to motivate and train students. SBS aims to establish as a center of excellence with its efforts grown up rapidly and signs of its achievements are being noticed at national and international levels in terms of work and student placements.

The school embraces and upholds these fundamental values:

- Striving to achieve excellence in education and research in the field of biological sciences, offering comprehensive training at undergraduate, graduate, doctoral, and post-doctoral levels.
- Creating an effective interdisciplinary learning environment that encompasses diverse areas of modern biology and integrates with other scientific disciplines.
- Preparing its students to stay up-to-date with the latest advancements in scientific research.
- Engaging in high-quality research activities focused on specific areas of biosciences to make a significant impact at both national and international levels.
- Providing professional training to cultivate skilled human resources across the state and country through short-term training courses.
- Endeavoring to develop cutting-edge infrastructure comparable to the best in the world.

Facilities for Research and Teaching

- Confocal Microscope Facility
- DNA sequencing
- Cell culture facility
- Green house
- Fly Laboratory for handling *Drosophila*

- X-ray diffractometer for protein crystal structure study
- Small animal handling facility
- Radioactivity facility

Courses Offered:

Biology-I : Science of Life, Biology-II: Cellular and Genetic basis of life, Microbiology, Biochemistry, Biophysics and Biostatistics, Cell Biology, Genetics, Immunology, Ecology, Molecular Biology, Physiology I (Animal Physiology), Physiology – II (Plant Physiology), Neurobiology, Principles of Drug design, Molecular genetics, Infection and immunity, Advance Molecular Biology, Advanced Biochemistry, Infectious Disease Biology, Enzymology, Virology, Structural Biology, Endocrinology, Plant Development Biology, Quantitative Biology, Bio-Techniques, Molecular Biology Laboratory, Immunology Laboratory, Plant Physiology Lab, Microbiology Laboratory, Cell Biology Laboratory, Genetics Laboratory.

School of Chemical Sciences

The vision of the School of Chemical Sciences is to promote, inspire and nurture the fundamentals as well as applications of chemistry among the 5 year integrated M.Sc. and PhD. Students. The School aims to provide ample of opportunities to explore various aspects of chemistry through high-level teaching and cutting-edge research. In order to achieve this goal, the course structure has been set in a manner that it covers the several branches of chemistry from basics to advanced concepts. The School also offers the relevant practical courses along with the theory courses that give the 'hands-on' activities to develop the research aptitude and to help the students to understand the scientific concepts and phenomena in a better way. The project dissertation in the final years of the course gives research exposure to fourth and fifth year students that enable them to become world leaders in the frontier of the chemistry research. The School has produced many proud alumni who have established themselves and/or are pursuing academic career in premier institutes like BARC, TIFR, IISc, MIT, ETH, YALE and Stanford university to name a few. The School also offers a vibrant PhD programme for the students from all the parts of the country. The school has well equipped facilities that enable the PhD students to carry out research in the areas like Synthetic Chemistry,

Medicinal Chemistry, Organometallic Chemistry, Polymer Chemistry, Bioinorganic Chemistry, NMR spectroscopy, Ultrafast laser spectroscopy, Catalysis, Material Chemistry, Theoretical & Computational Chemistry

Facilities for Research and Teaching:

- 700 MHz and 400 MHz Solution and Solid-state NMR spectrometer
- Single crystal and powder X-ray diffractometer
- Femto-second fluorescence upconversion facility
- TCSPC and Fluorimeter
- EPR spectrometer
- CD Spectrometer
- TGA, DSC and BET facility
- High performance computation facility
- ESI-MS and GC-MS spectrometers
- CHNS analyser

Courses Offered:

Theory: Chemistry-I, Chemistry-II, Basic inorganic Chemistry, Reaction Mechanisms in Organic Chemistry, Mathematical Methods for Chemists, Reagents in Organic Syntheses, Main group and Organometallic Chemistry, Quantum Chemistry I, Physical Organic Chemistry, Molecular Spectroscopy and group Theory, Thermodynamics and Electrochemistry, Coordination Chemistry, Chemical Binding, Physical Methods in Chemistry I, Physical Methods in Chemistry II, Chemistry of Heterocyclic and Natural Products, Chemical Rate Processes Practical: Chemistry Laboratory-I, Chemistry Laboratory-II, Inorganic Chemistry Lab, Physical Chemistry Lab I, Bimolecular Chemistry Lab, Organic Chemistry Lab I, Inorganic Chemistry Lab I, Physical Chemistry Lab II, Organic Chemistry Lab II

School of Computer Sciences

The School of Computer Sciences has been established to provide high quality education and carry out frontline research in various areas related to computer sciences. The school envisages to become a centre of international repute for fundamentals of Computer Science. The School offers a PhD program in computer science with a focus on the following areas. Algorithm, Cryptography, Computational Geometry, Cyber Physical Systems, Information Theory, Machine Learning,

Multiparty Secure computation and Computational Complexity. Courses Offered: Programming and Data Structures Lab I, Programming and Data Structures Lab II. Theory of Computation, Discrete Structure and Computation, Introduction to Programming, Design and Analysis of Algorithms, Modern Cryptology, Algorithmic Coding Theory, Complexity Theory, Linear Programming and Combinatorial Optimization, Distributed Network Algorithms. Computational Geometry, Parameterized Algorithms, Approximation Algorithms, Algorithmic Game Theory, Machine Learning, Advanced Machine Learning, Introduction to Computational Number Theory, Advanced Computational Number Theory & Secure Multiparty Computations.

School of Earth and Planetary Sciences

School of Earth and Planetary Sciences, NISER is a unique research-driven academic center in India that has been established to emerge and excel in high quality and interdisciplinary scientific research works in, Earth Sciences, Atmospheric-Ocean and Planetary Sciences. SEPS has started PhD degree program offering research areas in emerging fields of Earth, Atmospheric and Planetary Sciences. The PhD students undergo one year of coursework which include introductory courses covering the three disciplines in the first semester, followed by specialized courses in the second semester.

The school offers the following broad areas of research leading to PhD degree:

- Computational geophysics and seismology, Earthquake and landslide mechanics and physics
- Planetary composition and surface process, asteroids and Meteorites in the early solar system
- Astrochemistry, Star and planetary formation
- Atmospheric physics, regional hydroclimatology, land-climate coupling
- Exoplanets and Planetary Atmospheres

Courses Offered:

SEPS envisions starting its Integrated MSc program in the coming few years. This year, our proposal for the SEPS UG program was submitted to the NISER Academic Council and is currently under review with HBNI. The proposal includes courses on -

Heat transfer and thermodynamics; Mathematical methods for EPS; Atomic, molecular and physical chemistry; Electromagnetism; Classical and Celestial Mechanics; Continuum Mechanics; Numerical Methods; High performance computing in transport and wave phenomenon; Inverse Methods; Mineralogy and Crystallography; Petrology; Sedimentology and Stratigraphy; Ore and Economic geology; Geophysics; Seismology; Fracture Mechanics; Hydrology; Geochemistry; Time series analysis; Remote Sensing; Astronomy; Cosmochemistry; Planetary Formation; Solar and Exo- solar systems; Astrochemistry and Astrobiology; Exoplanets; Small bodies and Asteroids; Solar Physics and Space Weather; Space Instrumentation and Technology; Radiative Transfer and Planetary Atmospheres; Atmospheric and Oceanic Dynamics; Ocean Biogeochemistry; Atmospheric chemistry and aerosol pollution; Numerical modelling of the Earth system;

Paleontology; Paleoclimate; Cloud Microphysics; Terrestrial Biosphere and climate; Weather Prediction; Boundary Layer Meteorology; Tropical Dynamics; Storm Surge Modelling;

Star and Planetary Formation; Regional Hydroclimatology; Climate research in the Himalayas; Planetary and small bodies in the early solar system.

The school offers the following broad areas of research leading to Ph.D. degree:

- Petrology and thermo-tectonic evolution of early Earth
- Computational geophysics and seismology, Earthquake and landslide mechanics and physics
- Planetary composition and surface process, Asteroids and Meteorites in the early solar system
- Astrochemistry, Star and planetary formation
- Atmospheric physics, regional hydroclimatology, land-climate coupling
- Exoplanets & Planetary Atmospheres

School of Humanities and Social Sciences

The School of Humanities and Social Sciences (SHSS) at NISER plays a vital role in fostering scientific temper through a holistic and interdisciplinary approach. The school aims to equip students with essential

skills such as communication, critical thinking, and teamwork, while also instilling values of integrity, vision, and community involvement. SHSS offers tailor-made courses in the 5-year Integrated Program emphasizing humanities and social sciences through core and elective courses in areas like Sociology, Psychology, English and Economics. The teaching and training imparted through these courses are envisaged to develop students' understanding of society, self, and contemporary issues, preparing them for responsible global citizenship. The School also offers a PhD program designed to cultivate high-quality core and interdisciplinary research areas such as: Energy Transition, Environmental Economics, Public Economics, Postcolonial Studies, South Asian Studies, Translation Studies, Speculative Fiction Studies, Ecocriticism and Cultural Ecology, Tourism System, Social aspects of ICT, African American Literature, Public Policy and Governance, Society-Science Interface, Environment and Human-Wildlife Interaction, Organizational behaviour, Ethics and ethical cynicism, Cognitive and Clinical Psychology, etc. The doctoral programme combines coursework and original research, culminating in a thesis and quality publication in high impact academic journals. The program, prepares graduates for careers in academia and industry, ensuring they contribute meaningfully to scholarly and professional communities.

Courses Offered:

UG: Technical communication, Introduction to Psychology, Introduction to Sociology, Introduction to Economics, History of Science, Sociology of Science and Technology, Science Communication and Citizen, Organizational Behaviour, Applied Behavioural Science, Perspectives on Indian Society, Life and Community in the Urban World.

PG: Advanced Economic Theory, Econometric Theory and Applications, Issues in Public Finance, Development Economics, Environmental and Ecological Economics, Poverty, Inequality and Development, Project Evaluation, Indian Industrial Development, New Institutional Economics, International Trade and Finance, Topics in Experimental and Behavioural Approaches to Economic Development, Environmental Economics and EIA, Humanities and The Institutional Space, The Modern European Novel, The Idea of The Nation in Indian English Fiction, Black Intellectual Traditions and The Narratives of Race in America, Writings of The South Asian Diaspora, Translation

and Culture: Issues and Perspectives, Organizational Behaviour, Leadership, Organizational Change and Development, Positive Psychology, Cross Cultural Psychology, Business Ethics, Classical Sociological Theory, Information and Society, Sociology of Development, Contemporary Social Theory, Qualitative Research Methods, Quantitative Research Method, Social Network Analysis

School of Mathematical Sciences

The School of Mathematical Sciences strives to become a citadel for mathematics and allied subjects in terms of teaching and research. The faculty of Mathematics has a strong penchant for acquiring and updating their knowledge and imparting it to the students. The undergraduate program in the school is carefully designed to train the students to acquire creative mind and analytical skills that are needed to pursue their career. SMS aspires to become the foremost centre in the Ph. D. program in the forefront areas of Mathematics. In addition to formal courses and research, seminars are conducted regularly. In the seminars, outstanding mathematicians from throughout the world present their latest research findings in various fields of mathematics. SMS envisages to introduce strong curriculum in the fields of applied mathematics, financial mathematics and computer science so that students can take up prominent careers in financial/ industrial establishments.

The Curriculum of the School

The curricula of SMS stresses interdependence and unified structure of science and at the same time emphasizes intensity of study in order to achieve a good understanding and skills in Mathematics. To fulfil this objective, a basic common core has been identified which constitutes the courses of the first two semesters. The courses on Mathematics in the 3rd semester onwards will focus on reading and understanding of mathematical proofs, emphasizing precise thinking and presentation of mathematical results both orally and in written form. The courses for the second and third year have been designed to provide an understanding of foundational level mathematics in the areas of logic, number theory, algebra, analysis, geometry, discrete mathematics and informatics. The students are encouraged to develop minor areas of interest in other streams of study by a system of open electives running up to the end of the sixth semester. The last

four semesters have been reserved for advanced level courses and specialized courses. Provision has also been made for pursuing studies in special areas and writing an innovative project leading to a dissertation.

The aim and mission of the doctoral program in the School of Mathematical Sciences is to produce good and efficient scholars who will excel in acquiring and imparting good and deep knowledge in Mathematics. The program is carefully designed to understand mathematics both vertically and horizontally, that is, to obtain a fundamental understanding of basic fields of mathematics and a thorough state-of-the-art understanding of one major field of interest in which the student writes his thesis. Though the emphasis is placed on the abilities of the student recognizing significant research problems on their own and solving them, we create a sense of rapport between the students and the experts in the field, that is to say that an ambience is created for the students to have the excitement and stimulation on their own but at the same time with support and mentoring provided by the teachers.

The Ph. D. degree is generally a four-year program culminating in an original piece of mathematical research for a thesis and eventual publications in good and scholarly journals. While the thesis is in a specific area, the coursework leading up to this is designed to provide breadth to prepare the students for successful careers in the academics. Besides, there are many opportunities for our students to enrich their background in mathematics. Students are strongly encouraged to talk in the research seminars in the school, and to attend national/international conferences as well as regional meetings amply supported by NISER.

Facilities for Research and Teaching

- (a) State-of-the-art Computing facility and a High Performance Computing Cluster for theoretical calculation.

Courses Offered: General Mathematics – I & II, Computation Laboratory – I & II, Analysis-I, II & III, Algebra-I (Group Theory), Discrete Mathematics, Algebra-II (Linear Algebra), Probability Theory, Elementary Number Theory, Algebra-III (Rings and Modules), Differential Equations, Topology, Analysis-IV (Calculus of Several Variables), Algebra-IV (Field Theory), Complex Analysis, Optimization Theory, Differential Geometry, Functional Analysis, Representation of Finite Groups, Measure Theory,

Advanced PDE, Advanced Probability and Stochastic Process, Nonlinear Analysis, Commutative Algebra, Advanced Linear Algebra, Information & Coding Theory, Algebraic Topology, Operator Algebra, Harmonic Analysis.

School of Physical Sciences

The School of Physical Sciences runs three different academic programs, viz. (i) 5-year Integrated MSc program, (ii) Integrated MSc-PhD program, and (iii) PhD program.

(a) The **5-year integrated Master of Science** (Int. M. Sc.) programme in Physics includes courses from core areas of physics such as Classical Mechanics, Quantum Mechanics, Electromagnetism, Statistical Mechanics and Mathematical Physics. In addition, elective courses based on upcoming areas in physical sciences are also offered for final and pre-final year students. Each semester of the programme includes one laboratory component where the students experimentally verify their theoretical understanding of concepts. For the pre-final year students, the laboratories offer state-of-the-art experimental facilities for addressing open ended problems in physical sciences research. The final year of the programme includes one project course (depending on the expertise of the available faculty in the school) where the students learn about the various research methodologies and many aspects associated with carrying out active research in physics. The curriculum also includes a strong component of advanced elective theory courses which prepares and motivates students to take up research careers as per the mandate of the program. The school of Physical Sciences has a basket of about 25 research oriented elective courses covering all major branches of research in Physical Sciences, out of which the curriculum allows each student to take 6 electives in his/her area of interest. The final year of the Int. MSc curriculum has a master's thesis component with a grade point equivalent of 3 theory courses. This portion of the curriculum directly integrates the students into the ongoing theoretical and experimental research in the department.

(b) The **Integrated MSc- PhD** curriculum consists of a master's degree component followed by the PhD degree. The initial two years of the program covers

theory and laboratory courses in all basic physics subjects such as classical mechanics, Quantum mechanics, Electrodynamics, Mathematical Physics, and statistical Mechanics, supplemented by laboratory courses. The 3rd year of this program is entirely dedicated to a research project which ultimately may lead to a PhD project in subsequent years.

(c) The **Ph. D.** curriculum covers the one year of course work (spread over two semesters) which includes courses from the core-areas of physics such as Classical Mechanics, Quantum Mechanics, Electromagnetism, Statistical Mechanics, particle physics and condensed matter physics. The school offers the following broad areas in physics for carrying out research work leading to a PhD degree.

- High-energy physics (Theoretical) – String theory, Lattice Quantum Chromodynamics
- High-energy physics (Experimental) – Experiments at Large Hadron Collider (LHC), Switzerland
- Condensed-matter physics (Theoretical) – Electronic structure of matter, Colloids, Softcondensed matter and statistical mechanics, density functional theory etc.
- Condensed-matter physics (Experimental) – Magnetism, superconductivity, low-temperature physics, semi-conductors and nano-fabrication, spectroscopy
- Ultra-cold atoms and Bose-Einstein condensation (Experimental)
- Photonics – Nonlinear optics, Laser Physics, Nanophotonics
- Tera-Hertz Spectroscopy
- Energy materials and Device physics

Courses Offered:

Core: Mechanics and Thermodynamics, Electricity, Magnetism and Optics, Classical Mechanics, Mathematical Methods I, Electronics, Electromagnetism I, Mathematical Methods II, Quantum Mechanics I, Electromagnetism II, Statistical Mechanics, Quantum Mechanics II, Special relativity, Atoms, Molecules and Radiation, Introduction to Condensed Matter Physics, Nuclei and Particles Electives: Classical Mechanics-II, Advanced Solid State Physics, Astronomy and

Astrophysics, Computational Physics, Quantum Field Theory I, Quantum Optics, Particle Physics, Introduction to Phase-transition and Critical Phenomena, Plasma Physics and Magneto hydrodynamics, Biophysics, Nonlinear optics and laser, Quantum Information, General Relativity and Cosmology, Soft Condensed matter, Applied Nuclear Physics, Many Body Physics, Quantum and Nano Electronics, Nonlinear Physics, Chaos, Turbulence, Theory of Magnetism and Superconductivity, Density functional theory of atoms molecules and solids, Quantum Field Theory II

Centre for Medical and Radiation Physics

The Centre for Medical and Radiation Physics at NISER is conducting the following program:

- Master's Program in Medical and Radiological Physics (2 years + 1 year mandatory internship in collaborating hospitals).

The two year M.Sc. program covers core physics in the 1st year and core medical & radiological physics in the 2nd year. The program has been designed according to the syllabus prescribed by the Homi Bhabha National Institute (HBNI), Mumbai and it has a rigorous curriculum with emphasis on physics, radiology and its medical applications. The master's program is the first of its kind in the State of Odisha. This is also the first of its kind program at master's level being conducted by an institution of the Department of Atomic Energy, Govt. of India.

For mandatory one year internship, the centre is collaborating with All India Institute of Medical Sciences (AIIMS), Bhubaneswar, Odisha, Acharya Harihar Post Graduate Institute of Cancer (AHPGIC), Cuttack, Odisha, and Tata Memorial Centre (TMC) Mumbai, Maharashtra.

Total no. of seats is ten and the 3rd batch joined the program in AY 2024-25.

Skills developed by students after completion of the program:

- Safe use of diagnostic and treatment radiation equipment.
- Quality assurance of radiation machines, radiation treatment planning and radiation treatment delivery.
- In-depth knowledge on the radiation machine structure and function.
- Understanding of principles and physical laws governing the biological effects of radiation.
- Solution of radiation therapy technology related problems.
- Train junior technicians in radiation therapy and trainee oncologists on the relevant aspects of medical physics.
- Innovation in radiation therapy technology to enhance safety, improvement of efficacy and cost effective assurance of service.



Thirteenth Graduation Ceremony





Thirteenth Graduation Ceremony

The 13th Graduation Ceremony was held in NISER on 9th July, 2024. The Honorable President of India, **Smt. Draupadi Murmu** graced the occasion as the Chief Guest, imparting valuable insights and inspiration to the graduates. The Honorable Governor of Odisha, **Shri Raghubar Das** and the Honorable Chief Minister of Odisha, **Shri Mohan Charan Majhi** graced the occasion as Guest of Honor adding to the grandeur of the event. **Prof. Ajit Kumar Mohanty**, Secretary Department of Atomic Energy and Chairman of the Board of Governors at NISER has presided over the ceremony. In the 13th Graduating Batch, 157 Integrated M.Sc. students, 13 Integrated MSc-Ph.D students, 68 Ph.D. students and 10 MRP students were graduated. The students who won various Medals and Awards in the 13th Graduating Batch are mentioned below. For the complete list of degree recipients, please refer to Appendix A.



Overall Topper (Gold Medal)

Name	Department
Mr. Pranay Mohanty	Chemical Sciences
Mr. Arnab Roy	Medical & Radiological Physics
Mr. Tanmoy Pati	Physical Sciences

Department Topper (Silver Medal)

Name	Department
Mr. Nilesh Kumar Das	Biological Sciences
Mr. Pranay Mohanty	Chemical Sciences
Mr. Ayanava Mandal	Mathematical Sciences
Mr. Aditya Prakash	Physical Sciences

Best Thesis Award

Name	Department
Mr. Ayush Parag	Biological Sciences
Mr. Pranav Shridhar Mahulkar	Chemical Sciences
Ms. Gargi Biswas	Mathematical Sciences
Mr. Hitesh Chhabra	Physical Sciences
Mr. Sanchayan Banerjee	Physical Sciences

Memorial Awards

Recipient	Name of the Awards
Mr. Aditya Prakash	Sarat Chandra-Annapurna Memorial award
Mr. Pranay Mohanty	Smt. Jayalaxamma memorial award Ishwar-Parbati Memorial Award
Mr. Ayanava Mandal	Prof. Tribikram Pati Memorial award
Mr. Nilesh Kumar Das	Dr. Sumitra Maharana Memorial Award
Ms. Husna. A. V	Kanak Benjamin Memorial Award



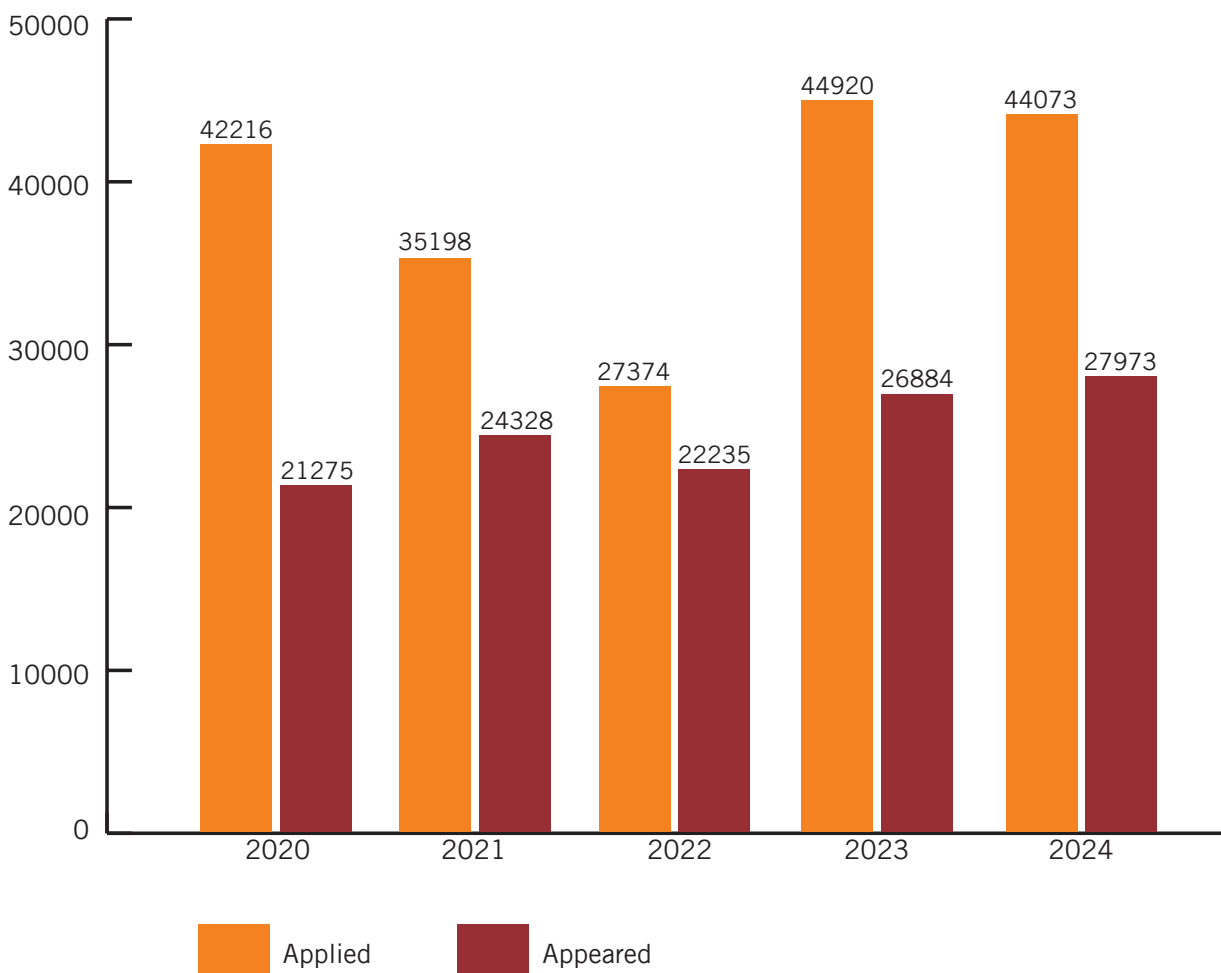
National Entrance Screening Test (NEST)



National Entrance Screening Test (NEST)

National Entrance Screening Test (NEST) is an annual entrance exam conducted by National Institute of Science Education and Research (NISER), Bhubaneswar and University of Mumbai - Department of Atomic Energy Centre for Excellence in Basic Sciences (UM-DAE CEBS), Mumbai. Successful candidates are offered admission to the Integrated-MSc programmes of these institutes based on the merit list. The NEST-2024 examination was conducted nationally on 30th of June, 2024. 44063 candidates had applied and 27973 candidates appeared for the exam out of which >33% were from Odisha and Uttar Pradesh. The exam was conducted in two sessions in 117 cities (139 venues) all over the country. Following the examination, the answer scripts were released to the students along with the answer keys and sufficient time was provided for raising objections. After dealing with all queries and objections the merit list was prepared based on the final answer key and the results were declared on the 12th of July, 2024. A total of 200+2 candidates were admitted (1st round) to the Integrated MSc program of NISER for the Academic Session 2024-29.

Number of applicants over last five years is depicted below



Brief Summary of the gender and category wise applicants who appeared in the test is as follows:

Gender	General	Gen-EWS	OBC-NCL	SC	ST	Supernumerary	Divyangjan	Total
Female	6391	780	3995	1555	521	133	52	13242
Male	6178	1158	4832	1963	600	137	84	14731
								27973

State of Domicile	Number	Percentage	State of Domicile	Number	Percentage
Odisha	5876	21.006	Punjab	281	1.005
Uttar Pradesh	3573	12.773	Gujarat	248	0.887
West Bengal	2257	8.068	Jammu & Kashmir	211	0.754
Maharashtra	2208	7.893	Tripura	107	0.383
Bihar	2062	7.371	Chandigarh	48	0.172
Rajasthan	1395	4.987	Manipur	38	0.136
Kerala	1272	4.547	Puducherry	31	0.111
Delhi	1143	4.086	Arunachal Pradesh	30	0.107
Haryana	978	3.496	Andaman & Nicobar Islands	29	0.104
Madhya Pradesh	925	3.307	Ladakh	24	0.086
Jharkhand	785	2.806	Meghalaya	14	0.05
Andhra Pradesh	679	2.427	Goa	14	0.05
Telangana	642	2.295	Nagaland	8	0.029
Himachal Pradesh	617	2.206	Dadra & Nagar Haveli	5	0.018
Tamil Nadu	604	2.159	Lakshadweep	2	0.007
Chhattisgarh	589	2.106	Sikkim	2	0.007
Uttarakhand	462	1.652	Mizoram	1	0.004
Karnataka	422	1.509	Daman & Diu	1	0.004
Assam	390	1.394			
				Total%	100

Research Overview



Research Overview

SCHOOL OF BIOLOGICAL SCIENCE

Prof. Chandan Goswami

Field of Specialization: Cell biology, Ion channels, Microscopy

Transient receptor Potential (TRP) ion channels are involved in a series of physiological functions and complex sensory events. Mutations and abnormal expressions in TRP channels often leads to pathophysiological conditions known as “channelopathy”. TRP channels are special group of ion channels as these channels has thermo-gating behaviour, i.e. activation by higher or lower temperature. Our lab has focused to dissect out the importance of thermo-sensitive ion channels in different cellular functions, regulation of subcellular organization, organelle functions. For this purpose, we use different cell types ranging from neuron, osteoclasts, osteoblasts, keratinocytes, immune cells and haploid mature gametes. We analyse sequence variations and conservation of these TRP channels in order to understand the importance of critical regions relevant for channel function, regulations and channel gating.

Prof. Palok Aich

Field of Specialization: Irreducible Systems Biology

My lab currently tries to understand a) various ways to induce gut bacterial dysbiosis and its consequences on the gut-adipose-brain axis and b) the role of the gut microbiome (bacteria) in various diseases (diabetes, obesity, NAFLD, and PD). My goal is to understand the role of microbiota and how the resident microbes regulate health. In order to do this, we developed a) ways to find out the role of circulating metabolites of microbial origin and their roles in regulating health and diseases, b) how to predict the microbiome using blood samples. The latter finding led us to a spin-off, patenting the innovation and CDSCO approval. This discovery also has the potential

(a) to act as an add-on to an existing mass spectrometer and

(b) to replace the need for Next Generation Sequencer Machines to identify and characterize the resident microbiome.

Dr. Abdur Rahaman

Field of Specialization: Cell Biology, Biochemistry

Nuclear remodeling is a universal process that occurs in all eukaryotes including human. It is relevant to human health, since a number of known human diseases are linked to nuclear remodelling. Moreover, changes in nuclear size and shape are relevant to cancer, aging and other pathobiological conditions. Therefore, identifying and understanding factors associated with nuclear remodeling will make important contribution not only to basic research but also to understanding these diseases, and could provide potential means for therapeutic intervention.

My group is interested on nuclear remodelling and cellular trafficking. For this purpose we use Tetrahymena (a single cell ciliate) as a model organism. We have recently demonstrated the molecular basis of nuclear recruitment of a nuclear dynamin related protein (Drp6) and provided the mechanism of target membrane selection. We have also uncovered the mechanism of nuclear expansion by Drp6 and investigated the role of microtubules in this process. Our results support a novel mechanism of nuclear expansion. We are also addressing the regulation of nuclear recruitment and nuclear expansion by post-translational modifications of Drp6. We are also investigating the kinase(s) and phosphatase(s) involved in phosphorylating Drp6 and their roles in nuclear expansion. Recently we have also discovered a novel endocytic route to deliver a specific lipid cargo to the nuclear envelope important for nuclear expansion.

Another aspect of our research involves understanding the mechanism of targeting a single cardiolipinsynthase into multiple membrane compartments namely mitochondria, nuclear envelope and plasma-membrane.

Dr. Asima Bhattacharyya

Field of Specialization: Host-pathogen interaction, Cancer Biology, Oxidative stress, Tumor microenvironment, Extracellular vesicles

Gastric cancer (GC) remains a leading cause of cancer-related mortality, particularly in developing countries, largely due to late diagnosis and limited biomarkers. *Helicobacter pylori* infection and tumor hypoxia are two critical factors driving GC progression. Hypoxia within the tumor microenvironment promotes epithelial-to-mesenchymal transition (EMT), angiogenesis, metastasis, and therapy resistance. The molecular events in *H. pylori* and hypoxia-driven gastric cancer progression and metastasis are complex and multifactorial. The focus of our group is to identify the molecular events and pathways that contribute in gastric cancer progression and metastasis. Recent findings from our group highlight the role of CEACAM6, a hypoxia-inducible adhesion molecule, as a key mediator in this process. Under hypoxic conditions, HIF1 α upregulates CEACAM6 in both gastric epithelial cells (GECs) and gastric cancer cells (GCCs). This upregulation enhances cell proliferation, migration, and ROS production via NOX4, while also facilitating *H. pylori* adhesion and CagAcytotoxin translocation in infected cells. CEACAM6 expression in GECs promotes M2-like macrophage polarization, contributing to an immunosuppressive tumor microenvironment. Collectively, these results identify CEACAM6 as a central node linking hypoxia, microbial infection, oxidative stress, and immune modulation in gastric cancer with strong potential as a diagnostic biomarker and therapeutic target.

Dr. Debasmita Pankaj Alone

Field of Specialization: Molecular Genetics and Epigenetics

With the shifting demographics towards older age, there is a major concern for age-related disorders. 90% of individuals dying each year are due to age-related causes. Understanding the genome, epigenome and proteome between healthy and diseased state of these individuals pave a way for unravelling bio-markers for early diagnosis and/or therapeutics for various diseases. Our goal is to find these underlying players that change the micro-environmental niche differently in a diseased state during the developmental process of aging and hence are responsible for these age related-disorders. We are currently focusing on understanding

the pathomechanism of aging eye disorder (Glaucoma, the leading cause of irreversible World Blindness and Corneal Endothelial Dystrophies) as well as Cancer using a plethora of cellular, biochemical, genetics, genomics and molecular biology techniques involving human samples, *Drosophila* models as well as in vitro cell lines.

Dr. Harapriya Mohapatra

Field of Specialization: Molecular Microbiology, Membrane proteins: role in antimicrobial resistance & stress tolerance; Antimicrobial resistance evolution, tolerance and persistence

Striding over the unfavourable condition is intrinsic requirement of all organisms for survival. Single celled bacteria are no exception to this. We are interested in understanding how the bacteria respond to antibiotic and pH stress. Our finding shows that bacteria can respond to stress in different ways. One of this involves engaging the structures (proteins) intrinsic to cellular functions and survival, while another involves slowing down the cellular metabolism. Thus, our research focuses on developing understanding of two such aspects involving the bacterial membrane proteins and persistence.

Project 1: We had previously shown (Mishra M, PhD thesis) upregulation of the outer membrane protein TolC in response to antibiotics and pH in *Enterobacter cloacae*. We are currently expanding the study to understand what role TolC plays in acid survival and how is it regulated? The investigations are ongoing and results of the study indicate proton pumping activity of the outer membrane protein TolC to be critical for acid survival of the pathogen. In addition we also show reduced adhesion and invasion in TolC knock out strains, indicating it's possible role in pathogenesis.

In addition to TolC, a reclusive inner membrane protein EmmdR is known to aid antimicrobial resistance in the bacteria. Mutational studies reported by others, have shown increased antimicrobial sensitivity by EmmdR mutants. However, review of literature lacks understanding on the topology of this protein. Using dual reporter assay system, we are trying to elucidate the topology of this inner membrane protein.

Project 2: We had completed microbiological studies and characterized factors affecting persistence in *Klebsiella pneumoniae* (Patole S, PhD thesis, 2022). We further asked the question whether this in-vitro phenomenon

has any relevance in-vivo? Utilizing Balb/C mice we showed that upon infection in animals *K. pneumoniae* forming persisters in-vitro showed drug tolerance and caused severe neutropenia (Hasda S, 2022). Extending this further we are investigating how the bacteria modulate its metabolism to facilitate persistence? We also have found persistence to be strain specific phenomenon and a serendipitous finding revealed that *Klebsiella pneumoniae* develops mutants in response to antibiotic exposure. We aim to understand the underlying mechanism of what are the mutations and how these mutations help bacteria overcome antibiotic stress.

For both the projects we resort to various microbial, molecular biology, biochemical, cell culture, microscopic techniques for addressing these questions.

Dr. Kishore CS Panigrahi

Field of Specialization: Plant developmental Biology

My lab has been instrumental in setting up a state of the art facility for plant signaling research. Major focuses are on Flowering time regulation, circadian clock, and light-mediated developmental responses in model organisms like *Arabidopsis*, Moss, Rice, and Mung bean. Several of the major focuses of Kish Lab are to understand the light and hormone regulated development, the Role of *G1* (*Gigantia*) the master regulator gene's regulation in circadian clock control, flowering time control, and the response in various biotic and abiotic stress, calcium-sensing and studying the post-translational modification of tubulin in *Physcomitrium patens* (Moss) and Effect of Carbon nanoparticles in Rice Physiology and mechanism of action and response in heavy metal toxicity and various stress in Rice, Mungbean and *Arabidopsis* plant.

Dr. Manjusha Dixit

Field of Specialization: Cancer Biology

Our research explores the intricate regulation of gene expression in disease contexts, with a particular focus on cancer biology. We uncovered a dynamic interplay among transcription factors Sp1, YY1, and DUX4 in modulating FRG1 transcription. Through promoter assays, mutagenesis, chromatin immunoprecipitation, and in vivo models, we demonstrated that these factors collaboratively fine-tune FRG1 levels, impacting tumorigenic properties.

Expanding on FRG1's functional significance, we established its crucial role in DNA base excision repair

(BER) within breast cancer cells. Integrating in-silico network analyses with experimental validation, we showed that reduced FRG1 expression impairs DNA repair capacity, correlating with poor prognosis and increased TP53 mutations. These findings suggest FRG1 as a potential biomarker and therapeutic target in breast cancer.

In a separate population-based study, we identified promoter variants of MMP2 associated with gallbladder cancer (GBC) in Eastern India. Genetic association analysis, haplotype construction, and functional luciferase assays revealed that specific SNPs enhance MMP2 expression, implicating them in GBC pathogenesis.

Our work emphasizes the importance of gene regulation in tumor progression, integrating molecular biology, functional genomics, and epidemiology. Key collaborations have been established with clinical research groups and bioinformatics teams to expand translational aspects of these findings.

Future directions include deeper mechanistic studies on FRG1's role in DNA repair pathways, investigating Sp1/YY1/DUX4 interactions in additional cancer models, and validating MMP2 variants as potential diagnostic markers for early GBC detection.

Dr. Mohammed Saleem

Field of Specialization: Membrane Biophysics in Disease, Host-pathogen Interaction, Neurodegeneration

1) Host phagosome maturation evasion by Mycobacteria: We are primarily interested in how the Mycobacteria manipulate host membrane compartments thereby altering the cellular signaling for its survival. The fundamental knowledge generation on the molecular mechanisms would enable rational design of lipid targeted therapeutics.

2) Neuronal membrane deformation and propagation of Amyloidogenic proteins: We are interested in the how neuronal membrane environments can alter the aggregation kinetics of amyloidogenic proteins (such as Amyloid beta, Alpha-synuclein and full-length human Tau) and their cross-talk. This is crucial in understanding how the proteins deform neuronal membrane for their cell-to-cell propagation and fundamental to designing single molecule inhibitors.

We discover that lipid membrane surfaces can facilitate

the condensation and fibrillation of Alfa-Synuclein at physiologically relevant sub-critical concentrations driving the process via the membrane interfacial potential. We also discover that the Mycobacterial tuberculosis virulence factor ESAT-6 polymerization drives the vesiculation of phagosomal membrane thereby disrupting the phagosome.

Collaborators: Sandeep Choubey, IMSc; Vineet Chowdhary, AIIMS New Delhi; Swagata Ghatak, NISER.

Dr. Pankaj Vidyadhar Alone

Field of Specialization: Molecular biology of protein biosynthesis

Protein biosynthesis is an important step in the life cycle of a cell, where genetic information is converted into functional protein information. The selection of an open reading frame is a key function of the translation initiation apparatus and a key regulatory step that controls gene expression. Our research interests are to understand a) The molecular mechanism of start codon recognition & translation fidelity. b) Translational control in molecular medicine and regulation of protein biosynthesis. c) Architecture of translation apparatus, molecular interactions, and supramolecular assembly of translation initiation complex by using a range of genetic, biochemical, and biophysical techniques in the yeast model system.

Dr. Praful Singru

Field of Specialization: Neural circuits, neuropeptides and behaviour

In the brain, the neuronal groups are connected with other groups of neurons and forms circuits. The neural circuitry precisely controls the behavioral or motor output in response to the inputs. Our lab is interested in studying the neural circuits that controls energy balance and reproduction. Hypothalamic arcuate nucleus (ARC) has emerged as crucial integrative center in the neural circuitry of energy balance. The axons from ARC innervate and regulate thyrotropin-releasing hormone (TRH) synthesizing neurons in medial part of the hypothalamic paraventricular nucleus (PVN) to regulate energy expenditure. Another distinct group of TRH neurons resides in anterior PVN (PVNa) but its relevance has remained unexplored. Although TRH is fully conserved across the vertebrate phyla, its significance in the brain of non-mammalian vertebrates and evolutionary emergence of TRH as regulator of

energy balance, are not well established. We have been interested in understanding the significance of non-hypophysiotropic TRHergic system in brain, role of neuromodulators/neuropeptides/ion channels in the regulation of TRHergic system and its regulatory pathways, and evolutionarily significance of the peptide. The neuropeptides are also expressed in the aggression circuitry but these neurochemicals drives the aggressive acts is not well understood. Although aggression is routinely employed during inter-male interaction of conspecifics, the behavior is rarely encountered in females. Female display fierce aggression during lactation/pregnancy to protect their offspring. How the aggressive behavior remain suppressed in virgin females is not known. Further, what triggers the lactating mothers to attack the intruders is not well established. Our lab seek answers to these questions, and probes the central mechanism that control the maternal aggressive behavior in rodents.

Dr. Ramanujam Srinivasan

Field of Specialization: Archaeal and Bacterial Cytoskeleton

Dr. Ramanujam Srinivasan's research program at NISER is built upon a deep investigation into the fundamental aspects of bacterial cell biology. His work is characterized by a strong emphasis on the intricate mechanisms governing cell division and the crucial roles played by the bacterial cytoskeleton. His expertise spans several interconnected domains, forming a cohesive research program. Central to his research is **Cytoskeletal Dynamics and Function in Bacteria**.

This broad area encompasses several key components:

- **Cell Division and Spatial Organization:** His laboratory meticulously studies the dynamics of the bacterial cytoskeleton, particularly the assembly of the cytokinetic Z-ring. This research aims to unravel the regulatory processes controlling cell division, which are essential for the proper partitioning of genetic material during bacterial replication.
- **Anti-bacterials Targeting Bacterial Cytoskeleton:** A significant applied aspect of his work involves identifying and developing compounds that specifically disrupt bacterial cytoskeletal proteins. This research offers promising new avenues for the development of antimicrobial therapies, addressing the urgent need for novel antibiotics.

Dr. Rudresh Acharya

Field of Specialization: X-ray crystallography, Protein-Structure-Dynamics, Protein Design and Engineering, Enzymes, and Membrane proteins

Proteins are workhorses of a cell, engaged in a wide range of tasks comprising structural stability, cell signalling, catalysis, transporting, molecular printing, membrane fusion, regulation, etc. Understanding the mechanism that underlies the functioning of these molecular gadgets is an intriguing question and defines the fundamentals of biological processes. This is an interdisciplinary research program, and we set out to address the question using X-ray crystallography coupled with biophysical and biochemical approaches. Currently, our research group is working on the following projects:

Transmembrane peptides (TM-Pep): The transmembrane polypeptide chain follows the two-stage model for folding in the membrane bilayer. The self-association of helices to achieve the folded state is the second stage of the model. It has been a daunting task to predict and model the oligomeric state of the folded state. Our research group aims to structurally characterize the self-associating transmembrane peptides and elucidate the determinants of self-association.

Polysaccharide Lyases (PLs): Bacterial polysaccharide lyases catalyze the degradation of the anionic polysaccharides in the host extracellular matrix and act as a virulence factor. Here, we recently provided a structural basis for the functioning of important proteins Smlt1473 and PanPL from the PL-5 family. Currently, our work is focused on engineering these proteins.

De novo protein design: Our other research program is *de novo* protein design, which aims to put our understanding of principles that define protein folding and functioning to the test. Here, inspired by nature, we seek to design self-assembling scaffolds that harbor tailored functions and bind co-factors to create new materials. In this scheme, we have successfully determined the crystal structure of previously *de novo* designed DFSc, the single-chain *de*-ferri protein. Prof. William DeGrado's group designed the DFSc.

Two-component systems in bacteria: We are interested in determining the structures of bacterial two-component systems (Histidine kinase and its response regulator), a widespread signal transduction system in prokaryotes. Here, we focus on providing a

structure-based mechanistic model for sensing and transmitting signals. Currently, we are working on ZraS, a metal-sensing HK, and have solved the crystal structure of the complete cytoplasmic domain to provide structural insights into autophosphorylation.

Dr. Subhasis Chattopadhyay

Field of Specialization: Immunology

Our current research works focus on Cellular Immune responses associated to experimental immune suppression, viral infection driven immune activation and cellular immune regulation. We are working on cellular function and phenotypes associated to Cell mediated immunity (CMI) of T cells and accessory antigen presenting cells. In a context of T cell mediated effector immune responses we have shown that Telmisartan driven suppression of such T cell activation induced effector functions were differentially delineated with TRPV1 and TRPA1 ion channels' modulators. In another project we have found that Chikungunya virus infection inhibits B16-F10 melanoma-induced immunosuppression of T cells and macrophages mediated by interleukin 10. The findings suggest that CHIKV modulates cancer-induced immunosuppression through IL-10 dependent pathways, providing new insights into viral-cancer interactions. We have also found that hypoxia promoted CEACAM6 in GCCs, and these cells acquired increased proliferative potential, migration ability and M2 polarization. Our unpublished works indicate that targeting Neuropilin-1 (NRP1) to enhance immunotherapy in Melanoma, which can reduce the peripheral Treg-mediated immunosuppression and tumor progression. Moreover, we have also observed that NRP1 plays an important role in CHIKV infection and may be targeted to regulate the viral infection and immuno-pathological consequences as well. Research with cell lines, primary cells, mouse model and also with the human blood samples from normal donors with due consents and National guide lines are the prime candidates for such experimental studies. Such understanding will be helpful towards designing immuno-therapeutic strategies to control various diseases.

Dr. Tirumala Kumar Chowdary

Field of Specialization: Structural virology

My lab's research focus is on understanding the conformational dynamics of viral proteins or protein-nucleic acid complexes that are required for viral entry

into the cell and viral genome replication. Mosquito-borne viruses such as chikungunya, dengue, Zika have a lipid-bilayer membrane as the outermost envelope of the virus. The proteins present tail-anchored in the viral membrane are required for binding to a cell surface receptor and then fusion of viral and cell membranes, facilitating viral entry into a host cell — hence called viral cell-entry proteins. The viral cell-entry proteins have distinct architecture and undergo conformational changes during the viral cell entry process upon specific cues such as receptor binding. Studies from our research group explained the receptor binding-driven conformation changes in chikungunya E1/E2 protein complex and the mechanism of acid-sensing (another trigger for the conformation change in the E1 required for membrane fusion) by the E1 protein.

Replication complexes (RC) — viral protein, nucleic acid complexes that are formed during RNA genome replication — of dengue and influenza virus are another focus of the research group. Dengue virus single-stranded RNA genome codes for one single long polypeptide, which is then processed into three structural and seven non-structural proteins (NS proteins). The NS proteins interact dynamically, in a context dependent manner, and form varied complexes with the viral genome (eg. NS3-NS4b-NS5-viral RNA). Understanding the interactions and its significance for the viral genome replication is of significance for designing novel therapeutic strategies. Work from our group mapped the interaction interface between NS3 and NS4b and the conformational dynamics in NS3, upon NS4b interaction, that would enhance NS3's RNA helicase activity. The viral protease and its interaction with another NS protein, NS2b, cofactor are also characterized in our studies.

Dr. V Badireenath Konkimalla

Field of Specialization: Drug Discovery and Delivery

- By applying nanotechnology approaches, a significant efficacy was achieved by improving solubility, targeting and stability of BCS class IV drugs.
- Such approaches have broad implications in repurposing, poorly soluble phytochemicals, therapeutic interventions, etc
- Developed an in-house Comprehensive Database for Exploring Peptide Alkaloid (**peptaloid**). <http://peptaloid.niser.ac.in>

Work on Chronic inflammation:

- Thermosensitive drug-loaded hydrogel suppressed chronic inflammation in FCA-induced rheumatoid arthritis conditions.
- Dual nanoparticulate loaded co-delivery system with PEITC & MTX in an alginate hydrogel significantly enhanced the efficacy in RA conditions.

Work on Cancer therapeutic drug delivery:

Redox-sensitive polymeric-lipid hybrid nanocarriers with beriberine accelerated drug release in the TME conditions

Dr. Aniruddha Datta Roy

Field of Specialization: Phylogenetics, Biogeography, Evolution, Ecology

At the School of Biological Sciences, NISER Bhubaneswar, my research group focuses on biogeography, evolutionary biology, and community ecology, with an emphasis on reptile systematics and the ecological impacts of anthropogenic change. In addition to ongoing work on skink systematics and biogeographic patterns, I supervise MSc students pursuing two-year thesis projects on a range of topics. These include phyllosphere dynamics in tropical forests using metagenomics, the effects of invasive plants on mycorrhizal communities in seasonally dry forests, population genetics and anthropogenic impacts on lizard populations, and the quantification of camouflage in ground-nesting birds. The lab employs a combination of field-based ecological assessments and molecular approaches to address research questions at the interface of ecology and evolution. Our work also contributes to biodiversity monitoring and habitat management in collaboration with local forest departments. The lab's research objectives are aligned with generating data that support evidence-based conservation and enhance understanding of biodiversity patterns in under-studied landscapes such as the Eastern Ghats

Dr. K. Himabindu Vasuki

Field of Specialization: Plant functional genomics

Tomato is the second most consumed vegetable in the world after potato in the world. The usage of this vegetable is indispensable for many preparations in Indian cuisine and it is consumed in raw or processed

form. Enhancing nutritional content of tomato will promote the health of the people at affordable costs. Fruits accumulate various pigments as a part of natural ripening process and I am interested in understanding the synthesis, accumulation and degradation of these pigments, especially in tomato fruits. Anthocyanin is effective antioxidant and also known to reduce the risk of cardiovascular diseases and involved in slowing down the progression of few types of cancers. In the high anthocyanin mutant, Abg we could show several novel candidate proteins associated with enhanced fruit pigmentation. In addition, we have observed that the PKM1 fruits show increased levels of antioxidants along with high levels of folate. Currently, in my lab, we use combined proteomics, metabolomics and transcriptomics techniques to understand the basis for this high pigment, vitamin and antioxidant levels in tomato fruits. The novel candidate genes/proteins identified will be functionally validated and introduced into the local tomato cultivar, AV for enhancing nutritional levels of market tomatoes.

Dr. Rittik Deb

Field of Specialization: Evolutionary Ecology, Animal Behaviour, Bioacoustics, Host-gut-microbiome interactions

Biotic interactions lie at the heart of biodiversity, orchestrating complex relationships that govern community assembly, behaviour, reproduction, and evolution. My research exemplifies this paradigm by exploring multiple dimensions of ecological interplay. We study the community assembly and spatial distribution of insects (order – Ensiferans), a sentinel taxon, in Eastern India using active and passive monitoring, diversity measurements, and species distribution models, which reveal how interspecies interactions and environmental influences coalesce to shape local biodiversity. Concurrently, by examining the eco-evolutionary dynamics of orthopterans under novel anthropogenic pressures, such as anthropogenic noise and artificial light at night, we highlight how these selection pressures remodel community interactions and adaptive responses in this key sentinel taxa. Delving deeper, our work on Ensiferans also explores how neuronal tuning can allow individuals to mitigate the disruptive effects of anthropogenic noise, a subtle yet profound adaptation that underpins effective communication in a crowded acoustic landscape. We further investigate alternative reproductive strategies

in Ensiferans by deciphering how individuals assess their hierarchical status and optimise their signalling behaviours in response to intraspecific dynamics. Moreover, by uncovering the intricate dependencies between macroscopic organisms and their resident microbes, we aim to determine whether such co-evolutionary relationships facilitate niche expansion and drive the evolutionary success of this insect taxon. Together, these interconnected studies underscore that biotic interactions—not merely the sum of individual traits—are the dynamic forces sculpting our planet's rich tapestry of life.

Other collaborative work with

- Dr Roy (SBS) - We are examining how ant-mimicking spiders behaviourally mimic the spiders to avoid predation pressure.
- With Dr Mukherjee (ATREE) and Dr Mishra (SCPS), we have developed ML models to classify honeybee images collected through a solar-powered automated camera setup.
- Dr Agashe (NCBS) – We are examining the role of the gut microbiome in host sexual selection in stored grain pest – red flour beetle. We aim to understand how the gut microbiome can help these pests shift across resources.
- Dr Pawar and Dr Mohanty (Imperial College) – Developing a centre to understand climate change adaptations (CCIMA) and its impact on biodiversity in Eastern India.

Dr. Swagata Ghatak

Field of Specialization: Neuroscience and Stem cell research

Research question: How K2P is affected and affects hyperexcitability and E/I ratio in AD and other neurological disorders?

Research objectives: Thus, our goal is to understand the aberrant interactions of K2P (changes in its expression and activity) because of AD related neuronal hyperactivity.

Secondly, we want to study whether modulating K2P activity and expression will lead to renormalization of the abnormal electrical activity.

Findings:

- Hyperexcitability in early stages of AD increases TREK1 expression via cAMP-PKA pathway which could be a neuronal survival mechanism.
- Amyloid β mediated neuronal hyperactivity increases TASK3 expression via activation of NFAT pathway in AD.
- Targeting reactive oxygen species with drug candidates like antioxidant silver(III) complex of morpholine-appended corrole can provide neuroprotection in AD.

Collaborations:

1. Prof. Sanjib Kar, SCS, NISER.
2. Dr. Mohd. Saleem, SBS, NISER.

Dr. Saurabh Chawla**Field of specialization: Veterinary and Animal Sciences, (Laboratory Animal Sciences/Preclinical Research)**

During this period (April 2024–March 2025), NCARE, SBS, NISER has provided high-quality preclinical research services including the supply and maintenance of Pathogen-Free (PF) rodents, execution of in vivo efficacy studies, and development of animal models for oncology, metabolic, and neurological diseases. Key studies included work on breast cancer liposomal formulations, hepatic encephalopathy and pancreatic cancer progression using mice model. These are being carried out in collaboration with institutions such as

Centurion University, IISER Berhampur and BRIC-NIBMG. A key highlight was the successful execution and completion of multi-institutional collaborative trials that adhered to ethical and biosafety standards. We also conducted training and outreach programs aimed at capacity building in laboratory animal sciences and promoted awareness on the use of patient-derived xenografts (PDX) in cancer research.

Dr. Shyamasree Ghosh

Exploring the medicinal properties of plants of eastern India with a focus on plants/herbs from Odisha and West Bengal, known for their medicinal properties, like antidiabetes, anti-hepatitis, anti-inflammatory, anti-Cancer, antimicrobial, and other properties as recorded in the rich traditional literature of the country. This study is being done in collaboration with School of Chemical Sciences, NISER.

Exploring the rich biodiversity of fauna of India with a focus on Leech and Earthworms under Phylum Annelida, across pan India. Exploring the biodiversity of Diptera Group under Class Insecta, Phylum Arthropoda and the importance of Forensic flies, pollinators and flies of medicinal and economic importance. This is done in collaboration with Director, Zoological Survey of India, Dr. Dhriti Banerjee and her team of Scientists. Study of biochemistry, metabolites, DNA barcoding, understanding their physiology, biology, ecology, invertebrate immunology, detection of Post mortem interval (PMI) based studies in groups of Caliphoridae, Muscidae are also being carried out.



SCHOOL OF CHEMICAL SCIENCES

Prof. Chidambaram Gunanathan

Field of Specialization: Organometallic Chemistry and Catalysis

Isolation and characterization of intermediates in catalytic processes are challenging owing to their inevitable low stability. However, overcoming this barrier and succeeding in this challenging task can turn out to be highly beneficial in further fine tuning and optimization of catalytic experiments, and for the fundamental understanding of reaction mechanisms. By employing pincer complexes as catalyst inert bond activations are established, which are further utilized for the development of catalytic processes.

The development of simple and general catalytic methods using abundant base metal catalysts for the deoxygenation of organic compounds for the valorization of biomass and chemical synthesis remains a formidable challenge. Cobalt pincer-catalyzed reductive deoxygenation of aldehydes, ketones, alcohols, and ethers to their corresponding alkanes is reported. Biomass-derived compounds were deoxygenated to their corresponding methylarenes. This catalytic system employs diethylsilane as a reductant and requires a substoichiometric amount of base. Investigations revealed the initial deprotonation of the amine arm on the catalyst, and catalysis begins with Si-H activation of silane facilitated by amine-amide metal-ligand cooperation. In situ-formed Co-H species carry out the hydrosilylation of carbonyl compounds, dehydrosilylation of alcohols, and hydrosilylation of ethers, resulting in common arylmethylsilyl or alkylsilyl ether intermediates. Further, the reaction of diethylsilane with arylmethylsilyl or alkylsilyl ether leads to deoxygenation and the formation of siloxane oligomers. Further, a DFT study reveals closely lying singlet-triplet electronic states of different intermediates facilitating the mechanism on different spin surfaces, verified through the located minimum energy crossing points (MECPs). In the case of alcohol, another low energy pathway is located where the amide arm of pincer, instead of hydride, can abstract the hydroxy proton and enable metal-ligand cooperation.

The reduction of aryl carboxylates to methyl and allyl arene was attained using a well-defined cobalt

catalyst. This catalytic transformation employs only a sub-stoichiometric amount of base, and diethylsilane as a reductant. Catalytic activation of the Si-H bond of the silanes, C-O bond of the ester, and silyl ether intermediates by cobalt is crucial to achieving exhaustive reduction

Prof. Himansu Sekhar Biswal

Field of Specialization: Spectroscopy and Computational Chemistry

Currently, Prof. Biswal's research group at NISER is actively engaged in the following five primary research areas:

- Developing instrumentation for polaritonic chemistry, gas phase, and frequency-domain THz spectroscopy.
- Investigating unusual non-covalent interactions using gas-phase laser spectroscopy.
- Examining the implications of amino acid-based ionic liquids on the catalytic activity, stability, dissolution, and storage of DNA, RNA, and proteins.
- Studying excited state proton transfer and photodynamic therapy mediated by sulfur and selenium-centered hydrogen bonds.
- Exploring processes of chirality transfer and chiral recognition.

To address these research questions at the molecular level, the group employs a combination of experimental and theoretical techniques. Experimental methods include frequency and time-resolved fluorescence spectroscopy, gas phase laser spectroscopy, and NMR MI-VCD. Theoretical approaches include electronic structure calculations, molecular dynamics simulations, and docking studies.

Prof. Jogendra Nath Behera

Field of Specialization: Inorganic and Material Chemistry

1. Porous Magnetic Materials
2. Supercapacitors for layered composite Materials
3. MOF-derived Electrocatalyst for Water Splitting
4. Materials for Magnetocaloric refrigeration

Prof. Moloy Sarkar

Field of Specialization: Fluorescence Spectroscopy

Several important physical insights in terms of understanding the behaviour of some nanostructured materials in absence and presence of analytes of interest have been obtained from Our Ongoing Research. Several students (comprising of both M.Sc and Ph.Ds) have also got training on various aspects of Material Sciences Spectroscopy and Microscopic techniques. Gave one Invited Talk in 2nd Materials Chemistry Symposium-Bhubaneswar, Bhubaneswar. Participated in NSRP, UFS and DAE conclave. Worked as Conveners in NSRP 2025 and UFS 2024. Was a member of screening committee for short selection of scientific staffs and was the Chairman in the screening committee for short selection of non-teaching staffs. Also acted as reviewer for several manuscripts from various Journals.

Prof. Prasenjit Mal

Field of Specialization: Organic Chemistry

The field of photocatalytic organic transformations is undergoing rapid advancement, driven by the discovery of novel photocatalysts, optimization of reaction conditions, and exploration of diverse synthetic applications. As understanding in this area grows, photocatalysis holds immense promise to revolutionize organic synthesis by enabling more sustainable, efficient, and environmentally friendly processes. Within this context, the applicant has made significant contributions to both homogeneous and heterogeneous photocatalysis. Notably, they have demonstrated the efficacy of organic dyes such as 9-mesityl-10-methylacridinium perchlorate as potent homogeneous photocatalysts for a variety of transformations. In heterogeneous systems, recent work by Mal and co-workers—closely aligned with the applicant's research interests—has achieved activation of C–Br bonds in CBrX_3 ($\text{X} = \text{Cl}, \text{Br}$) under sunlight or blue LED irradiation using CsPbBr_3 perovskite nanocrystals. Additionally, their pioneering efforts in semi-heterogeneous and supramolecular photocatalysis have broadened the landscape of light-driven chemistry. The applicant's research exemplifies multidisciplinary collaboration, seamlessly integrating organic synthesis, supramolecular chemistry, and catalysis. This interdisciplinary approach has not only deepened scientific understanding but also offered insights into coordination chemistry, physical organic chemistry, and chemical topology. By uncovering

the shared principles that link seemingly disparate fields, the applicant has established a strong and versatile foundation that paves the way for innovative and transformative research directions.

Prof. Sanjib Kar

Field of Specialization: Bioinorganic chemistry

Corrole, a contracted analog of porphyrin, has recently attracted significant research interest. A key advantage of corroles over porphyrins is their ability to stabilize metals in one-unit higher oxidation states. Additionally, corroles can theoretically store more electrons than porphyrins. Despite being trianionic, corroles fully retain their aromaticity. These distinctive properties have made corrole chemistry a vibrant area of study. Understanding the redox properties and electronic structures of metal–corrole complexes will not only deepen our fundamental insights into these intriguing molecules but also pave the way for their application in optoelectronic materials. Moreover, research into metal–oxo species of corroles holds promise for oxidation catalysis—a highly desirable process in the chemical industry.

Dr. Arindam Ghosh

Field of Specialization: NMR Spectroscopy/ MRI / Machine Learning

A. Design of novel MRI CEST contrast agents

Novel CEST MRI agents are being designed with optimized exchange rates, water solubility, and physiological responsiveness. Structural tuning of diaCEST and paramagnetic agents enhances sensitivity and specificity. These agents, often already FDA approved drugs, aim to enable safer, multiplexed, and functional imaging, improving diagnostic accuracy and disease monitoring through non-invasive, molecular-level contrast enhancement.

B. Understanding of the mechanism of CEST contrast and investigation of the role of hydrogen bonding

Understanding CEST contrast involves studying factors such as hydrogen bonding that influence proton exchange mechanisms. Hydrogen bonds affect exchange rates and chemical shifts, impacting contrast efficiency. Experimental and computational studies help clarify these effects, guiding the rational design of more effective CEST agents tailored to specific physiological environments and diagnostic applications.

C. Carbon quantum dots as a novel class of CEST MRI contrast agents

Carbon quantum dots (CQDs) are biocompatible nanomaterials and with suitable surface functional groups they show highly enhanced CEST contrast. Their exchangeable protons allow pH dependent tuning of contrast efficiency. CQDs offer advantages such as low toxicity, ease of synthesis, and multifunctionality, making them promising alternatives to traditional agents for advanced, targeted MRI diagnostics.

D. Use of AI and ML for developing novel signal processing techniques for NMR spectroscopy

AI and machine learning enhance NMR spectroscopy by facilitating data processing that no conventional method can achieve. Examples include but not limited to noise cancellation, diagonal peak suppression for homonuclear multi-dimensional NMR spectroscopy, and automated phase correction.

Dr. Bhargava B.L.

Field of Specialization: Theoretical and Computational Chemistry

Molecular simulations provide insights into the structure and dynamics of a system at atomic level helping to understand the system from a microscopic perspective. Using molecular simulations, it is possible to carry out controlled (virtual) experiments at extreme conditions without safety issues involved in carrying out the actual experiments. We use ab initio methods and empirical potential based molecular dynamics and Monte Carlo techniques to study condensed phases of materials. We explore structural and dynamical properties of materials that are of potential use. For systems exhibiting aggregation behavior beyond the length scales accessible to the atomistic simulations, coarse grained MD simulations are used. Biological systems such as proteins and lipids are also studied using molecular dynamics.

Dr. Krishnan Venkatasubbaiah

Field of Specialization: Inorganic and Materials Chemistry

The chemistry in my group will be interdisciplinary which includes inorganic, polymer and organic. My research focuses on the development of new functional materials which have potential applications in catalysis and making sensors, OLED's and NLO materials.

Dr. Nagendra Kumar Sharma

Field of Specialization: Organic and Bioorganic Synthesis

Amino acids and nucleosides are building blocks of biomacromolecules-protein, peptides and nucleic acids (DNA/RNA). These molecules have recently been considered as potential therapeutic drug candidates for the various diseases including genetic. However, the direct use of native molecules in the drug developments have faced various challenges such as poor solubility, cell permeability and target specificity. The structural modifications of native molecules significantly improve their solubility, permeability and stability. My research group focus the development of new synthetic methodology for the structural and functional tuning of native amino acid, peptides and DNA/RNA analogues. We modify their aromatic residue by metal catalysed C(sp²/sp³)-H activation methodology even at late stages. The Pd catalyzed arylation and chalcogenations of phenylamine/ tryptophan/tyrosine derivatives generated various type of unnatural aromatic amino acids. The aromatic residue of native biomacromolecules comprises only benzenoid scaffolds. However, nonbenzenoid aromatic scaffolds are also occurred in the natural product, Troponoids. We synthetically incorporated the non-benzenoid scaffold, **Tropolone**, into native amino acid, peptides, DNA, and RNA that shows unique structural and functional behaviour including fluorescence. Some of these derivatives shows remarkable therapeutic properties including anticancer and anti-quorum sensing in pathogenic bacteria. Overall my group is involved in the synthesis of natural product, amino acid, and nucleic acid derivatives by C-H activation or new methodology.

Dr. S. Peruncheralathan

Field of Specialization: Synthetic Organic Chemistry

Our research group is at the forefront of organic synthesis, developing innovative methodologies to create complex organic molecules with applications in pharmaceuticals and material science. We specialize in novel reactions such as organocatalytic dearomatization, palladium-catalyzed domino heteroarylation, and PIFA-mediated intramolecular dearomatization. Employing advanced catalytic systems and adhering to green chemistry principles, we aim to enhance reaction efficiency and environmental sustainability. Our significant contributions include synthesizing novel

compounds like pyrazolines and benzothienoquinolones, which are pivotal in drug discovery, and developing pyrazole polymers for sensor technologies, illustrating our impact on both health and environmental sectors. In the past year, we have expanded our scope to include functionalized spiroheterocycles, explored dearomative strategies for N-heterocycles, and collaborated across institutes on the design of sulfur-rich building blocks. Our future directions involve integrating photoredox catalysis and sustainable reagents into heterocycle synthesis, enabling the discovery of new molecular architectures with therapeutic and diagnostic potential.

Dr. Upakarasamy Lourderaj

Field of Specialization: Theoretical and Computational Chemistry

We are interested in the computational studies of the processes that happen during a chemical reaction. We use classical trajectories simulations as a tool to study the dynamics of chemical reactions. The simulation results are compared with experiments. Broadly, we work on the following topics:

- Mechanisms and dynamics of chemical reactions
- Chemical reactions at interfaces
- Development of methods and algorithms for ab initio direct dynamics simulations
- Machine learning in chemical dynamics

Dr. Bishnu Prasad Biswal

Field of Specialization: Porous inorganic and organic materials and membranes for sustainable applications

The separation of water-in-oil emulsions presents a growing challenge with significant implications for both

industrial efficiency and environmental protection. Traditional separation techniques often suffer from several drawbacks, including high energy consumption, limited separation efficiency, and poor material reusability. These issues make them unsustainable for long-term or large-scale use. Although membrane-based technologies have emerged as promising alternatives due to their lower energy demands and scalability, their practical application remains hindered by severe fouling caused by oil and surfactants. This fouling degrades membrane performance, reduces stability, and limits operational lifespan.

In response to these limitations, our research group has developed an innovative amphiphilic membrane capable of effectively separating water-in-oil emulsions. The unique amphiphilic nature of the membrane enables selective permeability and efficient demulsification, offering a more robust and sustainable solution. This development marks a significant advancement in membrane technology, addressing the critical issue of fouling and improving long-term operational performance.

Beyond separation technologies, our research also explores the frontiers of nonlinear optics and the development of processable covalent organic framework membranes (COFMs). These materials are gaining attention as semiconducting platforms with high tunability, porosity, and structural order. Their unique electronic and photonic properties make them highly promising for next-generation device applications, including sensors, optoelectronics, and photonic systems. The combination of our work on emulsion separation and COFM development aims to bridge material innovation with real-world application, advancing both environmental sustainability and high-performance device engineering.

SCHOOL OF COMPUTER SCIENCES

Dr. Aritra Banik

Field of Specialisation: Parameterized Algorithms, Computational Geometry, Approximation Algorithms

During the reporting period (April 2024–March 2025), my research focused on developing parameterized algorithms for classical and generalized graph-theoretic and geometric problems. Two key research outputs during this time were accepted at ESA 2024 and STACS 2025, both premier conferences in theoretical computer science.

The ESA 2024 paper addressed matroidal generalizations of classical graph separation problems, namely Vertex (s, t) -Cut and Vertex Multiway Cut, introducing and analyzing their Independent versions. In this setting, the solution is required not only to separate certain vertex pairs or sets but also to be independent in a given linear matroid over the graph's vertex set. We showed that these problems are fixed-parameter tractable (FPT) when parameterized by the solution size (equal to the matroid's rank). The algorithms are built upon recent advancements in flow augmentation and representative families for matroids, using dynamic programming techniques over flow-path structures. As a consequence, we also obtained new FPT results for Independent Odd Cycle Transversal, and outlined extensions to weighted and edge-deletion variants.

The STACS 2025 paper focused on the Dilation- t Augmentation problem in metric spaces derived from unweighted graphs. We proved $W[2]$ -hardness for $t=2$ in complete metrics and presented a parameterized complexity dichotomy based on structural properties and dilation values. Furthermore, we designed an FPT algorithm parameterized by $k+t+\Delta$, where Δ is the maximum degree of the input graph.

These contributions reflect my ongoing research in extending classical algorithmic frameworks using parameterized and matroidal techniques.

Dr. Anup Kumar Bhattacharya

Field of Specialisation: Algorithms, Theoretical Computer Science

- Published one journal article “Faster Counting and Sampling Algorithms using Colorful Decision

Oracle” in ACM Transactions on Computation Theory in June 2024.

- With my PhD student Pinki Pradhan, we proved tight sample complexity bounds for the moment estimation problem using proportional samples. The work got accepted in the conference CIAC 2025 to be held in June 2025.
- With my PhD student Pinki Pradhan, and collaborator Dr. Ragesh Jaiswal from IIT Delhi, we worked on clustering problems with noisy distance oracles. The work is currently under submission.

Dr. Manoj Mishra

Field of Specialisation: Secure Multiparty Computation

- Communication lower-bounds for computing functions of distributed inputs, securely.

Dr. Subhankar Mishra

Field of Specialisation: Machine Learning

Higher Dimensional Neural Networks

- Super sparse and low parameter neural networks with almost same accuracy with lottery tickets on quaternion neural networks [Convolutions, Transformers and Graph Neural Networks]
- Quaternion neural networks multi-modal fusion architecture that works by fusion of lower embedding space of both text and image for hate speech classification.
- Privacy in Machine Learning
 - One of the first works on structural privacy of graph neural networks along with node and feature level privacy with local differential privacy, StructPriv.
 - We introduced MIPS (Membership Inference on Prototype Selection), the first pri-vacy attack of its kind for examining potential information leakage from prototype sets created for large and sensitive datasets. Two attacks are described: Threshold-MIPS, a powerful threshold-based attack, and ShadowMIPS, a restricted attack using shadow datasets. The attacks utilize witness function scores and knowledge of the target dataset's distribution to infer membership from prototype sets

SCHOOL OF EARTH AND PLANETARY SCIENCES

Dr. Guneshwar Thangjam

Field of Specialization: Planetary composition: Understanding the planetary processes in the early solar system

Understanding planetary formation and evolution, including our unique home - the planet Earth's, is one of the prime science objectives of Planetary Science. In this context, information of planetary surface composition plays an important role to reveal not only the surface characterization but also the sub-surface and interior composition and their formation mechanism allowing to construct the overall evolutionary history. Therefore, study of surface composition and the geology of various planetary bodies are being carried out along with participation and collaboration at national and international platform (i.e., active participation in NASA Dawn mission to the largest asteroids Vesta and Ceres; ISRO Chandrayaan-2 mission to the Moon, etc.). Besides, study of planetary analogue samples and the meteorites or space rocks are also one of the major activities to decipher the early solar physico-chemical and geologic conditions.

Dr. Jayesh Mahendra Goyal

Field of Specialization: Exoplanets, Planetary Atmospheres, Radiative Transfer, Climate Science

Research in Dr. Goyal's NISER Planetary Atmospheres group focuses on observing and interpreting the observations of various exoplanet atmospheres by developing and applying theoretical atmospheric models as well as data reduction pipelines. His group is extensively involved in interpreting the observations from the James Webb Space Telescope (JWST) and the Hubble Space Telescope (HST). Dr. Goyal's group completed the first part of the development of the in-house adaptable planetary atmosphere model SANSAR. The first SANSAR paper applied to interpret the HST and JWST transmission spectra observations of HD-209458b was recently accepted for publication in the *Astronomical Journal*. The major findings of this work, included the most robust constraint yet on the first exoplanet with atmosphere detection (HD-209458b). This work also highlighted that without optical observations the interpretation from just infrared observations of JWST could lead to misleading

constraints. Furthermore, the second SANSAR paper focusing on the emission spectra of exoplanet atmospheres is near completion. In another work with a NISER Integrated MSc student published in *Monthly Notices of Royal Astronomical Society (MNRAS)*, they constrained the albedo and atmosphere properties six JWST targets using the TESS observations and their self-consistent model atmospheres. In the work with his collaborators at Indian Institute of Astrophysics (IIA), Dr. Goyal characterized the atmosphere of an exoplanet for the first time using a telescopic facility based in India. His research group at NISER was particularly involved in the interpretation of these observations. This work was also published in *MNRAS*. In another collaborative work with a PhD student at the University of Amsterdam, they performed a first comparative exoplanetology study of a transiting multi-planet system. This work was published in *Astronomy and Astrophysics Journal*. Dr. Goyal's group is making further developments in SANSAR to interpret observations of any planetary atmosphere, including solar system planets and even Earth.

Dr. Liton Majumdar

Field of Specialization: Exoplanet Atmospheres & Interiors, Planet Formation, Astrochemistry

I lead the *Exoplanets and Planetary Formation Group* at the School of Earth and Planetary Sciences, NISER. Our group investigates how planets form, evolve, and acquire their atmospheric and interior properties by integrating theoretical modeling with cutting-edge observations. Our research spans the domains of exoplanetary atmospheres, astrochemistry, planet formation, and planetary interiors. A major focus is to develop physically rigorous, next-generation modeling tools for understanding the structure and composition of exoplanets and their birth environments. We have developed state-of-the-art tools including **NEXOTRANS** (for exoplanet atmospheric forward and retrieval modeling), **SERPINT** (for modeling planetary interiors), and **PEGASIS** (a disk thermochemical model for simulating physical and chemical evolution in protoplanetary disks).

We utilize these tools to analyze data from premier observatories, such as JWST and ALMA. For example, with JWST spectroscopy and NEXOTRANS, we investigate the atmospheric diversity of exoplanets and

potential signatures of surface-interior-atmosphere coupling. With ALMA and PEGASIS, we model the thermal and chemical structures of planet-forming disks, constraining the distribution of key volatiles like C, N, and O that eventually form planetary atmospheres. Our group is also pioneering the use of **machine learning**, particularly deep learning, to extract insights from large-scale model grids and telescope data. Collaborations include international partners at NASA JPL, Caltech, and various observational teams worldwide.

Looking ahead, we aim to build comprehensive frameworks that connect the formation history of planets to their present-day observable properties, helping to identify potentially habitable worlds and understand their origins within the broader context of planetary system formation.

Dr. Pathikrit Bhattacharya

Field of Specialization: Geophysics

I am working on three projects:

1. With PhD student Ratna Bhagat, we have been able to produce an extremely accurate earthquake catalogue for the Palghar swarm in Maharashtra. This has revealed completely new, multi-fault spanning, migration patterns which correlate with slow slip also discovered by our collaborators in the same location. To our knowledge, this is the first report of a natural, slow slip driven, earthquake swarm anywhere in India.
2. With PhD student Souvik Daripa, I am working on understanding how multi-fault interactions modulate earthquake nucleation and size at instability. We are also working on developing a 3D code for modelling earthquake interactions within an elastic, deformable half-space. I am working individually on developing a theoretical framework for analyzing the evolution of rock friction in response to changes in normal stress. I have derived the new framework, and it can be reliably used to model observed friction phenomenology in the laboratory

Dr. Jaya Khanna

Field of Specialization: Atmospheric Physics

Research in this group focuses on tropical regional climatology, as impacted both by the land surface and atmospheric controls. We are interested in questions such as – what role do forests play in

convective triggering? what are the climatic impacts of landuse change?, what is the role of atmospheric water vapor in causing heat stress over tropical land areas?, what is the role of atmospheric water vapor on convective activity? The underlying theme of most of these studies is to understand the nature and climatic impacts of convection. We investigate tropical rainforests, Himalayan forests and dry tropical land regions to address the above questions. We utilize both observational and modelling tools to investigate these questions. We have recently also started collecting our own surface flux, hydrological and plant physiological data in the Himalayan forests to understand the impact of vegetation on convection in this high topographical setting.

Dr. Priyadarshi Chowdhury

Field of Specialization: Geosciences

My current research is aimed at:

- (a) Understanding how Earth's lithospheric processes have shaped the planet's surface environment and enabled long-term habitability, and
- (b) Investigating the formation and distribution of critical minerals in both terrestrial and extra-terrestrial materials. A major highlight this year was the publication of my article in the high-impact journal of Annual Review of Earth and Planetary Sciences, where I synthesized geological, geochemical, and geodynamic evidence to explore how stable continental landmasses may have formed for the first time on Earth. The emergence of such landmasses is considered a key transition in Earth history, as it enabled the development of a habitable atmosphere through enhanced weathering, nutrient cycling, and stabilization of surface conditions. This work contributes to a growing body of research that links deep Earth dynamics with surface habitability and the evolution of early life-supporting environments.

In parallel, I am working on the mineralogical and geochemical behaviour of critical metal-hosting phases, particularly those containing rare earth elements (REE), niobium, and zirconium. This includes high-temperature mineral assemblages from terrestrial rocks, as well as comparative studies on extraterrestrial materials. Earlier this year, I took part in a Science Meeting organized by ISRO focused on India's upcoming Lunar Sample

Return mission. As part of the meeting, I contributed ideas for how the returned samples can be used to learn more about the Moon's volcanic history, mantle melting conditions, and the distribution of strategic elements. This work ties directly into broader planetary questions about how rocky worlds evolve—and what makes them habitable.

Dr. Surya Snata Rout

Field of Specialization: Cosmochemistry

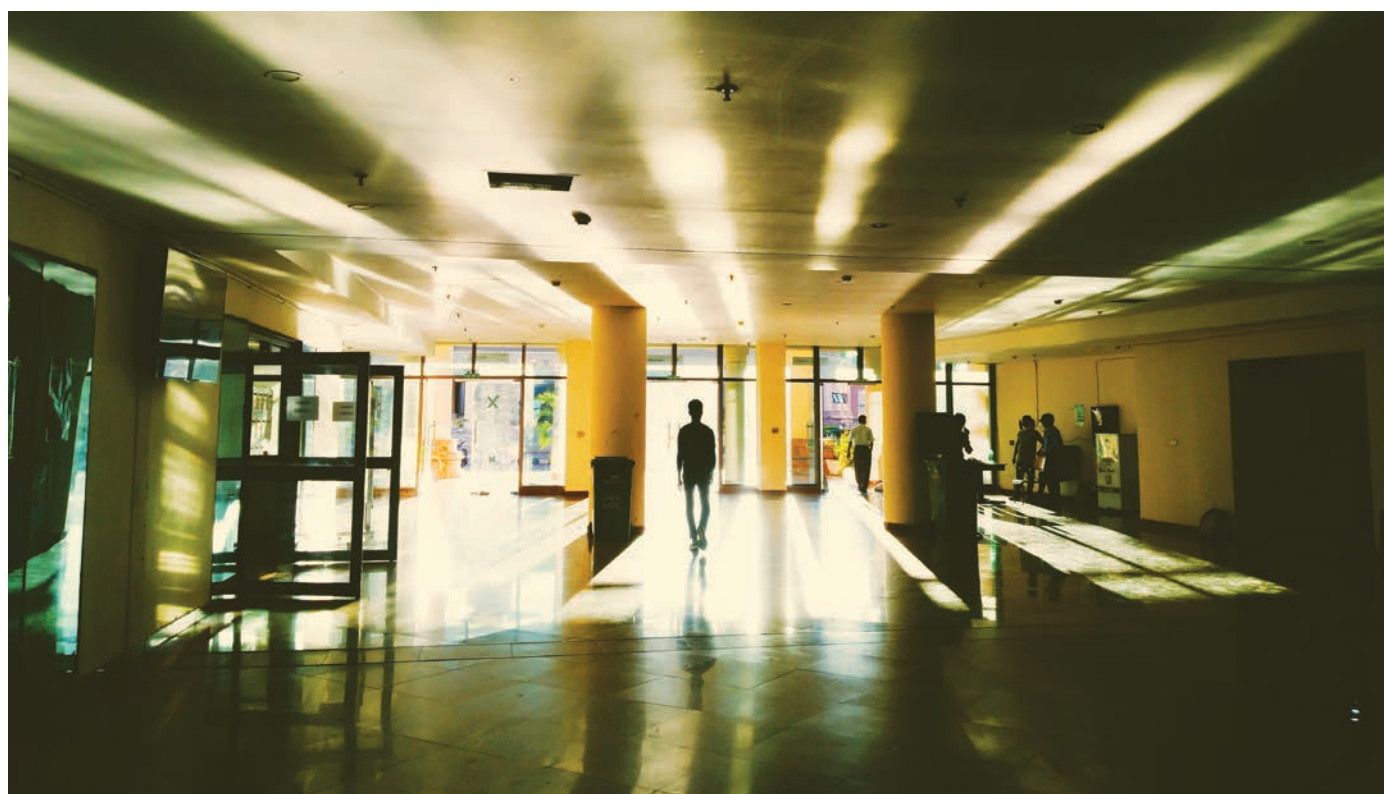
My primary research work is focused on the study of meteorites and extraterrestrial materials for understanding the formation and evolution of the solar system. The following are some of the important works that I have undertaken during the last year:

- (a) Experimental simulations of space weathering on Mercury, C-rich asteroids and the Moon: The work focuses on experimentally simulating the interaction of dust particles and solar wind ions on the surface of Mercury and C-rich asteroids to understand the changes in optical and chemical properties with time. The ongoing and planned studies will provide important information about the causes of darkening of the surface of Mercury, changes in structural state of organics and water bearing minerals on

the surface of C- rich asteroids and the formation process of water on the surface of the Moon.

- (b) Structural state and isotope composition of organics within volatile-rich meteorites: We are studying volatile- and organic-rich meteorite fragments that show characteristics of having formed in the cold outer regions of the solar system. The H- and N-isotope composition of these fragments hold clues to the formation and delivery of volatiles in the solar system.
- (c) Understanding stellar nucleosynthesis and initial condition during formation of the protosolar nebula through study of presolar and refractory grains: Under this work we are studying isotope and chemical composition of rare refractory grains found within primitive meteorites to understand the nature of dust that were the building blocks of the solar system.

Paleo flux of extraterrestrial materials to Earth: The primary aim of this study was to measure the flux of extraterrestrial materials falling on Earth during Permian-Triassic period using sediment dispersed extraterrestrial chromite (SEC) grains from sedimentary rocks. This is the first of its kind study in India using sediments from the Spiti region of Himalayas.



SCHOOL OF HUMANITIES AND SOCIAL SCIENCE

Dr. Amarendra Das

Field of Specialization: Economics of Energy Transition, Environmental Economics, Public Economics, Development Economics

Energy Transition and Climate Commitments

Energy generation, particularly from fossil fuels, is a significant driver of global warming and climate change. To mitigate carbon emissions from energy production, several international agreements have advocated for a shift toward cleaner energy sources. At COP 26, the Prime Minister of India committed to substantially reducing carbon emissions and achieving net-zero emissions by 2070. In this context, it is crucial to examine the key drivers of energy transition in India and identify the most effective economic instruments to facilitate a just transition. Eastern India, endowed with abundant mineral resources, faces unique challenges in ensuring a just energy transition. How can the eastern states of India navigate this path equitably? Our ongoing research seeks to address these critical questions.

Loss and Damage from Natural Disasters

Natural disasters continue to inflict significant damages and losses on households, markets, governments, and ecosystems. At COP 27, participating countries agreed to establish a Loss and Damage Fund. However, existing methodologies for estimating such damages and losses have several limitations. Our research focuses on identifying gaps in these methodologies and improving the estimation of damages, losses, and reconstruction needs. We are trying to understand how climate related uncertainties are impacting the poverty across districts of India. We are trying to understand the impact of heatwaves on the quality of life.

Regional Disparities in Democratic India

Economic theories often suggest that democratic nations promote inclusive growth, while autocratic regimes tend to foster exclusive growth. However, despite being a democratic country, India exhibits pronounced regional disparities. Even states governed by stable administrations experience significant inequality. What explains this paradox? Our ongoing research aims to explore the role of formal and informal institutions in shaping regional disparities within democratic settings.

Ecosystem Conservation and Agroecosystems

Conserving ecosystems is fundamental to achieving sustainable development. Biodiversity enhances the resilience of both nature and humanity. Economic valuation of ecosystem services is essential to recognize the benefits provided by nature and to support the conservation of ecologically sensitive areas. Payment for ecosystem services can incentivize the preservation efforts of ecosystem stewards. Our current research explores the interconnections between agroecosystems and other ecosystems, focusing on the valuation of agroecosystems to support conservation strategies.

Dr. Amarjeet Nayak

Field of Specialization: Postcolonial Studies, South Asian Studies, Translation Studies, Speculative Fiction Studies, Ecocriticism and Cultural Ecology

During the academic year 2024-2025, my research focused on cultural studies and environmental literature, blending interdisciplinary approaches. In cultural studies, I collaborated with Maheshwar Kumar and P.K. Swain on two key publications about Purulia Chhau, a traditional West Bengal dance. Our article, "Ritual, Performance and Spirituality: Revisiting the Performative Cultures of Chaitra Parva and Purulia Chhau in West Bengal" (The Oriental Anthropologist, 2024), explored its ritualistic and spiritual roles. The second, "New Normal, Cultural Shifting and Intellectual Property Rights: An Anthropological Appraisal of Purulia Chhau Dance" (Naad-Nartan: Journal of Dance and Music, 2024), assessed its adaptation to contemporary challenges and intellectual property issues. These works enhance understanding of cultural heritage preservation.

In ecocriticism, I partnered with Abhra Paul on a chapter, "Bioregionalism and Biocultural Region: Reconceptualizing the Human-Environment-Place Interrelationships Beyond the Nature/Culture Dichotomy" (Eco-Concepts, 2024), proposing a bioregional framework for human-environment ties. Our ongoing research, accepted for 2025, includes "The Sundarbans in Amitav Ghosh's Fiction: A Bioregional Perspective" (Jordan Journal of Modern Languages and Literatures) and "Mapping the Environmental Issues in Stephen Alter's Works on the Himalayas: The Anthropocene Concept" (The Wenshan Review of Literature and Culture). These analyse environmental themes in literature, advancing ecological discourse.

Using ethnographic fieldwork and literary analysis, my research bridges cultural and environmental humanities. Future efforts will explore sustainable traditional arts and broaden ecocritical perspectives across literary traditions.

Dr. Pranaya Kumar Swain

Field of Specialization: Public Policy and Governance (Health, Education and Livelihood), Society-Science Interface, Environment and Human-Wildlife Interaction

- Public perceptions of scientists shape how science is understood, trusted, and regarded as a career choice. The Draw-A-Scientist Test (DAST) has been an effective method to explore students' perceptions of scientists and studies using DAST consistently report that students hold a stereotypical view of scientists. We are exploring how undergraduate science students in India perceive science and scientists. The drawings, analyzed using the DAST-C protocol and thematic analysis, indicate that students are moving beyond traditional stereotypes, depicting scientists across diverse disciplines, engaged in various activities beyond laboratory work, including teaching, writing, and communicating science.
- Human-wildlife conflict does not seem to wither away any time soon. Its impact on the wellbeing of people on the margin worldwide remains a concern for conservation scientists, policy makers as well as social scientists. Although tangible losses from such conflicts are well documented, hidden health consequences and community-based mitigation mechanisms remain under-researched. We intend to carry forward the existing work and bring out sustainable mechanisms for wildlife conservation and human-wildlife coexistence in the shared landscape.
- Waste is culturally constructed and hence subjective to individuals who generate and manage it (Pongracz, 2002). With rapid urbanization and population growth resulting in substantial increase in waste generation in urban areas, solid waste management falls short of the desired level and the existing mechanisms do not appear so efficient and adequate (Kaza et al., 2018). There is a need to make substantial improvement in the waste management practices prevailing in the city to raise the standards of health, sanitation and urban environment. We have been investigating various sociological aspects of waste segregation and littering behaviour at household level and intend to bring out evidence-based approach that can be leveraged for public policy.
- Sowa Rigpa, or the Amchi system of medicine that is deeply rooted in Buddhist teachings and religion, is a central concept to Tibetans and Ladakhi. It is a medical system promoting the health of the people and acts as a politico-social mechanism to regulate the daily life and food habits of the people, which are strategies contributing to the social success of society. Medical systems are embedded cultural, social, political, and economic surroundings of the societies they are practiced in. They cannot be considered uncoupled from these parameters, including as well as their geographical and climatic settings as further influences (Besch, Florian 2006). Our research endeavour attempts to understand the role of Amchi medicine in promoting the overall health of the community, to understand the correlation between the Amchi system and its association with the indigenous Identity, and to explore the role of political associations and religious practices on the Amchi medical system.
- Another ongoing research, though at a very nascent stage, investigates the intricate interplay between climate change, global sea-level rise (SLR), and the impacts of sea-level rise on the coastal regions of India. Through an interdisciplinary approach, we attempt an overview of the global consequences of SLR on coastal communities, exploring economic, social, and environmental impacts on agriculture, communities, and coastal areas. Sea level rise and climate change are causing significant challenges to coastal habitats and human health, such as deforestation, fertilizer runoff from agricultural lands, and untreated sewage (Barbier et al., 2011). With this backdrop we intend to examine the displacement of communities, impact on food security, infrastructure, tourism and ecological loss based on a comprehensive empirical study. The study emphasizes sustainable preservation of coastal ecosystems and the development of climate-resilient infrastructure, and aims to offer a detailed understanding of the evolving landscape of coastal livelihoods, providing valuable insights for adaptive strategies, policy formulation, and sustainable development. Ultimately, it aims to contribute to the scientific discourse by shedding light on the complex dynamics between climate change, SLR, and coastal communities, guiding efforts toward a resilient and sustainable future.
- The experiences of vaccination programmes worldwide during the COVID-19 pandemic tell

us that massive vaccination still remains one of the most important preventive measures for a virus of this kind. The crisis of such extraordinary magnitude required fast-tracking and production of vaccines at an unprecedented pace and rolling out mass vaccination programmes for making rapid immunization possible. Albeit small in number, existing research suggests that there is a complex web of social factors embedded within the community structures that adversely shape perceptions and acceptance of vaccines. Muridzo et al. (2023) discussed four social determinants of COVID-19 vaccination: vaccination priority groups, vaccination hesitancy due to myths, social exclusion, and corruption. To promote inclusive and sustainable vaccination, it would be beneficial to identify and understand the empirically grounded and evidence based social determinants and their association with hesitant individuals (Waszkiewicz, et al., 2022). The objectives are two-pronged: (i) to understand the social determinants of vaccine acceptance or resistance and (ii) to propose structures for effective communication and sustainable vaccine campaigns. The empirical study is envisaged to generate implementable insights and policy recommendations from quantitative and qualitative data gathered through survey and interviews among respondents from representative population cutting across demographics and population segments. Envisaged outcomes include: to effectively promote vaccination, the government should extend vaccine education, and to reduce the level of vaccine hesitancy or reluctance. The survey results may help public health authorities to prepare a more effective communication materials, and vaccination campaigns and guidelines.

Dr. Joe Varghese Yeldho

Field of Specialization: African American Literature

The fundamental question about inhabiting physical space is trying to understand how we belong. And more importantly how do we cope with our lack of belonging to places or sites that are designed to heighten our anxiety about this question. African American fiction stages a topography where this traumatic realization has been extensively explored. The recent novel by Colson Whitehead, *Harlem Shuffle* (2021), detailing the life of Ray Carney a small time fence “peddling” the detritus given up or misappropriated by black lives in 1960s Harlem, looks into the nature of belonging as the capacity to transgress the bounds of legality.

The narratives that comprise this study offer a spatial critique of terms such as fact and evidence, residing and occupying, or sound and noise, or even what it means to walk or be a pedestrian. They map the streets and the buildings of Harlem from a time that marks the transition of its Heideggerian ‘locales’ to spaces of material disenfranchisement. Harlem in the civil rights era ironically serves as a cautionary tale of a coming together of people and their lived environment that inadvertently betrays our aspiration to belong. It anticipates the hollowing out of several such urban communities over time, as they repeatedly fend off the need to ‘build’ spaces populated with stuff, and sound, and routines that mask our placelessness, amongst buildings in whose shadows we contemplate our lack of a true home.

Dr. Rooplekha Khuntia

Field of Specialization: Psychology

Recent research focused on delving into the construct unconditional self-acceptance, created an instrument to assess it and investigated its correlates in both personal and occupational spheres of life. The primary findings indicated three principal themes associated with unconditional self-acceptance such as, self-awareness, a positive view of self and others, and social comparison. A rigorous test development procedure was employed to assess and the results demonstrated a robust model fit for a two-factor model. Other psychometric properties of the instrument were examined and results supported the two-factor model of unconditional self-acceptance. Finally, unconditional self-acceptance was found to be a significant predictor of quality of life, work engagement and OCB. Supporting the JD-R model our study revealed that unconditional self-acceptance plays a significant role in enhancing quality of life and the level of work engagement, consequently reducing the probability of experiencing job- related burnout.

Research is underway to provide a visual tool for understanding institutionalized children’s attachment pattern and emotional comprehension. Childhood care is most important for development. In the absence of primary caregivers, institutions affect vulnerable children’s emotional development. Despite an increasing number of children needing care and protection in our country, a decent foster care system is still in its infancy, increasing dependency on institutional care. Given the psychological importance of quality caregiving, this study examines how sociodemographic and psychosocial factors from the child, caregivers, and institutions affect emotional development.

SCHOOL OF MATHEMATICAL SCIENCE

Prof. Brundaban Sahu

Field of Specialization: Number Theory

We use differential operators to study arithmetic of Fourier coefficients of modular forms, and also explicitly evaluate convolution sums involving divisor functions of different types. Another direction, we prove non-vanishing of the Poincare series and certain L-functions associated with Jacobi forms of matrix index.

Dr. Anil Kumar Karn

Field of Specialization: Order theoretic Functional Analysis

I have studied a geometric characterization of order unit spaces. Presently, we are focusing of Lipschitz operator ideals and their generalization.

Dr. Binod Kumar Sahoo

Field of Specialization: Incidence Geometry

We study blocking sets in $PG(n, q)$ with respect to varying subsets of the line set of $PG(n, q)$. In particular, we are interested to (a) determine the smallest cardinality of (a) blocking set, and (b) characterize, if possible, all blocking sets of that minimum cardinality for line sets with nice geometric properties with respect to a quadric in $PG(n, q)$. We also study certain linear codes associated with the finite symplectic polarspace $W(2n-1, q)$, where q is even.

Dr. Deepak Kumar Dalai

Field of Specialization: Cryptography and Boolean function

- Study of cryptographically significant Boolean functions.
- Design and analysis of Coding theory based post-quantum cryptography.

Dr. Jaban Meher

Field of Specialization: Number Theory

In this period, I worked on the zeros of generalized Ramanujan polynomials. In a joint work with M. Charan and S. Pathak, we have proved that all non-real zeros of generalized Ramanujan polynomials lie on the unit

circle. This settles a conjecture of Maji and Sarkar. This paper is submitted for publication.

Dr. Kamal Lochan Patra

Field of Specialization: Algebraic graph Theory

- **Graphs associated with groups:** We study properties of several types of graphs associated with different finite groups.
- **Centrality in connected graphs:** We study different central parts of connected graphs and some related indices

Dr. Manas Ranjan Sahoo

Field of Specialization: Differential Equations

- We constructed a Hopf-Lax type explicit formula for a particular type of balance law for the initial and boundary value problem.
- Studied the asymptotics for the viscous Burgers equation under impulsive forcing.
- Studied the existence of a Cauchy problem for a class of forced Burgers equation

Dr. Panchugopal Bikram

Field of Specialization: Operator algebra and ergodic theory

In this period, we have obtained several interesting results both in von Neumann algebra and ergodic theory. With K. Mukherjee and C. Tamahnkhar, we have classified type I von Neumann algebras with respect to semifinite weights. In ergodic theory, with D. Saha, we have proved that the time average is the same as the space average for a group metric measure space.

Dr. Ritwik Mukherjee

Field of Specialization: Differential Geometry

I work in the topic of enumerating singular curves in projective spaces. A notorious obstacle to achieving this goal is the problem of excess intersection theory. Recently (along with my collaborators), we found a new way of looking at enumerative problems, which can often bypass the issue of excess intersection theory. We have been able to enumerate rational curves with an m -fold point for a general m , when in the past this

question had only been solved for $m=3$; even the case of $m=4$ was essentially unapproachable.

Dr. Sanjay Parui

Field of Specialization: Harmonic Analysis on Euclidean spaces

Through the well-established connection between the Fourier transform and the partial derivative operator, Dunkl operators introduce a new operator that generalizes the classical Fourier transform, called the Dunkl transform. Dunkl theory is a generalization of Fourier analysis and special function theory related to root systems and reflection groups. Dunkl operators allow one to build up a framework which is parallel to that of classical Fourier analysis. Over the past thirty years, numerous classical harmonic analysis theories concerning singular integrals, multiplier operators, and potential-type operators have been explored in the Dunkl framework. However, there has been limited investigation into multilinear operators or weighted inequalities in this setup.

Dr. Anupam Pal Choudhury

Field of Specialization: Partial Differential Equations

In a recently published work, we explored high-frequency stability estimates for the determination of the zeroth-order perturbation of the biharmonic operator with constant attenuation from the linearized partial Dirichlet-to-Neumann map when part of the boundary is inaccessible and flat. Our results suggest improvement of the stability with an appropriate choice of frequency.

Currently, we are working towards exploring similar phenomenon in the full Dirichlet-to-Neumann map case.

Dr. Dinesh Kumar Keshari

Field of Specialization: Functional Analysis

An approach to robust stabilization developed by control engineers leads to a variant of the classical Nevanlinna-Pick interpolation problem for matrix-valued analytic function in the unit disc. The variant involves cost function on the space of m by n matrices, which generalize the operator norm but are not themselves norm. This new interpolation problem is called the μ -synthesis problem. A drawback of this elegant theory of robust stabilization is that there is, and to date, no good algorithm for the solution of the resulting interpolation problem, and so there is strong motivation

for mathematical analysts to try to provide a theory of μ -synthesis problems and effective numerical methods for their solutions. We study the μ -synthesis problem from a several complex variables viewpoint. We have developed an approach to μ -synthesis that depends on a detailed study of the complex geometry of some particular domains associated with special cases of the cost function μ . It has to be admitted that so far the results of this line of enquiry fall sort of the theory which control engineers want, so it is a worthwhile endeavor to pursue it further in the hope of developing an adequate theory for use in control theory. We study generalized tetrablocks and provide a sufficient condition for a Schwarz Lemma for this domain. We also generalized other substantial results, including some advanced multivariable operator-theoretic results.

Dr. K. Senthil Kumar

Field of Specialization: Transcendental Number Theory

During this period, I worked on the following three topics:

- Algebraic independence of the values of Weierstrass zeta and sigma functions by Gelfond-Schneider algebraic independence method.
- Algebraic independence of the values of quasi-periodic and theta functions
- Transcendental numbers arising from the zeros of E_2

Dr. Kaushik Majumder

Field of Specialization: Combinatorics, Probability Theory

In a joint work with PhD student Sayan Gupta, we figured out some bounds of specific Ramsey numbers. In addition, I am working on two projects. The first is with Suprio Bhar from IIT Kanpur, where we broadly discuss several applications of probabilistic techniques in combinatorics. The second one is with Sushil Gorai, from IISER Kolkata; here we are interested in chaos theory.

I work in Teichmüller theory and Enumerative geometry. Both topics are related to Moduli of Riemann surfaces and have connections with various different areas of mathematics and theoretical physics.

Dr. Nabin Kumar Jana**Field of Specialization: Probability Theory**

Statistical Physics: Generalised random energy model was introduced to study hierarchical structure of energy landscape shown by mean-field models in statistical physics. We are working on different limit theorems for such model. The result predicted is reminiscent to that of Landau theory or renormalisation group flow in physics.

Probabilistic Methods: When a non-probabilistic statement in mathematics is proved using the probabilistic set up, it is known as probabilistic methods. Recently, along with my colleague Dr. Kaushik Majumder, we are working on to widening these probabilistic proof for updating the bounds of Ramsey Numbers.

Economics: 80:20 Pareto law in wealth distribution is a well-known fact in Capitalism whereas equal distribution is the key in Marxism. Progressive utilization theory is a mixture of both of them in a decentralized way where capitalistic 80:20 or similar such distribution is allowed after ensuring the basic minimum requirement to all. We are working on to build a prototype of probabilistic model for such wealth distribution given the available resources, number of people, basic minimum requirement and Pareto index.

Metaphysics: In Indian philosophy, Supreme Consciousness is considered to be the material cause. Thus to understand what is 'matter', the study of Supreme Consciousness can be the key to answer many unresolved questions related to it. With the help of distribution theory and quantum physics, we are trying to explore these possibilities.

Dr. Ramesh Manna**Field of Specialization: Harmonic Analysis**

I work in Harmonic analysis and am interested on operators for which curvature plays an important role. My research is based on studies of local smoothing estimate of Fourier integral operators, Factorization and heat semigroup in Modulation spaces. The theory of Fourier integral operator has gained a lot of importance due to its connection to PDE, number theory, geometric measure theory and many other areas of mathematics. I also worked in the Schrodinger equation with cubic convolution nonlinearity which has attracted a great deal of interest from mathematical quantum physics.

Dr. Chitrabhanu Chaudhuri**Field of Specialization: Complex Geometry**

- Geometric representations of Surface braid groups, (joint with Pranav Haridas of KSoM and Saswati Mukherjee at NISER).
- Computation of minimal regular and semistable model for modular curves $X_0(p^3)$, (joint with Debargha Banerjee at IISER Pune).
- Counting plane curves with multiple singularities (joint with Ritwik Mukherjee at NISER).

Dr. Krishanu Dan**Field of Specialization: Algebraic Geometry**

My work is related to the stability of Syzygy bundles. We have studied the Stability of Kernel Sheaf on Nodal Curves (jointly with Suratno Basu of IAI, TCG Crest and Aanjaneya Rath at NISER).

Dr. Rekha Biswal**Field of Specialization: Representation theory of affine Kac-Moody algebra**

It is a fundamental problem in representation theory to find the decomposition of tensor product of two irreducible integrable highest weight modules into direct sum of irreducibles over symmetrizable Kac-Moody algebras. Although there are many different algebraic, geometric and combinatorial formulae available in the literature to find out the multiplicities of each irreducible module in the decomposition, even figuring out when an irreducible module appears with non-zero multiplicity is challenging. There are several papers in the literature which prove the existence of a family of irreducibles appearing in the decomposition. However the complete description of all the irreducible modules appearing in the decomposition is not yet known. In my recent joint work with Professor Stephane Gaussent, I have discovered a new family of irreducible components that appear in the tensor product decomposition with non-zero multiplicity. As an application to that, we prove several results providing supporting evidence to the Schur positivity conjecture which is a longstanding open problem that was conjectured almost 20 years ago. Our approach to Schur positivity conjecture is different from the fusion product approach that is used in the literature. Moreover, we prove Schur positivity conjecture for simple Lie algebras in full generality

under additional hypotheses. We prove several cases of Kostant conjecture and Wahl conjecture. I plan to continue using my ideas to prove the Schur positivity conjecture in full generality in the next few years.

Dr. Sudhir Kumar Pujahari

Field of Specialization: Number Theory

- In a joint work with K. Ono, H. Saad and N. Saikia, We consider a special family of Gaussian hypergeometric functions whose entries are cubic and trivial characters over finite fields. The special values of these functions are known to give the Frobenius traces of families of Hessian elliptic curves. Using the theory of harmonic Maass forms and mock modular forms, we prove that the limiting distribution of these values is semi-circular (i.e. $SU(2)$), confirming the usual Sato–Tate distribution in this setting.
- In a joint project with B. Kane and Z. Yang, we investigate a variant of the bias conjecture for second moments, in the setting of elliptic curves over finite fields whose trace of Frobenius lies in a fixed arithmetic progression.
- In collaboration with K. Bringmann and B. Kane, we prove that the trace of Frobenius, restricted to arithmetic progressions with in certain families of elliptic curves, is equidistributed with respect to the Sato–Tate measure. This result is achieved by evaluating all moments of Hurwitz class numbers.
- In a joint work with N. Saikia, we recover the classical result of Gauss that there exist imaginary quadratic fields with arbitrarily large class number via the study of the digits of ℓ -adic expansions of $1/n$ for certain composite integers n .
- In joint work with P.P. Sathpathy, we have investigated the number of scattering geodesic (say n_q) of given sojourn time.

Dr. Sumana Hatui

Field of Specialization: Representation theory of groups

The foundation of the general theory of projective representations was laid by Schur in a series of papers. Projective representations have significant implications in various branches of mathematics and physics, particularly in quantum mechanics and coding theory.

Our recent questions are as follows.

- Describe the irreducible projective representations of different class of groups.
- One of the classical and challenging problems in the ordinary representation theory of finite groups is to determine the smallest positive integer n such that G embeds into $GL(n, \mathbb{C})$. We extend this notion to projective general linear groups, i.e., to find the smallest positive integer n such that G embeds into $PGL(n, \mathbb{C})$. One can further ask questions the other way around for a fixed n , which finite groups occur as subgroups of $PGL(n, \mathbb{C})$.
- We say two groups are related if there is an isomorphism between their twisted group rings. We study the Twisted group ring isomorphism problem (TGRIP) which asks to find the equivalence classes of groups under the above equivalence relation. The twisted group ring isomorphism problem (TGRIP) is a variation of the classical group ring isomorphism problem, boils down to the study of the Schur multiplier and projective representations of groups.

Ongoing work with my PhD students:

1. On Twisted group ring isomorphism problem for special p -groups (with Sahanawaj Sabnam).
2. Embedding degree of a group in projective general linear group (with Poonam Nayak).

Submitted:

1. On Projective representations of special p -groups. (submitted)
2. On Projective representations of direct product of groups. (submitted)

Dr. Tushar Kanta Naik

Field of Specialization: Algebra (Group theory and related topics)

The virtual braid group, the virtual twin group, and the virtual triplet group are extensions of the symmetric group, which are motivated by the Alexander–Markov correspondence for virtual knot theories. The kernels of natural epimorphisms of these groups onto the symmetric group are the pure virtual braid group, the pure virtual twin group, and the pure virtual triplet group, respectively. We investigated their automorphisms, commutator subgroups and crystallographic quotients.

SCHOOL OF PHYSICAL SCIENCE

Prof. Bedangadas Mohanty

Field of Specialisation: High energy and dark matter physics

Group Members:

Dr. Ranbir Singh	Mr. Sudipta Das
Dr. Varchaswi K. S. Kashyap	Mr. Bappaditya Mandal
Ms. Mouli Chaudhuri	Mr. Sawan
Mr. Prottay Das	Ms. Sarjeeta Gami
Ms. Swati Saha	Ms. Dipanwita Mandal

Research Overview

The group is involved in research activities related to heavy-ion physics experiments, ALICE at Large Hadron Collider (LHC), CERN, STAR experiment at Relativistic Heavy Ion Collider (RHIC), BNL, CBM experiment at Facility for Antiproton and Ion Research, GSI, and the dark matter experiment SuperCDMS. We are involved in both physics analyses and detector hardware and our main contributions are discussed below.

ALICE

In ALICE, our research focuses on several key aspects of heavy-ion collisions, including event-by-event fluctuations and correlations of conserved charges and mean transverse momentum, which provide insight into the QCD phase structure, initial-state geometry and dynamical evolution of the system. Recently, we have measured the correlations among net-charge, net-kaon, and net-proton numbers, considering net-proton and net-kaon as proxy of net-baryon and net-strangeness numbers. The centrality dependence of these correlations reveal significant deviations from Poisson expectations, highlighting the roles of resonance decays and local conservation of charges. We investigate anisotropic flow and radial flow observables to understand the collective behavior and the transport properties of the quark-gluon plasma (QGP). We have measured the transverse momentum-differential radial flow of identified particle species for the first time, which can provide new constraints on the bulk viscosity of QGP and QCD equation of state. The elliptic flow of K^0 resonance is measured for the first time in heavy-ion collisions with the high-statistics data from the LHC Run3 phase. We also explore ultra-peripheral collisions (UPC) as a tool to investigate photon-induced processes

and nuclear structure at high energies. Furthermore, we are also looking for the exotic hadronic states, which can offer new perspectives on QCD-bound systems beyond conventional mesons and baryons. Signal of a glueball candidate, and exotic state made of gluons only is measured in pp collisions at $\sqrt{s}=13.6$ TeV. Altogether, these efforts contribute to a comprehensive understanding of the strongly interacting matter created in high-energy nuclear collisions.

STAR

In STAR, our physics aim is to explore the QCD phase diagram and look for signs of a possible QCD critical point—a special feature in the phase diagram of QCD matter where a smooth crossover turns into a sharp 1st order phase transition. Fluctuations measured via the higher moments/cumulants of event-by-event multiplicity distributions of net-proton, net-kaon and net-charge are expected to show large fluctuations near the QCD critical point. Currently, we have performed precise measurement of net-proton cumulants and proton factorial cumulants and their ratios from BES-II data for Au+Au collision at $\sqrt{s_{NN}}=7.7 - 27$ GeV. and a paper draft based on these results is submitted to Physical Review Letters.

SuperCDMS

SuperCDMS is a direct dark matter search experiment that uses cryogenic solid state detectors to look for nuclear recoil signals from dark matter. In SuperCDMS, NISER is currently involved in detector calibration, characterization, testing and background studies.

1. We are currently working on extending the background models to set limits on the existence of ALPs (Axion Like Particles) and dark photons.
2. The next generation HVeV (High Voltage Electron Volt) detectors are being studied using the Compton step analysis. The analysis is under internal collaboration review.

MINER

The Mitchell Institute Neutrino Experiment at Reactor took data in the year 2022-23. We are currently analyzing the data from the experiment for signals of coherent elastic neutrino nucleus scattering and axion-like particles.

Hardware activities

1. *Resistive Plate Chambers or Plastic scintillators for ALICE3 MuonID system:* The ALICE experiment at CERN is planning to upgrade its detector in the coming years. One of its crucial subsystems is the muon ID system. We are studying the feasibility of using Resistive Plate Chambers and plastic scintillators with Silicon Photomultipliers for the system. Simulation studies are being done on an RPC based geometry for the system.
2. *ALICE upgrade project Forward Calorimeter (FoCal):* A forward calorimeter is proposed in the ALICE upgrade for Run 4. ALICE-India collaboration has intended to contribute the electromagnetic part of the calorimeter. Our group is participating in the R&D of n-type silicon pad array detectors. A fully functional Si-detector lab has been established at NISER. We have fabricated an 8x9 n-type Si-PAD detector in collaboration with Bharat Electronics Ltd., Bengaluru. These detectors are successfully tested with LED and Sr-90 sources in the NISER lab and with charged pion and electron beams at Proton Synchrotron (PS) facility at CERN. Two papers based on the detector design, fabrication, lab test, and detector performance in the test beam are now archived.

The ALICE experiment will undergo two major upgrades for Run4. One of its detector upgrades where our group is contributing is Forward Calorimeter (FoCal) to be placed in forward direction at 7 m away from the collision point. The FoCal will be built using a combination of Si pad detector array (8x9) and tungsten absorber. In collaboration with Bharat Electronics Ltd. (BEL) and Semiconductor Laboratory (SCL), Chandigarh, our group has developed 8x9 Si pad array detectors based on n-type and p-type substrate wafers, respectively. The n-type R & D was initiated during 2022-23 where our group has successfully completed the R & D and published two articles in Journal of Instrumentation.

Later the ALICE FoCal collaboration decided to use p-type semiconductor due to its radiation hardness and limitation from the detector readout chip (HGCROCV3). In this context our group has signed an R&D agreement with SCL in December 2023 to develop p-type pad array detectors. In Sept. 2024 SCL has successfully developed the first p-type pad array which our group has tested first at NISER Si lab using Sr90 electron source

and later using 2 GeV to 4 GeV electrons and 10 GeV pions at proton synchrotron (PS), CERN during Nov. 2024. The test campaign at CERN was very productive and the outcome of these tests is being documented in the form of one research paper which will be submitted soon for publication. In near future, we plan to build a FoCal-E prototype of 18 layered sandwich structure of p-type Si pad array and tungsten to be tested at SPS, CERN in Sept. 2025.

Prof. Sanjay Kumar Swain

Field of Specialisation: Experimental High Energy Physics

My primary research activity involves physics data analysis in CMS and NOvA neutrino experiment. I work in flavor physics (B-decays) and search for SUSY using the data collected by the CMS experiment. MY work resulted in several papers where me and my students are primary authors. In fact, we lead this effort from the Indian side. Apart from CMS, my work involves looking for magnetic monopoles using NOVA detectors. This is something no one has observed yet. The search still continues. The second project in NOvA is to explain the observed cosmic multi-muon seasonal variation with the data collected by NOvA. There have been several papers published by more than 5-7 experiments in the last several years, however there is no concrete explanation on why we see different seasonal variation for single and multi-muon events. Finally, we contribute significantly to neutrino oscillation parameters measurements which is the primary aim of the NOvA neutrino experiment. I will continue working in CMS as well as NOvA (and DUNE experiment in near future).

Prof. Subhankar Bedanta

Field of Specialisation: Magnetism nanoparticles and nanostructures, magnetic thin films, spintronics, organic spintronics, antiferromagnetic spintronics, skyrmions, domain wall and dynamics

Understanding and engineering spintronic materials is crucial for next generation technologies. In this academic period, our focuses were on the study of flexible spintronics with mechanically flexible thin film-heterostructure, spin-to-charge conversion through spin pumping, Skyrmion-based topological spin textures and study of domain wall motions/dynamics. One of our studies revealed how peeling-induced deformation in Co/Pt and Co/Pd films on Kapton alters magnetic domain behaviour and increases resistivity that are

crucial insights for robust flexible spintronic devices. Our study with magnetization dynamics has shown that incorporating oxidized copper layers (CuOX) into CoFeB/W structures can reduce magnetic damping, attributed to orbital Rashba Edelstein effects at interfaces, offering new avenues for efficient spin-to-charge conversion. Also enhanced spin pumping and magnon-magnon coupling was demonstrated in another system like a coupled ferrimagnetic garnet bilayers (YIG/TmIG), where interfacial exchange coupling significantly boosted spin current, suggesting potential for high efficiency magnonic systems. A significant spin-to-charge conversion was observed in sputtered MoS₂/CoFeB bilayers, and self-induced inverse spin Hall effects were reported in LSMO films, confirming manganites as intrinsic spin-current generators. This study was selected as an Editor's Choice in Physical Review B. Molecular hybridization using C60 molecules on β -W layers led to anti-damping and over 100% enhancement in spin-to-charge conversion, emphasizing the value of molecular engineering in spin-orbit coupling modulation. Skyrmion-based topological spin textures in multilayer Pt/Co/Ir/Co/Pt films are observed through transport and MFM measurements, highlighting the tunability of interlayer exchange for skyrmion nucleation. The study of domain wall motion in ultrathin perpendicular magnetic anisotropic Pt/Co/Pt systems is found to be ~ 32 nm/s which can be relevant for low-power racetrack spintronic memory and logic. In future we aim to explore (i) more about orbitronics in low Spin-orbit coupling materials such as Ti, Cr etc., (ii) enhancing Spin torque efficiency via interface engineering, (iii) achieving field free switching for future spintronics memory applications and (iv) Tuning the magnetic properties of magnetic thin films by application of strain.

Dr. Ajaya Kumar Nayak

Field of Specialisation: Condensed Matter Experiment

The group research in the last one year is mostly concentrated on magnetic skyrmions in different systems. In the following we discuss some of the important works carried out in this direction.

Magnetic skyrmions are topologically protected vortex-like objects which can be exploited to encode and manipulate information at the nanoscale in memory

and logic devices. These topological non-trivial magnetic objects are generally stabilized in chiral magnets with bulk Dzyaloshinskii-Moriya interaction (DMI). Certain centrosymmetric magnets with uniaxial magnetic anisotropy (UMA) can also give rise to the formation of skyrmions due to the competition between UMA and dipolar energy. In one of our recent works, we demonstrate the role of competing magnetic exchange interaction in the stabilization of magnetic skyrmions and type-II bubbles in centrosymmetric systems. For this study we take MnFe_{1-x}CoxGa as the model system to tune between RKKY dominated ferromagnetic (FM) exchange and super-exchange mediated antiferromagnetic (AFM) interaction in the system. Using Lorentz transmission electron microscopy (LTEM), we demonstrate the role of competing magnetic exchange-induced in-plane magnetic moment in the formation of nontopological type-II magnetic bubbles in the system. The work has been published in ACS Nano 19, 3614 (2025).

In another work related to magnetic skyrmions, we utilize Neel and Block DMIs to stabilize hybrid skyrmions. These hybrid skyrmions possess a great importance for racetrack device-based applications as they can move along the current direction without any skyrmion Hall effect (SkHE). We introduce a gradient variation of bulk and interfacial DMIs, which results in a parabolic trajectory of the skyrmion motion, thereby allowing us to find a critical DMI ratio with almost zero SkHE. Using a novel approach involving the engineering of a racetrack with strategically placed step DMI regions, we achieve a meticulous control over the size and speed of the hybrid skyrmions. The work has been published in J. Phys. D: Appl. Phys. 57 385001 (2024).

Dr. Amaresh Kumar Jaiswal

Field of Specialisation: High Energy Nuclear Physics

A broad area of research lies in the theoretical aspects of relativistic dissipative hydrodynamics and its application in high-energy nucleus-nucleus collisions. We have worked on many projects related to this topic as well as on several aspects of phenomenology of relativistic heavy-ion collisions. Further, we are currently diversifying our research to neutron star physics and physics of the early universe.

Dr. Anamitra Mukherjee

Field of Specialisation: Theoretical Condensed Matter Physics

I am working on four broad directions:

- Finite temperature properties of strongly correlated materials using a combination of static Aux. Fields and tensions at finite temperatures. This year, I have successfully extended the approach to (1) incorporate quantum fluctuations at low temperatures, which was a drawback of the method, and (ii) develop applications for interacting many-body systems with non-trivial band topology.
- Previously, I have developed a new approach to studying interacting fermions and spins on lattice systems, “Fock scape recursive Green’s functions.” We have now found much-improved memory scaling by incorporating information-theory-based breadth-first search algorithms. We are now applying the approach to study many-body localization phenomena.
- We have now progressed much further in simulating Resonant Inelastic spectroscopy (RIXS) of spin trimer chains, where we have predicted several signals, including novel fractionalization and composite spin-excitations that can be potentially observed in RIXS. Experimental control of these new modes can lead to control of spin transport vital for spin-based circuits.
- We are investigating how multi-spin excitations in integrable spin systems can lead to deconfined fermion excitations using the Density matrix renormalization group (DMRG).

Dr. Chethan N. Gowdigere

Field of Specialisation: String theory

Currently working in various area of string theory especially AdS-CFT correspondence.

Dr. Kartikeswar Senapati

Field of Specialisation: Superconductivity and magnetism

Our primary focus is to develop various superconducting Josephson devices for implementation in spin physics in condensed matter systems. In this direction currently we are working on fabricating and characterizing Josephson junction with spin orbit couple material. We also work

on superconducting nanowires of NiBi₃ and attempting to develop single nanowire based Josephson Junctions. In future we would like to extend the knowhow to research in superconducting qubits.

Dr. Nishikanta Khandai

Field of Specialisation: Astrophysics and Cosmology

Published a paper on the effect of peculiar velocities on Hubble’s constant measurements.

The following are the projects which I am working on:

1. The Gravitational Wave Signal from Supermassive Blackhole Mergers.
2. The stellar mass function of gas rich galaxies in the local Universe.
3. The scatter in the Halo Mass - HI Mass relation and its effect on the clustering of gas-rich galaxies.
4. The Universality of halo shape distributions.
5. The formation of high redshift galaxies in the NINJA (NISER-IUCAA New Simulations of JWST Galaxies) Simulation Suite.
6. The effect of feedback on the spatial distribution of gas and dark matter in halos.

Dr. Prasanjit Samal

Field of Specialisation: Density Functional Theory, Electronic Structure Theory, Theoretical Condensed Matter Physics, Computational Materials Science

This year, we have successfully completed many ongoing projects ranging from the new dielectric-dependent range-separated hybrid density functionals and orbital-free density functionals to applying these functionals to investigate electronic, magnetic, and optical properties of a wide range of materials. These functionals were evaluated against computationally rigorous and more accurate methods, showing that our developments offer an excellent balance of accuracy and efficiency and can be widely adopted by the computational materials science community.

Our work on dielectric-dependent hybrid (DDH) and meta-GGA functionals demonstrated their predictive power for accurately determining the electronic and optical properties of chalcopyrite semiconductors, rivaling many-body perturbation methods like G₀W₀ and the Bethe–Salpeter equation, but at significantly reduced computational cost.

Employing different rungs of density functionals, we explored band gap tuning, optical bowing, and photocatalytic properties of low-dimensional and strained heterostructures. And show that SCAN and r^2 SCAN functionals show excellent agreement with experiments. These two functionals are also used to study photocatalytic water-splitting and environmental stability.

With the help of the jellium-with-gap model, we proposed an orbital-free nonlocal kinetic energy functional without any parameter fitting. This particular functional shows significant improvement in both metals and semiconductors in comparison to previously developed functionals.

In our studies on thermoelectric materials, we pinpointed Ag-based chalcopyrites and mechanically strained half-Heusler compounds as strong candidates, exhibiting figures of merit (ZT) greater than one. This was achieved by integrating DFT calculations with transport predictions from the Boltzmann framework, complemented by detailed assessments of phonon scattering mechanisms.

We also showed that defects can offer a practical route in tailoring electronic, optical, and spin-related characteristics which can lead to enhanced functionality in future device applications. In this context, we demonstrate external modifications, such as ion implantation and ambient oxidation, can alter the structure and magnetism of nanoscale materials like TiO_2 and C_2N .

Dr. Prolay Kumar Mal

Field of Specialisation: Particle Physics, Collider experiments, Compact Muon Solenoid (CMS), Large Hadron Collider (LHC), Silicon detector, HL-LHC Upgrade, Future Circular Collider (FCC), Top quark, Higgs boson, New Physics searches

Prolay K. Mal and his group members are actively working under the CMS collaboration at the Large Hadron Collider (LHC), CERN, Geneva, Switzerland. He has been leading the searches for the vector-like quarks (VLQ) which are predicted by several new physics models to solve the Higgs Hierarchy problems addressing the electroweak symmetry-breaking mechanism. In addition, he has been pursuing several precision measurements involving the Higgs boson and top quark using the proton-proton collisions dataset

recorded during LHC Run 2 and Run 3 operations. For the HL-LHC upgrade of the CMS, he has been leading the Indian effort on the silicon strip tracker assembly and integration covering the barrel region. The assembly and integration of such a sophisticated silicon strip tracker is being pursued by the Indian HEP community for the first time, and several modules have already been produced and successfully tested at the tracker laboratory in NISER. Dr. Mal aims to design and develop future generation of the tracking detectors utilizing the expertise gained/developed through the CMS HL-LHC tracker activities at NISER.

Dr. Shamik Banerjee

Field of Specialisation: String Theory and Quantum Field Theory

My research is focused on scattering amplitudes, flat space holography and its realization in string theory. Recently we have written down the most general gluon-gluon celestial OPE which is invariant under the infinite dimensional soft symmetry algebra known as the S-algebra. This has led to the prediction of new solvable theories where gluon scattering amplitudes can be computed using methods of two dimensional conformal field theories. In another work we have for the first time found out the relation between the boundary operators in asymptotically flat space-time and its relation to the operators which create/annihilate asymptotic free particle states in a scattering experiment.

Dr. Subhasis Basak

Field of Specialisation: Theoretical High Energy Physics – Lattice QCD

- Determination of eigenspectra, zero mode density and obtaining Banks-Casher relation of Minimally Doubled Fermions
- Developing chiral perturbation theory for Minimally Doubled Fermions
- Investigation of bound or scattering state of double charmed tetraquark T_{cc}

Dr. Sumedha

Field of Specialisation: Statistical Mechanics

Our focus right now is on the disordered spin systems. We have developed a Large deviations method to study the equilibrium phase diagrams of different spins

models and given exact results. Some of them notable are:

- Splitting of a tricritical point into a bicritical and critical end point in the spin-1 ferromagnetic model with quenched crystal fields (with S. Mukherjee (PhD student));
- Shown the presence of a second order transition within an ordered state obtained from a first order transition in higher spin models with p-spin ($p \geq 2$) interactions (with S. Das (postdoc));
- Presence of low temperature canted state in the continuous spin XY model with quenched crystal field (with M. Barma);
- Possibility of inverse transition (inverse melting) in models with quenched random field obtained from asymmetric distributions (with S. Das (postdoc)).

We have also obtained the exact solution of a spin-1 random bond model, the “Random Energy Model”. It is a model of glasses with applications in diverse fields (with M. Marsili).

We are presently working on the dynamics of random field higher spin models to understand the dynamics of driven systems with rugged energy landscape. Understanding this dynamics is useful in understanding systems with punctuated response like Barkhausen noise, Earthquakes, response of neurons to stimuli etc (work in preparation with Aldrin B E (PhD student) and Alberto Rosso).

Dr. Victor Roy

Field of Specialisation: High-energy Heavy-Ion collisions

Our group research during this period has focused on non-equilibrium dynamics, transport phenomena, and causality in relativistic fluid and magnetofluid systems, relevant to both high-energy nuclear collisions and astrophysical plasmas.

Mostly we focussed on understanding the convergence behavior of hydrodynamic gradient expansions. In Phys. Rev. D 111 (2025) L071901, we demonstrated that the gradient series derived from the 3+1D Boltzmann equation in the relaxation time approximation (RTA) contains non-hydrodynamic terms that decay exponentially and may converge under specific analytic conditions challenging the assumption that hydrodynamic validity requires proximity to local equilibrium.

In another RTA-based kinetic study (Phys. Rev. D 109 (2024) 074020), we derived exact solutions under Bjorken symmetry with external longitudinal forces, showing that early-time attractor solutions persist, albeit modified, even when idealized symmetry assumptions are relaxed.

Electromagnetic field evolution in low-energy heavy-ion collisions was investigated in Phys. Rev. C 110 (2024) 024902, where we quantified the impact of baryon stopping on electric and magnetic field distributions. These modifications have measurable effects on observables like directed and elliptic flow.

In Springer Proc. Phys. 304 (2024) 625–626, we explored wave propagation in general relativistic magnetohydrodynamics (GRMHD) with dissipation, establishing causality and identifying novel couplings between gravitational and magnetosonic modes in curved spacetime—relevant for neutron star merger modelling.

Dr. Yogesh Srivastava

Field of Specialisation: Physics (Black holes in String theory, Gauge gravity duality)

I have been working, for the past many years, on understanding black holes in the context of String theory which is our most complete theory of quantum gravity. Issues raised by Stephen Hawking’s calculations on black holes as thermodynamic objects have been a consistent driving force for this endeavour. Along with my student (Subhodip Bandyopadhyay) and collaborator (Prof. Amitab Virmani, CMI), I have studied supersymmetric hair modes in the context of AdS/Cft duality. Hair modes are essential to account for the precise comparison between black hole microstate counting on the gravity side and brane microstate counting. We identified the hair modes in the near-horizon region and identified the detailed behaviour of these modes with respect to the boundary of the near horizon region. Our work was published in Journal of High Energy Physics (JHEP 11 (2024) 015)

Recently, it has been found that the correct saddle point to use in calculating the index on the black hole side is not the usual $AdS_2 \times S^2$ but a new complex geometry with angular momentum. We recently found the saddle solution for small black rings in 5 dimensions and thus extended the scope of earlier such studies for black holes. It will be an important step in understanding the behaviour of small black rings. We have put the

paper on arXiv (e-Print: 2504.09982 hep-th) and will be sent to the journal soon. I am currently working with my student (Parashar Chatterjee) and collaborator Prof. Sudipta Mukherji to study ISCO (innermost stable circular orbits) in the context of AdS/CFT. Based on some earlier work and considering the system as a non-linear dynamical system, we are working to identify the critical behaviour exhibited by this system

Dr. Kush Saha

Field of Specialisation: Theoretical Condensed Matter Physics

Our group has a broad range of interests in condensed matter physics with specific focus on physics of ultracold atomic gases loaded in optical lattices, topological phases of matter and Dirac semimetals. Over the past several months, we have been involved in studying various aspects of matter-light interaction in Dirac materials and bosons in optical lattices. In particular, we have been involved in proposing a protocol to have enhanced non-linear responses of incident pulses in the density wave phase within the extended Bose-Hubbard model using the concept of resonance-induced amplification (RIA). The proposed method enables the selection of an incident pulse frequency to amplify the desired harmonic order. We have discussed the enhancement of the non-linear harmonic spectra under various frequencies and field strengths of the incident pulses, and demonstrate that an optimal field strength is necessary to realize our protocol.

We have recently proposed a dynamical approach to detect changes in Fermi surface topology in a two-band model. Specifically, we have shown that the response of the system to a low intensity light pulse can precisely identify topological Lifshitz transitions. At a suitable frequency, the light resonantly couples valence and conduction electrons, leading to an oscillation in the interband coherence term. This, in turn, can generate a persistent oscillatory current which survives even after the end of the pulse. Notably, the relative amplitude of the oscillatory current during the pulse with that of the post-pulse reaches a minimum when the Fermi energy aligns with the saddle point, providing a robust framework for dynamically identifying Lifshitz transitions.

Very recently, we have been involved in studying spin-liquid phases in Kitaev Bilayers and moire superlattices. Employing Monte Carlo simulations and variational

analysis, we aim to uncover a rich variety of phases where the intra and interlayer Z_2 fluxes (visions) are arranged in a periodic fashion in the ground state, tuned by interlayer coupling and out-of-plane external magnetic field. We further plan to extend this to moire superlattices for various twist angles.

Dr. Luke Robert Chamandy

Field of Specialisation: Astrophysics

Cosmological Evolution of galaxy magnetic fields with a focus on population studies and statistics, Common Envelope Evolution of binary stars with a focus on global 3D hydro simulations with adaptive mesh refinement to capture large dynamic ranges.

Dr. Najmul Haque

Field of Specialisation: Theoretical High Energy Physics

Between April 2024 and March 2025, my research has centered on exploring the properties of the quark-gluon plasma (QGP) using both effective field-theoretic models and transport theory, with particular emphasis on nonperturbative effects and real-time observables. A key line of work involved studying the complex heavy-quark potential in the QGP medium by incorporating the Gribov-Zwanziger (GZ) action, which modifies the infrared behavior of gluon propagators. These studies revealed notable modifications to the potential, especially its imaginary part, offering insights into in-medium quarkonium dissociation mechanisms.

In parallel, I investigated the shear and bulk viscosities as well as the electrical conductivity of the QGP by combining Gribov-modified gluons with a quasiparticle description of quarks. These transport coefficients were evaluated near the deconfinement transition, where nonperturbative effects are significant. This approach provided a consistent picture of how the infrared suppression due to the GZ mechanism influences macroscopic transport properties, with implications for the hydrodynamic modeling of heavy-ion collisions.

Another related effort focused on the behavior of the heavy quarkonium potential in an anisotropic, collisional QGP. Accounting for momentum-space anisotropies and finite parton interaction rates, I analyzed the complex potential and its sensitivity to early-stage nonequilibrium dynamics, relevant for quarkonium suppression patterns observed at RHIC and the LHC.

A major development this year was the introduction of a matrix model for pure glue theory, formulated with adjoint gluons and ghost fields in two dimensions [arXiv:2504.20138], in collaboration with Robert D. Pisarski. We computed the shear and bulk viscosity in this framework, yielding results compatible with lattice and effective theory expectations.

As a future direction, I am now extending this matrix model to include quark degrees of freedom, with the aim of constructing a more complete effective theory that captures both deconfinement and chiral symmetry restoration in full QCD.

Dr. Shovon Pal

Field of Specialisation: Condensed Matter Physics and ultrafast spectroscopy

My research focuses on exploring the interplay of charge, spin and lattice dynamics at ultrafast timescales in a wide range of quantum materials. We use low-energy terahertz time-resolved spectroscopy as a major spectroscopic tool for our investigations. The collective electronic interactions in almost all correlated systems are governed by quantum-mechanical fluctuations. Although these fluctuations reside in the realm of low temperatures, a quantum-correlated state such as a superconducting state can survive to much higher temperatures, eventually becoming relevant for real-life applications. It then becomes quite intuitive to gain a direct access to the quantum world, avoiding thermal fuzziness. This, however, is not a trivial task. Albeit established theories, the indirectness of almost all experimental methods, relying on high energy radiation is counter-intuitive as it perturbs the system intemperately and non-resonantly and hence singularizing the relevant information often leads to controversial results, leaving behind open-ended questions. In contrast, our approach of using light pulses at extremely low, yet resonant energy scales provides a more direct look into the quantum world and draws valuable conclusions on the processes going on therein. These pulses belong to the terahertz range of the electromagnetic spectrum. The terahertz pulse makes a subtle perturbation to the quantum many-body state without destroying the quantum-mechanical coherence. In return, the system responds back in a distinct fashion that bears information on the stability and the composition of the many-body state. The terahertz radiation thus provides a means to address electronic states by resonant excitation and

time-resolved detection in any material systems where electronic states have energies in the milli-electronvolt range.

Our key findings during this period are:

- We identified the dynamic interaction of different energy scales such as Kondo, crystal electric field and antiferromagnetic order [the results published in Physical Review B 109, 075133 (2024)]. The results have significantly clarified the understanding of correlation dynamics of heavy quasiparticles, reconciling the seemingly contradictory phenomena – a long-standing open question – of quasiparticle destruction and their formation energy scales remaining finite.
- We provided the very first experimental realization of relativistic field derivative torque as an important parameter in dictating nonlinear ultrafast magnetization dynamics in multi-sublattice systems [Publication 3: Advanced Functional Materials, 2414582 (2025)]. Our research findings, univocally, suggest the presence and the relevance of FDT in magnetic systems with faster spin precession and higher Gilbert damping [The results are published in Advanced Functional Materials 35, 2414582 (2025) and Physical Review Materials 8, 114404 (2024)]. These works are very unique, which demonstrates that there are unconventional approaches to explore nonlinear spin dynamics that go beyond our conventional treatment of the LLG model. In addition, the demonstrated magnon population decay and magnon decoherence times further suggest that these classes of materials are potentially suitable for applications in the field of applied ultrafast THz spintronics.
- We have demonstrated a charge-transfer-induced tuning of the band gap with the incorporation of Pt, Au and Ag NPs in MoSe₂. In doing so, we obtained a dramatic 4-fold enhancement in the third-order nonlinear refractive index and two-fold enhancement in the third-order NLO susceptibility, making such composites superior to many recently reported NLO materials [The results are published in Advanced Optical Materials 12, 2401138 (2024)]. The MoSe₂-based noble metal nanocomposites show a significant enhancement in the THz conductivities along with the two-fold increase in picosecond scale scattering times, highlighting these materials practically useful in THz optoelectronics devices.

Dr. Tapan Mishra**Field of Specialisation: Quantum simulation and computation**

We are currently involved in studying topological phase transitions in interacting quantum systems, classical and quantum computing signatures of quantum dynamics of interacting particles, disordered induced phase transitions. We have obtained signatures of non-trivial doublon formation using a quantum computer. We have also obtained a possible setup where disorder can favor topological transport in the form of Thouless pumping. In the future, our goal is to obtain scenarios where re-entrant many-body localization can be obtained. We would like to extend our quantum computing simulations for other interacting models. Our focus is also to study the physics of driven systems. We are planning to implement quantum computing and machine learning approaches for quantum phase transitions.

Dr. Tuhin Ghosh**Field of Specialisation: Astrophysics and Cosmology**

The group led by Dr. Tuhin Ghosh focuses on certain aspects of Galactic Astrophysics and Cosmology. We are part of the following collaborations: SKA-India, PASIPHAE, CMB-Bharat (proposed ISRO mission), and sub-mm wave observatory at Hanle. Our group research themes are the following:

- Development of advanced statistical tools like Wavelet Phase Harmonics. Scattering Transform and Hamiltonian Monte-Carlo sampling algorithm to tackle astrophysical component separation problems.
- Constraining the large-scale regular magnetic field of external galaxies (e.g. M31, NGC6946 and IC342) using multiwavelength radio observations, including the depolarization factors at higher radio wavelengths.

Dr. V Ravi Chandra**Field of Specialisation: Theoretical Physics (Condensed Matter Theory)**

We completed a detailed investigation into the effect of magnon interactions on the All-in-All-out (AIAO) phase of the pyrochlore lattice with Heisenberg antiferromagnetic exchange and Dzyaloshinskii-

Moriya interactions (DMI). We demonstrated, using the evaluations of the leading order self-energy of the model, that the stability of the AIAO phase might be jeopardised unless the DMI strength is above a threshold. We also found that for a given value of the DMI strength the energy of the lowest band decreases with the strength of an applied magnetic field along a high symmetry direction. We probed the possibility of magnon decays and evaluated the range of the magnetic field and DMI strengths where magnon decays of the bands of the system are kinematically allowed. A preprint (arXiv:2502.09594) with details of our analysis is currently under review.

We have continued our analysis of the low temperature specific heat of the spin-1/2 kagome antiferromagnet. We had concluded a preliminary analysis using exact diagonalisation and finite temperature Lanczos calculations. We are now developing programs combining the method of thermal pure quantum states for evaluations at finite temperature with the evaluation scheme in the thermodynamic limit using matrix product states and operators, as found to be useful in other studies of two dimensional lattice models. We are currently benchmarking our programs against data at finite lattice sizes produced by exact diagonalisation. We hope to provide reliable evaluations of the low temperature specific heat of this model in the thermodynamic limit and compare the results with existing predictions based on theoretical analyses. We have also initiated a study of the J1-J2 antiferromagnet on the square lattice from the point of view of magnonic squeezed states. The latter are found in interpretations of the spin wave ground state of antiferromagnetic exchange models on bipartite lattices. We intend to use that physical picture of the ordered state to ask how such a state gives way to a spin liquid state on the introduction of J2.

Dr. Saralasrita Mohanty**Field of specialization: Condensed Matter of Physics**

My current research is primarily focused on condensed matter physics, with a special emphasis on topological phases of matter and their realization in topoelectronic systems. I am exploring the topological properties of coupled Su-Schrieffer-Heeger (SSH) chains through their analog implementation in electrical circuits, where edge states and topological invariants are experimentally accessible and visually demonstrable. A major outcome of this work includes the design and

fabrication of topological circuits that clearly exhibit edge state manifestation, providing both theoretical insight and experimental verification of bulk-boundary correspondence. I have also initiated investigations into non-Hermitian extensions of electrical circuits, which open new possibilities for studying parity-time (PT) symmetry, exceptional points, and topological phase transitions in engineered dissipative systems. These circuit-based platforms serve not only as analog simulators for quantum systems but also as powerful educational tools. To this end, I am also developing innovative experimental setups for undergraduate and postgraduate physics laboratories, aimed at integrating

modern concepts such as topology and non-Hermitian physics into hands-on learning. This includes the adaptation of low-cost components and open-source tools like ExpEYES for precise data acquisition and control. Collaborative efforts with interdisciplinary teams are underway to enhance the pedagogical value of these experiments and to explore bio-inspired topological designs for robust signal transport. Future directions include expanding this framework to higher-dimensional systems, exploring non-linearities and interactions, and embedding machine learning techniques to analyze complex topological data and experimental results.



CENTRE FOR MEDICAL AND RADIATION PHYSICS (CMRP)

Dr. Ganesh Jagannath Tambave

Field of Specialisation: Si detector R & D for medical imaging applications

Silicon detectors are used in medical imaging modalities: positron emission tomography (PET) scanners, X-ray CT scanners, proton Computed Tomography (pCT), dosimeter radiation monitor systems. Considering these medical applications, the CMRP Si Detector lab is established to test the Si detectors made at Bharat Electronics Limited (BEL), Bangalore and Semiconductor Laboratory (SCL), Chandigarh.

Major milestones (BEL made n-type Si pads):

- Two research publications came out of this work
- Layered detector structure tested at PS, CERN (26/10 – 10/11 2024)

Major milestones (SCL made p-type Si pads):

- Together with the SCL, CMRP group have developed p-type pad detectors to achieve better performance in radiation hard environments as compared to n-type Si pads.
- On 28 December 2023 - Research and development agreement (RDA) was signed between SCL and NISER Silicon wafers supplied to SCL for detector fabrication. Finalized the detector design and sent for mask production – April 2024
- 1st large area p-type detector is fabricated at SCL in collaboration with NISER – September 2024
- Detectors are tested by NISER at proton synchrotron facility (PS), CERN (26 Oct. to 10 Nov. 2024)
- Working on the paper for the above work: 1st paper draft is ready.
- In future plans to make layered prototypes to be tested at SPS test facility, CERN

Dr. Shuddha Shankar Dasgupta

Field of Specialisation: MPGD based photon detector

Frequent X-ray images or multi slice CT images are usually taken for cancer patients to pinpoint cancerous cells and to deliver precisely the required radiation dose to minimize the effect on surrounding vital organs.

Taking multiple X-ray images or doing more multi-slice CT images also increases the accumulated dose in the body for these patients. One of the possible ways to reduce this dose is to develop a large area multi-pixelated detector with low noise and high sensitivity for detecting X-rays. Solid State detectors are not cost effective for covering large areas with low noise and high photon resolution. A single photon sensitive detector based on Micro Pattern Gaseous Detector technology may be a possible way to achieve this. My field of expertise is on single photon sensitive Micro-pattern Gaseous Detectors. I am currently developing a low dose large area X-ray imaging detector for possible applications in medical physics.

We have started R&D on a material called aerogel that also has possible medical and strategic applications. The first steps are to set up a characterization setup for the aerogel tiles. In future the aim is to produce aerogel tiles which can be used for medical and societal applications.

Current status is as follows:

1. A newly designed THGEM detector foil with segments has been produced by Indian industry, Micropack India Ltd., Bengaluru in collaboration with NISER.
2. A medical imaging setup is being built for a low dose X-ray imager prototype.
3. Aerogel tiles from CIBA aerogel factory in Japan have been tested at NISER in collaboration with Central Tool-room and Training Center, Bhubaneswar.

Dr. Raveendrababu Karnam

Field of Specialisation: Resistive Plate Chambers (RPC) and imaging with cosmic-ray muons

My expertise is in the development and characterization of Resistive Plate Chambers (RPC), and their usage to the muon imaging applications. Muography is a non-invasive technique that exploits the naturally abundant cosmic-ray muons in the Earth's atmosphere and produces a projectional image of the target volume. Cosmic-ray muons undergo multiple Coulomb scattering in the high atomic number (Z) materials and attenuate

through large volume objects. These features allow them to reveal the internal structures of the target objects using particle detector technology. This technique has been developed for search of hidden chambers in a Pyramid, measuring the density distribution of volcanoes, mineral explorations, finding any cavities/shafts presented in the railway tunnels, homeland security, etc. At NISER, we are building a four-layer portable muon telescope in a modular form using glass RPCs as tracking detectors. Each layer is made of an acrylic chamber housing a glass RPC sandwiched between two orthogonally placed strip printed circuit board (PCB) based readout boards to provide X and Y position of the muon hit. The imaging techniques are being developed for both radiography and tomography applications.

Major achievements:

1. We built a three-layer muon telescope
2. Conducted a proof of principle test by observing the attenuation of cosmic-ray muon flux through Lead blocks.
3. The simulation studies demonstrated that the scattering based technique we developed can be used for distinguishing high and medium Z materials and imaging the spent nuclear dry cask structure.

Future targets:

1. Build the fourth chamber and install it in the telescope.
2. The four modules will be stacked inside an aluminium frame mounted on an alt-azimuth platform which allows the telescope to collect the target data with respect to zenith and azimuth angles.

In future, we plan to build a scintillator based electromagnetic calorimeter for applications in dose measurement.

Mr. Lalatendu Mishra

Field of Specialisation: Radiological physics

Digital X-Ray and Computed Tomography (CT) imaging are widely used for medical diagnostic purposes due to their quick process. To produce good quality of images and extract relevant clinical information, Quality Assurance of the machine is a mandatory requirement.

One of the quality assurance tests involves checking the applied kVp, mAs, dose and the contrast resolution. I am working on development of low-cost QA tools for diagnostic imaging equipment that can measure the above parameters.

Major work done is enlisted below:

- Setting up a Gamma Irradiation Chamber facility: Prepared the security plan and got it approved by the state law enforcement authority and AERB. The Gamma Irradiation Chamber machine GC-5000 was successfully installed on 28th March 2025, and the licence for operation was approved by AERB on 8th May 2025.
- Setting Up a NABL Accredited Calibration Laboratory: Calibration is a process that ensures the accuracy and reliability of instruments by comparing them against traceable reference standards. In a radiological calibration laboratory, the therapy level dosimeters are calibrated. These dosimeters are used to measure the radiation absorbed dose in the Radiotherapy Hospitals. The layout of the calibration laboratory was prepared with help from ESG, BARC and the geotechnical investigation of soil and rock was carried out at the location of the calibration Laboratory.
- Associated with the Radioanalytical laboratory. This facility will provide radiological testing certification for various commodities, consumable and non-consumable products. The HPGe detector facility was successfully installed in May 2024, intended to identify and measure the low-activity gamma-emitting radionuclides.

Mr. Kirti Prakash Sharma

Field of Specialisation: Design, development, testing and integration of readout electronics for detectors and Characterization of Si-detectors

My expertise is in design, development, testing and integration of readout electronics for imaging and nuclear physics detectors and characterization of Silicon photomultiplier detector. This work involves the development of readout electronics (PCBs) for Si-pad array detectors intended to be used in calorimetry and imaging applications. These PCBs are packaged and tested with Si-pad array detectors developed and fabricated in India in collaboration with Bharat electronics Limited (BEL), Bengaluru and

Semiconductor Lab (SCL), Mohali at CMRP lab and CERN. Setting-up a Silicon photomultiplier (SiPM) detector characterization and testing facility to evaluate key performance parameters of Silicon Photomultiplier (SiPM) detectors. The setup enables precise measurement of critical parameters such as breakdown voltage, quenching resistance, and capacitance, along with detailed analysis of detector noise characteristics including dark count rate, crosstalk, and after pulsing. Additionally, the facility supports measurement of LED response pulse height spectra for evaluating the signal response behaviour of the detectors. In addition, designed and developed a sectorized thick gas electron multiplier (THGEM) detector PCB which can be used for a low dose X-ray imaging application.

Mr. Rakesh Kumar Bhatta

Field of Specialisation: Medical physics

Low-dose radiation monitoring is critical in medical, environmental and nuclear applications where accurate assessment of radiation dose received is highly desired. Thermoluminescent (TLDs) and optically stimulated luminescent dosimeters (OSLDs) are widely used passive dosimeters. While both have established roles, their relative performance in low-dose regions requires further investigation. I want to carry such investigations to better understand and compare the dosimetric properties of TLD and OSLDs, especially in environments where radiation levels are minimal but still significant for long-term exposure assessment. This research will help in determining the more suitable dosimeter for precise dose monitoring in low-dose applications. Also we can verify the use of these dosimeters in low energy radiation environments. In addition to the above I am also studying the excessive use of pesticides in crops and its relation to cancer incidence in the western part of Odisha.

Mrs. Nijun Mishra

Field of Specialisation: Medical and Radiological physics

Chemical dosimetry plays a vital role in measuring absorbed radiation doses through radiation-induced chemical changes. In my current research, I am developing a chemical dosimeter using a binary mixture of ethanol and chlorobenzene. The system is being studied for its response to gamma radiation using Gamma Irradiation Chamber (GC-5000), which provides controlled and uniform exposure. Radiation exposure leads to the formation of radiolytic products in the ethanol-chlorobenzene (ECB) mixture, and then measurable changes in the solution's optical properties will be obtained by adding certain more chemicals during the readout process. A UV-Visible spectrophotometer can be used for this study for the readout process. The aim is to evaluate and validate the central axis dose (CAD) in GC-5000 using ECB chemical dosimetry. This study seeks to enhance the understanding and application of organic-based chemical dosimeters for use in radiation dosimetry and monitoring.

Associated with the Radioanalytical laboratory. This facility will provide radiological testing certification for various commodities, consumable and non-consumable products used by society. It's a specially designed laboratory facility that focuses on the identification, quantification, and analysis of radioactive content across a wide range of sample types. These labs employ advanced techniques and instrumentation to accurately quantify both naturally occurring and man-made radionuclides, if mixed with any consumable or non-consumable products. By analysing such consumable or non-consumable samples, these labs ensure public health safety, environmental protection, and regulatory compliance, and contribute to scientific advancements in radiological sciences.

Awards & Professional Activities



Awards & Professional Activities

AWARDS AND RECOGNITION

Prof. Bedangadas Mohanty

- Samanta Chandra Sekhar Award 2023, Odisha Bigyan Academy, 28th March 2025
- Odisha Citizens Award in Education Sector, 2024

Dr. Amarendra Das

- Times Icons of Odisha, 2024

Dr. V Badireenath Konkimalla

- ACS/Labs Best Research Award, 2024

Dr. Priyadarshi Chowdhury

- Mineralogical Society of America Award, Mineralogical Society of America

Mr. A. Anandaraman

- Elite Certification in High Performance Scientific Computing.

Dr. Najmul Haque

- Fellowship, Renewed research stay in Germany, Alexander von Humboldt Foundation.

Dr. Anamitra Mukherjee

- Fellowship, SERB-MATRICS

Dr. Satyaprasad P Senanayak

- Emerging Investigator in Material Science, Royal Society of Chemistry

FELLOWS OF ACADEMICS AND SOCIETIES

Prof. Chidambaram Gunanathan

- Associate Fellow, Indian National Science Academy, New Delhi, India.

Dr. Bishnu P. Biswal

- Associate, Indian Academy of Sciences, Bangalore.

Dr. Jayesh Mahendra Goyal

- Fellow, the Royal Astronomical Society (FRAS).

Dr. Pathikrit Bhattacharya

- Regular Associate, International Centre for Theoretical Physics (ICTP), Trieste.

Dr. Priyadarshi Chowdhury

- Associate, Indian Academy of Sciences, Bangalore.

Dr. Manas Ranjan Sahoo

- Associate Fellow, Indian National Science Academy, New Delhi, India.

Dr. Satyaprasad P Senanayak

- Associate, Indian Academy of Sciences, Bangalore

Dr. Sumedha

- Simons Associate, ICTP, Trieste, Italy.

Dr. Tuhin Ghosh

- Visiting Associate, Inter-University Centre for Astronomy and Astrophysics

POSITIONS HELD IN PROFESSIONAL BODIES

Prof. Palok Aich

- Jury, Aegis Graham Bell Award
- Grant reviewer, European Science Foundation

Dr. Asima Bhattacharyya

- Member, Biochemical Society, UK, Policy Network, 2017-present
- Grant reviewer, Israeli Research Foundation, (2024)
- Grant reviewer, The DFG, German Research Foundation, (2024)

Dr. Debasmita Pankaj Alone

- External Member, Local Research advisory committee (LRAC), Multi-disciplinary Research Unit, SCB Government Medical College, Cuttack.
- Board Member, Board of Studies, Zoology Department, Ravenshaw University, Cuttack.
- Expert Member, Board of Studies, Department of Biotechnology, Odisha University of Technology & Research, Bhubaneswar for Revision of Syllabus.
- External Member, PhD Doctoral Committee, ILS Bhubaneswar.
- Member, Vigyan Pratibha National Steering Committee.
- Coordinator, Vigyan Pratibha Initiative, Odisha, Chhattisgarh, & Andhra Pradesh Chapter.

Dr. Harapriya Mohapatra

- Peer Reviewer, Communications Medicine, FEMS Microbiology Letters, Molecular Biology Reports, Journal of Antimicrobial Chemotherapy, International Journal of Antimicrobial Agents, Open Microbiology, Annals of Clinical Microbiology and Antimicrobials, Current Microbiology, Environmental Monitoring and Assessment, Frontiers in Microbiology, BMC Microbiology, BMC Genomics, PLoS One.

Dr. Aniruddha Datta Roy

- Member, Indian Evolutionary biologists society.
- Regional coordinator, South Asia, IUCN SSC skinks specialist group.

Prof. Chidambaram Gunanathan

- Convener, Board of Studies for Integrated Masters Programme in Homi Bhabha National Institute.

Prof. Himansu Sekhar Biswal

- Member, Editorial Advisory Board, The Journal of Physical Chemistry Letters, ACS.
- Member, Board of Studies, Chemistry, HBNI.
- Member, Board of Studies, Chemistry, Ramadevi Women's University, Odisha.
- Member, Board of Studies, Chemistry, CET, Odisha.
- Member, Board of Studies, Chemistry, Berhampur University, Odisha.

Dr. Amarendra Das

- Secretary, Odisha Economic Association.
- Resource Person, Odisha State Higher Education Council, Odisha Higher Education Program for Excellence and Equity Project" (OHEPEE).
- Jury Member, Odisha Research Conclave, Fakir Mohan University and Odisha State Higher Education Council.

Prof. Bedangdas Mohanty

- Deputy Spokesperson, ALICE Collaboration, CERN.
- Member and convenor, Sectional committee on physical sciences, Indian National Science Academy, New Delhi, 2024.
- Member, Sectional committee on physical sciences, Indian Academy of Sciences, Bangalore, 2024.
- Executive Committee Member, Indian Physics Association, 2024-2025.
- Member, CERN-India DAE-DST Task Force.
- Member, SERB- SUPRA Committee of Department of Science and Technology, Government of India.
- Convenor, Board of Studies Physical Sciences, HBNI.
- Member, Board of Studies, Ravenshaw University, Cuttack.
- Member, Departmental research Committee, Utkal University, Bhubaneswar.

- Member, Selection committee for Physical Sciences, INSPIRE Faculty Fellowship 2024.
- Member, IPA selection committee for P. K. Iyengar Memorial Award for excellence in Experimental Physics.
- Chair, Indian Physics Association Rahul Basu Best Thesis Award Committee 2024.
- Member and represents ALICE at the Worldwide LHC Computing Grid Collaboration Board.
- Indian representative to The Advisory Committee of CERN Users (ACCU), CERN, Geneva, Switzerland.
- Indian representative to the International Committee for Future Accelerators, International Union of Pure and Applied Physics.
- Core Committee Member, Mukhyamantri Research Innovation (MRI) for extramural research funding 2024 under Mukhyamantri Research and Innovation Program (MRIP), Odisha State Higher Education Council Government of Odisha.

Prof. Subhankar Bedanta

- Senior Member, Technical and educational committee, IEEE magnetic society.
- Member, Educational Committee, IEEE Magnetic Society.

Dr. Amaresh Kumar Jaiswal

- Visiting Professorship, Jagiellonian University, Krakow, Poland, 2024.
- Membership, JINR Programme Advisory Committee for Particle Physics, JINR Dubna, Russia, 2024.

Dr. Pratap Kumar Sahoo

- Member, Board of Studies, School of Applied Physics, CV Raman Global University Bhubaneswar.
- Member, Board of Studies, School of Applied Sciences, Centurion University, Odisha.
- Member, Accelerator Program Committee, IUAC, New Delhi.



INVITED/CONTRIBUTED LECTURES AND TALKS

Prof. Chandan Goswami

- **Analysing mitochondrial structure and functions: Use of different molecular probes and novel microscopic techniques - relevant for diseases and health.** A Five Days Workshop/ Faculty Development Program on From Bench to Bedside: Challenges in Translational Biomedical Research, 19-23 Aug 2024, National Institute of Technology Rourkela. 20th Aug 2024.
- **Analysing mitochondrial structure and functions: Use of different molecular probes and novel microscopic techniques - relevant for diseases and health.** 5-day workshop on Techniques in Cell Death Signaling, 21st-25th August 2024, National Institute of Technology Rourkela. 25th Aug 2025.
- **TRP channels in sub-cellular organelle structure and functions: Importance in mitochondrial and lysosomal biology,** Departmental seminar talk, NIPER Ahmedabad. 11th Sept 2024.
- **Importance of TRP ion channels in regulation of mitochondrial and lysosomal biology: relevance in different diseases,** Emerging Trends and Prospects in Biotechnology, Utkal University. 28th Sept 2024.
- **Analysing mitochondrial structure and functions: Use of different molecular probes and novel microscopic techniques - relevant for diseases and health,** International Conference on Biological Innovation, Technology, Engineering and Sciences (BITES-2024), National Institute of Technology Rourkela. 20th Dec 2024.
- **From bench to bed: Thermosensitive TRP ion channels for tissue engineering and health benefits,** Patanjali research foundation, 8th Jan 2025.
- **TRP channels as regulators for sub-cellular organelle structure and functions: Importance in mitochondria and lysosome-mediated pathophysiology,** Seminar at NBRC, India. 10th Jan 2025.
- **TRP channels in sub-cellular organelle structure and functions: Importance in mitochondrial and lysosomal biology,** QUAD 5, IISER Berhampur. 31st Jan 2025.
- **TRP channels in sub-cellular organelle structure and functions: Importance in mitochondrial and lysosomal biology,** Fifth Annual Frontiers

in Bioscience: FS-BIO 2025, IISER Thiruvananthapuram. 8th Feb 2025.

- **TRP channels in sub-cellular organelle structure and functions: Importance in mitochondrial and lysosomal biology,** International Conference on Central Nervous System Disorders, NIPER Ahmedabad. 17th Feb 2025.
- **From bench to bed: Thermosensitive TRP ion channels for tissue engineering and health benefits,** NIRMA University. 18th Feb 2025.
- **TRP channels as regulators for sub-cellular organelle structure and functions: Importance in mitochondria and lysosome-mediated pathophysiology,** CEBS-UM-DAE. 25th Feb 2025.
- **Thermo-gated TRP channels as regulators for maintaining subcellular organelle structure, function and temperature: Implications in diseases,** 43rd Mahabaleswar conference on Membrane dynamics, Alibag. 27th Feb 2025.

Prof. Palok Aich

- **Metabolome Microbiome,** AOGCR 2025: Aspects of Gene and Cellular Regulation, Institute of Mathematical Sciences, Chennai. 27-28th March, 2025.
- **Host, Nutrigenomics and Microbiome-The triad is the new trinity,** Frontier in nutrition: challenge and opportunity for healthier tomorrow, AIIMS Bhubaneswar, India, 15th February, 2025.
- **Role of Gut Microbes in Healthcare,** 45th Annual Conference of Indian Association of Biomedical Scientists (IABMS), A.J. Institute of Medical Sciences & Research Centre, Mangaluru, Karnataka, India, 6-9 Nov, 2024.
- **Inclined to Nullcline to Assess Health Quantitatively,** Emerging Trends and Prospects in Biotechnology, 27-28 September, 2024.
- **MicrobioTx: where Metabolome and Microbiome melt to health,** Dr. Reddy's Laboratory, 18th April, 2024.

Dr. Abdur Rahaman

- International Symposium on Ciliate Biology 2025, International Society of Cell Biology, Acharya

Narendra Dev College (University of Delhi), Delhi.
6-7th Feb 2025.

- Organelle Biogenesis and Membrane Trafficking, IISER, Pune. 28-29th Oct 2024.
- 6th Biogroup-India Meeting, IIT Gandhinagar. 5-6th July 2024.

Dr. Asima Bhattacharyya

- **Understanding the trio in gastric cancer pathogenesis- hypoxia, CEACAM6 and Helicobacter pylori infection**, 32nd CEA Symposium: University of Würzburg, Germany. 20-23rd Sep. 2024.
- **The Cell Surface Adhesion Molecule CEACAM6 at the Crossroads of Hypoxia and Helicobacterpylori Infection**, 47th AICBC & International Symposium, NISER, Bhubaneswar. 18 Dec 2024.

Dr. Debasmita Pankaj Alone

- **Exploring glioma therapeutics on a multi-model in vivo platform**, Symposium on 'Brain - Behaviour Health and Diseases', IISER, Berhampur. 27th Jul 2024.
- **Myriad Facets of Gene Regulation: From Health to Disease**, Workshop on "Unlocking Molecular Biology: A Hands-On Experience for the beginners", Ravenshaw University, Cuttack. 21st Aug 2024.
- **Pathogenesis and Regulators of Psedoexfoliation Glaucoma in the Indian Con**, National Seminar on "Emerging trends and Prospects in Biotechnology", Utkal University, Bhubaneswar. 28th Sep 2024.
- **From Mechanisms to Markers: Decoding Genetic and Epigenetic Complexity in Pseudoexfoliation Glaucoma**, 5th Quarterly Union of Academic Discourse (QUAD), Symposium, IISER Berhampur, 01st Feb 2025.
- **From Genetic Variants to Epigenetic Modifications: Dissecting the Regulatory Mechanisms of Pseudoexfoliation**, National Conference on "Frontiers in Genetic and Genomics", Centurion University, Bhubaneswar, 20 Feb 2025.
- **Genomic and Epigenomic Insights into Pseudoexfoliation Glaucoma: Unraveling Genetic Risk Factors and Regulatory Mechanisms**, Research Seminar, IMSc. Chennai, 25 - 26 Feb 2025.

- **From Mechanisms to Potential Biomarkers: Decoding Genetic and Epigenetic Complexity in Pseudoexfoliation Glaucoma**, SBS Day, NISER, Bhubaneswar, 22 Mar 2025.
- **Interplay between genetic and epigenetic dysregulation in the pathogenesis of Pseudoexfoliation Glaucoma**, National Seminar on "Epigenetic landscape: An evolving bridge between environment, nutrition and health", Utkal University, Bhubaneswar, 28 Mar 2025.

Dr. Harapriya Mohapatra

- **Understanding molecular mechanism of de novo emergence of antibiotic resistance in *Klebsiella pneumoniae***, Conference on Multi-omics approach for Recent Innovations in Microbiology and Biotechnology (MOA-RIMB), FM University, Balasore, Odisha, 6-7th March. 2025.

Dr. Manjusha Dixit

- **Contrasting Roles of IQGAP1 and IQGAP2 in the Regulation of Multiple Breast Cancer Hallmarks**, QUAD, NISER-ILS, NISER Bhubaneswar. 10th Aug 2024.
- **EEF1A2 Drives Dual-Mode Angiogenesis in Breast Cancer in Normoxia and via a HIF1A-Driven Feedback Loop in Hypoxia**, DAE Conclave, NISER Bhubaneswar. 22-26th October, 2024.
- **EEF1A2 Orchestrates Angiogenesis and Scaffolding Protein Interactions in Breast Cancer**, 44th Annual Meeting of the Indian Association for Cancer Research and International Conference on Convergence of Fundamental and Translational Approaches in Cancer Theranostics, Chittaranjan National Cancer Institute, Kolkata. 16-18th January 2025.
- **Hypoxia's Ally: EEF1A2 and Its Dual Role in Breast Cancer Dynamics**, Workshop on cancer cell culture techniques for basic and clinical applications, Department of Life Science, National Institute of Technology Rourkela. 10-14th February 2025.
- **Exploring the Multifaceted Role of FRG1 in Tumorigenesis and RNA Biogenesis**, Symposium on Computational Oncology Systems and Advanced Omics Approaches in Cancer Biology, IISER Berhampur. 28th February 2025.

- **Role of FRG1 in Breast Cancer Tumorigenesis: Transcriptional Repression of GM-CSF Leading to ERK Activation**, Seminar on Advancing Cancer Research: Insights and Applications of PDX Models, NISER, Bhubaneswar. 8th March 2025.
- **Decrease in FRG1 Promotes Breast Cancer Tumorigenesis through GM-CSF Repression and ERK Activation**, Faculty Development Program on Next Generation Molecular Diagnostics for Pathogens and Cancer Detection, MITS School of Biotechnology, Bhubaneswar. 27th March 2025.

Dr. Mohammad Saleem

- **Pinch it like Mtb: ESAT-6's phagosome play and the role of bacterial direct-contact**, International Biomembranes Symposium, IISc, Bengaluru. 11-13th July, 2024.
- **Prison Break: How do pathogenic bacteria escape out of the host phagosome?** Soft Condensed Matter Group, Raman Research Institute, Bengaluru. 12-13th November, 2024.
- **Prison Break: How do pathogenic bacteria escape out of the host phagosome?** International Symposium on Interdisciplinary Approaches in Biological Sciences (IABS-2025), IACS Kolkata. 6-8th February, 2025.
- **Prison Break: How do pathogenic bacteria escape out of the host phagosome?** 43rd Mahabaleshwar Meeting - Molecules, Membranes and Organelles, TIFR Mumbai. 26th Feb – 1st March, 2025.

Dr. Pankaj Vidyadhar Alone

- **Decoding the Genetic Code: Why Is Translation Initiation Fidelity Critical for Protein Synthesis?** Institute of Mathematical Sciences Chennai. 2024.

Dr. Praful Singru

- **To date or to attack: Neuropeptidergic modulation of behavioural flexibility in female rats**, EMBO workshop on Neuropeptides and behavioural flexibility, NISER Bhubaneswar. 5-8th December, 2024.
- **Journal of Neuroendocrinology and British Society for Neuroendocrinology sponsored Pan-Indian workshop on Neuroendocrinology**, Department of Pharmaceutical Sciences, Nagpur University, Nagpur. 10-16th November, 2024.

Dr. Ramanujam Srinivasan

- **Filament mechanics drives FtsZ ring assembly**, EMBO Workshop Archaeal and bacterial cell division: Beyond the Z-ring, Alcobaça, Portugal. 14-17th May 2024.
- **DNA segregation in bacteria – ParA must cooperate**, 6th BioIndia Group Meeting, IIT Gandhinagar. 5-6th July 2024.
- **A salt bridge mediated resistance mechanism to FtsZ inhibitor PC190723 revealed by a single step cell-based screen**, Faculty Development Program on Fungal Biotechnology: Emerging Trends and Applications, NIT Warangal. 05-09th August 2024.
- **DNA segregation and cell division in bacteria – ParA must cooperate and tubulin must twist**, Organellar Biology & Membrane Trafficking, OBMT 2024, IISER Pune. 28-29th Oct, 2024.
- **DNA segregation in bacteria – ParA must cooperate**, Dept. of Biochemistry, Indian Institute of Science, Bengaluru. 9th Jan. 2025.
- **DNA segregation in bacteria – ParA must cooperate**, The Microtubule, Motors, Transport and Trafficking (M2T2) Meeting 2025, Jodhpur Club, IIT Jodhpur. 17-19th February 2025.
- **The Lord of the Rings: Endgame**, SBS Day, NISER Bhubaneswar. 22nd March, 2025.

Dr. Subhasis Chattopadhyay

- **Analysis of experimental Cell Mediated Immunity (CMI) and Immune Regulation**, Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad. 2nd April 2024.
- **Study of altered Cell Mediated Immunity (CMI) in health and diseases**, teaching class at Department of Biotechnology, Utkal University. 17th May, 2024.
- **Cell Mediated Immunity in Experimental Immune Regulation and Chikungunya virus infection**, 51st Annual International Conference of Indian Immunological Society, IISC Bengaluru. 17-20th October, 2024.
- **Analysis of experimental cell mediated immune responses and regulations during Chikungunya virus (CHIKV) infection**, Symposium for celebrating Forty Years of Virology in the Weller Lab on, Department of Molecular Biology and Biophysics, University of

Connecticut School of Medicine, Farmington, CT, USA. 20-21st September, 2024.

- **Analysis of experimental cell mediated immune responses and regulations during Chikungunya virus (CHIKV) infection**, “VIROCON-2024” International Conference on India Emerging Viruses: Pandemic & Biosecurity Perspectives, DRDE, Gwalior. 11-13th November, 2024.
- **Rewiring the cell-mediated Immunity (CMI) to unlock new ways to fight diseases**, INSA-NASI Conference on Science to the Society, Sophitorium Group of Institutions, Khordha, Odisha. 14th December, 2024.
- **Understanding and Re-research of cell-mediated Immunity (CMI) to unlock new ways to fight diseases**, Radhamoni-Kameshwar Memorial Lecture, Zoology Department, Utkal University. 15th February, 2025.

Dr. V Badireenath Konkimalla

- **Rational Design of Combinational Liposomes to Counteract Efflux Pump-Mediated Chemoresistance**, (Oral presentation), 23rd Transporter & Barrier Conference-2024, Bad Herrenalb, Institute for Pharmacy and Biotechnology, University of Heidelberg, Germany. 21-23rd May, 2024.
- **Rational Design and Evaluation of Nano-drug Delivery Systems**, Department seminar, Department of Organic Chemistry, University of Paderborn, Germany. 27th May, 2024.
- **Addressing Bottlenecks in Drug Discovery – Our attempts**, 14th National seminar on Requirement of Robust Innovation & Initiative Towards Quality Life-need of the hour, IMT Pharmacy College, Puri, Odisha. 21st Dec 2024.
- **Redox-responsive polymeric-lipid hybrid nanocarriers for better targeting of cancer cells**, 4th International Conference on Nanomaterials in Biology (ICNB 2024), University of Rajasthan and SMRS, Jaipur. 03– 06th February, 2025.
- **Rational Drug Delivery Design with Phytochemicals, Nanotechnology & PDX Models - A Faithful Combination to Foster Anticancer Therapeutics**, Seminar on Advancing Cancer Research: Insights and Applications of PDX Models, National Center for Animal Research and Experimentation (NCARE), NISER. 08th March, 2025.

Dr. Aniruddha Datta Roy

- **Understanding tree building methods: distance based and characters based**, Molecular Phylogenetics Workshop, Hyderabad University. 10-14th October, 2024.
- **Not quite Gondwanan: Contemporary distribution of Scincine lizards does not explain their evolutionary origin**, World Congress of Herpetology, Borneo, Malaysia. 5-9th August 2024.

Dr. K. Himabindu Vasuki

- **Hormone transport and homeostasis regulate plant specialized metabolism during growth and stress**, 2nd National Workshop on Plant Metabolomics: from sample preparation to data analysis, RTGR, Dept. Of Plant Sciences, University of Hyderabad, Telangana. 03-08th February, 2025.
- **Hormone metabolism and transport regulate plant growth under abiotic stress**, National seminar on Plants and Microbes for Sustainable Environment (PMSE-2025), Utkal University. 26-27th March, 2025.

Dr. Rittik Deb

- **Rapid, parallel evolution of reproductive isolation during dietary niche shifts - do microbes play a role?** QUAD 2, ILS, 2024.
- **Rapid, parallel evolution of reproductive isolation during dietary niche shifts - do microbes play a role?** SBS Day, IISER Berhampur, 2024.
- **Rapid, parallel evolution of reproductive isolation during dietary niche shifts - do microbes play a role?** RAASVB, Visva-Bharati, Santiniketan, 2024.
- **Understanding biological interactions - an eco-evolutionary approach**, SBS Day, NISER, 2024.

Dr. Swagata Ghatak

- **Amyloid- β mediated modulation of two pore domain leak potassium channels in hippocampal and cortical neurons**, One-day neuroscience symposium on Brain- Behaviour Health and Disorders, IISER Berhampur. 27th July 2024.
- **Hyperexcitability in early stages of Alzheimer's disease causes aberrant expression of two pore domain leak potassium channels**, Indian Academy

of Neurosciences Meeting, NIMHANS, Bengaluru. 12-14 November, 2024.

- **Amyloid- β Mediated Modulation of Two Pore Domain Leak Potassium Channels in Alzheimer's disease.** EMBO Workshop on Neuropeptides and behavioural flexibility, NISER Bhubaneswar. 5-8th December, 2024.
- **Ion channel-mediated regulation of excitatory/inhibitory (E/I) imbalance in Alzheimer's disease,** Indian Biophysical Society meeting, Indian Institute of Technology Madras. 6-9th March, 2025.

Dr. Saurabh Chawla

- **Handling, Restraining and Collection of Sample for experiments,** National Workshop on Laboratory Animal Handling, Experimental Procedures, and In-Vivo Imaging, BRIC-Institute of Life Sciences, Bhubaneswar. 7-11th January 2025.
- **Cancer Avatars: An Insight into cancer derived xenograft in mice,** Centurion University of Technology and Management (CUTM). 1st March 2025.

Prof. Chidambaram Gunanathan

- **Cobalt Catalysis Enabled by Metal-Ligand Cooperation.** 30th International Conference on organometallic chemistry India 2024, Jaypee Palace, Agra. 18th July 2024.
- **Cobalt Catalysis Enabled by Metal-Ligand Cooperation.** Emerging Landscape of Organometallic Chemistry & Catalysis at Global Virtual Symposium, ACS Fall 2024. 18th August 2024.
- **Sustainable Catalysis Enabled by Metal-Ligand Cooperation.** DAE Conclave, NISER Bhubaneswar. 22nd October 2024.
- **Catalysis Enabled by Metal-Ligand Cooperation.** 90th Anniversary General Meeting of the Indian National Science Academy, SRM Institute of Science & Technology, Kattankulathur, Chennai. 10th December 2024.
- **Cobalt Catalysis Enabled by Metal-Ligand Cooperation.** Recent Advances in Chemistry Research and Translation (ReACT-2025), IISER Kolkata. 31st Jan-1st Feb 2025.
- **Catalysis Enabled by Metal-Ligand Cooperation.** International Conference on Nanotechnology

and Materials Sciences, KSR College of Arts and Science for Women, Tiruchengode, Tamil Nadu. 5-7th Feb 2025.

Prof. Himansu Sekhar Biswal

- **Carbon and carbo-hydrogen bonding for materials science and chemical biology,** Radio Chemistry & Isotope Group, BARC, Mumbai. 24th April, 2024.
- **Probing hydrogen bonding with laser spectroscopy,** K.B.D.A.V College, Nirakarpur, Khurda. 09 August, 2024.
- **Vibrational spectroscopy: a journey from molecular clusters to polariton chemistry,** Institute of Chemical Technology Mumbai, Indianoil Odisha Campus Bhubaneswar, Bhubaneswar. 11th September, 2024.
- **Hydrogen bonding: a journey from supersonic jet spectroscopy to sustainable chemistry and biology,** Rajdhani College, Bhubaneswar. 14th September, 2024.
- **Probing aromaticity with supersonic jet spectroscopy,** Berhampur University, 19th September, 2024.
- **The pain and pleasure of building scientific instruments,** IISER Berhampur. 10th October, 2024.
- **Vibrational Spectroscopy: An Essential Tool for Frontier Research in Chemistry, Biology and Materials Science,** Refresher Course on Frontiers In Chemistry, Malaviya Mission Teacher Training Centre (MMTTC) and Sambalpur University. October, 2024.
- **Probing aromaticity with hydrogen bonding in a supersonic molecular jet,** 7th International Conference on Frontiers in Chemical Science, IIT Guwahati, Guwahati. 2-4th December, 2024.
- **Experimental challenges to probe carbon bond, hydridic hydrogen bond and carbohydrogen bond in isolated condition,** ChemSci-2024, Leaders in the Field Symposium, IISER Thiruvananthapuram, Thiruvananthapuram. 9-11th December, 2024.
- **Carbon bond, hydridic hydrogen bond and carbohydrogen bond : quo vadis,** 2nd KIIT-CRSI Seminar on Modern Trends in Chemical Science, KIIT, Bhubaneswar. 20-21st December, 2024.
- **Spectroscopy and Dynamics of Sulfur and Selenium Containing Molecular Probes,** Spectroscopy and Dynamics of Molecules and Clusters (SDMC-2025), IIT Roorkee, Roorkee. 20-23rd February, 2025.

- **Materials science: a vibrational spectroscopy perspective**, PARAM 2.0, IIT Bhubaneswar, Bhubaneswar. 18th March, 2025.
- **Can thioamides be the potential surrogates of amides?** Inter IISER-NISER Chemistry Meet 2025, IISER Pune, Pune. 20-22nd March, 2025.
- **Catalysis and stability of biomolecules in water**, ACS Spring 2025, Global Virtual Symposium: Sustainable Solvents, San Diego, USA. 23-27th March, 2025.

Prof. Jogendra Nath Behera

- **Inorganic Functional Materials for Energy Storage and Conversion**, RACS-2024, Gopalpur, Odisha, 26-27th October, 2024.
- **MOF-derived Nanostructured materials as electrocatalyst for Energy storage and Conversion**, EIHE-2025, BARC, Mumbai. 21-25th January, 2025.
- **Inorganic Functional Materials for Sustainable Energy Storage and Conversion**, FCS-II, MSCB University, Baripada. 28-29th March, 2025.

Prof. Molay Sarkar

- **Fluorescent copper nanoclusters: an interesting and versatile candidate for understanding its interactions with various important analytes**, 2nd Materials Chemistry Symposium-Bhubaneswar, CSIR-IMMT. 6th September, 2024.

Prof. Prasenjit Mal

- **Visible Light Photocatalysis in Organic Synthesis**. ICOMC 2024, Jaypee Palace Hotel & Convention Centre, Agra. 14-18th July, 2024
- **Heterogeneous Visible-Light Photocatalysis**. Mizoram University, Aizawl. 6-8th November 2024.
- **Heterogeneous Visible-Light Photocatalysis**. Recent Advances in Heterocyclic Chemistry (RAHC-2024), Department of Chemistry, Ravenshaw University, Cuttack. 20-21st November 2024.
- **Heterogeneous Visible-Light Photocatalysis**, 2nd Materials Chemistry Symposium Bhubaneswar, CSIR-IMMT, Bhubaneswar, Odisha. 06th September, 2024.

Prof. Sanjib Kar

- **Metalloporphyrins: Stabilizing Higher Oxidation**

States and Exploring Reactivity, 7th International Symposium on C–H Activation, IIT Bombay, Mumbai. 6–9th December, 2024.

Dr. Arindam Ghosh

- **Multi-dimensional NMR spectroscopy**, NMR Workshop, ICT-BBSR, 2024.
- **AI in NMR spectroscopy: Leveraging ML for Signal Processing**, ML4SCIENCE conference, Shillong, 2025.
- **Conversion to Carbon Nano Dots: A Possible Remedy Towards Low Efficiency of diaCEST Contrast Agents**, 10th International workshop on CEST, Nuremberg, Germany, 2025.

Dr. Bhargava B.L.

- **Investigation of tau fibril – membrane interactions using molecular dynamics studies**, ACS Spring 2025, Global Virtual Symposium. 23-27th March, 2025.

Dr. Krishnan Venkatasubbaiah

- **O,S-Chelated Fluorescent Boron Compounds: Synthesis, Characterization and Photophysical Studies**, International Conference on Main-group Molecules to Materials-IV (MMM-IV), IIT-Bombay. 9-12th February, 2025.
- **Synthesis and Applications of Hybrid Fluorescent Materials**, International Conference on Advances in Energy and Environment for Sustainable Development (AEESD-2025), Siksha 'O' Anusandhan (Deemed to be Uni.). 28-29th March, 2025.

Dr. Nagendra Kumar Sharma

- **Pd-Catalyzed C-H Activation has employed for the Synthesis of Unnatural Aromatic Amino Acid (UAAA)**, DCS-symposium-Technical Program, IISER-Berhampur. 5-6th October, 2024.
- **Synthesis of troponyl amino acid and peptides**, Recent Advances in Chemical Sciences – 2024 (RACS-2024). 26-28th October, 2024.
- **Pd-Catalyzed C-H Activation has employed for the Synthesis of Unnatural Aromatic Amino Acid (UAAA)**, Recent Advances in Heterocyclic Chemistry (RAHC)-2024, Ravenshaw University, Cuttack. 20-21st November, 2024.

- **Synthesis of aromatic amino acid analogs and their peptides**, National Symposium on Sustainable Organic Synthesis 2024 (SOS-2024), Berhampur University, Odisha. 20-21st December, 2024.
- **Synthesis of unnatural aromatic amino acids (UA 3) and their peptides**, International Conference on Advances in Organic Chemistry, Kenilworth Resort, Goa. 27-29th January, 2025.
- **Synthesis and biochemical evaluations of rationally designed troponyl-2'-deoxyuridine nucleoside and their DNA Analogs**, Oral presentation, First Nucleic Acid Therapeutics Meeting - India 2025, JNCASR, Bengaluru. 18-21st February, 2025.
- **Synthesis and Evaluation of Non-benzenoid Scaffold (Tropolone) Incorporated Biomacromolecules (Peptides and DNA)**, Inter IISER-NISER Chemistry Meet' IISER-Pune. 20-22nd March, 2025.
- **A Marriage of Metal Nanoparticle and Covalent Chemistry**, MPI-FKF, Stuttgart, Germany. June 2024.
- **A Marriage of Metal Nanoparticle and Covalent Chemistry**, TU Dresden, Dresden, Germany. June 2024.
- **Covalent Organic Framework Membranes for Molecular Separations and Beyond, Emerging Trends in Separation Science and Technology (SESTEC-2024)**, HSNC University, Mumbai. 10-13th July, 2024.
- **Terahertz Conductivity of Free-standing 3D Covalent Organic Framework Membranes Fabricated via Triple-Layer-Dual Interfacial Approach**, MOF24, Suntech City, Singapore. 15-19th July, 2024.
- **Chemistry and Chemist: What, How, Why?**, Angul (Govt. Auto.) College, Angul, Odisha. Oct. 2024.
- **Porous Reticular Materials: What Are They Good For?**, NTCS-OCS, Bhadrak (Auto.) College, Bhadrak, Odisha. Nov. 2024.
- **Covalent Organic Framework Membranes for Molecular Separations and Beyond**, MEEHCON, International Conference on Materials for Energy, Environment and Healthcare, NIT Calicut, Kerala. 20, 21 Dec 2024.
- **Chemistry and Chemist: Past, Present and Future**, Dept. of Chemistry, VSSUT, Burla, Odisha. Feb. 2025.
- **Nanoparticle Organic Networks: A New Class of Functional Materials**, IISER - NISER Chemistry Meet, IISER Pune. 20-22nd March, 2025.

Dr. S. Peruncheralathan

- **New Strategies for Benzoheterocycle Synthesis and Functionalization**. National Conference on Recent Advances in Heterocyclic Chemistry (RAHC-2024), Department of Chemistry, Ravenshaw University, Cuttack. 20-21st November, 2024.
- **New Toolkits for Benzoheterocycle Synthesis and Functionalization**. 7th International Symposium on C-H Activation (ISCHA 2024), IIT Bombay, Mumbai. 6-9th December, 2024.
- **New Strategies for Benzoheterocycle Synthesis and Functionalization**. One-Day Symposium on Sustainable Organic Synthesis 2024 (SOS-2024), Department of Chemistry, Berhampur University, Odisha. 20th December, 2024.
- **New Strategies for Benzoheterocycle Synthesis and Functionalization**. International Conference on Chemistry for Human Development (ICCHD-2025), Science College, University of Calcutta, Kolkata. 4-6th January, 2025.
- **New Strategies for Benzoheterocycle Synthesis and Functionalization**. 2nd International Conference on Emerging Areas of Chemistry (ICEAC 2025), Department of Chemistry, Tripura University. 12-14th February, 2025.

Dr. Bishnu Prasad Biswal

- **Porous Reticular Materials: What are They Good for?**, Chemistry MEET-2024, IISER Berhampur, Odisha. March 2024

Dr. Aritra Banik

- **Parameterized Algorithms: Tailoring Algorithms for Precision**, BITS Hyderabad. 18th October, 2024.

Dr. Subhankar Mishra

- **Cutting-edge Artificial Intelligence Applications: Opportunities and Challenges**, OUAT, Bhubaneswar. 30th March, 2025.
- **Application of Artificial Intelligence in Agriculture and Allied Sciences**, Department of Agricultural Statistics, College of Agriculture, OUAT, Bhubaneswar. 10th Mar, 2025.
- **Artificial Intelligence in Higher Education – opportunities & challenges in NEP-2020**, Niali College, Niali Cuttack. 31st January, 2025.

- **Research Challenges in SoC Design' at IEEE Circuits and Systems Society Seasonal School**, Vel Tech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology. 10 December, 2024.
- **Recent Trends in Computing and Communications**, Utkal University. 24th August, 2024.
- **The Game Theory Challenge**, KIIT University. 10th August, 2024.
- **Recent Advances in Computer Science**, Rama Devi Women's University, Bhubaneswar. 06th July, 2024.
- **Indian Institute of Materials Management**, Bhubaneswar Chapter. 02nd June, 2024.
- **Cyber Security Programme**, Commissionerate Police, Bhubaneswar-Cuttack. 29th May, 2024.

Dr. Jayesh Mahendra Goyal

- **Our search for generalized convective scheme for modelling planetary atmospheres**, SPP-IOE Convection Workshop, IIT Bombay, Mumbai. Nov, 2024.
- **What we are learning about exoplanet atmospheres from HST and JWST and what insights ExoWorlds could provide**, ExoWorlds Brainstorming Meeting, Indian Space Research Organisation (ISRO), Bangalore. Jan, 2025.
- **Clouds and hazes in exoplanet atmospheres**, Astrophysical Dust-Ices Workshop, Physical Research Laboratory (PRL), ISRO, Ahmedabad, March 2025.

Dr. Liton Majumdar

- **Exoplanets and the Search for Life in the Universe**, SETI Goa Workshop 2024, Breakthrough Listen and University Oxford, Goa, India. 13-15th December, 2024.
- **Unveiling the Origins, Atmospheres, and Interiors of Exoplanets: The New Frontier**, Astronomy from Moon in the era of Indian lunar missions, ASI Symposium 001, Raman Research Institute, Bengaluru. 2-4th Dec, 2024.
- **Exoplanet Origins, Atmospheres and Interiors: The New Frontier**, The 1st Indo-Thai Symposium on Astrophysics and Technological Development (ITSA 2024), Chiangmai, Thailand. 26-28th August 2024.

Dr. Priyadarshi Chowdhury

- **Integrating tectonic modelling with grain-scale diffusion chronometry: Insights into tectonic processes under hotter mantle conditions**, National Seminar on Dynamic Processes of the Earth, Presidency University, Kolkata. March 2025.
- **Subaerial emergence of continents on early Earth**, M-cube (Magmatism Metamorphism- Metallogeny) Conference, NCESS Thiruvananthapuram, February 2025.

Dr. Amarendra Das

- **Structural Changes and Development Trends of Odisha Economy**, Special Lecture for Odisha Administrative Officers, Gopabandhu Academy of Administration. 12th November, 2024.
- **Development Path of India and its neighbours**. Annual Academic Seminar, Kunja Bihari College, Baranga, Odisha. 07th December, 2024.
- **Odisha's Potential to Become a Developed a State by 2047**, State Level Seminar, Pattamundei College, Pattamundei. 04th January, 2025.
- **Freebies Politics in India and its Impact on Indian States**. Annual Academic Seminar, Jatni College, Jatni. 30th January, 2025.
- **Odisha Economy: An Overview**, Special Lecture for Odisha Administrative Officers, at Gopabandhu Academy of Administration. 4th February, 2025.
- **Union Budget 2025-26: Key Features and Its Implication**, Ekamra College, Bhubaneswar, 21st February, 2025.

Dr. Amarjeet Nayak

- **Decentering the Self and Foregrounding the Collective: Writers from the Margins and Their Quest to Celebrate the lowercaseness**, Interdisciplinary National Conference on Collective Memory and Cultural Heritage: Exploring Socio-Cultural Identities and Issues, Vikram Dev University, Jeypore. 15-16th February, 2025.
- **The Role of Dalit Autobiography in Memorializing Caste-based Trauma**, IACLALS Annual Conference, BITS Pilani (Hyderabad Campus). 20-22nd February, 2025.

Dr. Pranaya Kumar Swain

- **Popular perceptions about Science, Scientists and Science Education: Let's hear it from the Colts and Fillies**, Dept. of Sociology, and the DST Centre for Policy Research, University of Hyderabad. 16th January 2025.
- **Uniting for Sustainable Impact: An Industry and Academia Perspective**, CSR Conclave, CSR Cell and REP, IIT Bhubaneswar. 10th January 2025.
- **Culture of Integrity for Nation's Prosperity**, part of the Vigilance Awareness Week, DRM, KUR Divisional Administration, East Coast Railways, Khurda. 01st November 2024.
- **Plenary talk on Ethnography and participant observation in Everyday Life**, at the National seminar on Sociology in Everyday Life: Methodological Approaches, KISS-DU, Bhubaneswar. 23rd August 2024.
- **Ethical Principles in Social Research**. Dept of Sociology, Utkal University, Bhubaneswar. 18th July 2024.
- **Rising Odisha**, News-18, Bhubaneswar. 24th Feb 2024.
- **India: Globalization, self and everyday life in the wake of Sea level Rise**, National Seminar on Globalisation, Self and Lifeworld, Sikkim University in collaboration with ICSSR-NERC and RC-28 of the Indian Sociological Society. 10-11th March 2025.
- **Pandemic rendering the Transgender people more vulnerable, as if it was not already enough: A qualitative exploration from Odisha, India**, 16th Annual Conference (TQR2025), The Qualitative Report, NSU Florida. 5-6th March 2025.

Dr. Joe Varghese Yeldho

- **Harlem Figural: HANA, Colson Whitehead and the gathering of the city**. PAMLA Conference / UC Riverside (CA). 7th November, 2024.

Prof. Brundaban Sahu

- **A simple extension of Ramanujan-Serre derivative map and some applications**, Seminar talk, IISER Thiruvananthapuram, 23rd April, 2024.

- **Evaluation of Convolution sums and modular forms**, 36th Annual Workshop on Automorphic Forms and Related Topics, Oklahoma State University, Stillwater, USA. 20-24th May, 2024.
- **Nonvanishing of L-functions and Poincare series for Jacobi forms**, Decimas Jornadas de Teoria de Numeros, ICMAT, UAM, Madrid, Spain. 8-12th July, 2024.
- **A simple extension of Ramanujan-Serre derivative map and some applications**, International Conference on Class Groups of Number Fields and Related Topics, IISER Berhampur. 20-24th November, 2024.
- **Nonvanishing of kernel functions and Poincare series for Jacobi forms**, International Conference on Number Theory and related topics, IMSc Chennai/ IIT Madras. 16-18th December, 2024.
- **Nonvanishing of kernel functions and Poincare series for Jacobi forms**, Symposium on Number Theory, Ramanujan Mathematical Society Annual Conference, Christ University, Bengaluru. 27-29th December, 2024.
- **Nonvanishing of kernel functions and Poincare series for Jacobi forms**, International Conference on Analytic Number Theory, IISER Berhampur. 3-7 February, 2025.
- **A simple extension of Ramanujan-Serre derivative map and some applications**, National Conference on the Recent Developments in Mathematical Sciences-2025, University of Hyderabad. 5-7th February, 2025.
- **A simple extension of Ramanujan-Serre derivative map and some applications**, National Seminar on Number Theory and Lie Algebra, Sambalpur University. 27-28th February, 2025.

Dr. Binod Kumar Sahoo

- **Blocking sets of external, tangent and secant lines to an elliptic quadric in $PG(3,q)$** , Combinatorial Constructions Conference, Dubrovnik, Croatia. 7-13th April, 2024.
- **On zero-divisor graphs of local principal ideal rings**, Conference on Graph Theory and Additive Combinatorics, IIIT Allahabad. 3-5th May, 2024.

Dr. Jaban Meher

- **Location of the zeros of certain polynomials**, National seminar on Number Theory and Lie Algebra, Sambalpur University, Odisha. 27–28th February, 2025.
- **Zeros of a variant of Ramanujan polynomials**, Celebrating Number Theory in India, in honour of Professor M. Ram Murty on his 70th birthday, IISER Pune. 9–13th December, 2024.
- **Location of the zeros of certain polynomials**, 7th International conference on class groups of number fields and related topics, IISER Berhampur, Odisha. 20–24 November, 2024.
- **Multiplicity one results for Siegel modular forms**, International conference on Lie Algebra and Number Theory (ICLANT-2024), NIT Calicut. 10–14th June, 2024.
- **Some mathematical identities**, NISER outreach teachers' training workshop, NISER, Bhubaneswar. 8–10th April, 2024.

Dr. Kamal Lochan Patra

- **On vertex connectivity of zero-divisor graphs of finite commutative rings**, Combinatorial Constructions Conference, Dubrovnik, Croatia. 7–13th April 2024.
- **Zero-divisor graph of a finite local principal ideal ring**, 20th Annual Conference of ADMA - ICDM 2024, Savitribai Phule University, Pune. 7–10th June 2024.
- **Centrality in connected graphs via convexity or concavity**, Faculty Development Program on Advances in Graph Theory and Linear Algebra (Online), VIT-AP University, Andhra Pradesh. 1–5th October 2024.
- **Characteristic center of a connected graphs**, Mathematics Day, NISER Bhubaneswar. 18th October 2024.

Dr. Manas Ranjan Sahoo

- **On complex sequence of vanishing moments**, International Conference on Recent Advances in Applied Mathematics (RAAM 2024) IIT(BHU) Varanasi. 03–05th July, 2024.
- **Classical and weak solutions of some 1st order partial differential equations**, Interdisciplinary Refresher Course in Physical Sciences. 25th January, 2025.

- **Initial boundary value problem to the 1D pressureless gas dynamics**, 90th Anniversary General Meeting INSA, SRM Institute of Science and Technology (SRMIST), Kattankulathur. 9–10th December, 2024.
- **Wave front tracking method for scalar conservation laws and hyperbolic systems (with an emphasis on 2×2 system)**, NCM workshop on “Hyperbolic Conservation Laws”, NISER Bhubaneswar. 27th May–15th June 2024.

Dr. Sanjay Parui

- **Noncommutative Ergodic theorems for Radial averages on Real Hyperbolic Lie group**, 39th Annual Conference of the Ramanujan Mathematical Society, CHRIST (Deemed to be University), Bengaluru. 27–29th December 2024.
- **Boundedness of Differential Transforms for Dunkl Heat Semigroups**, mini conference on Harmonic analysis, IIT Bombay. 12–14th December 2024.

Dr. Anupam Pal Choudhury

- **A brief review on stability estimates for the inverse boundary value problem for the bi-harmonic operator**, Annual Inverse Meet 2025, IIT Gandhinagar. 13–15th February 2025.
- **A brief review on stability estimates for the inverse boundary value problem for the bi-harmonic operator**, International Conference on Nonlinear Dynamics: Modeling and Computation, Bharathiar University, 17–19th February 2025.

Dr. Dinesh Kumar Keshari

- **Invariants of Cowen-Douglas Operators**, IINMM 2024, IISER TVM. 27th June 2024.

Dr. K. Senthil Kumar

- **Linear Algebra**, SOPM NISER. 20th May - 8th June 2024.
- **A lower bound for the height of algebraic numbers**, Inter IISER-NISER Math Meet 2024, IISER TVM. 26–28 June, 2024.
- **Rational Approximations**, Mathematics Day, NISER. 18 October, 2024.
- **Transcendence of the values of quasi-periodic functions**, ICDEPRA-2024, ISI DELHI. 26–30th November 2024.

- **Algebraic independence of the values of Weierstrass Sigma functions**, TRADE, KSOM Calicut. 3 –5th January 2025.
- **Algebraic Independence of the values of Weierstrass zeta functions**, Number Theory and Lie Algebra, Sambalpur University. 27-28 February, 2025.

Dr. Ramesh Manna

- **The square function related to Fourier integral operator**, 39th Annual Conference of the Ramanujan Mathematical Society, CHRIST (Deemed to be University), Bengaluru. 27-29th December, 2024.
- **Global Fourier integral operators and the square function**, CHAS Summer School “Recent Developments in Harmonic Analysis”, Bedlewo, Poland.
- **On averaging operator: the square function vs Decoupling**, Mathematics Day, NISER. 2024.

Dr. Rekha Biswal

- **Ideals in enveloping algebras of affine Kac-Moody algebras**, Seminar talk, Institute of Mathematical Sciences, Chennai. 9th January, 2025.
- **Ideals in enveloping algebras of affine Kac-Moody algebras**, Seminar talk, University of Clermont Auvergne, France. 18th June, 2024.
- **Ideals in enveloping algebras of affine Kac-Moody algebras**, Seminar talk, University of Lyon, France. 13th June, 2024.
- **Ideals in enveloping algebras of affine Kac-Moody algebras**, Seminar talk, University of Vienna, Austria. 13th May, 2024.
- **Finite and affine Springer theory**, Oberwolfach Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture, Oberwolfach, Germany. 31st March- 5th April, 2024.

Dr. Sudhir Kumar Pujahari

- **A finer Sato-Tate conjecture and Bias conjecture for certain families of elliptic curves**, Annual Discussion Meeting in Analytic Number Theory, ISI Kolkata. 10-14th February, 2025.
- **A refinement of Chowla’s conjecture**, International conference on class group of number fields and related topics, 20-24 November, 2024.
- **A finer Sato-Tate conjecture and Bias conjecture for**

certain families of elliptic curves, IISc Bengaluru. 30th August, 2024.

- **All-purpose Erdos-Kac Theorem**, Conference on Galois Representations, Automorphic Forms and their L-functions, GALF 2024, University of Luxembourg. 1-5th July, 2024.
- **Sato-Tate conjecture in arithmetic progressions for certain families of elliptic curves**, 36th Automorphic Forms Workshop, Oklahoma State University. 20-24th May, 2024.

Dr. Sumana Hatui

- **On Projective representations of groups**, Workshop on Recent Developments in Algebra (RDAL-2024), IIIT Allahabad. 9th July 2024.
- **A quick tour from linear to Projective Representations of groups**, Math day, NISER, 18th October, 2024.

Prof. Bedangadas Mohanty

- **Recreating microsecond old universe conditions in the laboratory - science and societal benefits**, QGP Mini Symposium, IISER Berhampur, Odisha. 17th January 2025.
- **Recent experimental results from relativistic heavy-ion collisions**, 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha. 13-16th January 2025.
- **Overview of results in Nuclear Collisions**, Physics in Hadronic and Nuclear Collisions, Puri. 27-30th March, 2025.
- **Status of ALICE experiment at LHC**, Physics in Hadronic and Nuclear Collisions, Puri. 27-30th March, 2025.
- **Recreating microsecond old universe conditions in the laboratory - science and societal benefits**, QGP Mini Symposium, IISER Tirupati, Andhra Pradesh. 5th February 2025.
- **Recreating microsecond old universe conditions in the laboratory - science and societal benefits**, International Conference on Emerging Trends in Physics (ICETP-2025) along with the 41st Annual Convention of the Orissa Physical Society (OPS). 8-10th February 2025.
- **Recreating microsecond old universe conditions in A Large Ion Collision Experiment (ALICE)– a perfect**

fluid of quarks and gluons, CERN70 event at IIT Madras, India. 22nd February 2025.

- **Origin of mass of fundamental particles**, National Science Day, Inter-University Accelerator Center, New Delhi. 28th February 2025.
- **QCD Phase Structure and Relativistic Heavy-ion collisions**, IJCLAB, Orsay, France. 10th March 2025.

Prof. Sanjay Kumar Swain

- **India-CMS collaboration activities**, Physics in Hadronic and Nuclear Collisions (PHANC'25), Puri. 27-30th March 2025.
- **Status of LHC experimental program**, keynote talk, Lake Louise winter school, Canada. 2-8th March, 2025.
- **LHC Physics**, International conference on frontier in High Energy physics (ICFHEP), IIT Bhilai. 13-15 February, 2025.
- **Results from CMS**, 17th International conference on interconnection between particle physics and cosmology (PPC 2024), IIT Hyderabad. 14-18th Oct, 2024.
- **The Higgs Boson**, BoseStat@100, NISER. 18th October, 2024.

Prof. Subhankar Bedanta

- **Excitement in Nanomagnetism and Spintronics**, SPS Day, NISER. 30th August 2024.
- **Organic Spintronics: A new Playground for Exciting Physics**, IIT Delhi. 1st July 2024.
- **Domain and Skyrmion Dynamics for Spin-Orbit Torque based applications**, Durham University, UK. 28th June 2024.
- **Interface Phenomena for Spin-Orbitronics**, University of Leeds, UK. 27th June 2024.
- **Interface phenomena for Spin-Orbitronics**, Loughborough University, UK. 21st June 2024.
- **Excitement in Nanomagnetism and Spintronics**, Trident academy of Technology, Bhubaneswar, 28th May 2024.
- **Excitement in Nanomagnetism and Spintronics**, RDFMSA 2024, GIET University, Gunupur, Odisha. 20th April 2024.
- **Interface Phenomena for Spin-Orbitronics**, UGC-CSR consortium, Indore. 12th April 2024.

- **Nanomagnetism and Spintronics for Quantum Technology**, RRCAT, Indore. 10th April 2025.
- **Spin pumping with novel Quantum Materials**, PSCES-2024 Conference, IISER Bhopal. 8th April 2024.
- **Novel Materials, Devices & emerging phenomena for Spintronics & Quantum Technologies**, Faculty orientation program, Berhampur University, Odisha. January 2025
- **Nanomagnetism and spintronics for Quantum technology**, CRNAFP 2025, FM University, Odisha.

Dr. Ajaya Kumar Nayak

- **Prospect of Skyrmions in centrosymmetric magnets for skyrmion based qubits**, ICMAGMA-2025, IISc Bangalore. 12-14th Feb, 2025.
- **Non-coplanar magnetic structure driven Large Anomalous Hall Effect in electron doped Mn₃Sn**, QMAT-2024, IIT Guwahati. 20-23rd Dec, 2024.
- **Prospect of Skyrmions in centrosymmetric magnets for skyrmion based qubits**, RTBP-2024, Ashoka University. 10-12th March, 2025.

Dr. Amaresh Kumar Jaiswal

- **Strongly interacting matter in big bang and little bangs**, Full semester course, Jagiellonian University, Krakow, Poland. Spring 2024.
- **Relativistic kinetic theory and non-equilibrium transport**, Full semester course, Jagiellonian University, Krakow, Poland. Spring 2024.
- Series of 10 lectures on **Aspects of Relativistic Fluid Dynamics**, IIT Gandhinagar. July 2024.
- ALICE-India Webinar lecture on **Relativistic Hydrodynamics and Collective Flow**. 18th April 2024
- **Longitudinal spin polarization in a thermal model with dissipative corrections**, Białasówka, AGH University, Krakow. 24th May 2024
- **Relativistic spin-(magneto) hydrodynamics**, Physics Departmental Seminar, IIT Gandhinagar. 26th July 2024
- **Relativistic spin-(magneto)hydrodynamics**, Institute Colloquium, IMSc Chennai. 13th December 2024.
- **Spin polarization in heavy ion collisions and relativistic spin hydrodynamics**, ATHIC 2025, IISER Berhampur. 16th January 2025.

- **Hydrodynamics and collectivity in relativistic heavy ion collisions**, ICFHEP 2025, IIT Bhubilai. 14th February 2025.
- **Heavy quark polarization in QCD medium**, Flavor Physics Week, IIT Gandhinagar. 7th March 2025
- **Heavy quark spin polarization in QCD medium**, PHANC 2025, Puri. 28th March 2025.

Dr. Anamitra Mukherjee

- **Resonant inelastic X-ray spectroscopy for strongly correlated systems**, Quantum Condensed Matter (QMAT) 2024, IIT Guwahati. 20-23rd Dec 2024.
- **Computational investigations of strongly correlated quantum matter**, Quantum Condensed Matter Perspectives (QCMP), IIT Bombay. 11-12th Dec 2024.
- **Open questions in strongly correlated materials**, Consortium for Quantum Materials, SNBNCBS, Kolkata. 18-19th Nov 2024.
- **Spin-excitations of low-dimensional cuprates beyond linear response**, Emergent trends in Cond. Mat conference, IOP Bhubaneswar. 21-23rd Aug 2024.
- **Fock-space recursive Green's function for resonant inelastic X-ray spectroscopy**, Workshop on Correlated Quantum Matter, IISER Kolkata. 18th Apr 2024.

Dr. Ashok Mohapatra

- **Achieving Bose-Einstein Condensation in Laboratory**, BoseStat@100, NISER. 18th October, 2024.

Dr. Colin Benjamin

- **Resolving degeneracies in Google search via quantum stochastic walks**, Wolfram Virtual Technology Conference. 17th October, 2024.
- **Writing a good Master's thesis related to Quantum Physics**, Invited talk on "Quantum Physics" in July 2024 in GIET.
- **Research in theoretical nanoscience, quantum Information and game theory**, 50th anniversary celebration of Institute of Physics, Bhubaneswar. September 2024.

Dr. Kartikeswar Senapati

- **Fabrication of nanoscale Josephson junctions using Gallium Focused Ion Beam (FIB) patterning**

techniques (I), EMSI-2024, IIT Bombay. 18th May, 2024.

- **Routes to non-reciprocal transport across Superconducting tracks and JJs**, TIFR Mumbai, Mumbai. 13th October, 2024.
- **Signature of non-reciprocal supercurrent transport across Nb-Pt-Ni-Pt-Nb Josephson junctions**, Asia-Pacific Conference on Condensed Matter Physics 2024, IIT Patna. 9th December 2024.
- **Towards non-reciprocal superconducting devices**, OPS annual convention, KIIT University. 10th February, 2025.

Dr. Nishikanta Khandai

- **The Distribution of Cold Gas in the Local Universe**, Physics Department Seminar, IIT Madras. 25th April 2024.
- **21cm Cosmology in the Post-Reionisation Universe**, Workshop on 21cm Cosmology, IIT Madras. 9th December 2024.

Dr. Prasanjit Samal

- **Generalized Dielectric-Dependent Hybrids: A New Computational Window for Bulk to Nano-structured Quantum Materials**, International School and Conference on "Evolution of Electronic Structure Theory & Experimental Realization (EESTER), 2025, IIT Madras. 8-11th January 2025.

Dr. Pratap Kumar Sahoo

- **Defects activated charge density wave, excitons, and bandgap tunability in 2D quantum materials**, National Conference on Frontiers of Ion Beam Science (FIBS-2024), IoP, Bhubaneswar. 4-7th November, 2024.
- **Simulation and optimization of RF sputtering source design for large area uniform thin film growth**, DAE-BRNS National Conference on Development of RF Components for Accelerators (DRCA-2024), DAE Convention Centre, BARC, Mumbai. 20-22nd June 2024.
- **Spin Hall Magnetoresistance Device using Dual Focused Ion Beams Techniques**, International Conference on Electron Microscopy along with the XLII Annual Meeting of the Electron Microscope Society of India VMCC, IIT Bombay, Mumbai. 16-18th May, 2024.

- **Defects-activated CDW and excitonic luminescence in 2D quantum materials**, Asia-Pacific Conference on Condensed Matter Physics 2024 (AC2MP-2024), Indian Institute of Technology Patna (IIT Patna), India. 8-11th December, 2024.
- **Defects driven charge density wave and excitonic luminescence in 2D quantum materials**; AMSE-2025, IIT Bhubaneswar. 7th February, 2025.
- **Local density fluctuation in Raman modes of superconducting NiBi₃: Spin Phonon coupling**, International Conference on Emerging Trends in Physics (ICETP-2025) and the 41st Annual Convention of the Orissa Physical Society (OPS), KIIT University, Bhubaneswar. 8–10th February 2025.
- **Tuning charge density wave and excitonic luminescence in 2D quantum materials by low energy ion beams**, Workshop on Ion/Laser Beams in Nano-Science (WINS-2025), University of Hyderabad. 19– 20th February 2025.
- **Enhancement of Charge Density Waves and Ferromagnetism in 2D-quantum materials by Implanting metallic and semiconducting ions**, ECR and Accelerator-Based Atomic Molecular Physics and Related Topics (ECAAMP-2025), TIFR Mumbai. 06–08th March 2025.
- **Imitating Lotus Leaf Effect by Nanotechnology**, Department of Physics, Gopabandhu Choudhury College, Ramchandrapur, Jajpur. 22nd November 2024.
- **Imitating lotus leaf effect in artificially synthesized quantum dots**, ADVANCES IN MATERIALS' SCIENCE (AIMS-2024), Visva-Bharati University, Santiniketan. 9th August 2024.
- **Imitating lotus leaves effect by artificial quantum materials for social impact**, National Academy of Sciences, India (NASI) and Indian National Science Academy (INSA), Local Chapter: Conference and other Events at Sophitorium Group of Institutions (SGI), Bhubaneswar. 14th December, 2024
- **Imitating lotus leaves effect in artificial quantum materials for social impact**, International Symposium on Engineering Functional Materials for Sustainable Societal Applications (ISEFMSSA-2025) GIET University, Gunupur. 10-12th January, 2025.

Dr. Proloy Kumar Mal

- **Physics at the HL-LHC and beyond**, Pheno-Coffee Talk seminar, IISc Bengaluru. 3rd April, 2024.
- **Silicon Tracker for CMS Phase 2 Upgrade**, CHEP colloquium, IISc Bengaluru. 5th April, 2024.
- **Future Circular Collider**, BCVSPIN Conference, Kathmandu, Nepal. 9-13 December, 2024.
- **Precision Physics with Top Quark at the LHC**, XXVI DAE-BRNS HEP Symposium 2024, Banaras Hindu University (BHU), Varanasi, UP. 19-23rd December, 2024.
- **HL-LHC Upgrade of the CMS Tracker**, Conference on Cosmology, Astrophysics & Particle Physics (CCAPP), SRM Institute (SRM-IST), Kattankalathur, Tamil Nadu. 30th Jan – 1st February, 2025.
- **Top Quark Measurements**, Physics in Hadronic and Nuclear Collisions (PHANC), Puri, Odisha. 27-30th March, 2025.

Dr. Shamik Banerjee

- **Boundary operators in asymptotically flat space-time**, Department of Theoretical Physics (DTP), TIFR, MUMBAI. 22nd July 2024.
- **Boundary operators in asymptotically flat space-time**, Department of Physics, IISER Pune. Date: 25th July 2024.
- **Carrollian and Celestial limits of relativistic conformal field theories**, NSM 2024, IIT Ropar. 12th December, 2024.

Dr. Subhasish Basak

- **Strong decay of double charm tetraquark TCC**, Lattice 2024, University of Liverpool. 29th July 2024.

Dr. Sumedha

- **Spin-1 Random Energy Models**, Indo-French workshop on Classical and quantum dynamics in out of equilibrium systems, ICTS Bangalore. 16-20th December 2024.

Dr. Victor Roy

- **Baryon Stopping and EM fields in low Energy Heavy-Ion collision**, Hot QCD conference, IIT Mandi. 1-4th July, 2024.

Dr. Yogesh Kumar Srivastava

- **Supersymmetric Black Hole hair and AdS_3XS^3** , Centre for High Energy Physics CHEP, IISc Bengaluru. 9th February, 2025.
- **Supersymmetric Black hole hair and AdS/CFT** , Chennai Mathematical Institute CMI. 18th July 2024.
- **Supersymmetric Black hole hair: Inside out**, Harish Chandra Research Institute Prayagraj. 19th March 2024.
- **Introduction to Particle Physics**, Amity University, Lucknow. 12th March, 2025.

Dr. Kush Saha

- **Probing Fermi Surface Topology Through Ultrashort Light Pulse**, Young Investigators Meet on Quantum Condensed Matter Theory, IISER Pune, Pune. 16-18th December, 2024.
- **Frequency-selective amplification of nonlinear response in strongly correlated bosons**, 7th Annual Conference on Quantum Condensed Matter, IIT Guwahati, Guwahati. 20-23rd December, 2024.

Dr. Najmul Haque

- **Mesonic screening masses using Gribov-gluon propagator**, Institute of Theoretical Physics, Giessen, Germany. May 2024.
- **Non-perturbative resummation to study hot and dense nuclear matter**, The 10th International Conference on Quarks and Nuclear Physics, University of Barcelona. Jul, 2024.
- **Shear and Bulk viscosity in semi-QGP region for pure glue theory**, Physics in Hadronic and Nuclear Collisions (PHANC'25) conference, 27th March, 2025.

Dr. Satyaprasad P. Senanayak

- Invited Talk in International Conference of Advanced Polymeric Materials, CIPET Lucknow.
- Invited Talk in International Conference of Spins in Molecular Systems, IISc Bangalore.
- Invited Talk in International Conference in Functional Materials, IIT KGP.

Dr. Shovon Pal

- **Terahertz exchange nonlinearities in a ferrimagnetic insulator**, International Symposium on Ultrafast

Spintronics and Magnonics (ISUSM), IIT (ISM) Dhanbad. 3-4th February 2025.

- **THz driven ultrafast processes in quantum materials**, Processability and Applications of Reticular Advanced Materials (PARAM), NISER Bhubaneswar. 17-18th January 2025.
- **THz driven ultrafast processes in quantum materials**, MRS Spring Meeting and Exhibit, Seattle, Washington, USA. 7-9th May 2024.

Dr. Tapan Mishra

- **Non-trivial pairing of bosons in the quantum walk of interacting particles**, emerging trends in quantum condensed matter physics, IOP Bhubaneswar. 21-23rd August 2024.
- **Physics with BEC**, BoseStat@100, NISER. 18th October, 2024.
- **Non-trivial doublon formation**, DAE conclave, NISER, Bhubaneswar. 22-26th October 2024.
- **Non-trivial doublon formation using a quantum computer**, QMAT, IIT Guwahati. 20-23rd December 2024.
- **Formation of non-trivial doublons**, Department seminar, Physics department, IISc Bangalore. 17th January 2025.
- **Formation of nontrivial doublon using quantum computer**, Emerging trends in physics, KIIT University, Bhubaneswar. 8-10th February, 2025.
- **Non-trivial doublon formation on a quantum computer**, Department colloquium, IISER-Pune. 17th February 2025.

Dr. Tuhin Ghosh

- **Modelling magnetic field of M31 using radio observations**, Kagoshima Japan. 28th May, 2024.
- **Cosmology with Microwave Background Radiation**, National Science Day, NISER Bhubaneswar, 23rd August, 2024.
- **Modelling magnetic field of Andromeda Galaxy**, NISER Bhubaneswar. 30th August, 2024.

Dr. V. Ravi Chandra

- **Magnon interactions, spectral renormalisation and potential phase instabilities in some pyrochlore spin models**, Asia Pacific Conference on Condensed Matter Physics 2024, IIT Patna. December, 2024.

- **Spin wave interactions in the pyrochlore Heisenberg model with Dzyaloshinskii-Moriya terms**, Annual conference on quantum condensed matter, QMAT 2024, IIT Guwahati. December 2024.

Dr. Ranbir Singh

- **Resonance production in heavy-ion collisions**, Physics in Hadronic and Nuclear Collisions (PHANC'25), Puri, Odisha. 27-30th March, 2025.

Dr. Saralasrita Mohanty

- **Signatures of Topological Phase Transitions in Coupled SSH Chains using Electrical circuits**, International Conference on Emerging Trends in Physics (ICETP-2025) & 41st Annual Convention of Orissa Physical Society (OPS), Department of Physics, School of Applied Sciences, KIIT University, Bhubaneswar, Odisha. 8-10th February, 2025.
- Poster Presentation on “**Structural, Optical and Magnetic Characteristics of Barium Ferrite (BaFe₂O₄)**”, International Conference on Advances

in Energy and Environment for Sustainable Development (AEESD-2025), ITER, Siksha ‘O’ Anusandhan, in collaboration with Doon University, Uttarakhand, India, and CSIR-Institute of Minerals and Materials Technology. 28-29th March, 2025.

Dr. Ganesh J. Tambave

- **Silicon-Tungsten Based Multilayer Electromagnetic Calorimeter Development for Societal Applications**, XXVI DAE-BRNS HEP symposium, BHU, Varanasi, India. 19-23rd December, 2024,

Dr. Raveendrababu Karnam

- **A modular muon telescope for tomography and radiography applications**, XVII conference on Resistive Plate Chambers and Related Detectors, Spain. 9-13th September, 2024.
- **Resistive plate chamber-based tracking system for cosmic-ray muon radiography applications**, XXVI DAE-BRNS HEP symposium, BHU, Varanasi, India. 19-23rd December, 2024.

JOURNAL EDITORSHIP

Prof. Chandan Goswami

- Member, Editorial Board, Scientific Reports, Nature.
- Member, Editorial Board, Frontiers in Cell and Developmental Biology, Frontiers Media SA.
- Guest associate editor, Frontiers in Membrane Physiology and Membrane Biophysics, Frontiers Media SA.

Prof. Palok Aich

- Editor-in-Chief, Microenvironment & Microecology Research, Trend of Medical Research Publishing Group.
- Associate editor, Journal of Gerontology and Geriatrics, Italian Society of Gerontology and Geriatrics.
- Associate editor, Frontiers in Cellular and Infection Microbiology, Frontiers Media.
- Associate Editor, Current Bioinformatics, Bentham Science.
- Member, Editorial Board, PLoS One.

Dr. Asima Bhattacharyya

- Handling editor, PNAS nexus 2024
- Member, Editorial Board, Current Research in Physiology, ScienceDirect.

Dr. Harapriya Mohapatra

- Guest Associate Editor, Frontiers in Cellular and Infection Microbiology section Molecular Bacterial Pathogenesis, Frontiers Media SA.

Kishore CS Panigrahi

- Review Editor, Plant Biotechnology, Frontiers Media SA.

Dr. Manjusha Dixit

- Guest Editor, Scientific Reports: Angiogenesis in health and disease, Nature.
- Editor, Scientific Reports: Autophagy and anti-tumour immunity, Nature.

Dr. Pankaj Vidyadhar Alone

- Reviewer, PLOS ONE and FEBS-Lett.

Dr. Praful Singru

- Member, Editorial Board, Journal of Molecular Neuroscience, Humana Press.

Dr. Ramanujam Srinivasan

- Associate Editor, Resonance, Indian Academy of Sciences.
- Review Editor, Frontiers in Microbiology, Frontiers Media SA.

Dr. Subhasis Chattopadhyay

- Associate Editor, Frontiers in Immunology, Frontiers Media SA.
- Associate Editor in Chief, Journal of Inflammation Research, Dove Medical Press.

Dr. Aniruddha Datta Roy

- Editor, Zootaxa, Magnolia Press, Auckland, New Zealand
- Editor, Resonance Journal of Science Education, Indian Academy of Sciences
- Editor, Hamadryad, Madras Crocodile Bank trust and Centre for Herpetology.

Dr. K. Himabindu Vasuki

- Editor, Frontiers in Plant Sciences, Frontiers Media.

Prof. Chidambaram Gunanathan

- Member, Editorial Board, Journal of Chemical Sciences, Indian Academy of Sciences, Springer Science + Business Media.

Prof. Himansu Sekhar Biswal

- Member, Editorial Advisory Board, The Journal of Physical Chemistry Letters, ACS.

Dr. Bishnu Prasad Biswal

- Associate Editor, Frontiers in Chemistry, Frontiers Media SA.

Dr. Pathikrit Bhattacharya

- Associate Editor, Seismica

Dr. Priyadarshi Chowdhury

- Member, Editorial Board, Geology, Geological Society of America.

Dr. Amarendra Das

- Associate Editor, Odisha Economic Journal

Dr. Pranaya Kumar Swain

- Member, Editorial Board, Educational research and Evaluation, Taylor and Francis.
- Member, Editorial Advisory Board, Explorations, Indian Sociological Society.
- Editor, Sage Open

Dr. Binod Kumar Sahoo

- Member, Editorial Board, Innovations in Incidence Geometry, Mathematical Sciences Publishers.

Prof. Bedangadas Mohanty

- Member, Editorial Board, International Journal of Modern Physics E, World Scientific Publishing.
- Member, Editorial Board, Proceedings of the Indian National Science Academy, Springer Publishing.
- Member, Editorial Board, Nuclear Science and Techniques, Springer Publishing.

Prof. Subhankar Bedanta

- Editorial Advisory Member, Journal of Magnetism and Magnetic Materials (JMMM), Elsevier.
- Associate Editor, Journal of Superconductivity and Novel Magnetism, Springer.
- Associate Editor, Frontiers in Physics, Frontiers Media SA.
- Associate Editor, Frontiers in Nanotechnology, Frontiers Media SA.

Dr. Pratap Kumar Sahoo

- Topic Editor, Frontiers in Materials (Semiconducting Materials and Devices, Frontiers Media SA.
- Topic Editor, Frontier in Physics, Condensed Matter Physics, Frontiers Media SA.

Dr. Najmul Haque

- Guest editor, Journal of Subatomic Particles and Cosmology (Special issue for ATHIC conference proceedings), Elsevier.

Dr. Satyaprasad P Senanayak

- Guest Editor, Small, Wiley.

PARTICIPATION IN ACADEMIC EVENTS

Prof. Palok Aich

- Microbiome in Health and Disease. 6th Genomics Analysis and Technology Conference, IISER Pune. 4-6th April, 2025
- Precision Medicine in Indian Healthcare- Making it Affordable. 6th Genomics Analysis and Technology Conference, IISER Pune. 4-6th April, 2025
- Metabolome Microbiome. AOGCR 2025: Aspects of Gene and Cellular Regulation, Institute of Mathematical Sciences, Chennai. 27-28th March, 2025
- Host, Nutrigenomics, and Microbiome- The triad is the new trinity. Frontier in nutrition: challenge and opportunity for a healthier tomorrow, AIIMS Bhubaneswar, India. 15th February, 2025.
- 45 Annual Conference of Indian Association of Biomedical Scientists (IABMS). A.J. Institute of Medical Sciences & Research Centre, Mangaluru, Karnataka, India, 6-9th November, 2024.
- Chintan Shivir, ICTS-TIFR, Bengaluru, India. 4-9th March, 2024.
- Sarcopenia: Present & Future Perspectives, Dept of Physiology, AIIMS-Bhubaneswar, 20th January, 2024.

Dr. Manjusha Dixit

- Seminar on Advancing Cancer Research: Insights and Applications of PDX Models, NISER, Bhubaneswar, 8th March 2025.
- Symposium on “Computational Oncology Systems and Advanced Omics Approaches in Cancer Biology”. IISER Berhampur, 28th February 2025
- Workshop on cancer cell culture techniques for basic and clinical applications. Department of Life Science National Institute of Technology Rourkela. 10–14th February 2025.
- 44th Annual Meeting of the Indian Association for Cancer Research and International Conference on Convergence of Fundamental and Translational Approaches in Cancer Theranostics, Chittaranjan National Cancer Institute, Kolkata. 16-18th January 2025.
- DAE Conclave, NISER, Bhubaneswar. 22-26th October, 2024.

Dr. Praful Singru

- Journal of Neuroendocrinology and British Society for Neuroendocrinology sponsored Pan-Indian workshop on Neuroendocrinology, Department of Pharmaceutical Sciences, Nagpur University, Nagpur, India. 10-16th November, 2024.

Dr. Aniruddha Datta Roy

- World Congress of Herpetology in Borneo, Malaysia, August 2024.

Dr. Rittik Deb

- QUAD 2 at ILS, Bhubaneswar. April 2024.
- QUAD 3 at NISER, Bhubaneswar, August 2024.
- QUAD 4 at ILS, Bhubaneswar, November 2024.

Prof. Himansu Sekhar Biswal

- 7th International Conference on Frontiers in Chemical Science. IIT Guwahati, Guwahati, India. 2-4th December, 2024.
- ChemSci-2024, Leaders in the Field Symposium. IISER Thiruvananthapuram, Thiruvananthapuram, India. 9-11th December, 2024.
- 2nd KIIT-CRSI Seminar on Modern Trends in Chemical Science. KIIT, Bhubaneswar, India. 20-21st December, 2024.
- Spectroscopy and Dynamics of Molecules and Clusters (SDMC-2025). IIT Roorkee, Roorkee, India. 20-23rd February, 2025.
- PARAM 2.0. IIT Bhubaneswar, Bhubaneswar, India. 18th March, 2025
- Inter IISER-NISER Chemistry Meet 2025. IISER Pune, Pune, India. 20-22nd March, 2025.
- ACS Spring 2025, Global Virtual Symposium: Sustainable Solvents. San Diego, USA. 23-27th March, 2025.

Dr. Arindam Ghosh

- ML4SCIENCE conference, Shillong, 2025.
- 10th International workshop on CEST, Nuremberg, Germany, 2025.

Dr. Bhargava B.L.

- ACS Spring 2025, Global Virtual Symposium, 23-27th March 2025.

Dr. Upakarasamy Lourderaj

- Kaleidoscope, A Discussion Meeting in Chemistry, June 2024, Udaipur.
- Physics and Chemistry of Atomic, Molecular, and Condensed Matter Systems, Dec 2024, IISER Kolkata.
- Machine Learning for Molecular Sciences, January 2025, Shillong.

Dr. Jayesh Mahendra Goyal

- SCPP-IOE Convection Workshop, IIT Bombay, Mumbai, Nov. 2024.
- ExoWorlds Brainstorming Meeting, Indian Space Research Organisation (ISRO), Bangalore, Jan. 2025

Dr. Pathikrit Bhattacharya

- Impact of Enhanced Permeability on Aseismic Fluid-Induced Ruptures, R Das, P Sarma, P Bhattacharya, AGU Fall Meeting 2024 (326), S51C-326
- A high-precision relocated catalog of the Palghar swarm reveals complex interactions between seismicity, aseismic slip, and fluids, R Bhagat, P Bhattacharya, V Gahalaut, KM Sreejith, AGU Fall Meeting 2024, T01-33.

Dr. Priyadarshi Chowdhury

- National Seminar on Dynamic Processes of the Earth, Presidency University Kolkata. March 2025.
- M-cube (Magmatism-Metamorphism- Metallogeny) Conference, NCESS Thiruvananthapuram, February 2025.

Dr. Surya Snata Rout

- International Materials Research (IMRC) congress, Cancun, Mexico. 18-23rd August, 2024.

Dr. Amarendra Das

- 57th Annual Conference of Odisha Economic Association, Ravenshaw University, Cuttack, 7-8th February, 2025.

Dr. Amarjeet Nayak

- Interdisciplinary National Conference on Collective Memory and Cultural Heritage: Exploring Socio-Cultural Identities and Issues, Vikram Dev University, Jeypore. 15-16th February, 2025.

- IACLALS Annual Conference, BITS Pilani (Hyderabad Campus), 20-22nd February, 2025.

Dr. Pranaya Kumar Swain

- National Seminar on Globalisation, Self and Lifeworld, Sikkim University in collaboration with ICSSR-NERC and RC-28 of the Indian Sociological Society. 10-11th March 2025.
- 16th Annual Conference (TQR2025), The Qualitative Report, NSU Florida. 5-6th March 2025.
- Workshop on Understanding Institutional Ethics Committee Functions and Regulations, NISER Bhubaneswar. 15th April 2024.

Prof. Brundaban Sahu

- DAE Conclave, NISER Bhubaneswar. (22-26th October, 2024)

Dr. Binod Kumar Sahoo

- Combinatorial Constructions Conference, Dubrovnik, Croatia. 7-13th April, 2024.

Dr. Jaban Meher

- School and workshop on Number Theory and Physics, ICTP, Italy. 17—28th June, 2024.
- Circle method and related topics, ICTS, Bengaluru. 04—08th November, 2024.
- International conference on Number Theory and related topics, IMSc, Chennai. 16—18th December, 2024.
- Number Theory working group meeting, IMSc, Chennai. 27—31st March, 2025.

Dr. Manas Ranjan Sahoo

- NCM workshop on “Hyperbolic Conservation Laws” at NISER Bhubaneswar Programs. 27th May - 15th June 2024.

Dr. Panchugopal Bikram

- Operator algebra Conference at IITM 2025.
- COART IIT B 2025.

Dr. Anupam Pal Choudhury

- Annual Inverse Meet 2025, IIT Gandhinagar. 13-15th February 2025.
- International Conference on Nonlinear Dynamics:

Modeling and Computation, Bharathiar University.
17-19th February 2025.

Dr. K. Senthil Kumar

- ICNTRAT, IMSc, Chennai. 16-18th Dec, 2024.

Dr. Nabin Kumar Jana

- IISA 2024, CUST, Kochi. 27-28th December, 2024.

Dr. Ramesh Manna

- Mini conference, IIT Bombay. 12-14th December 2024.
- 39th Annual Conference of the Ramanujan Mathematical Society, CHRIST (Deemed to be University), Bengaluru. 27-29th December, 2024.
- CHAS Summer School “Recent Developments in Harmonic Analysis” at Bedlewo, Poland. 19-23rd August, 2024.

Dr. Rekha Biswal

- Representation Theory and Related Geometry: Progress and Prospects, University of Georgia, Athens, GA, USA. 27- 31st May, 2024.
- Oberwolfach Arbeitsgemeinschaft: Geometry and Representation Theory around the P=W Conjecture, Oberwolfach, Germany. 31st March – 5th April, 2024.

Dr. Sudhir Kumar Pujahari

- Annual Discussion Meeting in Analytic Number Theory, ISI Kolkata. 10-14th February, 2025.
- International conference on class group of number fields and related topics. 20 - 24 November, 2024.
- Indian Institute of Science (IISc.). 30th August, 2024.
- Conference on Galois Representations, Automorphic Forms and their L-functions, GALF 2024, University of Luxembourg. 1-5th July, 2024.
- 36th Automorphic Forms Workshop, Oklahoma State University. 20-24th May, 2024.

Prof. Bedangdas Mohanty

- First Anusandhan National Research Foundation (ANRF) Brainstorming Workshop, IIT Kanpur Outreach Extension Center, Sector-62, Noida. 6th April 2024.
- Chaired a session at 15th Workshop on Critical Point and Onset of Deconfinement – CPOD 2024,

Lawrence Berkeley National Laboratory, USA. 20-24th May 2024.

- Chaired a session at The 21st International Conference on Strangeness in Quark Matter – SQM 2024, Strasbourg, France. 3-7th June, 2024.
- Attended Rice University’s inaugural celebration of the Rice Global India Initiative at Indian Institute of Sciences in Bangalore. 18th November.

Prof. Sanjay Kumar Swain

- PHANC- 2025, Puri.
- NEUS-2024 ICTS Bangalore.

Prof. Subhankar Bedanta

- DAE Conclave 2024, NISER Bhubaneswar. 22-26th October 2024.
- Chintan Shivir, ICTS, Bangalore (March 2024). Coordinator for the thematic topic “Quantum Materials, Technology and Computing”.
- Presented a talk on behalf of the thematic topic “Quantum Materials, Technology and Computing” from the aided institutions of DAE.

Dr. Kartikeswar Senapati

- EMSI-2024, IIT Bombay. 18th May, 2024.
- Asia-Pacific Conference on Condensed Matter Physics 2024, IIT Patna. 9th December 2024.
- OPS annual convention, KIIT University. 10th February, 2025.

Dr. Nishikanta Khandai

- Department Seminar, IIT Madras, Department of Physics. 25th April 2024.
- Cosmic Revelations: A Joint DESI and eROSITA Symposium, ICTS Bangalore. 22nd May 2024.
- The NINJA Simulation Suite, Contributed Talk, Baryons Beyond Galactic Boundaries, IUCAA Pune. 2-6th November 2024.
- Workshop on 21cm Cosmology, IIT Madras. 9th December 2024.

Dr. Subhasish Basak

- 41st International Lattice Conference 2024, University of Liverpool, UK. 28th July – 03rd August.

Dr. Sumedha

- Indo-French workshop on Classical and quantum

dynamics in and out of equilibrium systems, ICTS Bangalore. 16-20th December, 2024.

- IOP Golden Jubilee Young Women Scientists' Meet - 2024 (IGJWSM-2024), IOP Bhubaneswar. 13-14th November 2024.

Dr. Victor Roy

- ATHIC, Swosti Beach Resort, Gopalpur, Odisha. 13-16th January, 2025.
- Hot QCD conference, IIT Mandi. 1-4th July, 2024.

Dr. Yogesh Kumar Srivastava

- Workshop on String theory, Black holes and Holography, CHEP, IISc Bengaluru.

Dr. Kush Saha

- Indo-German Kick-off Workshop on Recent Progress in Topological Magnetism, NISER Bhubaneswar and Sterling Puri. 5-8th November, 2024.
- Ultrafast Sciences (UFS-2024), NISER Bhubaneswar. 28-30th November, 2024.
- Young Investigators Meet on Quantum Condensed Matter Theory, IISER Pune, Pune. 16-18th December, 2024.
- 7th Annual Conference on Quantum Condensed Matter, IIT Guwahati, Guwahati. 20-23rd December, 2024.

Dr. Najmul Haque

- The 10th International Conference on Quarks and Nuclear Physics, Institute of Cosmos Sciences of the University of Barcelona. 8-12th July, 2024.
- The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), Mayfair Palm Beach Resort, Gopalpur, Berhampur, Odisha. 13 – 16th January, 2025.
- Physics in Hadronic and Nuclear Collisions (PHANC'25), Blue Liliy Hotel, Puri. 27-30th March, 2025.

Dr. Satyaprasad P Senanayak

- DAE Conclave, 2024, NISER Bhubaneswar.
- 90th Annual Meeting of Indian Academy of Sciences, Bangalore.

Dr. Shovon Pal

- International Symposium on Ultrafast Spintronics and Magnonics (ISUSM), IIT (ISM) Dhanbad. 3-4th February 2025.

- MRS Spring Meeting and Exhibit, Seattle, Washington, USA. 7-9th May 2024 (Virtual).

Dr. Tapan Mishra

- DAE conclave, NISER Bhubaneswar. 22-26th October 2024.
- QMAT, IIT Guwahati. 20-23rd December 2024.
- Emerging trends in quantum condensed matter physics, IOP, Bhubaneswar.
- Emerging trends in physics, KIIT University, Bhubaneswar. 8-10th February, 2025.
- 100 years of quantum mechanics, ICTS Bangalore. 13-17th January.

Dr. Tuhin Ghosh

- ISRO Brainstorming meeting on Space Science Roadmap Formulation, ISRO HQ, Bangalore. April 2024.
- Cosmic Magnetism in the pre-SKA era - Kagoshima University (Japan). - May 2024.
- National Space Day, NISER Bhubaneswar. - August 2024.
- SPS Day, NISER Bhubaneswar. - August 2024.
- Poster presentation, DAE Conclave, NISER Bhubaneswar. - October 2024.

Dr. V Ravi Chandra

- Asia Pacific Conference on Condensed Matter Physics 2024, IIT Patna. 8-11th December, 2024.
- Annual conference on quantum condensed matter, QMAT 2024, IIT Guwahati. 20-23rd December 2024.

Dr. G. Santosh Babu

- Radio Astronomy Winter Scholl (RAWS)-2024, IUCAA-Pune. 14-24th December 2024.

Dr. Saralasrita Mohanty

- Q-Karyasala 2024, a 2-day workshop on Quantum Technologies, IISc Bengaluru. Gained exposure to cutting-edge developments in quantum computing, quantum cryptography, and quantum communication, enhancing theoretical and practical understanding of quantum technologies. 24-25th June, 2024.
- Teacher Training Programme on Computer-Interfaced Science Experiments using ExpEYES, a one-week

Teacher Training Programme, conducted by Inter-University Accelerator Centre (IUAC), New Delhi, provided valuable skills in integrating computer interfaces with experimental setups to enhance the effectiveness of teaching science experiments in the lab. 23-28th September, 2024.

- National Workshop on Quantum Physics (Alice in Quantumland), National Workshop on Quantum Physics, at Kanya Maha Vidyalaya, Jalandhar, organized in association with the Indian Association of Physics Teachers (IAPT). Acquired deeper insights into advanced quantum physics topics, particularly in conceptualizing and teaching quantum phenomena to students. 9-14th April, 2024.

Dr. Ganesh J. Tambave

- XXVI DAE-BRNS HEP symposium, BHU, Varanasi, India. 19-23rd December, 2024.

Dr. Raveendrababu Karnam

- XVII conference on Resistive Plate Chambers and Related Detectors, Spain. 9-13th September, 2024.
- XXVI DAE-BRNS HEP symposium, BHU, Varanasi, India. 19-23rd December, 2024.

Mr. Kirti Prakash Sharma

- CeNSE Summer School on Semiconductor Technology and Microfabrication, conducted online by the Centre for Nano Science and Engineering, IISc Bengaluru. 3-14th June 2024.
- CAEN India 2nd school on waveform digitizers webinar, online. 18th July, 2024.

Mr. Lalatendu Mishra

- DAE conclave, NISER, and presented a Poster on “Medical Physics for Cancer Care and Treatment”. 22-26th October 2024.

Mr. A. Anandaraman

- Quantum Science and Technology International Webinar Series, Karnataka Science and Technology Academy (KSTA), DST, Government of Karnataka. 9–13th September, 2024.
- Workshop on Quantum Computations and Its Application in Molecular Structure, Centre for Computational and Data Sciences & Node Centre for Training in HPC & AI, IIT Kharagpur, under the aegis of the National Supercomputing Mission. 5th March, 2025.
- 5-day Online Faculty Development Program on “Quantum Computing: Algorithms and Applications”, Department of Computer Science and Engineering, NIT Warangal, in association with the Centre for Training and Learning. 15–19th July, 2024.
- Faculty Development Programme on Quantum Technologies & Applications (40 hours, 3 credits), E&ICT Academies (IIT Roorkee, IIT Guwahati, etc.), funded by MeitY, and endorsed by DST-NQM/AICTE/UGC. February–March 2025.
- Faculty Development Programme on QT-02: Foundations of Quantum Technologies (40 hours, 3 credits), E&ICT Academies (IIT Kanpur, IIT Roorkee, etc.), funded by MeitY, and endorsed by DST-NQM/AICTE/UGC. April–May 2025.

PROGRAM COMMITTEE

Prof. Palok Aich

- Panel Coordinator, Microbiome in Health and Disease, 6th Genomics Analysis and Technology Conference, IISER Pune, 4-6th April, 2025.
- Panellist, Precision Medicine in Indian Healthcare-Making it Affordable, 6th Genomics Analysis and Technology Conference, IISER Pune, 4-6th April, 2025.

Dr. Manjusha Dixit

- Panelist, Bridging the Gap: Translational Approaches in Cancer Research and Therapy – Use of PDX Model, 8th March, NISER.

Dr. Pankaj Vidyadhar Alone

- Chair, 12th RNA Group Meeting, IIT Guwahati, 22nd-24th May, 2024.

Dr. Praful Singru

- Member, International Congress on Neuroendocrinology, Japan.

Dr. Subhasis Chattopadhyay

- Chairperson and Expert, 6th Annual Conference of Immuno-Oncology Society of India: "I-OSICON 2025", Mayfair Convention, Bhubaneswar, 31st January- 2nd February 2025. shared the platform with the Nobel Laureate Dr. James P. Allison.

Prof. Chidambaram Gunanathan

- Convener, 90th Annual Meeting of Indian Academy of Sciences, NISER & IIT Bhubaneswar
- Best poster selection committee, Recent Advances in Chemistry Research and Translation (ReACT-2025), IISER Kolkata, 31st Jan-1st Feb 2025.

Prof. Moloy Sarkar

- Convenor, Ultrafast Sciences 2024, NISER Bhubaneswar.
- Convenor, National Symposium on Radiation and Photochemistry 2025, NISER Bhubaneswar.

Dr. Nagendra Kumar Sharma

- Local organizing committee member, Sub-Coordinator (Transport), 6th International Conference on Frontiers of Polymers and Advanced Materials (ICFPAM 2024), in Berhampur, Odisha, 9-13th November 2024.
- Best poster selection Judge, 16th National Symposium on Radiation and Photochemistry, (NSRP –2025), NISER-Bhubaneswar. 23-25th January, 2025.
- Coordinator, RSC Meet the Editor programme, NISER Bhubaneshwar. 11th November, 2024.

Dr. S. Peruncheralathan

- Convener, International Conference on Advances in Organic Chemistry, Goa. 27-29th January, 2025.

Dr. Bishnu Prasad Biswal

- Convener, Processability and Applications of Reticular Advanced Materials (PARAM 1.0), NISER Bhubaneswar. 17-18th January, 2025.
- Convener, Processability and Applications of

Reticular Advanced Materials (PARAM 2.0), IIT Bhubaneswar. 18th March, 2025.

Dr. Aritra Banik

- Member, Programme committee, 11th Annual International Conference on Algorithms and Discrete Applied Mathematics (CALDAM), PSG College of Technology, Coimbatore. 13-15th February, 2025.

Dr. Pranaya Kumar Swain

- Co-convenor, Research Committee # 28: Sociology of Everyday Life of the Indian Sociological Society, 2024-25.

Dr. Amarjeet Nayak

- Session Chair, Interdisciplinary National Conference on Collective Memory and Cultural Heritage: Exploring Socio-Cultural Identities and Issues, Vikram Dev University, Jeypore, February 15-16, 2025.
- Member, Doctoral Committees, IIT Bhubaneswar.

Prof. Bedangadas Mohanty

- Co-ordinator, National Science Planning Committee, DAE Conclave, 2024, NISER Bhubaneswar. 22-26th October 2024.
- Member, Organizing committee, 68th DAE Symposium on Nuclear Physics (DAE NPSYMP 2023), IIT Roorkee, Uttarakhand. 07-11th December, 2024.
- Member, Organizing committee, The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), Berhampur, Odisha. 13-16th January 2025.
- Member, National organizing committee, XXVI DAE-BRNS High Energy Physics Symposium, DAE, Banaras Hindu University, Varanasi. 19-23rd December 2024.
- Member, International Advisory Committee, the 21st International Conference on Strangeness in Quark Matter (SQM 2024), Strasbourg, France. 3-7th June 2024.
- Member, International Advisory Committee, XXXI International Conference on Ultra-relativistic Nucleus-Nucleus Collisions, Frankfurt, Hesse, Germany. 6-12th April, 2025.
- Convenor, 100 year Bose Statistics Event, NISER. 18th October 2024.

Prof. Sanjay Kumar Swain

- Convenor, Understanding the Universe through Neutrinos, Neutrino School at ICTS Bangalore, 22nd April-03rd May 2024.

Prof. Subhankar Bedanta

- Co-Convenor, Symposium on Magnetism and Spintronics 2024, IIT Bombay. 18th – 20th July 2024.
- Member, Organizing committee, International conference on magnetic materials and applications, IISc Bangalore. 12-14th February 2025.
- Member, Organizing committee, Indo-German workshop, NISER Bhubaneswar and Sterling, Puri. 5–8th November 2024.
- Member, National conference on new advances in frontier Physics (CRNAFP), F.M. University Balasore, 21-22nd March 2025.
- Member, International Conference in Emerging Trends in Physics, KIIT Bhubaneswar, 8-10th February 2025.
- Session Chair, PARAM Workshop, NISER. 17–18th January 2025.
- Session Chair, Ultrafast Sciences 2024, NISER Bhubaneswar. 28th-30th November 2024.

Dr. Ajaya K. Nayak

- Convenor, Indo-German Kick-off Workshop-2024, Sterling Puri, 5-8th November, 2024.

Dr. Amaresh Kumar Jaiswal

- Member, International Conference on Frontiers of High Energy Physics, IIT Bhilai. 13-15th February 2025.

Dr. Anamitra Mukherjee

- Session chair, Physics of Strongly Correlated Electron Systems (PSCES) 2024, IISER Bhopal. 8-10th April 2024.
- Co-organiser, Consortium for Quantum Materials, SNBNCBS, Kolkata.

Dr. Sumedha

- Panelist, IOP Golden Jubilee Young Women Scientists' Meet - 2024 (IGJWSM-2024), IOP Bhubaneswar. 13-14th November 2024.

Dr. Victor Roy

- Member, Local Organizing Committee, 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025).

Dr. Kush Saha

- Member, Local Organizing Committee, Indo-German Kick-off Workshop on Recent Progress in Topological Magnetism, NISER Bhubaneswar and Sterling Puri, Puri. 5-8th November, 2024.
- Member, Local Organizing Committee, Ultrafast Sciences (UFS-2024), NISER Bhubaneswar. 28-30th November, 2024.

Dr. Najmul Haque

- Member, Local Organizing Committee, 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025).

Dr. Satyaprasad P. Senanayak

- Convenor, HyPe-24 (International Conference in Hybrid Perovskite-2024).

Dr. Shovon Pal

- Convenor, Ultrafast Sciences – 2024, NISER Bhubaneswar. 28–30th November 2024.
- Member, HyPe – 2024, NISER Bhubaneswar. 19–22 December 2024.

Dr. Tapan Mishra

- Member, LOC, DAE conclave 2024, NISER Bhubaneswar.
- Member, LOC, 90th Annual meeting of the Indian Academy of Sciences 2024, NISER Bhubaneswar.

Dr. Tuhin Ghosh

- Group coordinator, PPC 2024, IIT Hyderabad. 14-18th October 2024.
- SOC member, 21-cm Cosmology Workshop, IIT Madras. 9-13th December 2024.

Research and Development



Research and Development

(a) SPONSORED PROJECTS

Projects sanctioned during 2024-25

- Investigation of light-matter interaction in crystalline polymer thin films and membranes, (**Max Plank Group**). Principal Investigator: **Dr. Bishnu Prasad Biswal**, Chemical Sciences.
- Space weathering on Mercury, Moon and Carbon-rich asteroids: Experimental simulation and nanoscale study, (**SPARC**). Principal Investigator: **Dr. Surya Snata Rout**, Earth and Planetary Sciences.
- Two pore domain leak potassium channel related mechanisms of excitatory-inhibitory imbalance in Alzheimer's disease, (**DBT**). Principal Investigator: **Dr. Swagata Ghatak**, Co-Principal Investigator: **Dr. Praful Singru**, Biological Sciences.
- Molecular Mechanism of Resistance to PC190723 and Tragating the essential Cell division Protein FTSZ of Helicobacter Pyloriand Pseudomonas Aeruginosa, (**DBT**). Principal Investigator: **Dr. Ramanujam Srinivasan**, Co-Principal Investigator: **Dr. Praful Singru**, Biological Sciences.
- Development of Portal for Data Capturing, Analysis and Visualization for NQAS, (**NHM**). Principal Investigator: **Dr. Subhankar Mishra**, Computer Sciences.
- Regional Academic Centre for Space (RACS) at NIT Patna, (**ISRO/DoS**). Principal Investigator: **Dr. Surya Snata Rout**, Earth and Planetary Sciences.
- Attractors and QGP Evolution in Heavy-ion Collisions: U(1) Gauge Field Effects, (**SERB**). Principal Investigator: **Dr. Victor Roy**, Physical Sciences.
- AI-Enhanced Predictive Modeling of Oncogenic Crosstalk and Prognosis: Unravelling the Regulatory Network of IQGAP1, IQGAP2, EEF1A2 and FRG1 protein complex in Breast Cancer Progression, (**ICMR**). Principal Investigator: **Dr. Manjusha Dixit**, Biological Sciences.
- Quantum Computing, (**DST**). Principal Investigator: **Dr. Ashok Kumar Mohapatra**, Physical Sciences.
- SWAYANSAASITA: Autonomous Driving of Motorcycles (Phase-2), (**DSF**). Principal Investigator: **Dr. Subhankar Mishra**, Computer Sciences.
- TirthaGen, (**DSF**). Principal Investigator: **Dr. Subhankar Mishra**, Computer Sciences.
- 30 MeV Medical Cyclotron, (**Govt. of Odisha & DAE**). Principal Investigator: **Prof. Bedangdas Mohanty**, Physical Sciences.
- NABL accredited calibration laboratory, (**DAE**). Principal Investigator: **Prof. Bedangdas Mohanty**, Physical Sciences & **Mr. Lalatendu Mishra**, Centre for Medical And Radiation Physics.
- Ligand Targeted Theranostics for PSMA+ Metastatic Castration-Resistant Prostate Cancer using the Principle of Boron Neutron Capture Therapy, (**SPARC**). Co-Principal Investigator-Indian: **Dr. S. Peruncheralathan**, Chemical Sciences.
- Impact of anthropogenic noise on the acoustically communicating Ensiferan communities: A study from Eastern India, (**Orthopterists Society**). Principal Investigator: **Mr. Souradeep Dutta & Dr. Rittik Deb**, Biological Sciences.
- Impact of anthropogenic noise on the acoustically communicating Ensiferan communities: A passive acoustic study, (**Wildlife Acoustics**). Principal Investigator: **Mr. Souradeep Dutta & Dr. Rittik Deb**, Biological Sciences.
- Impact of anthropogenic noise on acoustically communicating Ensiferan communities, (**Explorer's Grant**). Principal Investigator: **Mr. Souradeep Dutta & Dr. Rittik Deb**, Biological Sciences.
- Understanding the biogeography and phylogeny of four sympatric tree crickets (Genus: Oecanthus) in India. (**Orthopterists Society**). Principal Investigator: **Ms. Srijaanee Mitra & Dr. Rittik Deb**, Biological Sciences.
- Rainbow Diet Campaign for Odisha: Development and Scaling of Customised Rainbow Diet Food Matrices for Combating Malnutrition among Children in Keonjhar District, (**ICAR**). Co-Principal Investigator: **Prof. Chandan Goswami**, Biological Sciences.
- AI-Enhanced Predictive Modeling of Oncogenic Crosstalk and Prognosis, (**ICMR**). Co-Principal Investigator: **Dr. Subhankar Mishra**, Computer Sciences.

Ongoing sponsored projects

- Interaction-induced symmetry-protected topological phase transition, (**SERB**). Principal Investigator: **Dr. Tapan Mishra**, Physical Sciences.
- Hard probes of QGP at heavy ion collision experiments, (**DST**). Principal Investigator: **Dr. Lusaka Bhattacharya**, Physical Sciences.
- Quantum walk of multi-component bosons and its application to study many-body localization, (**SERB**). Principal Investigator: **Dr. Tapan Mishra**, Physical Sciences.
- Interface driven magnetic properties in ferromagnet (FM)/Metal phthalocyanine (MPc) hybrid bilayers, (**DST**). Principal Investigator: **Dr. Mitali Swain**, Physical Sciences.
- Representation of a natural number by Quadratic form, Convolution sums and modular forms, (**SERB**). Principal Investigator: **Prof. Brundaban Sahu**, Mathematical Sciences.
- Understanding the intricacies of eIF2 ternary complex formation that controls eukaryotic translation initiation, (**DBT**). Principal Investigator: **Dr. Pankaj Vidyadhar Alone**, Co-Principal Investigator: **Dr. Tirumala Kumar Chowdary**, Biological Sciences.
- Reconstructing Extraterrestrial Materials falling on Earth on Earth in the Past: Link to Extinction Events and Climate Change, (**SERB**). Principal Investigator: **Dr. Surya Snata Rout**, Earth and Planetary Sciences.
- Holographic Symmetry Algebra and Aspects of Cosmology, (**INSA**). Principal Investigator: **Prof. Sudhakar Panda**, Physical Sciences.
- Constraining the tectonic processes driving the subaerial emergence of continental crust on early Earth, (**SERB**). Principal Investigator: **Dr. Priyadarshi Chowdhury**, Earth and Planetary Sciences.
- Rational Projective representations of groups and Twisted group ring isomorphism problem, (**SERB**). Principal Investigator: **Dr. Sumana Hatui**, Mathematical Sciences.
- Sato-Tate conjecture in arithmetic progressions, (**SERB**). Principal Investigator: **Dr. Sudhir K. Pujahari**, Mathematical Sciences.
- Therapeutic Potential of Carnosic Acid in decreasing Astrocytic TREK1-mediated Excitotoxicity in Alzheimer's Disease, (**ICMR**), Principal Investigator: **Dr. Swagata Ghatak**, Biological Sciences.
- Stimuli-responsive cellulose ionic liquid-based hydrogels for drug delivery applications, (**CSIR**). Principal Investigator: **Prof. Molay Sarkar**, Chemical Sciences.
- Development of Base Metal (Manganese, Iron, Cobalt, Nickel and Copper) Catalysts for sustainable Oxidation and Reduction Reactions and Their Application in Biomass Valorization, (**SERB**). Principal Investigator: **Dr. Bidraha Bagh**, Chemical Sciences.
- Designing Sublinear Algorithms and Making Them Robust, (**SERB**). Principal Investigator: **Dr. Anup K. Bhattacharya**, Computer Sciences.
- Low-dimensional topology and Coxeter groups, (**SERB**). Principal Investigator: **Dr. Tushar Kanta Naik**, Mathematical Sciences.
- Precision Studies for the Top-quark Decay, (**SERB**), Principal Investigator: **Dr. Narayan Rana**, Physical Sciences.
- Identification of novel biomarkers for pseudoexfoliation glaucoma through epigenome-wide association study, (**SERB**). Principal Investigator: **Dr. Debasmita Pankaj Alone**, Biological Sciences.
- Role of Endothelial to mesenchymal transition (EndoMT) inducing factors in the pathophysiology of Fuchs Endothelial Corneal Dystrophy, (**ICMR**). Principal Investigator: **Dr. Debasmita Pankaj Alone**, Biological Sciences.
- A Proteomic approach towards understanding anthocyanin accumulation in tomato fruits, (**SERB**). Principal Investigator: **Dr. Himabindu V. Kilambi**, Biological Sciences.
- Unconventional topological aspects of hopf insulators, (**SERB**). Principal Investigator: **Dr. Kush Saha**, Physical Sciences.
- Novel explorations on earthquake nucleation within complex fault-networks: An integrated theoretical and experimental approach, (**MoE**). Principal Investigator: **Dr. Pathikrit Bhattacharya**, Earth and Planetary Sciences.
- Synthesis of B-N coordinated tetra-coordinated boron compounds and their applications towards sensing, catalysis and OLED, (**SERB**). Principal Investigator: **Dr. V. Krishnan**, Chemical Sciences.
- Theoretical investigation of the energy transfer and dynamics in gas-surface scattering, (**SERB**). Principal Investigator: **Dr. Upakarasamy Lourderaj**, Chemical Sciences.

- Centre for Policy research, (**DST**). Co-Principal Investigator: **Dr. Pranay Swain**, Humanities and Social Sciences.
- J. C. Bose Fellowship, (**SERB**). Principal Investigator: **Prof. Bedangdas Mohanty**, Physical Sciences.
- Indian participation in the ALICE experiment at CERN, (**DAE**). Principal Investigator: **Prof. Bedangdas Mohanty**, Physical Sciences.
- Stabilization of non-trivial magnetic skyrmions from trivial bubbles by helicity locking in centrosymmetric magnets, (**SERB**). Principal Investigator: **Dr. Ajay Kumar Nayak**, Physical Sciences.
- Role of host membrane modulation by mycobacterial membrane vesicles in evading phagosome maturation, (**DBT-Wellcome Trust India Alliance**). Principal Investigator: **Dr. Mohammad Saleem**, Biological Sciences.
- Interaction between thyrotropin-releasing hormone- and neuropeptide Y-containing systems in the hypothalamus of the zebra finch, *Taeniopygia guttata* and its relevance in regulation of energy balance, (**SERB**). Principal Investigator: **Dr. Praful Singru**, Biological Sciences.
- Vibrational Signatures of Chirality, Chiral Recognition and Chirality Transfer through Novel Noncovalent Interactions, (**SERB**). Principal Investigator: **Prof. Himansu Sekhar Biswal**, Chemical Sciences.
- Synthesis of Functional DNA Comprising Aminotroponyl 2'-deoxyuridine Analogues For Cross-linking with Peptides, (**SERB**). Principal Investigator: **Dr. Nagendra Kumar Sharma**, Chemical Sciences.
- Conversion of CO₂ to renewable fuels using photocatalytic membrane reactor composed of crystalline, porous polymers, (**DST**). Principal Investigator: **Dr. Bishnu Prasad Biswal**, Chemical Sciences.
- Measurement of Dust Growth in Protoplanetary Disks: Understanding the Origins of Planet Formation, (**SERB**). Principal Investigator: **Dr. Liton Majumdar**, Earth and Planetary Sciences.
- Novel Recursive Green's function technique in the Fock space & Applications, (**SERB**). Principal Investigator: **Dr. Anamitra Mukherjee**, Physical Sciences.
- Linear codes of the symplectic geometry over finite fields of even characteristic, (**SERB**). Principal Investigator: **Dr. Binod Kumar Sahoo**, Mathematical Sciences.
- Graphical Indices associated with different central parts of connected graphs, (**SERB**). Principal Investigator: **Dr. Kamal Lochan Patra**, Mathematical Sciences.
- Graph Clustering: A Theoretical Perspective, (**SERB**). Principal Investigator: **Dr. Aritra Banik**, Computer Sciences.
- Lunar Mantle exposed or missed in South Pole Aitken basin-Insights from Chandrayaan-2 IIRS, (**DOS**). Principal Investigator: **Dr. Guneshwar Thangjam**, Earth and Planetary Sciences.
- Dwarf planet Ceres: Inner or outer solar system origin?, (**Max Planck Society**). Principal Investigator: **Dr. Guneshwar Thangjam**, Earth and Planetary Sciences.
- Unravelling the Atmospheres of Far Away Worlds with Adaptable Planetary Atmosphere Model, (**SERB SRG Grant**). Principal Investigator: **Dr. Jayesh Mahendra Goyal**, Earth and Planetary Sciences.
- Spin to charge conversion in ferromagnet/non-magnet systems through spin pumping by inverse spin Hall effect method, (**SERB**). Principal Investigator: **Prof. Subhankar Bedanta**, Physical Sciences.
- Harnessing pure spin current by tailoring molecular spinterface, (**BRNS**). Principal Collaborator: **Prof. Subhankar Bedanta**, Physical Sciences.
- Intensification of Research in High Priority Area which involves demonstration of Semi-transparent Perovskite Photovoltaic Devices, (**SERB**). Principal Investigator: **Dr. Satyaprasad P. Senanayak**, Physical Sciences.
- Center for Policy Research (CPR) on Disaster Management, Energy Transition, and Tribal Education, (**DST**). Co-Principal Investigator: **Dr. Subhankar Mishra**, Computer Sciences.

Consultancy projects

Role of mycobacterial membrane vesicles in evasion of phagosome maturation, (**DBT-Wellcome Trust India Alliance**). Principal Investigator: **Dr. Mohammad Saleem**, Biological Sciences.

(b) PATENTS/INTELLECTUAL PROPERTY

Patent granted during 2024-25

- System and Method for Determining Microbiome from Host Metabolome Using a Machine Learning Model. Patentee includes **Prof. Palok Aich**. Indian Patent number is 552962.

(c) NEW RESEARCH DISCOVERY

5 production grade CMS silicon trackers modules:

Five production-grade CMS silicon tracker modules were developed under the leadership of Dr Prolay K. Mal and Prof. Sanjay K. Swain from the School of Physical Sciences. These modules were assembled and rigorously tested, incorporating high-quality silicon detectors suitable for the CMS tracker at CERN.

5 production grade CMS silicon trackers modules



(d) NEW RESEARCH FACILITIES

Gamma Irradiation Chamber facility:

The Gamma Irradiation Chamber (GIC) is a compact, self-shielded ^{60}Co radioactive source containing an irradiator. The design of the machine is such that it delivers safe and efficient irradiation to various materials of the user's choice. Developed by the Board of Radiation and Isotope Technology (BRIT), India, it adheres to international safety standards, including American National Standards (ANSI) and International Atomic Energy Agency (IAEA). It is approved by the Atomic Energy Regulatory Board (AERB), India. The GIC facility requires a specially designed room with adequate wall thickness to house the machine. Some Key features of the machine are given below:

1. Radioactive Source: ^{60}Co (1.25 MeV) pencil source with a maximum capacity of 14 kCi
2. Dose Rate: At least 9 kGy/hr at the center position of the sample chamber
3. Irradiation Volume: 5000 cc

4. Shielding Material: Lead and Stainless Steel
5. Weight of unit: 5600 kg approximately
6. Size of unit: 125 cm (L) x 106.5 cm (W) x 150 cm (H)
7. Irradiation time: 6 s



(Gamma Irradiation Chamber Facility)

This facility can be used for the following purposes:

- This facility is used for the training of M.Sc. MRP students enhance their practical knowledge on handling radiation-generating equipment, carrying out their chemical dosimetry experiments, which are included in their course curriculum.
- Small-scale food preservation and medical sterilisation.
- For research and development in the field of radiation chemistry, radiobiology, material modification, and new dosimeter development, and their response testing.

In the future, institutes will be notified regarding the utilisation of the facility, thereby enabling them to access its resources. In addition, irradiation services may be extended to external research institutions and industries as a means of generating revenue, while also supporting research and development activities in the areas of radiation chemistry and materials testing.

High Purity Germanium (HPGe) detector system:

High Purity Germanium (HPGe) detector is a semiconductor detector widely used for gamma spectroscopy due to its excellent energy resolution (less than 1% at 1.25 MeV). It operates at cryogenic temperatures (typically using liquid nitrogen at 77K) to reduce electronic noise. This property allows the detector to clearly identify the radionuclides even in complex or mixed spectra. Also, this detector system is surrounded by lead shielding to limit the background radiation.



(HPGe detector that will be used in the NABL accredited radioanalytical laboratory)

This facility can be used for the following purposes:

- The M.Sc. MRP students will directly gain hands-on practical experience with radiation detection instrumentation and radioactive contamination analysis in naturally occurring and artificial materials. They will also develop critical skills in data analysis and quality assurance that will be helpful for their career growth.
- This facility can be used for providing radioactive contamination testing and certification services to agricultural, mining, food processing plants, food and beverage industries, and many consumable and non-consumable products.
- Research related to epidemiological and natural background radioactivity studies can be performed by using this facility.

Argon Ion Miller and Metallization:

This system is employed for the precise microscopic patterning of devices through the use of accelerated argon ions. The ion milling process enables controlled removal of material at the nanoscale, thereby facilitating the fabrication of intricate patterns with high accuracy. In conjunction with metallization techniques, the system allows for the deposition of thin metallic layers on patterned substrates, which is critical for the development of advanced electronic and photonic devices. Such a facility is particularly valuable in research involving semiconductor fabrication, microelectromechanical systems (MEMS), and materials science, where precise surface engineering and device miniaturisation are essential.

Step Profiler:

The step profiler is an analytical system employed for the precise measurement of film thickness deposited on solid substrates using various physical and chemical techniques. By scanning across a step edge created on the sample surface, the instrument determines the vertical displacement with nanometre-level accuracy, thereby enabling reliable quantification of thin-film thickness. This facility is widely utilised in materials science, microelectronics, and surface engineering for characterising coatings, evaluating uniformity of deposition, and ensuring quality control in fabrication processes.

Development of Semi-Anechoic Chamber:

A state-of-the-art semi-anechoic chamber has been developed at the School of Biological Sciences (SBS), NISER, to facilitate advanced research in acoustics. The facility provides a controlled acoustic environment with a noise floor as low as 25 dB in the frequency range of 1 kHz to 20 kHz, enabling high-precision experimental

studies. Such a specialised setup is of immense importance for investigating sound propagation, auditory mechanisms, and acoustic interactions in both biological and physical systems. Among research institutions in India, only three such facilities currently exist—at IISc Bengaluru, IISER Mohali, and now at NISER—positioning the institute at the forefront of acoustic research infrastructure in the country.

(e) ACADEMIC AND SCIENTIFIC EVENTS ORGANIZED

During the reporting period, the Institute hosted several conferences, symposiums, and seminars aimed at advancing scientific research and fostering academic collaboration. These events provided a platform for researchers and experts to exchange ideas, present findings, and build meaningful connections across disciplines.

Conferences, Seminars & Workshops

DAE CV Raman Lecture

On May 10, 2024, NISER proudly welcomed **Dr. Ajit Kumar Mohanty**, Chairman of the Atomic Energy Commission and Secretary of DAE, for the prestigious DAE CV Raman Lecture. Prof. Mohanty's compelling talk, **"Atoms in the Service of the Nation,"** offered profound insights into the role of atomic science in national development. Organized in collaboration with the Indian Physics Association, this event was not only an educational milestone but also a vibrant celebration of scientific dialogue and collaboration. It marked a significant moment for advancing innovation and strengthening partnerships within the scientific community. The lecture illuminated the path forward, underscoring NISER's commitment to fostering groundbreaking research and contributing to the nation's scientific progress.

Summer Outreach Program in Mathematics (SOPM 2024)

The School of Mathematical Sciences hosted the "Summer Outreach Program in Mathematics (SOPM 2024)" from May 20 to June 8, 2024. The program featured interactive lectures, hands-on workshops, and collaborative problem-solving sessions to inspire and educate participants about mathematics, while also fostering connections between attendees and experts.

Advanced Instructional School for Hyperbolic Conservation Laws

The School of Mathematical Sciences hosted the "Advanced Instructional School for Hyperbolic Conservation Laws" from May 27 to June 15, 2024. This intensive program provided research scholars

with advanced training in conservation laws, featuring interactions with leading researchers to deepen expertise and encourage collaboration.

Third Quarterly Union for Academic Discourse (QUAD) Bhubaneswar 2024

The School of Biological Sciences, NISER, in dynamic collaboration with the Institute of Life Sciences (ILS) Bhubaneswar, hosted the "Third Quarterly Union for Academic Discourse (QUAD) Bhubaneswar 2024" on August 10. With the compelling theme **"Perturbation of Cellular Homeostasis and Rescue,"** this event brought together brilliant minds from both institutes, sparking insightful research discussions, inspiring academic dialogues, and igniting new avenues for collaboration.

Common Pitfalls in Scientific Writing & Science of Synthesis

On September 13, 2024, NISER's Central Library, in collaboration with Thieme Publisher, hosted an Editorial Talk on "Common Pitfalls in Scientific Writing & Science of Synthesis,". The session engaged faculty, research scholars, PDFs, and MSc students from SBS and SCS.

Training session on Grammarly

The Central Library, NISER, in collaboration with Total Library Solutions, organized an informative training session on Grammarly EDU (Premium Suite) on 27th September 2024. Expertly conducted by Mr. Binoy Halam, the session highlighted Grammarly's advanced features, including writing enhancements, real-time plagiarism detection, grammar and style improvements, and crafting effective academic and professional emails, drawing active participation from faculty members, staff, and students.

Outreach Workshop for BoseStat@100, NISER

The Outreach Workshop for BoseStat@100, held on October 18, 2024, at NISER, celebrated Satyendra Nath Bose's contributions to physics. Organized by the Indian Physics Association, SNBNCBS, and NISER, the workshop included talks on Bose Einstein statistics, fundamental physics sessions, and discussions on its applications. The event inspired students, connected researchers, and fostered enthusiasm for scientific discovery. Appreciation was extended to all participants, speakers, and organizers for their contributions.

DAE Conclave 2024

The inaugural DAE Conclave 2024, hosted at NISER Bhubaneswar as part of the DAE Platinum Jubilee celebrations, brought together over 500 distinguished scientists, engineers, and experts from across the nation. This landmark event focused on critical areas such as Energy Security, Healthcare, and Advanced Technologies, offering a platform to showcase significant advancements in nuclear science and technology. With over 300 poster presentations and 50 exhibitors, the Conclave encouraged collaboration and knowledge sharing, fostering connections among professionals and researchers dedicated to advancing science and technology. With participation from institutions like BARC, IGCAR, RRCAT, and VECC, the Conclave highlighted DAE's strength in scientific innovation. It served as a platform for researchers to connect with industry leaders, fostering collaborations that bridge research and industry. Highlighting advancements in nuclear science, it reinforced India's vision of sustainability and self-reliance.

Indo-German Kick-Off Workshop on Topological Magnetism

The Indo-German Kick-Off Workshop on Topological Magnetism, held from November 5-8, 2024, brought together leading scientists from India, Germany, and beyond to discuss recent advancements. A collaborative effort between the Max Planck Institute of Microstructure Physics and NISER, the event featured in-depth discussions and exchanges, fostering international collaboration. Around 100 participants engaged in cutting-edge research, driving progress in this exciting field of physics.

Workshop on Academic Integrity

The Central Library, NISER, in collaboration with Turnitin, organized a workshop on Academic Integrity on 6th November 2024. Conducted by **Mr. Gautam Raval**, the session introduced Turnitin's advanced iThenticate V2 platform, focusing on report generation, interpreting

plagiarism versus similarity, and AI detection tools, actively engaging faculty, scholars, and students.

Advances in Biological Sciences Symposium

The Advances in Biological Sciences Symposium, held on November 7, 2024, was organized by the Journal of Biosciences Editorial Board and NISER. It provided a platform for researchers, faculty, and students from NISER and local institutes to exchange insights. The half-day event featured seven talks by Editorial Board Members, followed by a Q&A session, fostering discussions on recent advancements in biological sciences.

Artificial Intelligence and Scientific Publishing – Friends or Foes?

The Central Library, NISER, hosted a talk titled "Artificial Intelligence and Publishing – Friends or Foes?" on November 8, 2024. **Dr. Paresh Kumar Majhi**, Scientific Editor at Elsevier, discussed AI's role in peer review, research integrity tools, journal selection, and responsible generative AI use, highlighting AI's evolving impact on scientific publishing.

90th Annual Meeting of the Indian Academy of Sciences

The 90th Annual Meeting of the Indian Academy of Sciences commenced on November 8, 2024, at NISER Bhubaneswar, co-hosted by IIT Bhubaneswar. This prestigious event gathered scientists and researchers nationwide to share knowledge, explore advancements, and celebrate nine decades of research excellence. Highlights included thematic symposiums, special lectures on diverse topics like history and AI, and public talks by renowned experts.

DAE-BRNS 11th Theme Meeting on Ultrafast Sciences (UFS-2024)

The DAE-BRNS 11th Theme Meeting on Ultrafast Sciences (UFS-2024), held from November 28-30, 2024, at NISER Bhubaneswar, brought researchers together to discuss advancements in ultrafast science. Topics included attosecond spectroscopy, light-matter interaction, nonlinear optics, photochemistry, terahertz spectroscopy, ultrafast laser sources, and multidimensional imaging. The event fostered collaborations and showcased significant research, concluding successfully.

EMBO Workshop on Neuropeptides and Behavioural Flexibility

The EMBO Workshop on Neuropeptides and Behavioural Flexibility, held from December 5-8, 2024, at NISER Bhubaneswar, gathered researchers to

explore neuropeptides' role in behavior. It highlighted advancements in genetic tools, electrophysiology, mass spectrometry, and optogenetics, featuring studies from peptidergic signaling in echinoderms to human behavior, fostering cross-disciplinary collaboration.

47th All India Cell Biology Conference and International Symposium

The 47th All India Cell Biology Conference and International Symposium, held from December 16-18, 2024, at NISER Bhubaneswar, focused on "CELL IN ACTION." The event brought together scientists and researchers to discuss cellular mechanisms and their impact on human health and science, showcasing the vibrancy and transformative potential of cellular biology.

International Conference on Metal Halide Perovskites 2024 (HyPe-24)

The International Conference on Metal Halide Perovskites 2024 (HyPe-24), held from December 19-22 at NISER Bhubaneswar, showcased advancements in halide perovskites, including synthesis, photophysics, charge transport, and optoelectronic devices. The event united international and Indian researchers, fostering collaboration and advancing perovskite research.

Processability and Applications of Reticular Advanced Materials (PARAM-2025)

The School of Chemical Sciences at NISER Bhubaneswar hosted a two-day workshop on "Processability and Applications of Reticular Advanced Materials" on January 17, 2025. The event brought together researchers, graduate students, and post-doctoral scholars to discuss recent advancements in reticular chemistry. Key topics included interface engineering, thin films and membranes for separation, theoretical reticular material design, optoelectronics, electrochemistry, and THz spectroscopy. A highlight was the poster presentation session, where students showcased their research, with the best posters receiving awards from RSC and Thieme Publishers. The workshop aimed to foster collaborative and interdisciplinary research, paving the way for innovative scientific progress.

16th National Symposium on Radiation & Photochemistry (NSRP-2025)

The School of Chemical Sciences, NISER, in association with ISRAPs, hosted the 16th National Symposium on Radiation and Photochemistry (NSRP-2025) from January 23-25, 2025. The event brought together leading researchers and young scholars nationwide to discuss recent advances and foster collaboration in radiation and photochemistry.

Scholarly publishing in the age of artificial intelligence

The Central Library, NISER, in collaboration with ACS, organized a talk on "Scholarly Publishing in the Age of Artificial Intelligence" on 10th February 2025. Aimed at faculty, scientific officers, research scholars, PDFs, and senior Integrated MSc students, the session explored key topics including role of AI in scholarly publishing, efficiency enhancements, AI-powered innovations, ethical considerations, and future trends shaping academic publishing.

NVIDIA Run AI Workshop with MPCL

The School of Computer Sciences, NISER, in collaboration with MPCL, organized the NVIDIA Run AI Workshop on 14th February 2025. The workshop introduced advanced AI tools and technologies, offering hands-on sessions and insights into real world applications, helping students, researchers, and faculty enhance their skills in AI and accelerated computing.

Advancing Cancer Research: Insights and Applications of PDX Models, 8th March 2025.

A one-day seminar titled "Advancing Cancer Research: Insights and Applications of PDX Models" was organized on March 8, 2025, at NISER, jointly by the National Centre for Animal Research and Education (NCARE) and the School of Biological Sciences (SBS). The event brought together clinicians, veterinarians, and life science researchers on a common platform to deliberate on translational cancer research using Patient-Derived Xenograft (PDX) models. The seminar featured expert talks from leading national and international speakers, topics such as chemo-immunotherapy using PDX models, Innovations in treating high-mortality cancers. Other sessions explored tumor microenvironments, theranostics, and advanced drug delivery systems. Additionally, students from ILS Bhubaneswar and NISER presented their recent work, and a panel discussion on bridging research and clinical applications facilitated ideas for future collaborations. The seminar fostered interdisciplinary collaboration, emphasized the importance of advanced cancer modeling, and opened new avenues for translational research funding and institutional partnerships.

Particle Therapy Masterclass (PTMC 2025)

Particle Therapy MasterClass (PTMC 2025) conducted targeting the High School Students. The PTMC is a one-day workshop organized for nearby school (10+) students and 1st year NISER students as an outreach programme of CMRP, NISER. In this workshop, we introduce students to the field of Medical and Radiation physics and motivate them to join for research as

well as our CMRP M.Sc. course in medical physics. The workshop includes half day lectures on particle therapy, the basics of particle accelerators and related instruments, and a half-day hands-on-session of software (Matrad) training for nearly 100 students.

In the hands-on session, 50 desktop computers were equipped with Matrad. It is software used in hospitals for dose calculation while treating the tumour with high energy radiation of photons, electrons and heavy ions (proton, He, C, etc.).

Invited Lectures

- Quality Assurance of Imaging devices associated with Medical Linear Accelerator by **Mr. Ashis Masanta**, KIMS Hospital, KIIT, Bhubaneswar. 8th April, 2024.
- Tiny marvels, big impact: quantum dots redefine possibilities by **Prof. Hirendra Nath Ghosh**, NISER Bhubaneswar. 12th April, 2024.
- Beyond the blink: illuminating matter with attosecond precision by **Dr. Shovon Pal**, NISER Bhubaneswar. 12th April, 2024.
- Science, Technology & Innovation in India: Setting up Anusandhan National Research Foundation by **Dr. Akhilesh Gupta**, DST, Government of India. 19th April, 2024.
- Quantum Metrology and role of optics by **Prof. Venugopal Achanta**, Tata Institute of Fundamental Research, Mumbai. 16th May, 2024.
- Tasks before the 16th Finance Commission by **Prof. Manoj Panda**, Member of the Sixteenth Finance Commission. 18th June, 2024.
- Spectral CT by **Dr. Avtar Kular**, HBCH & RC, Punjab. 10th September, 2024.
- Neuroeconomics: How the brain decodes the value of money by **Prof. Krishanu Ray**, National Brain Research Centre, Manesar. 24th September, 2024.
- Biped Robotics: Gait Generation by **Prof. V. Pandu Ranga**, IIT Bhubaneswar. 1st November, 2024.
- Building Stars, Planets, and the Ingredients for Life in Space: Now with Webb! by **Prof. Ewine F. van Dishoeck**, Leiden Observatory, Leiden University, The Netherlands. 14th November, 2024.
- Mastering the Art of Scientific Publication by **Prof. Prashant V. Kamat**, University of Notre Dame, Notre Dame. 19th December, 2024.
- Halide Perovskites: Past Excitements and Recent Surprises by **Professor D. D. Sarma**, Indian Institute of Science, Bangalore. 19th December, 2024.
- 18S rRNA G1412A Mutation Affects Translation Initiation Fidelity and Ribosomal Biogenesis, by **Mr. Akhil Kumar**, NISER Bhubaneswar. 10th January, 2025.
- Radiomics and Its Application in Oncology by **Dr. Avinav Bharati**, NCI-AIIMS Jhajjar, Haryana. 13th January, 2025.
- It takes only one AUG codon to start translation... Or does it? by **Ms. Tanaya Kole**, NISER Bhubaneswar. 17th January, 2025.
- Plasmodium berghei radiation-attenuated sporozoite-immunized mice require infectious sporozoite challenge to maintain protective immunity by **Prof. Sarat K. Dalai**, Nirma University, Ahmedabad. 23rd January, 2025.
- Radiobiology of Charge Particles and Heavy Ions used in Radiotherapy by **Dr. Nagesh Bhatt**, RPAD, BARC, Mumbai. 27th January, 2025.
- Mechanics, Turing and the Quail by **Mr. Vaishnav Manoj**, NISER Bhubaneswar. 31st January 2025.
- Discussion of Union Budget 2025-26 by **CA Bodhisatwa Mohanty**, Partner PAMS & ASSOCIATES CA Firm. 21st February, 2025.
- The Compact Muon Solenoid (CMS) Odyssey — Run 3 and Beyond by **Dr. Gautier Hamel De Monchenault**, CMS Spokesperson. 25th February, 2025.
- Commissioning of proton therapy facility by **Mr. Kantaram Dareker**, ACTREC-TMC, Mumbai. 07th March, 2025.
- Calibration of therapy level dosimeters by **Dr. Rajesh Kumar**, RPAD, BARC. 09th March, 2025.
- Being Macaque: Our Complex Coexistence with Urban and Synurbising Macaques by **Professor Anindya 'Rana' Sinha**, National Institute of Advanced Studies, Bangalore. 13th March, 2025.

Publications



Publications

Research publications represent the scientific output and impact of NISER. Faculty, researchers, and students contribute to reputed journals, books, and conference proceedings, reflecting the quality and visibility of the institute's work. The publications listed here are selected highlights and not a comprehensive record of all outputs from the year.

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Central Library



Central Library



Nestled in the heart of the campus, the Central Library stands as a beacon of knowledge and inspiration, offering an unparalleled range of resources and specialized services to meet its users' diverse and evolving needs. Driven by a passionate commitment to fostering discovery and innovation, the library continually enhances its offerings to support the academic and professional aspirations of students, faculty, and staff. It houses a rich collection across a broad spectrum of disciplines, including Biology, Chemistry, Mathematics, Physics, Earth & Planetary Sciences, Humanities, and Computer Sciences.

The library serves as a vibrant hub of learning and discovery, welcoming readers daily from 9:00 AM to 11:00 PM. Even on institutional holidays, it remains open from 9:00 AM to 5:30 PM, offering a quiet and resource-rich environment for uninterrupted study. These hours reflect our dedication to nurturing academic excellence, intellectual growth, and the spirit of inquiry at all times.

RESOURCES AT A GLANCE

The total collection of the central library as of 31st March 2025 stands as follows:

Purchased Books	26007	Electronic Databases (Full-Text)	26	Hindi Collection	275
Gratis Books	2104	Electronic Journals	16881	Odia Collection	246
Bound Volume Journals	1458	CD/DVD	226	Popular Science Collection	58
E-Books	10141	PhD Thesis & MSc. Dissertations	821	Newspapers	07
Electronic Databases (Bibliographic)	4	Children's Collection	473	Magazines	25

LIBRARY SERVICES

The Central Library supports academic pursuits through these services:

- Library Orientation Program
- Ask Librarian (librarian@niser.ac.in)
- Library Website
- Library Brochure
- Reading Area
- Circulation (Issue, Return, Renewal & Reservation)
- Self-Check-out, Check-in, Renewal facility
- Overnight Book Lending
- Web-OPAC
- New Arrivals of Books
- Special Collection (Hindi, Odia, Popular Science)
- Children's Library
- Reference and Information Services
- User Guides
- Subject Guides
- Research Guides
- Screen Reader through JAWS Software
- Current Awareness Service (Newsletter "Vibes", NewsCasting)
- User Awareness Programs (Workshops, Training Programmes)
- Document Delivery Services
- Publications & Citations
- Table of Contents (Print Journals)
- Research Support: Citation Styles
- Institutional Digital Repository
- National Digital Library of India Membership
- Indian Research Information Network System (IRINS)

INFRASTRUCTURE FACILITIES

- Spacious, Air-conditioned reading area with seating for up to 400 users simultaneously.
- CCTV surveillance across the premises for enhanced security.
- RFID Integrated Digital Kiosks.
- Cashless payment facility via UPI for late fee transactions.
- Computer systems for seamless access to e-resources.
- Seamless Wi-Fi connectivity across library premises for uninterrupted digital access.
- Designated Silent Zone to ensure a quiet, focused study environment.
- E-Reading Section to accessing digital resources
- Scholar's Zone for intensive, focused research activities
- Spacious Seminar Halls equipped with modern technology for hosting national and international conferences.
- Central Board Room and Conference Room for meetings and discussions.

RESEARCH SUPPORT TOOLS

- **SciFinder-n:** A comprehensive platform offering access to an extensive range of scientific information, facilitating efficient exploration and discovery.
- **Grammarly:** A writing enhancement tool that assists users in improving their grammar, clarity, and writing style.
- **Web VPN:** Enables off-campus access to e-resources through NISER's secure VPN connection.
- **Quick Start Guides:** Convenient guides for reference management tools like Mendeley, Zotero, and RefWorks, available directly through the library's website.
- **iThenticate (Turnitin):** A powerful tool for checking originality and preventing plagiarism.
- **Measuring Research Impact:** A collection of various metrics and tools used to assess research performance.
- **Improve Research Visibility:** Strategies and resources to enhance the visibility and reach of your research work.

LIBRARY'S PERIODICAL RESOURCE PORTFOLIO

ELECTRONIC JOURNALS

To ensure uninterrupted access to a comprehensive range of academic literature, the Central Library subscribes to 16,881 electronic journals across 65 scholarly publishing platforms. These include leading scientific, technical, and professional societies such as the **American Chemical Society (ACS)**, **American Physical Society (APS)**, **IEEE**, **Royal Society of Chemistry (RSC)**, and **Springer Nature**, among others. The library also provides access to prestigious university presses like **Oxford University Press (OUP)**, **Cambridge University Press (CUP)**, **Johns Hopkins University Press**, and **Duke University Press**, as well as renowned content aggregators including **JSTOR**, **Project MUSE**, and **ScienceDirect (Elsevier)**. This robust digital resource supports multidisciplinary research across science, engineering, medicine, humanities, and social sciences, empowering the NISER academic community with global knowledge and high-impact scholarship.

CURATED NEWS & MAGAZINE COLLECTION

The Central Library maintains a robust collection of newspapers and magazines to keep the NISER community informed, inspired, and intellectually engaged. The newspaper section features leading national and regional dailies such as *The Hindu*, *The New Indian Express*, *The Times of India*, *The Economic Times*, *Dainik Jagaran*, *The Samaj* (ସମାଜ), and *The Sambad* (ସମ୍ବାଦ), providing comprehensive coverage of current affairs in Hindi, English and regional languages. The magazine collection spans a diverse array of genres—academic, popular, and general interest—including *India Today*, *The Week*, *Frontline*, *Yojana*, *The Economist*, *Science Reporter*, *Reader's Digest*, and *Sportstar*, among others. To engage young minds, a dedicated section of children's magazines such as *Champak*, *Tinkle*, *Magic Pot*, *National Geographic Kids*, and *Akadabakad* (Hindi) is also curated. Together, these resources enrich the learning experience beyond textbooks, promoting cultural literacy, critical thinking, and lifelong curiosity.

ELECTRONIC DATABASES (BIBLIOGRAPHIC DATABASES)

The Central Library continues to support advanced research and academic inquiry by providing access to a suite of premier bibliographic databases. Key resources include;

- CCDC – CSD Enterprise License (CCDC)
- MathSciNet (AMS)
- Science of Synthesis (Thieme)
- Sci-Finder-n (CAS- ACS)

NEW INITIATIVES

OPEN ACCESS PUBLISHING: EMPOWERING KNOWLEDGE SHARING

In alignment with global trends promoting transparency and accessibility in academic publishing, NISER Library introduced a significant initiative to support Open Access (OA) publishing. Through strategic Read-and-Publish agreements with prominent publishers—Springer Nature, Wiley, Cambridge University Press (CUP), and the Association for Computing Machinery (ACM)—NISER researchers now have the opportunity to publish their work in OA format across 3,000+ high-impact journals at no additional publishing cost. These agreements, active through 2024, not only provide comprehensive reading access but also remove financial and institutional barriers to publishing, thereby ensuring wider dissemination and increased citation potential for NISER's research output. This initiative reinforces the institute's commitment to fostering inclusive knowledge exchange and global academic collaboration.

FREQUENTLY ASKED QUESTIONS

The FAQ page of the Central Library provides valuable information to assist users in navigating library services and resources. It covers a range of frequently asked questions regarding library membership, borrowing privileges, access to digital resources, and various library services. The page also offers guidance on how to use the library's catalog, access e-journals, and make the most of research support tools. By addressing common queries, the FAQ page aims to enhance user experience and streamline access to essential information, ensuring

ELECTRONIC BOOKS

The Central Library has significantly strengthened its digital resources by offering access to a wide range of scholarly e-books across reputed academic publishers. The collection includes **9,567 titles from Springer Link**, **561 titles from Elsevier**, and **8 titles from Cambridge University Press**, all of which support perpetual access, ensuring long-term availability for the academic community. Additional titles include **4 from Taylor & Francis**, **8 from Pearson**, and **1 from Oxford University Press**, each acquired with perpetual rights.

a smooth and efficient interaction with the library's facilities.

AI ASSISTANCE

The AI Assistance page of the Central Library Website features an independently curated collection of AI-powered tools, designed to support and enhance the research workflow. The aim is to offer users a diverse range of AI tools that can aid in various aspects of academic work, from improving writing quality to enhancing research productivity. By organizing these resources, the library helps users explore different options available for streamlining their research processes.

SITE MAP

The Site Map page of the NISER Central Library website provides an organized overview of the site's structure. It categorizes resources into sections like 'About', 'Services', 'E-Resources', 'Scholarly Publications', and more, with subcategories linking to relevant pages. This layout ensures easy navigation, allowing users to quickly access the information they need.

DYNAMIC REPOSITORY OF NISER RESEARCH PUBLICATIONS

As part of its commitment to promoting research visibility and scholarly communication, the Central Library has introduced a dynamic and continuously updated repository of NISER Publications (Research Papers). This initiative, ensuring that the most recent and relevant research outputs by NISER faculty

and scholars are accessible in real time. Users can efficiently explore the collection using filters such as publication year, department, alphabetical listing, and keyword search. This curated and structured access to indexed research enhances academic collaboration, supports institutional benchmarking, and contributes to the dissemination of NISER's intellectual contributions on a global scale.

LIBRARY STATS

The Library Stats page on the Central Library website presents key metrics through interactive graphs, including OPAC visitors, website traffic, IDR visits, book procurement, DDS usage, and issue statistics. These visual insights help track library usage and trends, aiding in better resource management and decision-making.

INTERNSHIP AND TRAINING ACTIVITIES

As part of the institute's in-house trainee programme the Central Library recruited 4 professional trainees and under the Board of Practical Training (BOPT) apprenticeship scheme, 3 library apprentices during the reporting period.

Also to support LIS academic curriculum, the Central Library offered short-term internships and training to students from various academic institutions. From December 18 to 27, 2024, the Central Library hosted a 10-day internship programme for 16 Master of Library and Information Science (MLISc) students from Berhampur University, Odisha.

EVENTS AND ACTIVITIES

During the reporting period, the Central Library continued to contribute to the Institute's academic endeavours by organizing workshops and training programmes in collaboration with leading publishers such as Elsevier, Wiley, Grammarly, iThenticate, and Thieme. Subject-matter experts engaged with the NISER community, offering insights into new innovations, research methodologies, and platform features. Key events included Common Pitfalls in Scientific Writing & Science of Synthesis, a Training Session on Grammarly, a Workshop on Academic Integrity, and topical discussions such as Artificial Intelligence and Scientific Publishing – Friends or Foes? and Scholarly Publishing in the Age of Artificial Intelligence. Each session concluded with an interactive Q&A, fostering active participation. A detailed overview of these events is provided in the Research and Development chapter.

In addition to publisher-led workshops, the Central Library organized several in-house events to strengthen research and academic literacy among NISER stakeholders. These included:

Utkal Dibasa Celebration

To celebrate Utkal Dibasa on April 1st, 2024, the Central Library at NISER organized a exhibition featuring a rich collection of Odia books. The exhibit warmly welcomed visitors, inviting them to explore and immerse themselves in the depth and beauty of Odia literature, offering a unique opportunity to engage with this captivating collection.

National Librarian's Day

On August 12, 2024, the Central Library, NISER, celebrated National Librarian's Day to honor Professor S. R. Ranganathan on his 132nd birth anniversary.

Library staff and trainees paid tribute to Ranganathan, reflecting on his groundbreaking contributions to library science. The event included a discussion on his innovative principles and their enduring relevance in today's library practices.

Hindi Diwas Celebration

To mark Hindi Diwas, the Central Library, NISER, hosted a vibrant Hindi Book Exhibition from 14th to 30th September 2024. The exhibition featured a diverse selection of works by renowned authors, including both modern and classic literature, providing readers with a wonderful opportunity to explore new titles and deepen their appreciation for Hindi literature.

Science Quiz Competition

The Central Library, NISER, in collaboration with IOP Publishing, successfully hosted the “IOP Science Quiz” online from 30th August to 2nd September 2024.

Integrated MSc. students (1st to 5th year) participated

with great enthusiasm, showcasing their scientific knowledge and competitive spirit. Winners were selected by IOP Publishing and awarded Amazon gift vouchers, making the event both intellectually rewarding and memorable.

VISITORS DIRECTORY

- On July 29, 2024, the Central Library, NISER, welcomed **Management Trainees** from **Hindalco Industries Limited** in collaboration with IMMT. The visit showcased the library's resources, fostering industry-academia collaboration and promoting learning and professional development. The trainees appreciated the library's role in advancing knowledge and innovation.
- On 5th December 2024, 50 secondary school teachers and three deputy librarians from Regional Institutes of Education (RIEs) visited the NISER Central Library as part of their Orientation Programme. The visit focused on modern library management, e-library systems, and enhancing learning through digital resources.

OPERATIONAL STATISTICS OVERVIEW

300

Faculty, Students, researchers, staff from various departments and programmes joined the Central Library, strengthening our academic user base.

377

Journal articles, Book chapters, standards were successfully delivered to the academic community to support research and learning.

207

Theses and dissertations were archived in the Institutional Repository, strengthening NISER's collection of scholarly and intellectual contributions.

800

library collection was enriched with newly acquired academic books, covering diverse subject areas across Science, Technology, and Medicine.



Student Activities



Student Activities

AWARDS AND RECOGNITIONS

HBNI Outstanding Doctoral Student Award

- **Dr. Tusar Kanta Acharya**, *School of Biological Science* (Mentor: Prof. Chandan Goswami)
- **Dr. Shyam Kumar Banjare**, *School of Chemical Science* (Mentor: Dr. P. C. Ravikumar)
- **Dr. Samapan Bhadury**, *School of Physical Science* (Mentor: Dr. Amaresh Jaiswal)
- **Dr. Ashish Pandav**, *School of Physical Science* (Mentor: Prof. Bedangadas Mohanty)

Best Thesis Award

- **Dr. Ashish Pandav**, Ph.D. alumnus from the School of Physical Sciences, supervised by **Professor Bedangadas Mohanty**, received the RHIC & AGS Thesis Award 2024, a prestigious international recognition for outstanding doctoral work. He was also conferred The Rahul Basu Memorial Award, which honours the most exceptional Ph.D. theses in India in the field of high energy physics.

Best Poster Award

- **Mr. Aher Jayesh Bhausaheb**, from the School of Biological Sciences, has won the 'Biointerphase Best Poster Awards' at the 6th Biomembranes Symposium 2024. His outstanding work on Phagosomal membrane sculpting and remodelling by Mycobacteria, conducted under the guidance of **Dr. Mohammed Saleem**, has been recognized at this prestigious event co-organized by the Department of Physics and Molecular Biophysics Unit, Indian Institute of Science, Bengaluru.
- **Mr. R. Vijaya Sankar** from the School of Chemical Sciences received the Best Poster Award at the Emerging Trends in Organometallics and Catalysis (ETOMC), held on 12–13 July 2024 at IISER Kolkata. Under the guidance of **Prof. Chidambaram Gunanathan**, his poster titled "Ruthenium-Catalyzed Selective α -Alkylation of β -Naphthols using Primary Alcohols: Elucidating the Influence of Base and Water" was recognized for its outstanding contribution and scientific merit.
- **Ms. Kshyama Subhadarsini Tung**, from the School of Biological Sciences, has received the Best Poster Award at Immunocon 2024, held from 17th to 20th October 2024 at the Indian Institute of Science, Bengaluru. Guided by her supervisor, **Dr. Subhasis Chattopadhyay**, her exceptional work highlights innovation and dedication in immunological research.
- **Mr. Amit Haldar**, from the School of Physical Sciences, received the Outstanding Poster Presentation Award from the Ultrafast Optical Phenomena Technical Group at the prestigious FiO+LS (Frontiers in Optics and Laser Science) Conference held in Denver, USA. His achievement, under the guidance of **Dr. Shovon Pal**, reflects the institute's growing international presence in cutting-edge optics research.
- **Mr. Swapnil Sahoo**, from the School of Biological Sciences, received the Best Poster Award at the Organelle Biology and Membrane Trafficking (OBMT) 2024 conference, held at IISER Pune on 28–29 October 2024. His achievement, guided by **Dr. Abdur Rahaman**, highlights their significant contribution to cutting-edge biological research.
- **Ms. Payel Shee**, from the School of Physical Sciences, NISER, was awarded the Best Poster Award at the 7th National Conference on Electronic Structures (NCES-2024), held at SRM University, Hyderabad from 21–23 November 2024. Her achievement reflects her innovative research and dedication, guided by her supervisor, **Dr. Shovon Pal**.
- **Mr. Rakesh Kumar Behera**, from the School of Chemical Sciences, NISER, was awarded the Best Poster Award at the Ultrafast Sciences (UFS-2024) conference held at NISER, Bhubaneswar, from 28–30 November 2024. His recognition highlights his research excellence and dedication, under the guidance of his supervisor, **Prof. Hirendra Nath Ghosh**.
- **Mr. Prabin Bawali**, from the School of Biological Sciences, won the Best Poster Award at the 1st National Conference for Undergraduate Research

in Biosciences (NCURB), held on 16–17 December 2024 at IISER Tirupati. This achievement reflects his dedication and passion for biosciences, guided by **Dr. Asima Bhattacharyya**.

- **Rahul Madhav, Joel Joseph, Sreerag M, and Shourya**, from School of Biological Sciences has won the Best Poster Award at the International Conference on Biofilms and Biofouling Control (BBC-2024), held from 12–14 December 2024 at BARC IGCAR-Kalpakkam. This recognition highlights the team's scientific potential and the valuable mentorship of their guide, **Dr. Harapriya Mohapatra**.
- **Debopam Acharjee**, a Research Scholar from the School of Chemical Sciences, NISER, has been bestowed with the Best Poster Award at the International Conference on Metal Halide Perovskites (HyPe-2024), held from 20–22 December 2024 at NISER Bhubaneswar. This achievement is a testament to Debopam's research excellence and the invaluable guidance of his supervisor, **Dr. Subhadip Ghosh**.
- **Sayantan Mukhopadhyay**, from School of Chemical Sciences, was awarded the Best Poster Award at the Main-Group Molecules to Materials conference held at IIT Bombay from February 9-12, 2025. This outstanding achievement is a testament to Sayantan's research efforts and the guidance of his mentor, **Dr. Sharanappa Nembenna**.
- **Ankita Panda**, from School of Chemical Sciences, was awarded the Best Poster Award at the First Nucleic Acid Therapeutics Meeting - India 2025, held at JNCASR from February 18th to 21st, 2025. This recognition highlights her excellent research work under the mentorship of **Dr. Nagendra K. Sharma**.
- **Mr. Sudipta Das**, Research Scholar, received the Best Poster Award at "SPS DAY 2024", organized at NISER on 30–31 August 2024.
- **Mr. Suraj K. Agrawalla**, Research Scholar, from School of Chemical Science, has won the Best Poster Prize at the National Conference on Chemistry for Sustainability.
- **Mr. Swosti Prakash Sarangi**, Integrated MSc Student from School of Physical Science has been awarded the Best Poster Award at the Ultrafast Sciences (UFS-2024) Conference.
- **Mr. Kanha Ram Khator**, Research Scholar from School of Physical Science has been honored with

the Best Poster Award at the HyPe 2024 held at NISER, Bhubaneswar.

Achievements & Accolades

- **Ms. Supriya Samal**, a Research Scholar from the School of Biological Sciences, under the guidance of **Dr. Asima Bhattacharyya**, has been honored with an APPRECIATION AWARD at EVOLVE 2025, the 1st Annual Meet of the Indian Society for Extracellular Vesicles. The conference was held at All India Institute of Medical Sciences (AIIMS), New Delhi, from March 24-26, 2025.
- **Ms. Supriya Samal and Mr. Smaran Banerjee** from the School of Biological Sciences, under the guidance of Dr. Asima Bhattacharyya, have jointly secured the THIRD PRIZE in the Photography (Microscopy) Competition at EVOLVE 2025, the 1st Annual Meet of the Indian Society for Extracellular Vesicles, held at AIIMS, New Delhi (March 24-26, 2025)
- **Ms. Supriya Panda**, from School of Chemical Sciences, has been awarded the Certificate of Leadership by the Ministry of Youth Affairs & Sports, Government of India. This recognition celebrates her exceptional contributions, visionary leadership, and path-breaking ideas presented at the Viksit Bharat Young Leaders Dialogue held in Delhi. Guided by **Dr. Subhadip Ghosh**, Ms. Panda's achievement is a testament to the excellence and innovation within our research community.
- **Mr. Sawan**, Research Scholar from the School of Physical Sciences, working under the guidance of **Professor Bedangadas Mohanty**, received the Best Oral Presentation Award at the 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), held from 13–16 January 2025 in IISER Berhampur, Odisha.
- **Mr. Bappaditya Mondal**, Research Scholar from the School of Physical Sciences, under the supervision of **Professor Bedangadas Mohanty**, received an Honorary Mention Award for his poster presentation titled "Precision measurement of (net-)proton number fluctuations in Au+Au collisions at RHIC" at the RHIC/AGS Users' Meeting, Brookhaven National Laboratory (BNL), New York, USA, held from June 11–14, 2024.
- **Ms. Ananya Palo**, Research Scholar from School of Biological Science was awarded the Prof. U N Singh Best Research Talk at the 5th iZIM Conference held at ILS.

SCHOLARLY CONTRIBUTIONS AS SPEAKER

Ms. Swati Saha

- **Study of baryon-strangeness and charge-strangeness correlations in Pb-Pb collisions at 5.02 TeV with ALICE**, on behalf of ALICE Collaboration, The 21st International Conference on Strangeness in Quark Matter (SQM 2024), Strasbourg, France. 3-7th June 2024.
- **Study of baryon-strangeness and charge-strangeness correlations in Pb-Pb collisions at 5.02 TeV with ALICE**, on behalf of ALICE Collaboration, 42nd International Conference on High Energy Physics (ICHEP 2024), Prague, Czech Republic. 17-24th July 2024.
- **Investigating the effect of magnetic field on baryon-charge correlations in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with ALICE**, on behalf of ALICE Collaboration, XXVI DAE-BRNS High Energy Physics Symposium, DAE, Banaras Hindu University, Varanasi. 19-23rd December 2024.
- **Fluctuations and correlations of net-conserved quantities at LHC energies with ALICE**, behalf of ALICE Collaboration, The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha. 13-16th January 2025.

Mr. Bappaditya Mondal

- **Search for QCD critical point using (net-)proton fluctuation measurement from BES-II**, on behalf of STAR Collaboration, STAR Collaboration meeting, Poland. 21- 25th October, 2024.



- **Hyper-order fluctuation of (net-)proton multiplicity distributions in BES-II collider energies**, on behalf

of STAR Collaboration, STAR Collaboration meeting, Poland. 21- 25th October, 2024.



- **Precision measurement of (Net-)proton Number Fluctuations in Au+Au Collisions from BES-II Program at RHIC-STAR**, on behalf of STAR Collaboration, XXVI DAE-BRNS High Energy Physics Symposium, DAE, Banaras Hindu University, Varanasi. 19-23rd December 2024.
- **Precision measurement of (Net-)proton Number Fluctuations in Au+Au Collisions from BES-II Program at RHIC-STAR**, on behalf of STAR Collaboration, The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha. 13-16th January 2025.

Mr. Sudipta Das

- **Feasibility of CEvNS Search at APSARA-U**, XXVI DAE-BRNS High Energy Physics Symposium, DAE, Banaras Hindu University, Varanasi. 19-23rd December 2024.

Ms. Sarjeeta Gami

- **Study of resonances flow and production in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.36$ TeV with ALICE**, on behalf of ALICE Collaboration, The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha. 13-16th January 2025.

Mr. Sawan

- **Study of exotic resonances in pp collisions with ALICE at LHC**, on behalf of ALICE Collaboration, The 10th Asian Triangle Heavy-Ion Conference (ATHIC 2025), IISER Berhampur, Odisha. 13-16th January 2025.

VIBRANT MOMENTS FROM CAMPUS CLUBS

ZAARIYA

In the academic year 2024–25, Zaariya, NISER's social outreach club, organised a series of impactful events promoting community engagement, compassion, and social responsibility. The Raksha Bandhan celebration honoured the campus security and health staff through the symbolic gesture of tying handmade rakhis. On Diwali eve, the "Bright Bites Fest'24" Food Festival served as both a celebration and a fundraiser, bringing together flavours and generosity. On November 15th, volunteers visited *Prativa Ashram* in Bhubaneswar to support and interact with children, while on January 19th, 2025, Zaariya and other campus clubs visited *Asha Kiran Old Age Home*, donating essential supplies and hosting an evening of music and drama.

The club's annual event, "Yours कृतज्ञतापूर्वक," held on January 7th and 8th, created a space for heartfelt anonymous expressions of gratitude. A blood donation camp in collaboration with Khordha Blood Bank on February 1st successfully collected 79 units. As part of *Swachhata Pakhwada*, Zaariya organised a campus march and village visit promoting cleanliness and sustainability. The event *Prerna*, held on March 29th, introduced children from the campus staff and neighbouring Bhoi Sahi village to hands-on science activities. Concluding the year, a four-day cloth donation drive (March 26–29) supported underprivileged communities via Jazbaa, Rotaract, and a village in Mayurbhanj, reaffirming Zaariya's mission of inclusive service.



ROBOTECH

The Robotech Club at NISER undertook a dynamic range of activities throughout the academic year, fostering technical skills, research, and innovation among students. The Skill Development Program (SDP) evolved this year by shifting from module-based learning to project-based learning, with hands-on experiences in projects like Robo Racer and Line Following Robot, guided by experienced project leads. Students also represented NISER at inter-institutional robotics competitions held at Silicon Institute of Technology and IIT Bhubaneswar.

The club successfully hosted the 4th edition of its annual inter-college hackathon, *Hack-duino*, in collaboration with Dr. Shubhankar Mishra's Lab, where shortlisted teams earned internships and funding support to develop their innovative ideas. As part of NISER's intra-college fest *Umang* on 15th September, the club organized *Tech Sprint*, a creative challenge encouraging students to design problem-solving devices from basic components.

Other notable events included *Electrologic*, a circuit-building competition that tested problem-solving and electronics skills, rewarding winners with Arduino kits. The club continued work on its flagship *Rover Project*, making design enhancements, while also initiating a *Drone Project* focusing on autonomous navigation and image processing. The drone initiative earned recognition in the ISRO Robotics Challenge 2025 and was presented at the Smart India Hackathon.



ARTS CLUB

The Arts Club (Arc) at NISER curated a vibrant calendar of events that fostered creativity, expression, and environmental awareness. During UMANG 2024 (15–17 September), the club hosted “Battle of Batches,” an inter-batch creative contest featuring canvas painting (Comic Relief), wall painting (Home City), and a virtual book cover design competition. Skill-building remained central, with a Calligraphy Workshop by Vaishnavi Pawar (18 October 2024) and an online Warli Painting session by Ms. Shweta Joshi (17 January 2025), which explored traditional tribal art.

In collaboration with the R&D Department, Arc organized a Logo Design Competition (7–12 February 2025) for the NISER Homi Bhabha Incubation Foundation (NHBIF). Valentine's Week saw “Mold Your Love,” a clay modelling event with 50+ participants. As part of Swacchata Pakhwada 2025, a wall painting competition (13–22 March) engaged 11 teams in creating murals themed on climate change, blending art with activism. The club's efforts this year significantly enriched campus life, promoting artistic skill, cultural appreciation, and social consciousness.



FILM CLUB

The NISER Film Club continued to enrich campus life by promoting meaningful cinema through weekly screenings, thematic events like Horror Month, Oscar Marathons, and special showcases such as Watusi Zombie followed by a discussion with its creators. Events like Filmologica during Umang 2024 and scriptwriting contests fostered engagement and creativity. Collaborations with other clubs brought fresh perspectives to cinema appreciation. As a platform for both critique and creation, the club remains committed to nurturing a vibrant film culture that inspires thoughtful discussion and creative expression.



Events & Activities



Events & Activities

International Day of Yoga

On June 21, 2024, NISER commemorated the 10th International Day of Yoga with a structured programme comprising a group yoga session and a series of talks focused on yoga, mindfulness, and holistic health. Held at the NISER Community Hall, the event witnessed active participation from students, staff, faculty members, and their families. The yoga session was conducted with guided instructions, ensuring each asana was demonstrated with clarity, along with explanations of its health benefits and contraindications. The session concluded with a brief meditation practice aimed at enhancing mental clarity and emotional balance. The celebration reflected the institute's continued commitment to fostering physical well-being, mental wellness, and community harmony through traditional practices.

Independence Day Celebration

NISER celebrated the 78th Independence Day with great enthusiasm and patriotism, featuring a vibrant plantation drive and captivating cultural performances. The sapling plantation emphasized our commitment to sustainability and environmental care, while the cultural events showcased the unity and diversity of our nation. The day reflected pride in our heritage, a sense of responsibility, and a shared vision for a greener and brighter future, leaving everyone inspired and filled with national pride.

National Space Day

To celebrate Chandrayaan-3's historic Moon landing, August 23rd was declared "National Space Day" by the Hon'ble Prime Minister. NISER's School of Earth & Planetary Sciences hosted lectures, a space quiz, and panel discussions with experts. The highlight was the unveiling of 'KALPANA,' NISER's Observatory, honoring Kalpana Chawla. Developed by the Astronomy Club, it features advanced telescopes for deep-sky observation and astrophotography, marking a new era in cosmic exploration.

Foundation Day

The 15th Foundation Day was celebrated on 6th September, 2024. **Prof. Ravi B Grover**, Member Atomic

Energy Commission & Founding Vice-Chancellor, Homi Bhabha National Institute (HBNI) was invited as the Chief Guest on this occasion and delivered a talk on "**Development-led transition to a net zero energy mix in India**". The talk was followed by felicitation of the outstanding performers for the Academic Year 2023-24.



7th DAE National Yoga Conference

The 7th DAE National Yoga Conference, themed "**Ancient Yogic Science for Modern Lifestyle Management**," was held at NISER on September 28-29, 2024. The event brought together scholars, practitioners, and yoga enthusiasts to explore the relevance of ancient practices in modern living. It featured talks, practical sessions, and discussions, offering participants valuable insights into yoga's transformative applications for lifestyle enhancement. The conference's success highlighted the contributions of speakers, participants, and organizers.

Observance of Rashtriya Ekta Diwas

On October 30, 2024, NISER celebrated National Unity Day, honoring Sardar Vallabhbhai Patel's enduring legacy. The community enthusiastically took the Rashtriya Ekta Diwas Unity Pledge, reaffirming their unwavering commitment to national integration, unity, and harmony.

Observance of Vigilance Awareness Week

Vigilance Awareness Week, held from October 28th to November 3rd, 2024, focused on fostering integrity under the theme “**Culture of Integrity for Nation’s Prosperity.**” On October 30th, 2024, Prof. Hirendra Nath Ghosh, Director of NISER, led an Integrity Pledge with the staff and faculty, reinforcing the institution’s commitment to upholding integrity and combating corruption. This initiative aimed to instill values of ethical conduct and transparency within the campus community, strengthening the foundation for a prosperous and fair future.

Observance of the Constitution Day

On November 26, 2024, NISER observed Constitution Day with active community participation. The Preamble was collectively read, and the Director emphasized the significance of the day in upholding the values of democracy and governance.

Special Swachhata Campaign

The Swachh Bharat (Clean India) Campaign marked its 10th anniversary in 2024, a decade since its launch by Prime Minister Shri Narendra Modi on October 2, 2014. To commemorate this milestone, nationwide initiatives were held from October 2 to 31. At NISER, various activities highlighted the institute’s dedication to cleanliness and environmental care, echoing the national vision of a cleaner, greener India.

Republic Day Celebration

NISER celebrated the 76th Republic Day of India with pride and enthusiasm, beginning with the hoisting of the national flag on campus amidst great joy. The event featured a spirited parade by NISER’s security staff and the heartfelt rendition of the national anthem, resonating patriotism across the grounds. In his inspiring address, Prof. Hirendra Nath Ghosh, Director of NISER, highlighted the values that unite us as a nation. The occasion also recognized excellence, as awards were presented to outstanding administrative, scientific and technical staff for their dedication and contributions to the NISER community. Adding to the celebrations was a vibrant cultural program, where the creativity and talent of students and staff shone through colorful performances and energetic beats. The distribution of medals to the winners of IISM and IICM events further elevated the festive spirit, recognizing excellence and fostering camaraderie. The day was a

true reflection of unity, pride, and the enduring spirit of NISER.

Swachhata Pakhwada

In adherence to the objectives of the Government of India’s Swachhata Pakhwada initiative, the National Institute of Science Education and Research (NISER) conducted the observance of Swachhata Pakhwada from March 11 to 24, 2025, in lieu of the nationally designated period in February, owing to the pre-scheduled mid-semester examinations during that time. The observance started with the Swachhata Pledge administered by the Director, reaffirming collective commitment to cleanliness and sustainability. A series of impactful events followed:

- **Swachhata Rath:** a mobile exhibit designed with creative and informative displays carrying key messages on the importance of maintaining cleanliness in both public and private spaces, which circulated across campus academic blocks to ensure visibility and engagement.
- **Plastic Reuse Art Exhibition:** Students and staff crafted utility items and artworks from used plastic bottles, promoting recycling and awareness of plastic pollution, which were then showcased in an on-campus exhibition.
- **Short Documentary Screening (“Clean NISER”):** Held on March 22, student-made short documentaries under the theme “Clean NISER”, captured institutional cleanliness efforts and conveyed the importance of individual responsibility.
- **Campus Cleanliness Drive (March 15):** Over two hours of collective participation from the community to clean walkways and green areas, instilling long-term cleanliness habits.
- **Cycle Rally to Daya River (March 17):** Volunteers cycled 20 km to raise awareness on river pollution, with a special focus on the Daya River, which holds significant historical and cultural relevance in Odisha but is currently facing ecological degradation. Collecting 1,000+ public signatures for a memorandum to the Hon’ble CM of Odisha, urging immediate and sustained action to restore and protect the river’s ecosystem.
- **Panel Discussion:** To deepen the intellectual discourse on issues related to waste and urban sustainability, a Panel Discussion was organized on March 19, 2025, themed “Challenges of Waste

Management in Urban Spaces,” with speakers from NISER and Executive Officer of Jatni Municipality Sri Suryamani Pattajoshi sharing insights on sustainable practices and policy challenges.

- **Competitions:** In order to make cleanliness a part of everyday culture, NISER conducted competitions such as Cleanest Office/Hostel, Slogan Writing, Swachhata Quiz, and Graffiti fostered active engagement from students and staff on hygiene and sanitation.
- **Community Outreach (Padanpur Village):** Conducted with student group Zaariya, involving a cleanliness drive and awareness sessions with local residents on waste disposal and hygiene.

The fortnight concluded with a **Closing Ceremony on March 24**, featuring prize distribution and speeches by the Director and Faculty-in-Charge of Swachhata Hi Seva Committee. Their address reaffirmed NISER’s commitment to Swachh Bharat and highlighted the importance of civic responsibility within the academic community.

Official Language Hindi in NISER

NISER being a public funded Institute, the Official Language Policy of the Union is implemented in the Institute to the extent possible manner. The Institute is making all efforts to promote Official Language Hindi in all official works being executed by its Sections / Schools / Cells and Centers. The Official Language Implementation Committee (OLIC) consisting of all the Deans, Chairpersons, FICs, Registrar & other Section Heads under the Chairmanship of Director, NISER plays an important role to ensure the effective compliance and implementation of the policy. The mandatory requirements like signage, stamps, letterheads, advertisements, and various administrative reports are already being done in bilingual manner. Staff members particularly those who have been trained through various official language Hindi courses and many

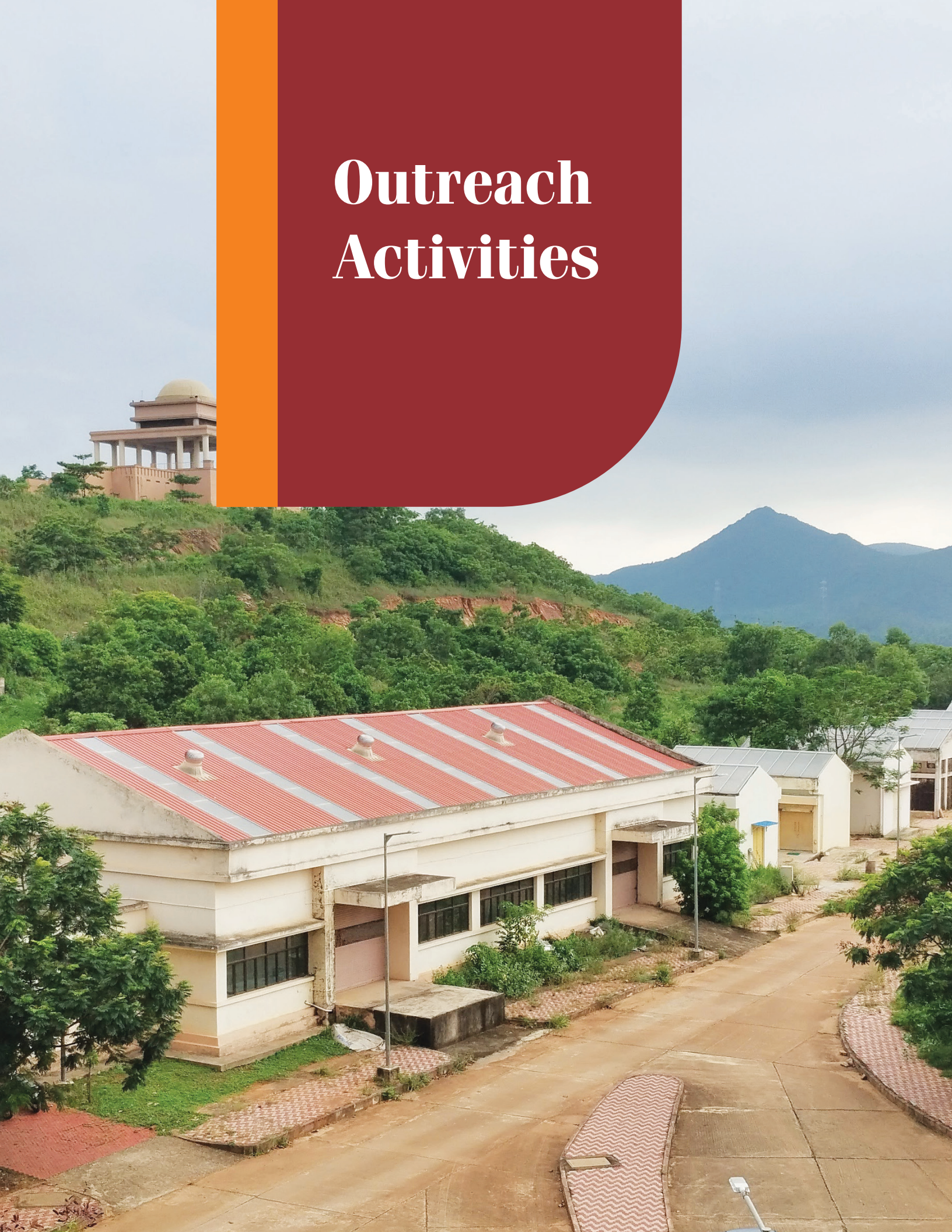
others also execute their official work in Hindi to the best possible extent. To encourage and motivate more employees of the institute to execute their official work in Hindi, DAE’s Incentive Scheme (ATOLIS – Atomic Energy Official Language Implementation Scheme) has been implemented. The institute time to time also conducts Hindi Seminars / Webinars, Conferences, Workshops and Training Sessions. Competitive events in official language Hindi like essay writing, film quiz, Hindi Grammar quiz competitions etc. are also being conducted during the Hindi Pakhwada celebrations. Some of the official language Hindi related events conducted during the year 2024-25 are mentioned below:

In the year 2024-25 **हिन्दी पखवाड़ा / Hindi Fortnight** was observed in the Institute during September 16 – 30, 2024. Following competitive event were conducted during the **पखवाड़ा / Fortnight**:

- **शुद्ध हिंदी वर्तनी प्रतियोगिता / Correct Hindi Spelling Competition** open for all students & employees was conducted on 20.09.2024.
- **नाइसर छात्रों द्वारा हिंदी में निबंध लेखन प्रतियोगिता / Hindi Essay Writing Competition** by all NISER students was conducted on 21.09.2024.
- **नाइसर कर्मचारियों द्वारा हिंदी में निबंध लेखन प्रतियोगिता / Hindi Essay Writing Competition** by all NISER employees was conducted on 23.09.2024.
- **हिंदी चलचित्र पर आधारित प्रश्नोत्तरी प्रतियोगिता / Hindi Film Quiz Competition** was conducted for all Students and Employees on 27.09.2024.

A **“Public Awareness Programme on DAE’s Activities”**, was conducted in collaboration with NISER & IOP at Kalinga Institute of Social Sciences, Bhubaneswar on February 3rd & 4th, 2025. This programme was fully sponsored by the DAE & Conducted by the officials of Hindi Section of DAE Mumbai.

Outreach Activities



Outreach Activities

ACTIVITIES BY MEMBERS

Prof. Palok Aich

- **Chief Guest, Innovate Odisha, AIC-Nalanda Institute of Technology Foundation (AIC- NITF), Bhubaneswar, 28th to 29th September 2024.**

Dr. Debasmita Pankaj Alone

- School Visit: **Exploring Genetics: From Cell Division to DNA and Mutations**, Balipatpur Refugee Government High School, Bhusandpur, Khordha. 18 Jul 2024.
- Invited Talk: **Inquiry Based Learning on 'Cell Division'**, Workshop on **'Pedagogy and Assessment in Science in Middle Stage'** for Kendriya Vidyalaya Science Teachers, Zonal Institute of Education and Training, Kendriya Vidyalaya Sangathan, Bhubaneswar. 08 Aug 2024.
- Invited Talk: **Inquiry Based Learning on 'Barr Body and Dosage Compensation'**, Workshop on **'Pedagogy and Assessment in Science in Middle Stage'** for Kendriya Vidyalaya Science Teachers, Zonal Institute of Education and Training, Kendriya Vidyalaya Sangathan, Bhubaneswar. 25 Sep 2024.
- Participated in the Vigyan Pratibha Resource Generation Camp at IISER Bhopal from 3rd to 7th October 2024 and presented a new idea on the topic 'Barr Body' for inclusion in a Vigyan Pratibha Learning Unit.

Dr. Harapriya Mohapatra

- Delivered talk on **"Bacterial membrane functions: More than check gates"**, 7th July 2024, IISER Berhampur, Bookworms Club.

Dr. Manjusha Dixit

- Faculty Development Program "Next Generation Molecular Diagnostics for Pathogens and Cancer Detection" MITS School of Biotechnology, Bhubaneswar. 27 March 2025.

Prof. Chidambaram Gunanathan

- **Sustainable Catalysis Enabled by Metal-Ligand Cooperation.** Delivered the Lecture on 21st Jan. 2025 at Teachers' Training program in Chemistry,

Department of Chemistry, ITER campus, SOA University, Bhubaneswar.

- **Ammonia and Its Importance to the Mankind.** Delivered the Lecture on 28th Nov. 2024 at UGC - Malaviya Mission Teacher Training Centre (UGC - MMTTC), Bharathidasan University, Tiruchirappalli.
- **Sustainable Catalysis.** Delivered the Lecture on 28th Nov. 2024 at UGC - Malaviya Mission Teacher Training Centre (UGC - MMTTC), Bharathidasan University, Tiruchirappalli.
- **Sustainable Catalysis Enabled by Metal-Ligand Cooperation.** Delivered the Lecture on 22nd Nov. 2024 in Journal of Chemical Sciences Outreach Program and Editorial Board Meeting -2024 during 21-23 Nov. 2024, Central Tribal University, Visakhapatnam.

Prof. Himansu Sekhar Biswal

- **Teaching Software:** We made a software called **"ViLEG"** (Virtual Laboratory Experiments for Graduates). The purpose of this software to demonstrate the rural students the experiments that use sophisticated instruments like fluorimeter, TCSPC, ES-MS and NMR spectrometer. Most of the colleges in Odisha don't have access these instruments. In the weekends and holidays we visited almost 15 remotely located colleges to demonstrate the use of the software.

Dr. Nagendra Kumar Sharma

- **Synthesis and Biochemical Evaluation of Unnatural Amino Acids and Nucleic acids**, Balabhadra Prasad PG seminar, Dept of Chemistry, Ravenshaw University, 10th April 2024.

Dr. Jayesh Mahendra Goyal

- Outreach Talk - Satellite Remote Sensing from Space, National Space Day, NISER, August 2024.

Dr. Surya Snata Rout

- Invited member to the brainstorming meeting for future Space Science Roadmap Formulation (SSRF) (SG5: Solar System Exploration (Includes Moon, Mars, Venus, Outer Solar System, Small bodies)).

Contributed to the discussion and formulation of the science goals and measurements required to achieve these science goals which will provide a direction to the development of instruments for space sciences for the Short- (till 2030), Mid- (2031-2035) and Long-term (2035-2045) goals. 22-23 April, 2024.

Prof. Brundaban Sahu

- Compact course on Algebra, Bhadrak Autonomous College, Bhadrak. 27-29th September, 2024.
- Mathematics Problem Solving Camp, IIT Bhubaneswar. 14-16th October, 2024.
- Let us Solve: Workshop for Mathematics Problem Solving, MDC Nabarangpur. 24-25th January, 2025.
- Prime numbers and distribution, Seminar at Dhenkanal Autonomous College Dhenkanal. 15th February, 2025.
- Empowering minds through Mathematics: One day outreach and training camp for undergraduate students, Bhadrak Autonomous College, Bhadrak. 16th February, 2025.

Dr. Jaban Meher

- On solving polynomial equations, Berhampur University, Berhampur, Odisha. 28th September, 2024.

Dr. Rekha Biswal

- Invited to interact with students of Jawahar Navodaya Vidyalaya, Puri for the activity of role model interaction and career counselling under Vigyan Jyoti programme on 20.07.2024.
- Invited to give a webinar talk to the students of Jawahar Navodaya Vidyalaya, Khurai Sagar in order to inspire them to pursue a career in science on 27.02.2025.

Dr. Sudhir Kumar Pujahari

- Legacy of Ramanujan, Pranatha college, Khurdha. 22nd December, 2024.
- Legacy of Ramanujan, Srikrushna Chandra Gajapati University. 23rd December, 2024.

Prof. Bedangadas Mohanty

- TEDx Talk at IISER Berhampur on Perfect Fluid on 15th September 2024.
- Indian representative at International Particle

Physics Outreach Group (IPPOG).

- Chair of the Outreach Board, ALICE experiment at CERN, Geneva, Switzerland.
- Talk on Artificial intelligence and its impact at AICTE Sponsored Three Days Seminar Under AICTE-VAANI On Advance Computing (NSAACS-2024), 25-27th July, 2024
- Invited to be Chief Guest and deliver a keynote talk on Indian Space sciences for the National Space Day Celebration in Ravenshaw University on 23-08-2024.
- Outreach talk at Bhima Bhoi College Rairakhol, Odisha on Our Universe and its basic building blocks, 21st September 2024.
- Invited to deliver a lecture Preparation of Winning Grant Research proposals in the DST Sponsored Workshop during December 14-15, 2024 in Berhampur University.
- Invited as Chief guest and keynote speaker of Xavier's Kedar Gouri School, Bhubaneswar annual day celebrations on 20th December 2024.
- Invited talk on Science relevance to the society and the journey, Alumni association Utkal University, Vani Vihar, Bhubaneswar, Odisha, 31st January 2025.

Prof. Sanjay Kumar Swain

- "Understanding the Universe", Maharshi College, Bhubaneswar. 6th Sept, 2024.

Prof. Subhankar Bedanta

- Interaction with students on National Science day (2025) at NM institute of engineering and technology (NMIET), Bhubaneswar.
- Outreach activity for M.Sc. students of C.V. Raman global university Bhubaneswar.
- Chief guest at Future Bhubaneswar School, Patia.
- Outreach activity for students from DAV Pokhariput, Bhubaneswar.
- Chief guest at PM Shri Jawahar Navodaya Vidyalaya, Raipur.
- Presented a talk on "Quantum Technology for space science" at the camp at IIT Bhubaneswar for school students.
- Presented a talk for the summer students at NISER Bhubaneswar.

Dr. Nishikanta Khandai

- High-redshift Galaxies, Talk for School Children on National Space Day, 23 August 2024.

Dr. Pratap Kumar Sahoo

- Periodic nanostructures for photonic and biosensing applications, Popular Science Lecture, ISCA BBSR Chapter, KIIT Deemed University, Bhubaneswar. 15th Sept 2024.
- Fano Interference Effect in TiO₂ Nanorods, UGC HRDC Sambalpur University Lectures, Malaviya Mission Teacher Training Centre (MMTTC), Sambalpur University, Jyoti Vihar- 768019 (Odisha), 26th Sept. 2024.

Dr. Tapan Mishra

- Visited Kendrapara College for a seminar for undergraduate students and interaction.
- Visited Anandapur College for a seminar on the occasion of National Science Day.
- Visited Odisha Adarsha Bidyalaya, Biridi Block, Jagatsinghpur for participation in science fair.

Dr. Saralasrita Mohanty

Delivered an invited talk on “**Quantum Computing for Everyone: Learn the Fundamentals in a Day**” during the NSAACS-2024 event, held from 25th-27th July 2024. This talk was part of the AICTE-VAANI initiative, aimed at introducing the fundamentals of quantum computing to a broad audience.

OUTREACH CELL ACTIVITIES

Science outreach is a vital part of the mission of many research and educational institutes. It involves engaging the public, especially students, educators, and community members, with scientific knowledge and research developments. This outreach raises awareness and appreciation of science and fosters a scientific culture encouraging curiosity, critical thinking, and innovation. The Outreach Cell at NISER is a vibrant entity that promotes awareness about science education and research possibilities and prospects across diverse socio-economic groups. With a special emphasis on students—the future torchbearers of India—the cell strives to inspire and guide them toward careers in STEM, while nurturing their scientific inquisitiveness and capabilities. The program is dedicated to bringing science closer to people from all walks of life. Through a wide range of initiatives, the program ensures that scientific knowledge is more inclusive and widely accessible, so that it helps cultivate a society that values discovery, embraces innovation, and stays actively involved in the progress of science. Through engaging tools such as hands-on experiments, workshops, demonstrations, and direct interactions with scientists and researchers, the outreach initiatives broaden students’ perspectives on scientific advancements beyond classroom lessons. Additionally, these activities help strengthen relationships between NISER and educational institutions across Odisha, fostering collaboration and mutual support in academic pursuits.



Distinguished faculty members from various schools at NISER have been pivotal contributors to the success of these Outreach programs. Notable individuals in this dedicated cohort 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, SCoS; Dr. Anupam Pal Choudhury, Reader-F, SMS; Dr. Jayesh Mahendra Goyal, Reader - F, SEPS; and Dr. Satyaprasad P. Senanayak, Reader-F, SPS.

Academic year 2024-25 was an eventful year, which witnessed the successful execution of several outreach events throughout the year. The main initiatives taken by NISER Outreach Cell in FY 2024-25 are as follows:

Outreach activity	Number
Educational visit to NISER	16
Popular Talks and Events	02
Students Internship	01
Outreach Teachers Training Workshop	01
Open Day	01
School visit to remote areas	01
Other events (Outreach event with The Academy Trust, National Science Day 2025 celebration, Teachers' training at ZIET Bhubaneswar etc.)	08
TOTAL	30

EDUCATIONAL VISIT TO NISER

Venturing beyond the classroom can have a transformative impact on students' learning experiences. Organizing educational visits to research institutes gives students a unique opportunity to immerse themselves in a leading-edge scientific environment. With this aim, the NISER Outreach Cell regularly hosts educational visits for school, college, and university students across Odisha. These visits, held year-round (typically on Fridays with prior arrangement), introduce students to the cutting-edge research facilities, fostering curiosity and interest in science careers. The visits generally begin with an orientation by **Dr. Debasmitta P. Alone**, who introduces NISER's facilities, departments, courses, and admission, along with basic biological science concepts. Students then explore various schools of their choice, where live demonstrations and concept briefings by scientific officers simplify complex topics and spark research interest. Students' feedback collected at the end helps improve and refine future visits.

In the academic year 2024-25, NISER Outreach, with support from different departments and centres such as SBS, SPS, SCS and CIS, successfully organized 16 educational visits benefitting 800 students and 76 teachers from 20 different schools and colleges

including PM Shri KV Khurda Road; Saraswati Vidya Mandir, Keshavdham, Cuttack; Apeejay School Bhubaneswar, Sophitorium Institute of Technology and Life Skills; Ghanshyam Hemalata Vidya Mandir Puri-2; Vikash Residential School; JNV Angul; OAV Sandhapur; OAV Sialia; Pranath Higher Secondary School, Khordha; Jatni Higher Secondary School; JNV Khurda; JNV Mundali; JNV Jajpur; DPS Paradeep Refinery; AECS OSCOM; OAV Kaudukol; PM Shri KV No. 2 Bhubaneswar; PM Shri KV No. 5 Bhubaneswar and Indira Gandhi Institute of Technology.

The scientific officers who were engaged in these year-round educational visits are Dr. Shyamasree Ghosh and Dr. Chandramohan Bathrachalam from SBS; Dr. Arun Kumar and Dr. Priyanka Pandey from SCS; Dr. Sudakshina Prusty, Dr. Saralasrita Mohanty, and Dr. Santosh Babu Gunda from SPS. Some faculty members, including Dr. Ajaya Kumar Nayak, Dr. Kartikeswar Senapati, and Dr. Pratap Sahoo, volunteered in a special educational visit to SPS curated for the Indira Gandhi Institute of Technology. The CIS visits were coordinated with support from Prof. Subhankar Bedanta, Chief Coordinator, CIS; Dr. Tapas Ghosh, Scientific Assistant-C, CIS; and other CIS staff.



OUTREACH POPULAR TALKS



NISER organizes popular science talks by distinguished scientists from across the country, targeting students from **grades 9 to 12** and **undergraduates**. These talks cover contemporary research topics in simplified language, often with engaging demonstrations, making science accessible and exciting. Each session includes an interactive Q&A, allowing students to interact directly with the experts and explore topics further. These events broaden students' understanding, fuel curiosity, and inspire a deeper interest in science and technology.

In the academic year 2024-25, two popular talks were organized by the Outreach cell.

The **first popular talk** was delivered by **Prof. Ashok Kumar Ganguli**, Director, IISER Berhampur. In his talk titled '**Gifts of Science to Society**', the speaker discussed scientific innovations that have made everyday life significantly easier and brought advancements in health, transportation, and other sectors. The event witnessed around 750 participants, including students from Jatni Higher Secondary School, Pranath Higher Secondary School, JNV Khurda, JNV Angul, BJB Higher Secondary School, Sophitorium Institute of Technology and Life Skills, along with KV and AECS Teachers.

The **second popular talk** event, '**Chemistry is Fun!**'

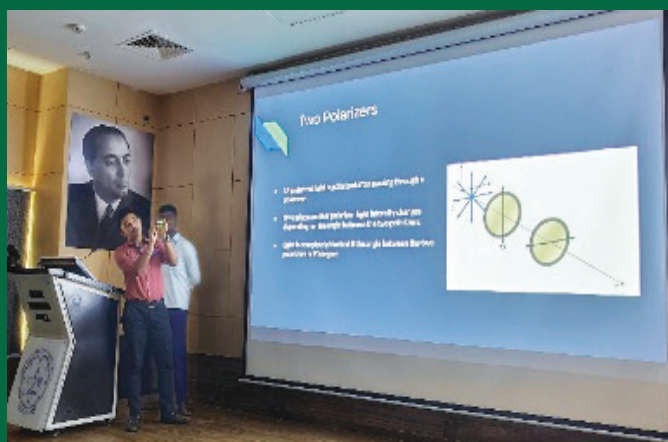
was organized on 28th March, 2025, featuring some captivating experimental demonstrations and talk based on chemistry, performed by eminent scientists **Prof. Uday Maitra** from IISc, Bengaluru, and **Prof. Samita Maitra** from BMS College of Engineering, Bengaluru. Around 650 students and teachers from 9 schools and colleges across Odisha attended the event. The participating institutions are: OAV Sandhapur, OAV Sialia, JNV Khurda, PM Shri KV Khurda Road, Jatni College, Rajdhani College Bhubaneswar, Carmel English Medium School, Dhenkanal Autonomous College, and DAV Public School Chandrasekharapur. Around 50 students, staff, and faculty from NISER also joined this event, making it a vibrant scientific gathering.

STUDENTS' INTERNSHIP

The NISER Outreach program has pioneered a transformative 15-day internship tailored for students in **grades 11th to 12th**. This programme offers school students a unique opportunity to work alongside researchers. During the internship, students engage in ongoing scientific experiments, develop new skills, and experience the rigors of scientific inquiry. They are mentored by faculty members who provide guidance on scientific concepts and experimental techniques. This exposure to real-world research helps students develop a deep understanding of scientific processes, preparing them for careers in research and innovation. On the last

day of the program, the students are also given a chance to present what they have learned from the internship, which enables them to have a first-hand idea about science communication.

In 2024-25, **32 students** from four reputed schools: BJB Higher Secondary School, Jatni Higher Secondary School, Pranath Higher Secondary School, and Maharishi College of Natural Law participated in the internship program. A total of **18 faculty members** from six different schools: SBS, SCS, SCoS, SEPS, SMS and SPS volunteered for this internship program.



TEACHERS'-TRAINING WORKSHOP



Recognizing the importance of effective science education at the grassroots level, NISER organizes workshops for maths and science teachers. These workshops equip teachers with the advanced pedagogical tools, teaching strategies, and updates on recent scientific advancements. By providing teachers with new resources and hands-on training in scientific experiments, NISER empowers them to create a more engaging learning environment in their classrooms. The workshops cover various topics, such as experimental design, inquiry-based learning, and technology integration in science education, enhancing teachers' ability to effectively inspire and educate their students.

In the 2024-25 academic year, **one outreach teachers'**



training workshop was organized for 51 OAV teachers across 21 districts of Odisha. It was a three-day workshop from 8th April to 10th April, 2024. The teachers were trained with hands-on experiments and mathematical derivations. The sessions were taken by NISER faculty members and scientific officer including Dr. Anupam Pal Choudhury, Dr. Chandra Shekhar Purohit, Dr. Chitrabhanu Chaudhuri, Dr. Debasmita P. Alone, Dr. G. Santosh Babu, Dr. Jaban Meher, and Dr. Krishanu Dan as well as resource person from other institutes such as Dr. Priyoneel Basu from Kalinga Institute of Social Sciences, Dr. Jyothi Ranjan Tripathy from Odisha Primary Teacher Research and Training Institute, Prof. Pradeep Kumar Burma from University of Delhi, and Dr. Subhash Bhaskaran from IISER Tirupati.

NISER OPEN DAY

NISER's Open Day is an annual event where the institute opens its doors to school students and teachers to attend scientific demonstrations, developed by NISER students and researchers, and insightful faculty talks. The event showcases the breadth of scientific research at NISER, with interactive displays, demonstrations, and exhibitions highlighting research in physics, biology, chemistry, mathematics, and other fields. The Open Day helps foster a sense of wonder and excitement about science among attendees, especially young students, by giving them direct exposure to the exciting scientific experiments.

Open Day 2024 welcomed over 550 students and teachers from eight schools: PM Shri KV Khurda Road,

PM Shri KV No. 1 Bhubaneswar, PM Shri KV No. 1 Cuttack, PM Shri KV Puri, PM Shri JNV Mundali, Apeejay School Bhubaneswar, Carmel English Medium School, and Cohen International School. The event featured an opening motivational speech by the Director, NISER, followed by two faculty talks on '**Science behind the Nobel prizes: Machine learning**' by **Dr. Subhankar Mishra**, and '**Science in a tiny fraction of a second**' by **Dr. Kush Saha**. Next, the Coding Club and the Robotics Club captivated the students with demonstration sessions. The participants got engaged with parallel sessions of scientific demonstrations performed by student volunteers from 4 schools: SBS, SCS, SMS, and SPS.



SCHOOL VISIT TO REMOTE AREAS

This academic year, the NISER Outreach Cell has extended its efforts to rural Odisha, aiming to enhance science education in underserved areas. Through visits to rural schools and interactive outreach sessions, the initiative sparks curiosity and promotes scientific thinking among students. Through scientific demonstrations and interactions, it encourages critical thinking and inspires rural youth to explore careers in research. These efforts are vital in bridging educational gaps and fostering inclusive growth in science across socio-economic backgrounds.

This initiative kicked off with the first visit to **Balipatpur**

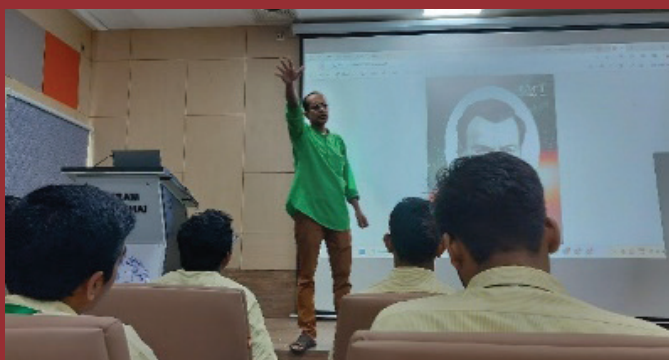
Refugee Government High School on 18th July 2024. The event was curated for around 200 school students in **Class 9 and Class 10**. Faculty members, including **Dr. Anupam Pal Choudhury** from SMS, **Dr. Debasmitta P. Alone** from SBS, **Dr. Kartikeswar Senapati** from SPS, **Dr. Pankaj V. Alone** from SBS, **Dr. Subhankar Mishra** from SCoS, and **Dr. U. Lourderaj** from SCS, conducted interactive sessions on scientific demonstrations for the students. Prof. Hirendra Nath Ghosh, Director, NISER, addressed all the participants and inspired them towards pursuing a career in science education and research.



OUTREACH EVENT WITH THE ACADEMY TRUST

NISER Outreach Cell, in collaboration with The Academy Trust, organized an outreach event on 8th November 2024 on the occasion of the 90th Annual Meeting of the Indian Academy of Sciences. This event witnessed the participation of 87 students and 5 teachers from five different schools: OAV Sandhapur, OAV Sialia, Pranath Higher Secondary School, Khordha, Jatni Higher Secondary School, and JNV Khurda. The event featured several engaging sessions, including an interaction session with **Mr. Subhankar Biswas**, Executive Secretary, The Academy Trust,

Indian Academy of Sciences, and **Dr. Debasmitta P. Alone**; one talk and interaction session with eminent scientist **Prof. K. Sankara Rao**, IISc who delivered a captivating talk on “**Plants, Landscapes and Information Portals**” and another interaction session on astronomy: ‘**Vijnana Harate**’ with **Prof. Ranganath R. Navalgund**. The students were also taken to laboratories for an educational visit where they were given demonstrations on different scientific experiments and advanced instrumentation.



NATIONAL SCIENCE DAY CELEBRATION

National Science Day is observed annually on 28 February to commemorate the discovery of the Raman Effect by Nobel Laureate Dr C. V. Raman in 1930, a landmark contribution to the understanding of light scattering. The 2025 theme was “Empowering Indian Youth for Global Leadership in Science and Innovation for VIKSIT Bharat.”

At NISER, the occasion was celebrated with the participation of 608 Class IX students and 30 teachers from 204 government secondary schools in Jajpur district, along with the District Education

Officer. The event featured three faculty talks and live demonstrations aimed at inspiring young learners to engage with science and innovation. The event started with a welcome address by the Director, NISER, who emphasized the significance of National Science Day in his inspiring speech and highlighted Dr. C.V. Raman’s groundbreaking contributions. The welcome address was followed by a talk & demonstration session by **Dr. Kartikeswar Senapati** on different topics of Physics, such as longitudinal and transverse waves, diffraction of light, etc. Other two faculty talks included a talk by **Dr. Chandra Shekhar Purohit**, who highlighted several

fascinating innovations that showcase the application of both basic and advanced chemistry in everyday life and another talk by **Dr. Debasmita P. Alone**, who explored into the profound mystery of life: the intricate process of

an organism's development from a single cell. The event ended with an engaging Q&A session and interaction with the speakers.



SUPPORT FOR THE TEACHERS' TRAINING AT ZIET BHUBANESWAR

In FY 2024-25, NISER Outreach cell continued its journey of empowering school educators beyond the institute campus. The Outreach cell supported teachers' training programs at ZIET Bhubaneswar, which were designed for the KV teachers of Odisha and other states in the eastern zone. Faculty and scientific officers from NISER visited ZIET Bhubaneswar four times as resource persons and conducted training sessions on inquiry- and activity-based learning for the teachers. Of these four sessions, two sessions on biology were taken by **Dr. Debasmita P. Alone**, one on chemistry was taken by **Dr. U. Lourderaj**, and **Dr. G Santosh Babu** took one session on physics. Around 40 teachers attended each of these four training sessions.

Support for DAE CV Raman Lecture and Support for National Space Day celebration:

NISER Outreach program provided financial support to the DAE CV Raman Lecture held on 10th May 2024, featuring a captivating lecture on 'Atoms in the Service of the Nation' by Prof. Ajit Kumar Mohanty, Chairman of the Atomic Energy Commission and Secretary of DAE. On the other hand, National Space Day was celebrated on 23rd August 2024. On the occasion of National Space Day, NISER inaugurated the *KALPANA* Observatory, a state-of-the-art Roll-Off-Roof facility honoring Kalpana Chawla. Spearheaded by the NISER Astronomy Club, *KALPANA* features advanced telescopes including 'Paddy,' an 11" Schmidt-Cassegrain hybrid telescope, and 'Bhaskara,' an 8" reflecting Newtonian telescope and computing systems for deep-sky observation and astrophotography. The event also included engaging lectures, a space quiz, and expert panel discussions, marking a significant leap in the journey to explore and share the wonders of the universe.



VIGYAN PRATIBHA INITIATIVE AT NISER

Vigyan Pratibha is a forward-thinking initiative launched by the Department of Atomic Energy, Government of India, to transform science education at the school level by promoting a dynamic, constructivist, and collaborative approach to learning. Spearheaded by HBCSE, this program is implemented at NISER for the states of Odisha, Chhattisgarh, and Andhra Pradesh in collaboration with IOP, Bhubaneswar.

Targeting students of Classes 8 and 9 from Kendriya Vidyalayas (KVs), Jawahar Navodaya Vidyalayas (JNVs), and Atomic Energy Central Schools (AECS), Vigyan Pratibha focuses on enriching their scientific understanding through experiential learning. At the heart of the initiative are 'Learning Units'—innovative activity modules thoughtfully aligned with the NCERT curriculum and designed to foster conceptual clarity, critical thinking, and scientific curiosity, as well as build proper aptitude for science and mathematics.

A key component of the program involves capacity-building for educators. Teachers from KVs, JNVs, and AECS participate in intensive training workshops, equipping them with the necessary pedagogical tools and hands-on experience to effectively implement these

modules in their classrooms. In addition to workshops, the program also emphasizes in-school support through follow-up visits. These visits ensure the effective implementation of learning units and provide real-time guidance to educators. This project also organizes resource generation camps for the Vigyan Pratibha staff and coordinators across different regional centres, as well as external resource persons, subject matter experts, academicians, members from KVS, NVS & AEES to delve into discussions related to modification of existing learning units and generation of ideas for new learning units.

Through this model of collaborative initiative involving scientists, educators, and teachers, Vigyan Pratibha is redefining how science is taught and learned in schools. By encouraging active participation and inquiry-based learning, the initiative strengthens students' aptitude in science and mathematics and nurtures a lifelong appreciation for scientific thinking.

In the academic year 2024-25, the Vigyan Pratibha initiative at NISER conducted and participated in the following activities:

Vigyan Pratibha activity	Number
Vigyan Pratibha Teachers' Training Workshop	02
Vigyan Pratibha School Visit	15
Participation in Resource Generation Camp	01

VIGYAN PRATIBHA TEACHERS' TRAINING WORKSHOP

Vigyan Pratibha Teachers' Training Workshops are organized biannually, which serve as immersive, hands-on training experiences, equipping educators with innovative pedagogical strategies rooted in activity-based learning. During the first workshop, participants get a detailed orientation on the Vigyan Pratibha initiative and engage deeply with learning units emphasizing active student participation and conceptual clarity. Teachers are trained with the concept of the respective LUs and in creating interactive, inquiry-based classrooms where students explore scientific concepts through experimentation and discussion.

A unique and impactful feature of the Vigyan Pratibha program is its continuity. The second workshop is a follow-up of the first one, engaging the same group of teachers. During this workshop, they are introduced to

a new set of learning units. More importantly, educators share their experiences, highlighting successes, innovations, and challenges they encountered while implementing the modules in real classrooms. This exchange not only helps refine the modules and teaching methods but also builds a collaborative network of educators committed to excellence in science education.

In the academic year 2024-25, the 1st teachers' training workshop was organized on 1st-5th April 2024, engaging 71 Teachers from KV, JNV, and AECS across Odisha, Chhattisgarh, and Andhra Pradesh. The teachers were divided into science and math groups, and each group was trained with 7 Learning Units. Inclusion of an insightful plenary talk, visit to the CIS facility, and the Regional Science Centre, Bhubaneswar, made



this workshop even more enriching. The following 2nd Teachers' training workshop was organized on 17th – 20th September 2024, with 51 teachers from KV and AECS teachers of Odisha, Chhattisgarh, and Andhra Pradesh. This workshop featured new sets of learning units, skill development sessions, Teaching Learning Lab sessions, Teachers' presentation sessions, etc.

The involved resource persons for these two workshops included faculty from NISER, such as Dr. Anupam Pal

Choudhury, Dr. Debasmita P. Alone, Dr. G Santosh Babu, Dr. Pankaj V. Alone, Dr. Subhankar Mishra, and Dr. U. Lourderaj and external resource persons, including Prof. Ajit Srivastava, IOP; Dr. Amrit Krishna Mitra, Govt. General Degree College, Singur; Dr. Anisa Chorwadwala, IISER Pune; Prof. Biju Raja Sekhar, IOP; Dr. Birendra Nath Das, Vivekananda College; Dr. Mainak Ghosh, ISI Bengaluru, Dr. Mukul Mhaskey, HBCSE, and Dr. Shikha Takker, Mahindra University, Hyderabad.

VIGYAN PRATIBHA SCHOOL VISIT AND LEARNING UNITS CONDUCTED IN SCHOOLS

The ripple effect of Vigyan Pratibha extends far beyond the workshops. By continuously refining pedagogical skills and embracing innovative teaching methods, the empowered educators play a critical role in cultivating scientific literacy and a spirit of inquiry in their students. Following the training, educators return to their respective schools and begin implementing these Learning Units, thus translating theory into practice and fostering an engaging learning environment for students. The Vigyan Pratibha team at NISER collaborates closely with school teachers to implement the designed learning units directly within classroom settings. As part of this

initiative, team members conduct in-person visits to individual schools, working alongside teachers to bring engaging, hands-on science activities to students. These classroom sessions begin with a thorough introduction to the learning modules, helping students understand the goals and structure of the units. Following this, the teachers jointly guide students through a series of interactive tasks outlined in each module.

Students are encouraged to participate actively in these activities—posing questions, discussing concepts with their peers, and tackling challenges collaboratively.

This participatory approach fosters a more profound and intuitive understanding of scientific ideas, moving beyond rote learning to a more experiential and inquiry-driven form of education. The sessions also serve as valuable opportunities for observing how students interpret scientific content and how teachers facilitate and adapt the material to suit their classroom dynamics. These insights are crucial in refining both the pedagogical strategies and the development of future learning modules.



In the academic year 2024-25, a total of 15 school visits were conducted to the following schools: AECS OSCOM, JNV Angul, JNV Narayanpur, JNV Kondagaon, JNV Kurud (Dhamtari), KV No 2, Angul, KV Kendrapara, JNV Jagatsinghpur, JNV Sambalpur, JNV Boudh, JNV Nuapada, JNV Balrampur, JNV Bijapur, PM Shri JNV Champa, and PM Shri JNV Mayurbhanj. These 15 school visits benefited 567 students from the 8th and 9th grades.



PARTICIPATION IN RESOURCE GENERATION CAMP

The Vigyan Pratibha Team, along with a few faculty and scientific officers, including **Dr. Debasmitta P. Alone**, **Dr. G. Santosh Babu**, **Dr. Pankaj V. Alone**, and **Dr. U. Lourderaj** visited IISER Bhopal on 3rd October – 7th October to join the Resource Generation Camp. The camp served as a platform for participants to share their experiences from school visits, emphasizing the creativity, ingenuity, and active involvement of students observed during these sessions. Key discussions revolved around effective resource management, using native languages in teaching, peer-led learning methods, and inventive strategies for implementing the learning units. Participants engaged in collaborative brainstorming to generate fresh ideas, refine existing learning units, and plan future activities such as workshops, cluster meetings, teacher contributions,

and fellowship programs. Overall, the camp promoted a spirit of collaboration and forward-thinking, laying the groundwork for more impactful and well-coordinated efforts within the Vigyan Pratibha initiative.

Overall, through its Outreach Program and the Vigyan Pratibha initiative, NISER has made significant contributions to science education beyond its campus boundaries. By engaging with school teachers, students, and local communities, NISER's outreach efforts not only support the development of critical thinking and problem-solving skills among young learners but also strengthen the broader educational ecosystem. These sustained initiatives reflect NISER's commitment to nurturing a scientifically literate and inspired society.

Institutional Facilities



Institutional Facilities

NEW CAMPUS INFRASTRUCTURE

Academic Block Extension: Computer Sciences

As part of its continued efforts to enhance academic infrastructure, NISER has commenced the construction of the School of Computer Sciences building, which will serve as an extension of the existing School of Mathematical Sciences. The new G+3 structure is designed to match the architectural layout of the SMS building and will include modern classrooms, seminar rooms, advanced laboratories, and server rooms. This expansion aims to accommodate the growing academic and research needs of the newly established School of Computer Sciences.



Class 1000 Cleanroom for Medical and Radiation Physics Research in CMRP

A state-of-the-art Class 1000 cleanroom facility has been established at the Centre for Medical and Radiation Physics (CMRP) to support advanced research in medical and radiation physics. This specialized infrastructure provides a highly controlled environment that minimizes contaminants such as dust, airborne microbes, and aerosol particles, ensuring optimal conditions for precision-driven scientific experiments.

The cleanroom is designed to support the development and testing of sensitive products including electronic components, pharmaceuticals, and medical devices. This addition significantly strengthens CMRP's capabilities in conducting high-end research requiring stringent environmental control.



National Centre for Animal Research and Experimentation (NCARE) Chiller Work (ONGOING)

The National Centre for Animal Research and Experimentation (NCARE) is a state-of-the-art facility for pre-clinical research in India. It was established to meet the growing demand for animal models in biomedical research, particularly in the pharmaceutical and biotechnology industries. An HVAC chiller is a key component in large cooling systems, working by removing heat from a liquid (usually water) and circulating it to cool a building or space. In a cleanroom, an HVAC chiller system plays a crucial role in maintaining precise temperature and humidity levels, while also controlling airflow and air quality. This is achieved by using a chilled-water system to cool air, which is then circulated through the cleanroom to maintain the required environmental conditions.



HEALTH CENTRE

The health center at NISER Bhubaneswar provides comprehensive primary healthcare to the institute's faculty, staff, and their eligible family members, as well as students, research fellows, and retired employees of the Department of Atomic Energy enrolled under the CHSS program at the Heavy Water Facility in Talcher. In addition to basic medical care, the center offers health promotion activities such as health education, periodic and pre-employment health checkups, vaccinations, and dietary advice. The health center is currently staffed by four doctors, five nurses, one physiotherapist, one radiographer, one medical laboratory technician, and one pharmacist. A part-time pediatrician also visits the center once a week to provide consultations for pediatric patients.

The Health Centre continues to provide comprehensive healthcare services through a wide array of facilities catering to the needs of patients. Key services include regular OPD consultations, laboratory investigations, X-ray, ultrasound for obstetrics and gynaecology, ECG, and physiotherapy support. In addition, the centre is equipped with a minor OT and dressing room, an emergency ward for urgent care, pulmonary function testing for respiratory assessments, and an in-house pharmacy ensuring timely access to prescribed medications. These facilities collectively contribute to delivering effective and holistic medical care to the community.

Health centre in NISER, Bhubaneswar has been established to provide health care facility to the Institute faculties and staffs and their dependent

entitled family members, students, research fellows and retired employees of DAE enrolled under the CHSS of Heavy Water Facility Talcher. The Health Centre aims at providing comprehensive primary health care. Apart from basic health care it also provides health promotional activities like health education, periodical and pre-employment health check-up, vaccination and dietary advices. The Health Centre at present is staffed by four doctors, five staff nurses, one physiotherapist, one radiographer, one medical laboratory technician and one pharmacist. One-part time visiting paediatrician is also available once in a week for providing consultation to paediatric patients.

OPD patients	15440
Laboratory Investigations	7782
Physiotherapy	3259
Paediatric Patient	1274
Diabetes	612
X Ray	553
Hypertension	466
Antenatal Check up	123
Inpatient	76



Administration

Administration

NEW APPOINTMENTS

The organization welcomed the following new members during the past year:

Scientific and Technical Staff

Dr. Divya Undrakonda	Scientific Officer – C, Health Centre
Dr. Malaya Kumar Sahoo	Scientific Assistant – C, School of Chemical Sciences
Dr. Ravi Ketavath	Scientific Assistant – C, School of Chemical Sciences
Shri Alok Ranjan Swain	Scientific Assistant – C, School of Physical Sciences
Dr. Tapas Ghosh	Scientific Assistant – C, Centre for Interdisciplinary Science
Dr. Akhandal Sahoo	Scientific Assistant – C, School of Earth & Planetary Sciences
Mr. Vishalkumar Uttamrao Jadhav	Scientific Assistant – C, School of Biological Sciences
Mrs. Manorama Parida	Scientific Assistant – B, School of Computer Sciences
Mr. Jitendra Kumar	Scientific Assistant – B, School of Physical Sciences
Shri. Devi Prasad Vaddi	Scientific Assistant – B, Institute Works Department
Ms. Neeru Meena	Technician – B, School of Biological Sciences
Shri Rajesh Kumar Samal	Technician – B, School of Chemical Sciences

RETIREMENTS

The following staff members retired upon superannuation during the year:

Mr. Deepak Srivastava	Retired on November 30, 2024
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EMPLOYEE DATA (AS ON 31.03.2025)

Faculty	Scientific and Technical Staff	Administrative Staff	Total
111	101	42	254

EMPLOYEE DATA ON SC, ST, OBC AND PWD (AS ON 31.03.2025)

	SC	ST	OBC	PWD
Academic	01	NIL	14	NIL
Non-Academic	16	11	27	01

RIGHT TO INFORMATION ACT DATA

Under the Right to Information Act 2005, 76 RTI applications and 8 Appeals were received during the period of April 1st 2024 to March 31st 2025 and were responded to.

Information provided for RTI Request

RTI Request (s) disposed of	Within 30 days	After 30 days
76	76	NIL

Information provided for RTI Appeals

RTI Appeal (s) disposed of	Within 30 days	After 30 days
8	8	NIL

Annexures



Annexures

Management

Academic Council

Chairman

Prof. Hirendra Nath Ghosh,
Director, NISER Bhubaneswar (Ex-officio)

Members

Prof. A Srinivasan,
SCS, NISER

Prof. Bedangadas Mohanty,
SPS, NISER

Prof. Sanjay Swain,
SPS, NISER

Prof. Palok Aich,
SBS, NISER

Prof. Subhankar Bedanta,
SPS, NISER

Prof. Chandan Goswami,
SBS, NISER

Prof. Chidambaram Gunanathan,
SCS, NISER

Prof. Himansu Sekhar Biswal,
SCS, NISER

Prof. Jogendra Nath Behera,
SCS, NISER

Prof. Moloy Sarkar,
SCS, NISER

Prof. Prasenjit Mal,
SCS, NISER

Prof. Sanjib Kar,
SCS, NISER

Prof. Sudip Barman,
SCS, NISER

Prof. Brundaban Sahu,
SMS, NISER

Dr. Pankaj V. Alone,
Chairperson, SBS, NISER

Dr. Sharanappa Nembenna,
Chairperson, SCS, NISER

Dr. Aritra Banik,
Chairperson, SCoS, NISER

Dr. Liton Majumdar,
Chairperson, SEPS, NISER

Dr. Pranaya Kumar Swain,
Chairperson, SHSS, NISER

Prof. Brundaban Sahoo,
Chairperson, SMS, NISER

Dr. A V Anil Kumar,
Chairperson, SPS, NISER

Dr. Rooplekha Khuntia,
Chairperson, UGCI, NISER

Dr. Pratap Kumar Sahoo,
Chairperson, PGCI, NISER

Dr. Praful Singru,
Chairperson, Library advisory committee, NISER

Prof. U. Kamachi Mudali,
Vice Chancellor, HBNI, Mumbai

Prof. L S Shashidhara,
Director, NCBS, Bangalore

Prof. Prabal Maiti,
IISc, Bangalore

Prof. Swadhin Mandal,
IISER Kolkata

Prof. Gadadhar Mishra,
ISI Bangalore

Prof. Madhaban Mukund,
Director, Chennai Mathematical Institute

Prof. Nibir Mandal,
Jadavpur University, Kolkata

Prof. Pravakar Sahoo,
Institute of Economic Growth, New Delhi & Programme Director, NITI Aayog

Members-Secretary

Dr. Pranaya Kumar Swain, *Dean, Academic Affairs*

Institute Level Council

Chairman

Prof. Hirendra Nath Ghosh,
Director, NISER Bhubaneswar

Members

Prof. A. Srinivasan,
Dean, Faculty Affairs

Dr. Pankaj V Alone,
Chairperson, SBS

Dr. Aritra Banik,
Chairperson, SCoS

Prof. Palok Aich,
Dean, Research & Development

Dr. Sharanappa Nembenna,
Chairperson, SCS

Dr. Liton Majumdar,
Chairperson, SEPS

Dr. Pranaya Kumar Swain,
Dean, Academic Affairs

Prof. Brundaban Sahoo,
Chairperson, SMS

Dr. Abhaya Kumar Naik,
Registrar

Dr. Ashok Kumar Mohapatra,
Dean, Student Affairs

Dr. A V Anil Kumar,
Chairperson, SPS

Prof. Bedangadas Mohanty,
Professor-In-Charge, CMRP

Dr. Pranaya Kumar Swain,
Chairperson, SHSS

Finance Committee

Chairman

Prof. Hirendra Nath Ghosh,
Director, NISER Bhubaneswar

Members

Joint Secretary (R&D), *Dept. of Atomic Energy*

Joint Secretary (Finance), *Dept. of Atomic Energy*

Member (Invitee), *Board of Governors*

Finance Officer, *NISER Bhubaneswar*

Building and Works Committee

Chairman

Prof. Hirendra Nath Ghosh, *Director, NISER Bhubaneswar*

Members

Director, *DCSEM (Ex-Officio)*

Director (Finance), *Dept. of Atomic Energy*

Mr. Hemant Kumar Mishra, *Head, Engg. Service Division, CSIR-IMMT*

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Academic Affairs

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Student Affairs

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Deputy Controller of Accounts

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Chairperson, SCoS

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Chairperson, SEPS

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Dr. Debasmita P Alone,
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PGCS Convener, SPS

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Dean/FIC, Academic Affairs

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Student Representative, SPS

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Physical Sciences

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Earth and Planetary Sciences

Dr. Anupam Pal Choudhury,
Mathematical Sciences

Dr. Kush Saha,
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Dr. Mohammed Saleem,
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Dr. Manoj Mishra,
Computer Sciences

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Ms. Namrata Chadha,
Ex-Member, SWC Odisha, Ext. Member

Dr. Kartikeswar Senapati

Dr. Rooplekha Khuntia

Dr. Sudakshina Prusty

Mr. Dhaneswar Nayak

Mrs. Apolina Lakra

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Debasmita Pankaj Alone, Associate Professor, PhD (BHU, Varanasi)

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Kishore CS Panigrahi, Associate Professor, PhD (TIFR, Mumbai)

Manjusha Dixit, Associate Professor, PhD (SGPGIMS, Lucknow)

Mohammed Saleem, Associate Professor, PhD (University of Münster, Germany)

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Praful Singru, Associate Professor, PhD (Nagpur University, India)

Ramanujam Srinivasan, Associate Professor, PhD (IISc, Bangalore)

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Subhasis Chattopadhyay, Associate Professor, PhD (IICB, West Bengal)

Tirumala Kumar Chowdary, Associate Professor, PhD (CCMB, Hyderabad)

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Subhankar Mishra, Reader – F, PhD (University of Florida)

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Liton Majumdar, Reader – F, PhD (University of Calcutta, Kolkata)
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Binod Kumar Sahoo, Associate Professor, PhD (ISI, Bangalore)
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VA Sakthivel, Technician-F

Debasis Das, Technician-D

Srikrushna Sahu, Technician-D

Susanta Kumar Parida, Technician-C

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Pradeep Kumar Mishra, Administrative Officer-II

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Rajeev Kumar Singh, Administrative Officer-II

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Dolananda Pradhan, Administrative Officer-I

Hiralal Das, Administrative Officer-I

Sanjaya Kumar Patro, Administrative Officer-I

Shabnam Khanum, Administrative Officer-I

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Bijay Kumar Behera, Assistant "A"

Biplab Kanungo, Assistant "A"

Bishnupriya Das, Assistant "A"

Chittaranjan Nayak, Assistant "A"

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Lopamudra Sahoo, Assistant "A"

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Sandeepa Sahoo, Assistant "A"

Smruti Kanungo, Assistant "A"

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Vijay Singh, Assistant "A"
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Banita Pradhan, Upper Division Clerk
Elina Das, Upper Division Clerk
Monalisa Baliarsingh, Upper Division Clerk
Nabin Kumar Sahoo, Upper Division Clerk

Ranjan Kumar Das, Upper Division Clerk
Sujit Kumar Bastia, Upper Division Clerk
Madhusudan Padhy, Office Assistant (Multi Skill)
Jogendra Jena, Operator (General Functions)
Sasmita Sahoo, Operator (General Functions)
Subrat Ranjan Hota, Operator (General Functions)
Tusar Kanta Sahoo, Operator (General Functions)



Convocation Degree Recipients

Doctoral Degree Awarded

(Integrated MSc- PhD Programme)

Recipient	Thesis title	Supervisor Name
Milan Patra	The Fluid-Membrane-Gravity Duality	Dr. Sayantani Bhattacharyya
Sourav Bhakta	Ion Beam-Induced Defect Phenomena in Rock-Salt Crystals (MgO, NiO) for Optical and Electronic Device Applications	Dr. Pratap Kumar Sahoo

(PhD Programme)

Recipient	Thesis title	Supervisor Name
Ajay Kumar Sharma	Assembly and dynamics of escherichia coli FtsZ mutants L68W and T127A and validation of FtsZ inhibitors using fission yeast as a heterologous host	Dr. Ramanujam Srinivasan
Alena Patnaik	Correlating light signaling and gigantea with auxin in patterning the root and shoot development in plants	Dr. Kishore CS Panigrahi
Bratati Mukherjee	Mechanistic Insights Towards Understanding FRG1 Mediated Regulation of Breast Tumorigenesis and Angiogenesis in Different Molecular Subtypes	Dr. Manjusha Dixit
Chandan Mahish	Role of TLR4 in Chikungunya virus (CHIKV) infection and associated altered cell mediated immune responses	Dr. Subhasis Chattopadhyay
Dhyanendra Singh	Impact of altered light-dark cycle on gut microbiota in mouse model	Prof. Palok Aich
Kapuganti Ramani Shyam	Genetic and epigenetic regulation of candidate genes associated with pseudoexfoliation	Dr. Debasmita P. Alone
Kundarapu Satyamurthy	Dengue Virus Non-structural Protein Complexes in Genome Replication: Structural and Functional Characterization	Dr. Tirumala K. Chowdary
Prakash Haloi	Development and characterization of a drug-loaded smart injectable hydrogel as a drug delivery system for the treatment of rheumatoid arthritis	Dr. V. Badireenath Konkimalla
Prerana Dash	Structure-function-dynamics of PanPL, a bacterial polysaccharide lyase from the PL-5 family	Dr. Rudresh Acharya
Ram Prasad Sahu	Importance of TRPV3 in the regulation of Sub-cellular organelles and their functions: Implications in health disorders	Prof. Chandan Goswami
Rojalin Pradhan	Cytoskeletal phenomena associated with novel lateral e-cadherin junctions during organ degeneration in the respiratory system of drosophila melanogaster	Dr. Ranjit Mathew Co-Guide- Dr. Praful Singru
Saptarsi Mitra	Neuropeptidergic regulation of the dopaminergic pathways in the brain	Dr. Praful Singru
Sohini Mukhopadhyay	Role of intestinal microbiota on exogenously induced colitis and associated physiological changes: a comparative analysis of DSS and antibiotic treatment	Prof. Palok Aich
Tusar Kanta Acharya	Elucidating the involvement of thermosensitive ion channels (TRPV4 and TRPM8) in mitochondrial structure-function relationship: Significance in physiology and diseases	Prof. Chandan Goswami
Uday Pandey	Gut microbial regulation of intestinal epithelial development in mice and organoid models : a postnatal temporal study	Prof. Palok Aich
Vinay J	Genetic predisposition and molecular mechanistic studies of matrix metalloproteinases in gallbladder carcinogenesis	Dr. Manjusha Dixit
Abhisek Padhy	Metal phosphate and oxide based electroactive material for energy conversion and storage application	Prof. Jogendra Nath Behera
Amit Akhuli	Understanding the interactions of luminescent coinage metal nanoclusters with target analytes using various spectroscopic and microscopic techniques	Prof. Moloy Sarkar

Recipient	Thesis title	Supervisor Name
Amita Mahapatra	Understanding the intermolecular interaction and structural organization in some imidazolium and pyrrolidinium-based ionic liquids : implications in biological and electrochemical applications	Prof. Moloy Sarkar
Anweshha Bhattacharya	Selective C–N, C–S & C–C bond formation of substituted thioamides & nitriles	Dr. S Peruncheralathan
Ashis Mathuri	Sustainable Approaches in the Synthesis of Organosulfur Compounds	Prof. Prasenjit Mal
Kiran Devi Tulsian	Storage, Stability, and Activity of ctDNA, tRNA, Hemoglobin and Cytochrome c in Cholinebased Ionic Liquids	Prof. Himansu Sekhar Biswal
Manish Kumar Gupta	Synthesis And Conformational Analyses Of Unnatural Amino Acids And Their Hybrid Peptides	Dr. Nagendra K Sharma
Murali A C	Thioketone and Pyrazole based Luminescent Boron Compounds: Synthesis, Characterization and Photophysical Properties of Poly(indazaboles)	Dr. Krishnan Venkatasubbaiah
Nachiketa Sahu	MOF-derived metal chalcogenide nanostructured materials as electrocatalysts for water splitting in electrochemical energy conversion	Prof. Jogendra Nath Behera
Namrata Prusty	Synthesis and Functionalization of N-Heterocycles via Bismuth catalyzed SEAr reaction and Nickel Catalyzed C-H/C-N bond activation	Dr. Ponneri C Ravikumar
Prajnashree Panda	Fabrication of Hybrid Nanostructured Materials and Porous Carbon for Energy Storage and Gas Adsorption Applications	Prof. Sudip Barman
Rahul Ghosh	Development of Ruthenium and Iron Complexes for Catalytic Applications in Sustainable Oxidations and Reductions	Dr. Bidraha Bagh
Rajata Kumar Sahoo	Molecular Zinc(I) Dimers, Zinc(II) Hydrides, and Cations: Synthesis, and Catalytic Applications with Mechanistic Insights	Dr. Sharanappa Nembenna
Rakesh Ranjan Behera	Development of Low-valent Manganese Complexes for the Catalytic Applications in Hydrosilylation Reactions	Dr. Bidraha Bagh
Rupayan Biswas	Machine learning representation of potential energy surfaces and energy transfer in gas-surface scattering	Dr. Upakarasamy Lourderaj
Sagarika Meher	Syntheses and biochemical assessments of modified nucleosides, nucleic acid and peptides containing tropolone surrogates	Dr. Nagendra K Sharma
Sahadev Barik	Studies on the structural organizations and dynamics of some deep eutectic solvents and room temperature ionic liquids in the absence and presence of electrolyte and biomolecule by various spectroscopic methods	Prof. Moloy Sarkar
Sandip Pattanaik	Catalysis Based on Cobalt Pincer Complexes	Prof. Chidambaram Gunanathan
Sonali Panigrahy	Carbon supported nanomaterials for electrochemical energy applications	Prof. Sudip Barman
Subrat Sethi	Synthesis and Characterization of Copper Complexes with Tridentate NNO and NNS Ligands and Their Catalytic Applications in Oxidation and Cycloaddition Reactions.	Dr. Bidraha Bagh
Surajit Panda	Development of Iridium Catalyst for α -Alkylation using Alcohol as Alkylating Partner and Utilization of Cobalt Catalyst for Hydrosilylative Reduction	Dr. Bidraha Bagh
Tanmoy Pain	Design, Modification, and Diverse Applications of Tetrapyrrolic Macrocycles: Exploring both Free-Base and Metallated Variations	Prof. Sanjib Kar
Unmesh Dutta Chowdhury	Investigating The Aggregation Of Neurodegenerative Proteins Using Molecular Dynamics Simulations: Implications For Tau Pathogenesis	Dr. Bhargava B.L
Biswajit Apat	Lived Experiences In Contractual Employment: A Sociological Study Of Early Career Teachers Of Government Elementary Schools In Odisha	Dr. Pranay Kumar Swain
Dasarathi Padhan	Integrated Economic and Environmental Accounting of Mineral Resources in India	Dr. Amarendra Das
Debasish Mishra	The quest for a home in the jesus trilogy of J.M. Coetzee	Dr. Amarjeet Nayak

Recipient	Thesis title	Supervisor Name
Maheshwar Kumar	Performance As Cultural Text: Defamiliarizing The Performing Art Tradition Of Purulia Chhau	Dr. Amarjeet Nayak
Prachi Parimita Rout	Sociological aspects of sex reassignment surgery : an empirical study of lived experiences of transgender people in Odisha	Dr. Pranay K. Swain
Swatiprava Rath	Social contexts of solid waste in urban households: uncovering the practices of waste segregation and littering in Bhubaneswar	Dr. Pranay Kumar Swain
Isha Bihari	Esports as a New Age Profession and its Socio-Cultural Appeal in India: A Systemic Inquiry into the New Normative Practice in Operational Working Hours	Dr. Debashis Pattanaik
Diptesh Kumar Saha	Non-Commutative Neveu Decomposition And Associated Ergodic Theorems	Dr. Panchugopal Bikram
Gorekh Prasad Sena	Lehmer's Problem And Algebraic Points Of Weierstrass Sigma Functions	Dr. K. Senthil Kumar
Mrityunjoy Charan	Some problems on nearly holomorphic modular forms	Dr. Jaban Meher
Shivansh Pandey	Nonvanishing Of L-Functions And Differential Operators For Jacobi Forms	Prof. Brundaban sahu
Bidyadhar Das	Impact of Impurities and Synthesis Techniques on Superconducting and Magnetic Properties of NiBi ₃ Thin Films	Dr. Pratap Kumar Sahoo
Brindaban Ojha	Domain wall and skyrmion dynamics in perpendicular magnetic anisotropic thin films	Prof. Subhankar Bedanta
Dipika Dash	Relativistic dissipative hydrodynamics with extended relaxation time approximation	Dr. Amaresh Jaiswal
Dola Chakrabartty	Stabilization of magnetic skyrmion bubbles and anomalous magneto-transport properties in centrosymmetric hexagonal magnets	Dr. Ajaya K. Nayak
Esita Pandey	Strain-driven tuning of properties in magnetic thin films: Towards Flexible Spintronics	Prof. Subhankar Bedanta
Gurupada Ghorai	Plasmonic excitations in 1D and spin-interactions in 2D Cr-based Nanostructures	Dr. Pratap Kumar Sahoo
Jobin Sebastian	Anisotropic Aspects Of Heavy Quarkonium Potential In Thermal Qcd Medium	Dr. Najmul Haque
Joydev De	Construction of optimally directed localized basis for arbitrary bond-angles, and correlated real time dynamics in the proposed directed basis for accurate estimation of optical properties of large systems	Dr. Joydeep Bhattacharjee
Km Surbhi	Third order Nonlinear properties in WSe ₂ thin films	Dr. Ritwick Das
Laxmipriya Nanda	Fabrication of NiBi ₃ nanostructures and studies of quantum transport in the resistive state of NiBi ₃ nanowires	Dr. Kartikeswar Senapati
Prafulla Saha	Probing new physics through Standard Model Higgs to diphoton signature in pp collisions at $\sqrt{s} = 13$ TeV	Dr. Prolay Kumar Mal
Pushpendra Gupta	Study of spin pumping and inverse spin Hall effect on manganite based thin films	Prof. Subhankar Bedanta
Rashmi Rekha Sahoo	Studies on Nonlinear Frequency Conversion Techniques using $\chi(2)$ Processes	Dr. Ritwick Das
Shailja Sharma	Topological aspects of electromagnetic wave propagation in one-dimensional photonic crystal	Dr. Ritwick Das
Sk Jamaluddin	Characterization of non-trivial spin texture and anomalous electronic transport properties in Mn-based Heusler Systems	Dr. Ajay Kumar Nayak
Subhashree Sahoo	Bandgap engineering in phase selective TiO ₂ microflowers for photonic applications	Dr. Pratap Kumar Sahoo
Tribeni Mishra	Searches for SUSY and HCal performance studies with CMS Run 2 data	Prof. Sanjay Kumar Swain
Utkalika Priyadarsini Sahoo	Defect induced tunable charge density wave ordering and optical properties in 2D -TiSe ₂ TMDs materials	Dr. Pratap Kumar Sahoo

Master's Degree Awarded

Master of Science in Biological Sciences

Akankshya Nayak	Dipanjali Kachhap	Prajwal Roopanath M M	Shwetha Sasindran
Amisha Aparupa	Jayaprakash Majhi	Raima Sing	Sibabrata Biswal
Amit Beniwal	Jeevan Nayak	S Mrithika	Siddhant Mahato
Ashwin B Nair	Kunal Kumar Bharat	Sagnik Rout	Srishti Shah
Athulya. K	Manali Banerjee	Samadrita Mondal	Subhakanta Behera
Avhra Biswas	Mimasha Mallik	Samarpita Hembram	Subham Gamango
Ayush Parag	N Devanand	Samita Nayak	Subham Mishra
Barsha Rani Pradhan	Neha Sanal Kumar	Sanchita Rath	Subhamjyoti Nanda
Bibhu Prasad Behera	Nibedita P. Dehury	Shubham Agrawal	Sunaina
Chinthakunta Vaishnavi	Nilesh Kumar Das	Shubhanjali	Uditanshu Priyadarshi

Master of Science in Chemical Sciences

Abhinandan Mohanty	Bikash Ranjan Sahu	Naikwade Shyamali Rajendra	Subhakanta Parida
Aditi Pradhan	Chandan Prasad Sahoo	Pranav Shridhar Mahulkar	Subhasis Sahoo
Adway Majumdar	Chetan Kumar Prasad	Pranay Mohanty	Suchismita Naik
Ankit Ray	Debashish Paik	Pritha Gayen	Supratim Chatterjee
Anusmita Rout	Dev Shrivastava	Priyanka Maharana	Suraj Kumar Maharana
Arijit Mahana	Goutam Bissoyi	Rashmita Sethi	Swetalina Das
Ashish Kumar Behera	Gracely Jeeva	Rudhi Ranjan Sahoo	Vibhu PS Hada
Ashutosh Mahakhuda	Husna. A. V	Sangita Mandal	Vishamber Verma
Ashutosh Mahalik	Jinan. M. S	Sarin C Jacob	Yashaswini Gupta
Aswini A	Kushal Baloda	Siddharam Rana	Yendety Radha Krishna
Ayush Bhadani	Lamphiza O Najjar	Soumyashree Priyadarshinee	Gitanjali Bhoi
Bhairab Chand Hembram	Maria Tomy	Sriman Srisa Saran Mishra	

Master of Science in Mathematical Sciences

Abhijit Chakraborty	Krishna Priya K M	Rahul Vishwakarma	Shubhanshu Prasad
Aliyya Fathima Rinu	Kumar Vinayak	Rohan Naskar	Soham Samanta
Ayanava Mandal	Meghna Manoj	Shinde Ashutosh Pradip	
Gargi Biswas	Prosondip Sadhukhan	Shubhang Srikanth Acharya	

Master of Science in Physical Sciences

Abha Vishwakarma	Avani. A	Oommen P Jose	Sarthak Patel
Abhilash Rout	Chandan Kumar Sahu	Pius Ranjan Padhi	Saumya Prakash Sharma
Abhishek	Chintamani Sahu	Pritha Mallik	Simran Agrawal
Abhishek Singh	Daksh Kadian	Punyam Pandey	Soumya Dasgupta
Aditya Prakash	Debabrata Barik	R.Vasanth Kashyap	Sourav Kumar Sahu
Aheesh C. Hegde	Devamrutha I S	Rajdeep Tah	Sreehari C
Ajay Krishna. A	Dibya Bharati Pradhan	Ratul Das	Sudip Kumar Kar
Akash Yadav	Gayathri Santhosh	Ritadip Bharati	Sumegha M T

Akashdeep Kar	Hitesh Chhabra	Rohan Thomas Mathew	Thriveni Santhosh
Alan Biju John	Jyotiprakash Satapathy	Rudra Prasad Sangram Singh	V E Krishnaprasad
Anna Binoy	Krishna Kant Parida	S. Rajalakshmi	James Aidan Wilson
Anshuman Sahoo	Maitrey Sharma	Sandeepan Sahoo	Girish Tripathy
Arpan Maity	Mihir Chandra	Sanyam Kumar	Abhaya Kumar Kanhar
Arshia Anjum	Mubashir M	Sarbajit Mazumdar	Vishnu Namboodiri K S
Arif Sarkar	Deepanshu Gurjar	Hemant Lohumi	Subhashis Ghosh
Avick Saha	Garge Purvesh Vikas	Nikhil Anand	Tanmoy Pati
Biplab Mahapatra	Gourab Bhattacharya	Sanchayan Banerjee	

Master's of Medical and Radiological Physics

Aditya Upadhyay	Megha Rai	Rakesh Patra	Sudam Masanta
Arnab Roy	Nimi Mathew	Roselin Panda	
Bishal Baral	Pushpraj Bhardwaj	Satish Kumar Chaturvedi	



Audited Statement of Accounts & Statutory Auditor's Report



Audited Statement of Accounts & Statutory Auditor's Report Financial Year-2024-25



Auditor
BATRA SWAIN & ASSOCIATES
CHARTERED ACCOUNTANTS
L-3/80, Housing Board Colony,
Acharya Vihar, Bhubaneswar-751013



BATRA SWAIN & ASSOCIATES

Chartered Accountants

INDEPENDENT AUDITOR'S REPORT

TO
THE MEMBERS,
National Institute of Science Education and Research,
P.O.:Jatni, Dist:Khurda, Odisha
PIN-752050

We have audited the accompanying financial statements of National Institute of Science Education and Research, Bhubaneswar ('The Institute'), which comprise the Balance Sheet as at 31 March 2025, the Income and Expenditure account and the Receipt & Payment account for the year ended, and a summary of significant accounting policies and other explanatory notes.

Management's Responsibility for the Standalone Financial Statements

The management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance of the Institute in accordance with the accounting principles generally accepted in India. This responsibility also includes maintenance of adequate accounting records for safeguarding the assets of the Institute and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

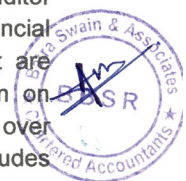
Our responsibility is to express an opinion on these financial statements based on our audit. We have taken into account the accounting and auditing standards generally accepted in India.

We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and the disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal financial control relevant to the Institute's preparation of the financial statements that give a true and fair view in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on whether the Institute has in place an adequate internal financial controls system over financial reporting and the operating effectiveness of such controls. An audit also includes

L3/80, Housing Board Colony, Acharya Vihar, Bhubaneswar, Odisha - 751013, Tel.: 0674-2541159
Email : caadeetya@gmail.com / batraswain3@gmail.com / info@batraswain.com , Web.:www.batraswain.com

H.O. At :- Forum Mart, Bhubaneswar, Branches at : Bhubaneswar, Gurgaon.



Continuation Sheet

BATRA SWAIN & ASSOCIATES

Chartered Accountants

evaluating the appropriateness of the accounting policies used and the reasonableness of the accounting estimates made by the Institute as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the standalone financial statements.

Opinion

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information required by the Act in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India,

Further to our observations annexed hereto, we report as follows:

1. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit.
2. In our opinion proper books of accounts have been kept by the Institute so far as appears from our examination of those books.
3. The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of accounts maintained by the Institute.
4. In our opinion and to the best of our information and according to explanations given to us the said accounts give a true and fair view:
 - (i) In the case of the Balance Sheet, of the state of affairs of the Institute as at 31st March, 2025.
 - (ii) In the case of Income and Expenditure Account of the excess of Expenditure over income for the year ended on that date.
 - (iii) In the case of Receipt and Payment Account of the actual receipt and the payment made during the year ended on that date.

For Batra Swain & Associates
Chartered Accountants
FRN - 322050E

CA Aditya Narayan Mahapatra
Partner

M. No. 066784

UDIN - 25066784BMOPLE6824



Place: Bhubaneswar
Date: 22.07.2025



NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

BALANCE SHEET AS AT 31ST MARCH, 2025

Amount in (₹)

Particulars	Schedule	As at 31st March, 2025	As at 31st March, 2024
A. CAPITAL FUND & LIABILITIES :			
1. Capital Fund	1	6,54,94,88,717	6,75,31,42,111
2. Reserves & Surplus	2	-	-
3. Earmarked/Endowment Fund	3	-	-
4. Secured Loans & Borrowings	4	-	-
5. Unsecured Loans & Borrowings	5	-	-
6. Deferred Credit Liabilities	6	-	-
7. Current Liabilities & Provision	7	1,54,67,88,797	79,30,66,234
TOTAL		8,09,62,77,514	7,54,62,08,345
B. ASSETS :			
1. Fixed Assets	8	5,90,66,50,384	6,33,30,09,616
2. Investments of Earmarked/Endowment Funds	9	-	-
3. Investments (Others)	10	1,29,56,56,290	96,43,32,150
4. Current Assets, Loans & Advances etc.	11	89,39,70,840	24,88,66,579
TOTAL		8,09,62,77,514	7,54,62,08,345
Significant Accounting Policies	24		
Contingent liabilities & Notes on Accounts	25		

*As per our report of even date attached

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

CA Aditya Narayan Mahapatra
(Partner)

M. No. 066784

UDIN : 25066784BMOPLE6824

Place: Bhubaneswar

Date: 22.07.2025



Deputy Controller of Accounts

23/7/25

Director



2024-25

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2025

Amount in (₹)

Particulars	Schedule	As at 31st March, 2025	As at 31st March, 2024
A. INCOME :			
1. Income from Sales/ Services	12	-	-
2. Grant/ Subsidies	13	1,37,15,00,000	1,29,27,00,000
3. Fees/ Subscriptions	14	2,77,76,443	2,72,91,734
4. Income from Investment	15	-	-
5. Income from Royalty, Publication etc.	16	-	-
6. Interest Earned	17	1,12,84,889	57,10,270
7. Other Income	18	500	-
8. Increase/(Decrease) in stock of Finished Goods & Work-in-Progress	19	-	-
TOTAL (A)		1,41,05,61,832	1,32,57,02,004
B. EXPENDITURE :			
1. Establishment Expenses	20	94,55,87,007	91,96,55,523
2. Other Administrative Expenses etc.	21	49,92,36,364	42,06,51,787
3. Expenditure on Grants, Subsidies etc.	22	-	-
4. Prior Period Income (Adjustment)		57,10,270	1,00,93,429
5. Interest	23	-	-
6. Depreciation (Net total at the year-end-corresponding to Schedule-8)		70,68,26,585	78,29,31,537
TOTAL (B)		2,15,73,60,226	2,13,33,32,276
Balance being Excess of Expenditure over Income (A-B)		(74,67,98,394)	(80,76,30,272)
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/ CAPITAL FUND		(74,67,98,394)	(80,76,30,272)
Significant Accounting Policies	24		
Contingent liabilities & Notes on Accounts	25		

*As per our report of even date attached

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

CA Aditya Narayan Mahapatra

(Partner)

M. No. 066784

UDIN : 25066784BMOPLE6824

Place: Bhubaneswar

Date: 22.07.2025



Deputy Controller of Accounts

Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTS

2024-25

RECEIPTS AND PAYMENTS ACCOUNT FOR THE PERIOD FROM 1ST APRIL, 2024 TO 31ST MARCH, 2025

Amount in (₹)

RECEIPTS	As at 31st March, 2025	As at 31st March, 2024	PAYMENTS	As at 31st March, 2025	As at 31st March, 2024
I. Opening Balances			I. Expenses		
a) Cash in Hand	-	-	a) Establishment Expenses (corresponding to Schedule 20)		
b) Bank Balances:	13,08,34,638	6,04,56,554	i) Pay & Allowances	92,93,81,434	89,73,69,131
II. Grants Received			b) Administrative Expenses (corresponding to Schedule 21)		
a) From DAE	1,85,15,00,000	1,93,43,00,000	i) Other Administrative Expenditure	37,22,28,088	24,06,01,678
b) Vigyan Pratibha Phase-II Grant	38,50,000		ii) NISER Plan Expenses	12,87,10,466	17,48,83,327
c) CMS Expr at CERN Grant	3,82,85,000				
d) Alice Experiment CERN	2,10,10,000		II. Expenditure on Fixed Assets & Capital Work-in-Progress		
III. Interest Received			a) Purchase of Fixed Assets	27,80,13,410	45,05,57,958
a) On Bank Deposits (SBI & IOB)	1,03,10,888	47,93,847	b) Expenditure on Capital WIP	24,80,730	62,34,518
b) On IT Refund	24,329	-			
c) On Grant (Medical Cyclotron Grant)	73,97,261	-	III. Finance Charges (Interest Refunded)	57,10,270	1,00,93,429
IV. Other Income			IV. Other Payments		
a) Registration Fee (MSc & PhD)	2,05,85,867	1,90,47,528	a) NISER R&D	16,00,729	-
b) Job Application Fee	-	1,22,000	b) Deposit (Asset : LC)	33,13,24,140	73,80,21,898
c) RTI Application Fees	120	80	c) Security Deposit (Refundable)	12,22,552	13,58,711
d) Sale of Tender Paper	55,870	2,40,206	d) Duties & Taxes	-	8,82,914
e) Guest House Rent	17,83,920	14,00,280	e) 7th DAE Yoga Conference	2,30,928	-
f) License Fees (Rent of Quarter/Bank Branch)	37,47,766	35,01,016	f) DAE Conclave Programm	35,00,000	-
g) Transcript Fees	42,080	33,600	g) Student Dues	-	24,177
h) Identity Card/Health Card (Duplicate Fee)	9,920	17,325	h) Loans & Advance (Asset)	11,64,99,821	10,23,87,431
i) Lease Rent	10,04,484	7,82,006	i) Liabilities for Expenses (Sundry Creditors)	-	35,31,598
j) Water Charges	10,441	-	j) EMD / SD Released	27,32,626	-
k) Sale of Assets	26,787	-	k) Statutory Recoveries	1,56,51,552	2,17,30,802
l) Liquidated Damage	21,82,723	21,44,931	V. Closing Balances		
m) Sample Testing Charges	3,24,096	24,400	a) Cash-in-Hand	66,00,07,784	13,08,34,638
n) Sale of Animals	2,54,900	1,59,000	b) Bank Balances:		
o) Creche & Day Care Fees	2,83,580	21,805			
p) Service Book (Duplicate)	500				
V. Any other receipts (Loans, Advances & Expenses Recovered)					
a) Security Deposit (Refundable)					
b) E.M.D	24,000	11,42,921			
c) Income Tax Refund	6,34,121	-			
d) Student Dues	12,42,510	-			
e) 7th DAE Yoga Conference	50,000	2,00,000			
f) DAE Conclave Programm	35,00,000	-			
g) Duties & Taxes	3,18,729	-			
h) Medical Cyclotron UNIT Grant (GOVT OF ORISSA)	75,00,00,000	75,00,00,000			
i) NISER R&D	-	1,24,711			
	2,84,92,94,530	2,77,85,12,210		2,84,92,94,530	2,77,85,12,210

*As per our report of even date attached

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050E

CA Aditya Narayan Mahapatra
(Partner)
M. No. 066784
UDIN : 25066784BMOPLE6824
Place: Bhubaneswar
Date: 22.07.2025



Deputy Controller of Accounts

23/7/25
Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER) ANNUAL ACCOUNTS

2024-25

Schedule - 3 : Earmarked / Endowment Fund

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Particulars	Fund-wise Break up				Totals	
	Fund WW	Fund XX	Fund YY	Fund ZZ	Current Year	Previous Year
1) Opening balance of the funds :	-	-	-	-	-	-
2) Additions to the funds :						
a. Donations / Grants	-	-	-	-	-	-
b. Income from Investments made on account of funds	-	-	-	-	-	-
c. Other additions	-	-	-	-	-	-
TOTAL (A + B)	-	-	-	-	-	-
3) Utilisation / Expenditure towards objectives of funds :						
a. Capital Expenditure :						
(i) Fixed Assets	-	-	-	-	-	-
(ii) Others	-	-	-	-	-	-
Total (i)	-	-	-	-	-	-
b. Revenue Expenditure :						
(i) Salaries, Wages and allowances	-	-	-	-	-	-
(ii) Rent	-	-	-	-	-	-
(iii) Other Administrative expenses	-	-	-	-	-	-
Total (ii)	-	-	-	-	-	-
TOTAL (C)	-	-	-	-	-	-
Net Balance at the year end (A+B-C)	-	-	-	-	-	-

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050E

CA Aditya Karayan Mahapatra
(Partner)
M. No. 066784

Deputy Controller of Accounts

Director



5/12/25

**NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTS**

2024-25

Schedule - 4 : Secured Loans and Borrowings

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year		Previous Year	
1. Central Government		-		-
2. State Government (Specify)		-		-
3. Financial Institutions				
a) Term Loans	-		-	
b) Interest accrued and due	-	-	-	-
4. Banks:				
a) Term Loans	-		-	
b) Interest Accrued & Due	-		-	
c) Other Loans (Specify)	-		-	
d) Interest Accrued & Due	-	-	-	-
5. Other Institutions & Agencies		-		-
6. Debenture & Bonds		-		-
7. Others (Specify)		-		-
TOTAL		-		-

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050E

Aditya Narayan Mahapatra
CA Aditya Narayan Mahapatra
(Partner)
M. No. 066784



Deputy Controller of Accounts
Deputy Controller of Accounts

23/7/25
Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -5 : Unsecured Loans & Borrowings

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year		Previous Year	
1. Central Government		-		-
2. State Government (Specify)		-		-
3. Financial Institutions		-		-
4. Banks:				
a) Term Loans	-	-	-	-
b) Other Loans (Specify)	-	-	-	-
5. Other Institutions & Agencies		-		-
6. Debenture & Bonds		-		-
7. Fixed Deposits		-		-
8. Others (Specify)		-		-
TOTAL		-		-

Schedule -6 : Deferred Credit Liabilities

(Schedule forming part of the accounts for the period ended on 31.03.2024)

Amount in (₹)

Particulars	Current Year		Previous Year	
1) Acceptances secured by hypothecation of capital equipment & other assets		-		-
2) Others		-		-
TOTAL		-		-

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E



CA Aditya Narayan Mahapatra

(Partner)

M. No. 066784




Deputy Controller of Accounts



Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -7 : Current Liabilities & Provisions

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

SL. No.	Particulars	Current Year		Previous Year	
A.	CURRENT LIABILITIES				
1.	Acceptances	0	0	0	0
2.	Sundry Creditors:				
	a) For Goods/Services			2767230	
	b) Others - EMD	1954000	1954000	2696372	5463602
3.	Advances Received	0	0		0
4.	Interest accrued but not due :				
	a) Secured Loans/Borrowings		0		0
	b) Unsecured Loans/Borrowings		0		0
5.	Statutory Liabilities				
	a) Overdue		0		0
	b) Others				
	i) TDS	463299		524478	
	ii) TDS (CGST)	185130		125382	
	iii) TDS (SGST)	185131		125382	
	iv) TDS (IGST)	659047		251654	
	v) Labour Cess	0	1613258	164321	1191217
	vi) CGST/SGST RECEIPT	120652			
6.	Other Current Liabilities				
	a) Student Dues :				
	(i) Internal Amenitie S.D.	0			
	(ii) Excess Prog. Regd. Fees	0			
	(iii) Caution Money (Labrotary)	13000		13000	
	(iv) Caution Money (Library)	3433680		2907680	
	(v) Caution Money (Institute)	5885250		5499250	
	(vi) Caution Money (Hostel)	714521		494811	
	(vii) CSIR Contingency	90713		90713	
	(viii) Alumuni Association Subscription	336620		281220	
	(ix) Student Welfare Fund	586060		530660	
	(x) Kotak Mahindra Scholarship Payable	0		0	
	(xi) DBT Scholarship (Ph.D)	26210		26210	
	(xii) HDFC Scholarship	0		0	
	(xiii) Inspire Scholarship (Ph.D)	7536694	18622748	7536694	17380238
	(b) Smart City Fund		2974		2974
	(c) 7th DAE Yoga Conference		19072		
	(d) NISER R&D Payable		13064267		13064267
	(e) Medical cyclotron unit Grant (DAE)		1500000000		750000000
	Interest on Deposit(Medical cyclotron unit Grant)		7397261		
	(f) Security Deposit :				
	SD (Aditya Hygiene)	55413			
	S D (Amarendra Ojha)	3961		3961	
	SD (Anton Paar India Pvt Ltd)			119593	
	SD (A R Fire Sales & Services)	16200			

ANNUAL ACCOUNTS

2024-25

Schedule -7 : Current Liabilities & Provisions

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

SL No.	Particulars	Current Year	Previous Year
	SD (Axenic Systems)	268435	268435
	SD (Bansidhar Hati)	171919	171919
	S.D(Bigyan Kumar Pradhan)	173304	121908
	S.D(Bijay Kumar Behera)	257806	332181
	SD (Central Warehouse Corporation)	115783	135505
	SD (CHEMIX Speciality Gases & Equipments)		22319
	SD (Daikin Airconditioning India Pvt Ltd)	20604	
	SD (Deepana Electricals and Consultancy)	84860	10139
	SD (Eco Pest Control and Engineering Services)		5952
	SD (Enva Water Technologies Pvt Ltd)	38542	116842
	SD(Ethnic Enterprises)	329097	
	SD (G.D Anklesaria & Co.)		242725
	SD (Giridhari Lal)	89450	89450
	SD (GL Solutions)		48525
	SD (Golden Bell Co.)		4289
	S.D (HAK Electrical & Engineering Works)	11255	11255
	SD (Indian Plant Feeds)	629269	519817
	SD (Jagannath Electrical Works)	24700	24700
	SD (Kislay Kumar)	3699	3699
	SD (Laxminarayan Eneterprises)	215951	86091
	SD (Mahima Enterprises)		21444
	SD(Martha Engineerings and Suppliers)	27506	16500
	sD (Mascotek Engineers)		381612
	SD (Medi Analytika)	65000	
	SD (M/s Carbofill)	34000	34000
	SD (M/s Millenium Business Associate		70908
	SD (M/s Sign World)	62781	62781
	SD (New Odisha Enterprises)	16628	41781
	SD (Nirmal Chandra Sar)	56978	167464
	SD (Nischint Multiservice Pvt Ltd)		
	SD (N K Refrigeration)	43910	
	SD (Novel Telenet Pvt Ltd)		51870
	SD (Orbital Infrastructure Consultancy)	39243	
	SD(Oriental Security Service)	788637	810755
	SD (Prachi Electrical)	6801	1683
	SD (Prakash Chandra Dhal & Co)	19704	19704
	SD (Priyabrata Sahoo)	75754	
	SD (Rabindra Electricals)	4230	16822
	S D (Rabindra Kumar Mallick)		57268
	SD (Ramakata Sahani)		11186
	SD (Rath Architectonic)	72240	72240
	SD (RGS Infotech)	43875	43875
	SD (Sahai Exclusive Contracts Pvt Ltd)		842164
	SD (Sainez)		37025
	SD (Shinryo Engineers Pvt Ltd)	58986	58986
	SD (Shri Samareesh Chottaray)		5887
	SD (Signworld)	3103	3103
	SD(Sonatech Infosolutions Pvt Ltd.)	7408	7408
	SD (SPK & Co.)	16174	25133
	SD (Sritam Computers)		18653
	SD (SRS Enterprises)	30898	37188
	SD (Supdex Services Pvt Ltd)		6083
	SD (Suvendu Kumar Mohanty)		237702

ANNUAL ACCOUNTS

2024-25

Schedule -7 : Current Liabilities & Provisions

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Sl. No.	Particulars	Current Year		Previous Year	
	S.D (Tathagata Enginering)	78393		163661	
	SD (The Seal Coat Stuctural Works Pvt Ltd)			11516	
	SD (The Taste, BBSR)				
	SD (Uma Fire Services Pvt Ltd.)	22545		88475	
	SD (Vertiv Energy Privet Limited)	6189			
	SD (Vijaypower Generators Limited)			151253	
	SD (WIS Construction and Consultancy Pvt. Ltd.)	1368		1368	
	SD (Zero Degree Cooling System Pvt Ltd.)	18600	4111199	18600	5935403
	(g) Statutory Recoveries :				
	i) Faculty Club NISER	1000		26500	
	ii) NPS Recovery	2818		1033	
	iii) Professional Tax	200	4018	1000	28533
	Sub-Total (A)		1546788797		793066234
B.	<u>PROVISIONS</u>				
1.	<u>For Expenses Payable :</u>				
	Sub-Total (B)		0		0
	Total (A+B)		1546788797		793066234

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

CA Aditya Narayan Mahapatra
(Partner)

M. No. 066784



Deputy Controller of Accounts

Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTSSchedule - 8: Fixed Assets
(Schedule forming part of the accounts for the period ended on 31.03.2025)

2024-25

			GROSS BLOCK				DEPRECIATION			NET BLOCK		Amount in (₹)
Sl. No.	Particular of Assets	Rate	WDV as on 01.04.2024	Addition during the year		Deductions (Sale / Adjustt.) during the year	Cost/valuation at the year-end	Depreciation for the year	Deducti ons during	Total upto the year-end	As at the current year ended on 31.03.2025	As at the Previous year ended on 31.03.2024
				> 180 days	< 180 days							
1	Land	0%	2,76,17,405	-	-	-	2,76,17,405	-	-	-	2,76,17,405	2,76,17,405
2	Buildings (Academic)	10%	1,64,64,09,541	41,23,244	35,35,093	-	1,65,40,67,878	16,52,30,033	-	16,52,30,033	1,48,88,37,845	1,64,64,09,541
3	Building (Residential)	5%	2,12,65,64,715			-	2,12,65,64,715	10,63,28,236	-	10,63,28,236	2,02,02,36,479	2,12,65,64,715
4	Electrical Installation	10%	16,87,91,290	17,12,958	5,33,149		17,10,37,397	1,70,77,082	-	1,70,77,082	15,39,60,315	16,87,91,290
5	Furniture & Fixtures	10%	20,74,65,807	7,40,198	3,12,950	-	20,85,18,955	2,08,36,248	-	2,08,36,248	18,76,82,707	20,74,65,807
6	Computers	40%	2,44,41,126	1,97,997	2,95,458	-	2,49,34,581	99,14,741	-	99,14,741	1,50,19,840	2,44,41,126
7	Software	40%	22,57,355		9,510	-	22,66,865	9,04,844	-	9,04,844	13,62,021	22,57,355
8	Lab Equipments	15%	75,00,28,733	1,48,29,690	59,59,584		77,08,18,007	11,51,75,732	-	11,51,75,732	65,56,42,275	75,00,28,733
9	Tools Equipments	15%	40,610			-	40,610	6,092	-	6,092	34,518	40,610
10	Books	40%	56,12,664	12,50,341	9,63,446.00	-	78,26,451	29,37,891	-	29,37,891	48,88,560	56,12,664
11	Journals	40%	13,27,47,027			-	13,27,47,027	5,30,98,811	-	5,30,98,811	7,96,48,216	13,27,47,027
12	Air Conditioners	15%	83,33,251		1,26,000.00	-	84,59,251	12,59,438	-	12,59,438	71,99,813	83,33,251
13	Vehicles	15%	6,07,310			43,846	5,63,464	84,520	-	84,520	4,78,944	6,07,310
14	Bicycle	15%	986			-	986	148	-	148	838	986
15	Machinery & Equipments	15%	1,23,06,14,229	14,51,43,894	9,82,96,729	16,832	1,47,40,38,021	21,37,35,973	-	21,37,35,973	1,26,03,02,048	1,23,06,14,229
16	EPABX	15%	3,088			-	3,088	463	-	463	2,625	3,088
17	Kitchen Equipments	15%	14,36,532			-	14,36,532	2,15,480	-	2,15,480	12,21,052	14,36,532
18	Telephones	10%	37,947			-	37,947	3,794	-	3,794	34,153	37,947
19	Capital Assets(WIP)	0%			24,80,730		-	-	-	-	24,80,730	-
	T o t a l		6,33,30,09,616	16,79,98,322	11,25,12,649	60,678	6,61,09,79,180	70,68,09,526	-	70,68,09,526	5,90,66,50,384	6,33,30,09,616

BATRA SWAIN & ASSOCIATES
Chartered Accountants

ERN - 322050E

CA Aditya Narayan Mahapatra
(Partner)

M. No. 066784

Deputy Controller of Accounts

Director

PO: Bhubaneswar - Padanpur, Jatani, Khurda - 752050, Odisha, India, Phone: 0674-2494008, Fax: 0674-2494009, Email: director@niser.ac.in, Web: www.niser.ac.in



NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -9 : Investments - Earmarked/ Endowment Funds

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1. In Government Securities	-	-
2. Other Approved Securities	-	-
3. Shares	-	-
4. Debentures & Bonds	-	-
5. Subsidiaries & Joint Ventures	-	-
6. Others (to be specified)	-	-
TOTAL	-	-

Schedule -10 : Investments - Others

(Schedule forming part of the accounts for the period ended on 31.03.2024)

Amount in (₹)

Particulars	Current Year	Previous Year
1. In Government Securities	-	-
2. Other Approved Securities	-	-
3. Shares	-	-
4. Debentures & Bonds	-	-
5. Subsidiaries & Joint Ventures	-	-
6. FD at Bank	1,29,56,56,290	96,43,32,150
TOTAL	1,29,56,56,290	96,43,32,150

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E


CA Aditya Narayan Mahapatra
(Partner)

M. No. 066784




Deputy Controller of Accounts



Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -11 : Current Assets, Loans, Advances etc.

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year		Previous Year	
A. CURRENT ASSETS:				
1. Inventories:				
a) Stores and Spares	-		-	
b) Loose Tools	-		-	
c) Stock-In-trade				
i) Finished goods	-		-	
ii) Work-In-progress	-		-	
iii) Raw Materials	-	-	-	-
2. Sundry Debtors:				
a) Debts Outstanding for a period exceeding six months	-		-	
b) Others	-		-	
3. Cash balances in hand	-	-	-	-
4. Bank Balances				
a) SBI A/C - 30755200010	4,54,36,118		68,27,075	
b) SBI A/C - 37871572767	10,29,916		3,67,55,945	
c) IOB A/C - 373701000000001	53,87,46,747		6,03,46,323	
d) IOB A/C -147601000015510	47,62,162		28,58,868	
e) SBI A/C - 38629236942	6,90,56,076		2,38,63,449	
f) SBI A/C - 41803345744	6,70,387		1,61,173	
e) IOB A/C - 373701000002190	3,06,378	66,00,07,784	21,805	13,08,34,638
Total (A)		66,00,07,784		13,08,34,638
B. LOANS, ADVANCES AND OTHER ASSETS:				
1. Loans & Advances				
a) Security Deposit :		64,37,479		64,37,479
SD(Bhubaneswar Development Authority)	3,55,869		3,55,869	
SD (BSNL)	2,250		2,250	
SD (BSNL,GMTD, BBSR)	78,000		78,000	
SD (CESU)	59,07,310		59,07,310	
SD (Hindustan Gas)	3,700		3,700	
SD (HP GAS)	38,850		38,850	
SD (Jai Mata Di HP Gas Agency, Khurda)	10,800		10,800	
SD (PRW Deptt.)	3,900		3,900	
SD (Swosti Fuel Center)	21,800		21,800	
SD (Veer Sachi Indian Gas)	15,000		15,000	
b) Staffs:				
Abhay Kumar Naik	25,300			
Alok Sahoo	-		90,000	
Amaresh Kumar Jaiswal	4,000		5,000	
Anirudha Dutta Roy	-		61,103	
Binod Kumar Sahoo	-		1,80,000	
Brundaban Sahu	-		1,50,000	
Chandra Shekar Purohit	-		40,000	
Debasmita P.Alone	10,000		20,000	
JYOTI RANJAN MOHANTY	30,000		-	
Kamal Lochan Patra	-		2,00,000	

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -11 : Current Assets, Loans, Advances etc.

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year		Previous Year	
Kartikeswar Senapati	-		1,40,000	
Lipsa Das	51,000		-	
Liton Majumdar	-		96,000	
Nabin Kumar Sahoo	9,600		-	
Najmul Haque	28,400		-	
P. C. Ravikumar	-		78,000	
Prasenjit Mal	57,000		-	
Pratap Kumar Sahoo	-		1,40,000	
Ram Jeet	7,900		-	
Ranbir Singh	2,50,000		-	
Raveendrababu Karnam	-		49,700	
Sanjay Kumar Swain	10,20,000		-	
Saralasrita Mohanty	12,500		-	
Satya Narayan Moahanty	-		9,105	
Saurabh Chawla	1,902		20,000	
Shabnam Khanum	-		2,52,000	
Subhankar Bedanta	-		1,53,900	
Subhasis Basak	1,50,000		-	
Sudip Barman(SCS)	-		35,400	
Surya Snata Rout	-		87,840	
Victor Roy	-		80,000	
c) Student	-		-	
Bappaditya Mondal	-		-	
Prottay Das, PhD Student	3,50,000		-	
Sarjeeta Kalubhai Gami	4,61,419		-	
Sawan, PhD, SPS	4,61,419		2,55,278	
Swati Saha, PhD Student	4,61,419			
		33,88,055		21,43,326
d) Others				
i) DCS & EM, Mumbai	21,35,00,000		10,65,00,000	
ii) Director, NIPGR	1,30,980		1,30,980	
iii) Director, IMMT	-		-	
iv) Registrar, IISC	-		-	
v) Central Tool Room & Training Centre	-		-	
vi) Exim Logistic P Ltd.	-		-	
vii) Advance-Exim Logistics Pvt. Ltd.	62,76,740		-	
viii) M/s Entuple Technologies Pvt Ltd	6,600		-	
ix) IISER, Pune	52,801		52,801	
x) Board of Radiation & Isotope Technology	-		6,08,070	
xi) National Informatics Centre	8,980		1,89,980	
xii) Ulta-Tech Laboratories P. Ltd.	1,121		8,968	
ix) Imprest Advance	28,818		61,700	
x) Advance Tax, TDS & TCS Receivable	24,98,978	22,25,05,018	18,98,637	10,94,51,136
2. Advances and other amounts recoverable in cash or in kind or for value to be received:				
a) R&D Receivable	16,00,729		-	
b) Lease Rent Receivable	-		-	
i) SBI (NISER Campus) - March 2021	-		-	

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25

Schedule -11 : Current Assets, Loans, Advances etc.

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year		Previous Year	
ii) IOB (NISER Campus) - March 2021	-		-	
iii) Subhamayee Devi - Feb, 21 & Mar, 21	-		-	
iv) Rudra Narayan Mishra - Mar, 21	-		-	
c)Sum Ultimate Medicare (Advance)	31,775	16,32,504	-	-
3. Income Accrued:				
a) On Investments from Earmarked/Endowment Fund	-		-	
b) On Investment (Others)	-		-	
c) On Loans and Advances	-		-	
d) Others	-	-	-	-
4. Grant Receivables		-		-
Total (B)		23,39,63,056		11,80,31,941
TOTAL (A+B)		89,39,70,840		24,88,66,579

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

CA Aditya Narayan Mahapatra

(Partner)

M. No. 066784



Deputy Controller of Accounts

Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTS

2024-25

Schedule -12 : Income from Sales/Services

(Sch (Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1) Income from sales		
a) Sale of Finished Goods	-	-
b) Sale of Raw Material	-	-
c) Sale of Scraps	-	-
2) Income from Services		
a) Labour and Processing Charges	-	-
b) Professional/Consultancy Service	-	-
c) Agency Commission and Brokerage	-	-
d) Maintenance Services (Equipment/Property)	-	-
e) Others (Specify)	-	-
TOTAL	-	-

Schedule -13 : Grants/Subsidies

(Schedule forming part of the accounts for the period ended on 31.03.2024)

Amount in (₹)

Particulars	Current Year	Previous Year
(Irrevocable Grants & Subsidies Received)		
1) Central Government		
a) Revenue (Salary & General)	1,37,15,00,000	1,29,27,00,000
TOTAL	1,37,15,00,000	1,29,27,00,000

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050E

GA Aditya Narayan Mahapatra
(Partner)
M. No. 066784



Deputy Controller of Accounts
Deputy Controller of Accounts

23/7/25
Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024 -25

Schedule -14 : Fees/Subscriptions

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1. Registration Fees (MSc & PhD)	1,80,37,478	1,60,20,111
2. License Fees	37,51,087	35,01,016
3. Sale of Tender Paper	55,870	2,40,206
4. RTI Application Fees	120	80
5. Transcript Fees	42,080	33,600
6. Identity Card/Health Card Fee	9,920	17,325
7. Guest House Rent	17,83,920	15,08,557
8. Job Application Fees		1,22,000
9. Sample Testing Charges	3,24,096	24,400
10. Lease Rent	10,38,863	5,42,006
11. Misc. Receipt (EMD & SD Lapsed)	-	29,56,697
12. Liquidated Damages	21,82,723	21,44,931
13. Water Charges (Income)	10,441	-
14. Creche & Day Care Fees	2,83,580	21,805
15. Sale of Animals	2,56,265	1,59,000
TOTAL	2,77,76,443	2,72,91,734

Schedule -15 : Income from Investments

(Schedule forming part of the accounts for the period ended on 31.03.2024)

Amount in (₹)

Particulars	Investment from Earmark Fund		Investment Others	
	Current Year	Previous Year	Current Year	Previous Year
(Income on Invest. From Earmarked/Endowment Funds) Transferred to Funds				
1) Interest :				
a) On Govt. Securities	-	-	-	-
b) Other Bonds/Debentures	-	-	-	-
2) Dividends :				
a) On Shares	-	-	-	-
b) On Mutual Fund Securities	-	-	-	-
3) Rents	-	-	-	-
4) Others (Specify)	-	-	-	-
TOTAL	-	-	-	-
Transferred to Earmarked/Endowment Funds	-	-	-	-

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050E

CA Aditya Narayan Mahapatra
(Partner)
M. No. 066784



Deputy Controller of Accounts

23/7/25
Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER) ANNUAL ACCOUNTS

2024 -25

Schedule -16 : Income from Royalty, Publication etc.

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1) Income from Royalty	-	-
2) Income from Publications	-	-
3) Others (Specify)	-	-
TOTAL	-	-

Schedule -17 : Interest Earned

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1) On Term Deposits:		
a) With Scheduled Banks	-	-
b) With Non-Scheduled Banks	-	-
c) With Institutions	-	-
d) Others	-	-
2) On Savings Accounts:		
a) With Scheduled Banks	1,12,60,560	57,10,270
b) With Non-Scheduled Banks	-	-
c) With Institutions	-	-
d) Others	-	-
3) On Loans:		
a) Employees/Staff	-	-
b) Others	-	-
4) Interest on Debtors & Other Receivables		
a) Interest on IT Refund	24,329	-
TOTAL	1,12,84,889	57,10,270

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

CA Aditya Narayan Mahapatra

(Partner)

M. No. 066784



Deputy Controller of Accounts

Director

23/7/25

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTS

2024-25

Schedule -18 : Other Income

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
1. Profit on Sale/disposal of Assets:		
a) Owned Assets	-	-
b) Assets acquired out of grants, or received free of cost	-	-
2. Export Incentives Realised	-	-
3. Fees for Miscellaneous Services	-	-
4. Service Book reissue charges	500	-
TOTAL	500	-

Schedule -19 : Increase / (Decrease) in Stock of Finished Goods & Work-in-progress

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

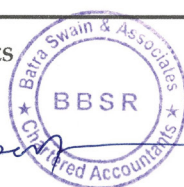
Particulars	Current Year	Previous Year
a) Closing Stock	-	-
Add: Finished Goods	-	-
Add: Work-in-Progress	-	-
b) Less : Opening Stock	-	-
Add: Finished Goods	-	-
Add: Work-in-Progress	-	-
NET INCREASE / (DECREASE) (a-b)	-	-

Schedule -20 : Establishment Expenses

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
a) Pay and Allowances	48,16,98,308	44,01,83,801
b) Manpower (Outsourced)	12,65,58,413	11,66,02,603
c) Contribution to NPS	6,50,47,816	5,86,78,362
d) Leave Travel Concession	45,84,642	23,52,140
e) Fellowship	19,87,57,684	18,90,25,794
f) Honorarium & Scholarship	86,14,360	99,90,738
g) PRIS	2,08,76,556	5,92,24,368
h) Medical Expenses	2,25,06,843	3,00,78,585
i) Children Education Allowance	43,28,512	37,26,000
j) Leave Encashment	42,89,184	32,46,847
k) Professional Update Allowance	69,67,550	64,75,496
l) Gratuity	13,57,139	70,789
TOTAL	94,55,87,007	91,96,55,523

BATRA SWAIN & ASSOCIATES
Chartered Accountants
FRN - 322050ECA Aditya Narayan Mahapatra
(Partner)
M. No. 066784

Deputy Controller of Accounts

Director

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)

ANNUAL ACCOUNTS

2024-25
Schedule -21 : Other Administrative Expenses

(Schedule forming part of the accounts for the period ended on 31.03.2025)

		Amount in (₹)	
Particulars	Current Year	Previous Year	
<u>A. Other Administrative Expenses :</u>			
Academic Expenditure	17,14,164	9,63,389	
Freight & Forwarding Expenses	3,63,772	10,25,735	
Purchases (Consumables)/ Supplies & Materials	3,23,47,771	2,45,53,309	
Repair and Maintenance - Equipments	7,15,255	-	
Repair & Maintenance	4,56,45,935	3,95,21,383	
Advertisement	12,10,272	9,28,426	
Audit Fees	1,29,800	59,000	
Bank Charges & Commission	18,441	8,531	
Hindi Divas Exp.	18,000		
CRA Service Charges	33,941	34,174	
Electricity Charges	10,26,98,345	9,59,16,281	
Fuel for DG set	5,55,000	13,31,223	
House Keeping Expenses	2,53,35,439	3,26,69,103	
Legal Fees	13,27,100	12,14,900	
Meeting Expenses	15,86,808	35,08,704	
News Papers & Periodicals	1,49,818	1,51,947	
Postage & Telegram	2,22,596	2,05,739	
Printing & Stationery	4,04,149	20,63,803	
Seminar/Workshop Expenses	11,67,422	37,80,389	
Telephone & Internet Charges	69,10,497	79,68,780	
Travelling & Conveyance - Domestic	71,43,745	56,31,053	
T.A. on Transfer	1,17,142	-	
Travelling & Conveyance - Foreign	63,66,737	25,17,270	
Vehicle Maintenance Expenses	1,08,79,135	86,39,557	
Professional Charges	9,08,516	6,12,388	
Publication Charges	31,184	6,51,906	
Subscription Journal	10,60,17,093	-	
Subscription Expenses	28,343	19,83,016	
Thesis Evaluation Fee Expenses	2,62,800	8,47,625	
Water Charges	98,53,090	17,90,994	
Rent, Rate & Taxes	30,39,898	33,78,522	
Sports & Internal Activity	8,47,873	-	
Membership Fees	19,430		
EMD/SD Released	13,64,602	-	
<u>B. NISER PLAN EXPENSES :</u>			
a) Domestic Travel	23,57,932	51,41,389	
b) Fellowships/Honorarium	3,54,18,983	2,37,68,667	
c) Foreign Travels	61,62,501	1,34,71,646	
d) Salary Expenses	30,85,946	17,83,973	

e) Other Office Expenses	5,62,664	2,09,747
f) Supplies & Materials	6,93,40,346	11,91,31,589
g) Meeting /Seminar/Workshop Expenses	44,67,951	1,01,26,817
h) Repaire & Maintanance	82,55,758	46,48,134
i) Printing & Stationary	1,50,170	4,12,678
j)Freight & Forwarding Expenses		-
TOTAL	49,92,36,364	42,06,51,787

BATRA SWAIN & ASSOCIATES

Chartered Accountants

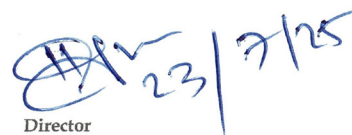
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QA Aditya Narayan Mahapatra
(Partner)

M. No. 066784



Deputy Controller of Accounts



Director



NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER)
ANNUAL ACCOUNTS

2024-25

Schedule -22 : Expenditure on Grants, Subsidies etc.

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amount in (₹)

Particulars	Current Year	Previous Year
a) Grant given to Institutions/Organisation	-	-
b) Subsidies given to Institutions/Organisation	-	-
TOTAL	-	-

Schedule -23 : Interest

(Schedule forming part of the accounts for the period ended on 31.03.2024)

Amount in (₹)

Particulars	Current Year	Previous Year
a) On Fixed Loans	-	-
b) On Other Loans (including Bank Charges)	-	-
c) Others (Specify)	-	-
TOTAL	-	-

BATRA SWAIN & ASSOCIATES

Chartered Accountants

FRN - 322050E

Aditya Narayan Mahapatra

CA Aditya Narayan Mahapatra

(Partner)

M. No. 066784



Deputy Controller of Accounts

Deputy Controller of Accounts

23/7/25

Director

ANNUAL ACCOUNTS 2024 - 25**SCHEDULE 24 – SIGNIFICANT ACCOUNTING POLICIES***(Schedule forming part of the accounts for the period ended on 31.03.2025)***About the Organization:**

The National Institute of Science Education and Research (NISER) was set up at Bhubaneswar by the Department of Atomic Energy, registered as a Society with the Registrar of Societies, Cuttack, Orissa vide registration no:22426/16 dt. 10.07.2007.

NISER, a Grant-in-Aid institution of Department of Atomic Energy and affiliated to Homi Bhabha National Institute, Deemed University of DAE, Mumbai conducts the following academic programme for bright and meritorious students who are selected through National Entrance Screening Test (NEST) conducted on all India basis.

- a) An integrated 5 year M.SC programme in the core and emerging branches of basic sciences to students after 10+2 higher secondary schooling.
- b) Integrated M.SC +PHD programmes after B.Sc from other universities.
- c) Ph.D programme after M.Sc from other Universities.
- d) Computer Science and Earth & Planetary Science

Presently NISER has 853 students admitted in 5 year M.Sc. programme, 19 students admitted in CMRP M.Sc. in the various streams of Basic Sciences. Moreover NISER has 289 research Scholar (Ph D) and 111 Integrated Ph.D. in its roll.

1. Basis of Preparation of Financial Statements

The Financial Statements have been prepared on Cash (Receipt & Payment) basis following going concern concept, accounting standards and in accordance with the General Accepted Accounting Principles in India (Indian GAAP) except otherwise stated elsewhere.

The accounting policies adopted in the preparation of financial statements are consistent with those of previous year.

2. Fixed Assets

Fixed assets are stated at cost of acquisition inclusive of inward freight, duties & taxes and incidental & direct expenses related to acquisition.

3. Depreciation

Depreciation has been provided on written down value method as per rate prescribed in the income Tax Act, 1961.

4. Capital Assets(WIP)

The Institute has certain projects which are still in execution stage and hence these are taken as CWIP. But, as on 31st March,2025, value of CWIP is Rs.24,80,730/-

5. Recognition of Income & Expenditure

Income & expenditure are generally recognised on Cash (Receipt & Payment) basis.

6. Consumable Stores

Lab consumables and stores consumables purchased during 2024-25 are treated as recurring expenditure and the consumables are transferred to respective Schools of study. Necessary records are maintained at the School concerned.

7. Foreign Exchange Transactions

Transactions involving foreign currency are accounted at the exchange rate prevailing on the date of the transaction.

8. Accounting for Registration Fees

Registration fee of students are being accounted for on receipt basis.

9. Accounting of interest earned on FD

Interests earned on lien of FD against LC are being accounted for on actual basis.

10. Government Grants/ Subsidies

- a) Government Grants of the nature of contribution towards capital cost of setting up projects are treated as grant in aid for creation of assets.
- b) Grants in respect of specific fixed assets acquired are shown as a deduction from the cost of the related assets.
- c) Government Grants are accounted on realisation basis.

11. Lease Rent:

Lease Rentals are with reference to Lease Terms.

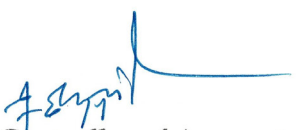
12. Retirement Benefits

Liability towards gratuity payable on death/ retirement and provision for accumulated leave encashment benefit to employees is not applicable at present.

For Batra Swain & Associates
Chartered Accountants
FRN -3222050E



CA Aditya Narayan Mahapatra
Partner
M. No. 066784
UDIN - 25066784BMOPLE6824



Deputy Controller of Accounts
Dy. Controller of Accounts
NISER, Bhubaneswar



Director
DIRECTOR
NISER
Bhubaneswar

Place: Bhubaneswar
Date: 22/07/2025



ANNUAL ACCOUNTS

2024- 25

Schedule -25: Contingent liabilities & Notes on Accounts

(Schedule forming part of the accounts for the period ended on 31.03.2025)

Amounts in Rs.(In Crores)

A) CONTINGENT LIABILITIES

1. Claims against the entity not acknowledged as debts	NIL
2. Liability for partly -paid investments	NIL
3. Liabilities on account of outstanding forward exchange contracts	NIL
4. Guarantee & letters of credit outstanding	NIL
5. Bills Discounted	NIL
6. Other items for which the entity is contingently liable	NIL
7. Arbitration Case with M/s MEIL(Bhubaneswar) Bulk Water Project P Ltd	23.21
8. Income Tax pending demands against which First Appeal filed	
Assessment Year 2018-19	0.60
Assessment Year 2017-18	17.64

B) Notes on accounts

1. Deposit with DCSE&M, Mumbai

During the period of report, against the deposit placed with DCSE&M, Mumbai for construction of NISER Complex, the detailed account statement for Rs. 21,35,00,000/- is yet to be submitted by DCSE&M, Mumbai.

2. Lien against FD

Lien against FD shown in Receipt & Payments account relates to items under import & the same is in order.

3. Fixed Asset Verification

Physical verification of Fixed Asset has been carried out, as informed to us, by the management but no report is available for our verification.

4. Consumable Stores

All purchases are made against specific requirement and supposed to have been consumed in total during the year, hence there is no store lying unused.

5. Corresponding figures for the previous year have been regrouped/ arranged, where ever necessary.
6. Rounded off to the nearest rupee.
7. Two Fixed deposits with Indian Overseas Bank amounting to Rs 45 Crore bearing numbers SDR-373704000002641 for Rs 20 Crore and RDP 373704000002643 for Rs 25 Crore were made. In both the cases the transaction date was 02/04/2025 but the transaction date was 26/03/2025.
8. Schedules 1 to 25 are annexed to and form an integral part of the Balance Sheet as at 31st March, 2024 and the Income & Expenditure Account for the year ended on that date.

For Batra Swain & Associates
Chartered Accountants
FRN -3222050E



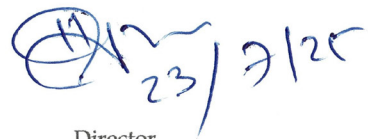
CA Aditya Narayan Mahapatra
Partner
M. No. 066784
UDIN - 25066784BMOPLE6824

Place: Bhubaneswar
Date: 22/07/2025



Deputy Controller of Accounts

Dy. Controller of Accounts
NISER, Bhubaneswar



Director

DIRECTOR
NISER
Bhubaneswar

Note

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ପରମାଣୁ ଶକ୍ତି ବିଭାଗ, ଭାରତ ସରକାରଙ୍କ ଏକ ସ୍ୱୟଂଶାସିତ ପ୍ରତିଷ୍ଠାନ

राष्ट्रीय विज्ञान शिक्षा एवं अनुसंधान संस्थान

परमाणु ऊर्जा विभाग, भारत सरकार का एक स्वयंशासित संस्थान

National Institute of Science Education and Research
AN AUTONOMOUS INSTITUTE UNDER DAE, GOVERNMENT OF INDIA