2014-15 ANNUAL REPORT

राष्ट्रीय विज्ञान शिक्षा एवं अनुसंधान संस्थान

NISER

विद्ययाऽमृतमश्नुते

NISER, BHUBANESWAR

NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, BHUBANESWAR

(An Autonomous Institution Under Department of Atomic Energy, Govt. of India)

Annual Report 2014-15

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Former Professor, IIT Kanpur

Prof. A. Srinivasan,
School of Chemical Sciences, NISER

Prof. V. Krishna Kumar,
School of Mathematical Sciences, NISER

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School of Biological Sciences, NISER

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School of Mathematical Sciences, NISER

Dr. Bedangadas Mohanty,
School of Physical Sciences, NISER

Dr. Sumedha,
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Dr. Manjusha Dixit,
School of Biological Sciences, NISER

Dr Pranay Swain
School of HSS, NISER

Secretary

Dr. A. K. Naik
Registrar, NISER

From The Director's Desk

"No one saves us but ourselves. No one can and no one may. We ourselves must walk the path." **- Gautama Buddha, Sayings of Buddha**

With the possession of the wisdom of the passing one and the dreams and promises of the new one, I take immense pleasure in to presenting the annual report of National Institute of Science Education and Research (NISER) for the financial year 2014-15.

The year that passed by 2011-12 was a meaningful one in many ways. Among the major achievements during this one year, the stand out one has been the success stories scripted by our graduated students. I am extremely proud to note that our alumni have kept the NISER flag flying at some of the most sought after places all over the globe. Most of them are pursuing PhD programmes with fellowships from esteemed Universities and Institutes like Stanford, UCLA, Carnegie Mellon, Pennsylvania, Chicago, Stony Brook, TIFR, IISc, IITs, etc. which reinforces the mandate that NISER is committed to create quality manpower for research in different areas of basic sciences.

The first phase of Jatni campus is nearing completion. The 4th convocation of NISER is going to be held in the permanent campus. We are upbeat about the next academic session (2015-16 July/August) starting from our permanent campus. The facilities in the new campus would include separate buildings for the schools of Physics, Chemistry, Mathematics, Biology and Humanities and Social Sciences. 130000 sq mtrs of residential space accommodating 11 hostels for boys and girls, faculty housing, staff quarters, auditorium, school, post office, hospital, playground, a unique yoga centre on the hill top, etc. are coming up to give the campus a holistic look. In addition to these, facilities for a green house, an animal house, rainwater harvesting, fire fighting, sewage water plants, etc. will also be in place.

We have been extremely privileged to have the financial support from DAE to establish ourselves in the forefront of research and development. Our extremely talented faculty members are currently engaged in scores of research projects with funding from non-DAE sources as well. We at NISER have a youthful profile of faculty members with the average age hovering around the mid-thirties, creating synergy to build the Institution. I take this opportunity to thank them for choosing to grow with this growing institution. We also applaud their achievements in various avenues as they have continuously been bagging academic fellowships and awards, publishing in high impact journals, being invited for talks, attending conferences, engaging in collaborative efforts with leading Universities abroad, etc.

We at NISER firmly believe that innovative approaches and contribution to the existing knowledge pool will hold the key to making the presence of NISER felt in the global knowledge community. That said, we must pull up our socks to graduate from taking baby-steps to giant-strides by furthering the intellectual environment that we have been silently grooming. Such growth would depend entirely on the vision driven actions, quality of inputs, leadership, and commitment from the entire NISER family. NISER recognizes that modern scientific research is carried out in a domain transcending academic and intellectual boundaries. The undergraduate students and research scholars are being nurtured in the ambiance of this scientific culture. We all have been tirelessly working towards this and will continue travelling the extra miles.

With the eternal words by Alexander Graham Bell, let me sum up our journey at NISER:

"When one door closes another door opens; but we so often look so long and so regretfully upon the closed door, that we do not see the ones which open for us."

Last but not the least; I appreciate the efforts by the editorial team in bringing out this comprehensive Annual Report.

Prof. V Chandrasekhar
DIRECTOR

ABOUT NISER

National Institute of Science Education and Research (NISER) is envisioned to be a unique institution of its kind in India. NISER will strive to be recognized as a Centre of Excellence in science education and research in four basic sciences (Biology, Chemistry, Mathematics and Physics) and in related areas. The aim of this special institute is to nurture world class scientists for the country who will take up challenging research and teaching assignments in universities, R & D laboratories and various industries. The exemplary teaching and research attributes of its faculty will inspire strongly motivated bright young students to dedicate their lives for scientific research.

NISER is currently operating out of its transit campus with over 5300 students spread over five batches of students admitted to the flagship MSc programme through NEST in Biology, Chemistry, Physics and Mathematics and Doctoral Programme in all Basic Sciences.

ACADEMIC OVERVIEW

The academic programme of NISER is designed to provide strong foundations to students through core courses, before they embark at the threshold of research in the field of their choice. Although there are four main school: Biology, Chemistry, Mathematics and Physics disciplines like Humanities and Social Sciences have already roped in and Computer science, engineering sciences and earth and planetary sciences will also be included at appropriate stages.

Curriculum

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

School of Biological Sciences

The School of Biological Sciences aims to establish itself as a leading international centre for research and teaching with harmonious synthesis of classical and modern biology - always promoting scholarship, original thinking, innovative ideas and cutting edge research.

The school is on a mission

- To strive to become a centre of excellence in education and research in biological sciences providing training at undergraduate, graduate, doctoral and post-doctoral level.
- To provide effective interdisciplinary learning ambience through extensive subject coverage in all fields of modern biology and inter-phasing with other scientific disciplines.
- To equip its students to keep pace with recent developments in the field of scientific research.
- To undertake high quality research activities in defined areas of biosciences so as to make an impact at national and international level.
- To impart professional training for skilled human resource development across the state and country through short term training courses.
- To strive to develop state of the art infrastructure comparable to best anywhere in the world.

Facilities for Research and Teaching

- Confocal Microscope Facility
- DNA sequencing and Surface Plasmon Resonance Facility
- Micro-array facilities for Genomics

School of Chemical Sciences

Chemistry as a subject has considerable impact on our everyday lives and on other scientific disciplines. The aim of the School of Chemical Sciences at NISER is to impart high quality undergraduate and postgraduate level of knowledge to students coupled with cutting edge research activity by the faculty and the students of the school. In addition to traditional organic, inorganic, physical and theoretical chemistry areas, the school embarks on teaching and research activity in the interface areas of Biology, Material Sciences and Medicine. The teaching philosophy at NISER is not only to impart high quality training to students to make them talented and motivated scientific personnel but also to inculcate human values and concern for societal needs and environment. The School of Chemistry offers one of the best integrated M. Sc. programme and the syllabus is designed not only to teach basic principles but also to have hands on practical experience by doing research projects as a part of the curriculum. The Ph. D. programme of School of Chemical sciences has also been initiated since 2009. Currently, there are over 30 students working in various frontier areas of chemistry.

Facilities for Research and Teaching

- GC Mass and ESI Mass Spectrometers

- State-of-the-art NMR Spectrometer for 1D and 2D Experiments
- Time-Resolved Fluorescence Spectrometers

School of Mathematical Sciences

The School of Mathematical Sciences (SMS) 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 center 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

5-years Integrated M.Sc. Programme

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.

Ph.D. Progamme

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.

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Facilities for Research and Teaching

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

School of Physical Sciences

The 5-year integrated Master of Science (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. 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 Ph.D. students undergo 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 degree of Ph.D.

- 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, Soft-condensed 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, Nano-photonics

Facilities for Research and Teaching

- Scanning Electron Microscope and Lithography
- Ultrafast Time-resolved Spectroscopy for quantum life measurements of molecular dynamics and Ultracold atoms and BEC facility using atom trapping by lasers
- Facility of Magnetic nanostructures and multilayers

School of Humanities and Social Sciences

Scientific temper can sustain and advance in a holistic environment. Creative thinking along with skill based expertise is essential for new age scientists. The School of Humanities and Social Sciences plays a crucial role in the NISER undergraduate programme. The purpose of Humanities and Social Sciences is to help students to identify a set of values which will help them exercise integrity, vision, community involvement, and knowledge of self. It also helps students equip themselves with strong communication skills, interpersonal and team building skills and apply the same in their respective profession. Students must understand the application of their discipline to contemporary issues, they must acquire strong communication and team-building skills, and they must understand the definitions of leadership, personal responsibility, and professionalism. The Humanities and Social Sciences curriculum provides students the opportunity to explore and master communication skills, critical thinking skills, innovative problem-solving skills, and other learning opportunities offered by the department. The school focuses on bridging the gap between society-science interfaces. The School of Humanities and Social Sciences (SHSS) is encompassing five specific areas of study. The school aims to become an innovative centre for research in the fields of English, Economics, Sociology, Philosophy and Psychology. With faculty drawn from diverse background and experience, it targets to be a thriving academic community, ensuring a fertile ground for true multi-disciplinary research. where academic programs are nationally recognized for high levels of quality and clear multi – disciplinary research.

The curricula of the school for the 5-year Integrated Program emphasize interdisciplinary and holistic approach to impart training and skills in humanities and social sciences. To achieve this objective, a set of core has been identified which constitutes the courses of the first two semesters, and one in each in third and forth semester. The curriculum generally begins with a two-course in communication skills, the purpose of which is to develop the required proficiency necessary to communicate, both orally and in writing, in their classes, in the workplace, and in community. Subsequent courses consist of introductory courses humanities and social science courses in

sociology, psychology and economics that introduce students to the concepts of community, society, and self. In the third and fourth semester students are offered a variety of humanities and social science with an opportunity to select any two courses. Students are required to complete a minimum 16 credits. The electives are designed to provide advanced and applied knowledge in the areas of science communication, science, technology and society, organizational behaviour, urban planning, applied behavioural sciences, Indian society and social problems. This installs holistic vision and importance of responsible and sensitive global citizenship, through cultural self-reflection, ethical reasoning and historical understanding among the students.

The PhD. Programme in the school is currently in the implementation phase. The Ph.D programme aims to cultivate high quality research in various fields of English, Economics, Philosophy, Psychology and Sociology. Graduates of the programme are expected to design and execute original, high quality, interdisciplinary research that can be published in major scholarly journals and books of the profession. The Ph.D. degree is generally a four year program culminating in an original piece of humanities and social science research for a thesis and eventual publications in good and scholarly journals. The proposed programme consists of both course Work and research work independently carried out by the student. 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 and industry.. Students are expected to participate in the research seminars in the school, and to attend national/international conferences as well as regional meetings amply supported by NISER. Tata Institute of Social Sciences, Mumbai has recently conveyed approval to host NISER students for the Ph.D programme in Humanities and Social Sciences. The modalities are being worked out and we hope to offer the Ph.D programme in Humanities and Social Sciences from the even semester of academic year 2015-16.

FACULTY

School of Biological Sciences

Dr. Abdur Rahaman Reader-F	Biochemistry
Dr. Asima Bhattacharyya Reader-F	Physiology/Host-Pathogen Interaction, Cancer Biology
Dr. Chandan Goswami Reader-F	Cell Biology
Dr. Debasmita Pankaj Alone Reader-F	Molecular Genetics
Dr. Harapriya Mohapatra Reader-F	Microbiology
Dr. Kishore CS Panigrahi Reader-F	Plant Biology
Dr. Manjusha Dixit Reader-F	Human Genetics
Dr. Palok Aich Associate Professor	Systems Biology
Dr. Pankaj Vidyadhar Alone Reader-F	Molecular Biology
Dr. Praful Singru Reader-F (Chairperson)	Neurobiology
Dr. Subhasis Chattopadhyay Reader-F	Immunology
Dr. V Badireenath Konkimalla Reader-F	Bioinformatics
Dr. Rudresh Acharya Reader-F	Macromolecular X-ray Crystallography, Structural Biology, De novo protein design
Dr. Tirumala Kumar Chowdary Assistant Professor	Structural Virology
Dr. Ramanujam Srinivasan Reader-F	Bacterial Pathogenesis, Cytoskeletal Dynamics and Funtions
Dr. Renjith Mathew Reader-F	Cell Biology, Developmental Biology

School of Chemical Sciences

Prof. V. Chandrasekhar Professor, (Director)	Synthetic Inorganic Chemistry
Prof. T. K. Chandrashekar Sr. Professor (on deputation to SERB, DST)	Inorganic Chemistry Bio-Inorganic Chemistry – Expanded porphyrin Chemistry
Dr. A. Srinivasan Professor	Inorganic Chemistry Bio-inorganic Chemistry: Pyrrole Based Receptors
Dr. Arindam Ghosh Reader-F	Physical Chemistry Methodology development in NMR
Dr. B. L. Bhargava Reader-F	Physical Chemistry Computational studies of Materials
Dr. C. S. Purohit Reader-F	Organic Chemistry Bio-organic and Organic Synthesis
Dr. C. Gunanathan Reader-F	Organic Chemistry Organometallic Chemistry and Catalysis
Dr. J. N. Behera Reader-F	Inorganic Chemistry Low temperature multiferroics from single source precursors and Porous Magnetic Materials
Dr. M. Sarkar Reader-F (Chairperson)	Physical Chemistry Fluorescence Spectroscopy
Dr. N. K. Sharma Reader-F	Organic Chemistry Bio-organic and Organic Synthesis
Dr. Prasenjit Mal Reader-F	Organic Chemistry Supramolecular chemistry and Photochemistry
Dr. S. Peruncheralathan Reader-F	Organic Chemistry Synthetic organic chemistry and Asymmetric Catalysis
Dr. Sanjib Kar Reader-F	Inorganic Chemistry Bio-inorganic chemistry: Metals in Medicine
Dr. Sharanappa Nembenna Reader-F	Inorganic Chemistry Main Group Organometallic chemistry and Low oxidation state metal chemistry
Dr. Subhadeep Ghosh Reader-F	Physical Chemistry Single Molecule Spectroscopy, Molecular Dynamics
Dr. Sudip Barman Reader-F	Physical Chemistry Synthesis and Functionalization of Graphene

Dr. U. Lourderaj Reader-F	Physical Chemistry Theoretical and Computational Chemistry
Dr. V. Krishnan Reader-F	Inorganic Chemistry Catalysis and Materials synthesis
Dr. Himansu Sekhar Biswal Asst. Professor	Laser Spectroscopy and Instrumentation

School of Mathematical Sciences

Dr. Varadharajan Muruganandam Professor	Harmonic Analysis
Dr. Anil Karn Associate Professor (Chairperson)	Theory of operator spaces
Dr. Binod Kumar Sahoo Reader – F	Representations of Geometries
Dr. Brundaban Sahu Reader-F	Number Theory
Dr. Deepak K. Dalai Reader – F	Cryptography
Dr. Kamal Lochan Patra Reader-F	Algebraic Graph Theory
Dr. Nabin Kumar Jana Assistant Professor	Probability Theory
Dr. Sanjay Parui Reader – F	Harmonic Analysis
Dr. Vellat Krishna Kumar Visiting Professor	Differential Geometry
Dr. Subhas Visiting Faculty	Topology
Dr. Shymal Krishna De Asst. Professor	Statistics and Probability Theory
Dr Tanusree Khandai Visiting Faculty	Representation Theory

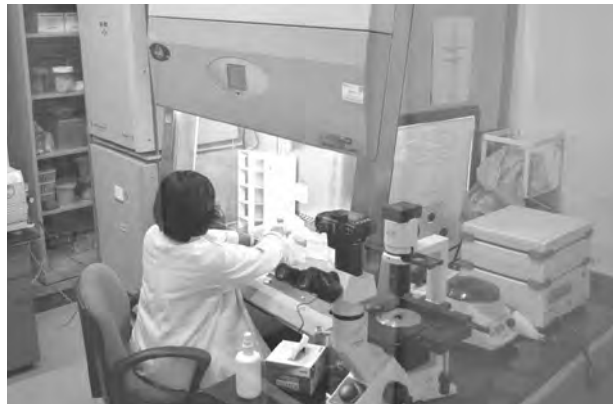
School of Physical Sciences

Sir Christopher Llewellyn Smith Distinguished Professor	
Prof. Ashoke Sen Honorary Fellow	
Prof. Jnanadeva Maharana Adjunct Professor	
Prof. Subhendra D. Mahanti Adjunct Professor	
Dr. Bedangadas Mohanty Associate Professor (Chairperson)	High energy heavy-ion collisions
Dr. Subhasis Basak Reader – F	HEP Theory: Lattice QCD
Dr. Sanjay Kumar Swain Associate Professor	Experimental HEP: LHC Physics
Dr. A. V. Anil Kumar Reader-F	Statistical Mechanics and Modeling of Soft Matter
Dr. Ashok Mohapatra Reader – F	Ultra cold Atoms and Bose-Einstein Condensation
Dr. Chethan N. Gowdigere Reader-F	String Theory
Dr. Colin Benjamin Reader – F	Theoretical CMP and Quantum Information
Dr. Joydeep Bhattacharjee Reader – F	Computational Condensed Matter Physics
Dr. Kartikeswar Senapati Reader-F	Experimental CMP
Dr. Prasanjit Samal Assistant Professor	Theoritical CMP, Atomic and Molecular Physics
Dr. Pratap Kumar Sahoo Reader – F	Nano fabrication and Ion/Photon matter interaction
Dr. Proloy Kumar Mal Assistant Professor	Experimental High Energy Physics (Collider experiments)
Dr. Ritwick Das Reader-F	Nonlinear optics, Lasers and Integrated Optics

Dr. Subhankar Bedanta Reader – F	Experimental condensed matter physics (Nanomagnetism and multiferroics)
Dr. Sumedha Reader – F	Special Mechanics and Interdisciplinary Applications
Dr. Yogesh Kumar Srivastava Assistant Professor	String Theory
Dr. V Ravi Chandra Asst. Professor	Theoretical Condensed Matter Physics
Dr. Prolay Kumar Mal Asst. Professor	Experimental High Energy Physics
Dr Nishikant Khandai Reader-F	Astrophysics and Cosmology

School of Humanities and Social Sciences

Dr. Pranay K. Swain Reader – F	Public Policy and Governance, Science-Society Interface, Contemporary Social Issues
Dr. Debashis Pattanaik Assistant Professor	Social Innovation, Social Network Analysis, Social Study of Science and Technology
Dr. Rooplekha Khuntia Assistant Professor	Business Ethics, Ethical Cynicism, Organizational Behavior and Leadership
Dr. Sujata Kar Assistant Professor	Monetary and Financial Economics
Dr. Joe Varghese Yeldho Assistant Professor	Critical History and Narratives of Race



Courses Offered

School of Biological Sciences

Biology I: Science of Life, Biology II: Cellular and Genetic basis of life, Biophysics and Biostat, Cell biology, Genetics, Ecology, Cell biology Laboratory, Genetics Laboratory, General course, Advance Molecular Biology, Advance Neurobiology, Cancer biology, Advanced Biochemistry, Biology Laboratory, Microbiology, Biochemistry , Biophysics and Biostat, Microbiology Laboratory, Biochemistry Laboratory , Physiology I (Animal Physiology) , Physiology II (Plant Physiology), Neurobiology, Physiology I (Animal Physiology) Lab , Physiology II (Plant Physiology) Lab, Principles of Drug design, Molecular genetics Infection and immunity, Cellular and Genetic Basis of Life, Cell Biology, Genetics, Ecology, Cell biology Laboratory, Genetics Laboratory, Molecular Biology, Immunology, Endocrinology, Plant Developmental Biology, Mol Biology Laboratory, Immunology Laboratory, Quantitative Biology, Biological techniques: Theory and practice.

School of Chemical Sciences

Theory: Chemistry I, Quantum Chemistry I, Physical Methods in Chemistry II, Nuclear Magnetic Resonance, Basic Inorganic Chemistry, Polymer Chemistry, Advanced Organic Chemistry, Classics in Molecules, Physical Organic Chemistry, Organic Chemistry I, Organic Chemistry II, Organic Chemistry III, Supramolecular Chemistry, Organic Photochemistry, Advanced Bio-Organic Chemistry, Magnetism, Solid State Chemistry, Crystallography

Laboratory: Chemistry Lab I, Chemistry Lab II, Chemistry Lab III, Physical Chemistry Lab -1, Biomolecular Lab, Electronics Lab, Inorganic Chemistry Lab

School of Mathematical Sciences

General Mathematics – I & II, Computation Laboratory – I & II, Analysis-I, Algebra-I (Group Theory), Discrete Mathematics, Analysis-II, Algebra-II (Linear Algebra), Probability Theory, Elementary Number Theory, Analysis-III, 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 and Coding Theory, Algebraic Topology, Operator Algebra, Harmonic Analysis.

School of Physical Sciences

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,

School of Humanities and Social Sciences

Technical communication – I & II, 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.

Academic Achievements and Research Overview

SCHOOL OF BIOLOGICAL SCIENCES

Systems Biology (Palok Aich, Associate Professor)

Modern day world requires more work than play. While such demand puts us under various stressors (cause of stress) with the potential to perturb homeostasis, physiologically we try to restore normalcy by adjusting parameters of several physiological processes of a system. How do we achieve the restoration, how are balancing acts performed among different physiological processes such as immunity, metabolism etc. are a few of the interests of my laboratory. My lab tries to develop methodologies to quantify psychological stress status of individuals, correlating stress with disease susceptibility (e.g. metabolic syndromes and infectious diseases) as well as how innate immunity can be primed to prevent against such diseases. For priming, we use mainly select probiotics and host defense peptides. We also try to enhance efficacy of these immune modulators by nanotechnology. In addition, we also attempt to understand how metagenome of gut microbiome regulates us. As we are more metagenomic than genomic, my main emphasis is to understand cross talk between host genome and metagenome of resident microbiomes under different conditions.

Our results are leading to an insight that correlation of genomic and metagenomic (especially for gut microbiota) properties of individuals could perhaps lead to a better understanding of physiology and perhaps better maintenance of health. We use a combination of experimental and theoretical methodologies to achieve our goals

Signaling systems in plants, Light perception, flowering time control, circadian rhythm and biological clock. (Kishore CS Panigrahi, Reader-F)

As a living organism, plants are unique in many ways compared to animals. Like animals they also sense and perceive environmental stimuli and react to it. However, unlike animals they cannot run away from the unfavorable environmental conditions. They have also mechanisms that anticipate diurnal and seasonal changes that in turn are required for its reproductive fitness. Undoubtedly, they have evolved with amazingly intricate but well defined signaling networks tuned to suit its neighboring environment. We would like to explore these signaling networks in plants and would employ molecular, genetic, proteomic and cell-biological approaches. These researches would lead to identify possible regulators that would help the plant to withstand the effects of global warming and climate change. Furthermore, we will also explore some of the locally available

medicinal plants and their extracts under the frame-work of chemical genetics. We wish to start with the following areas first and would expand our research interest with time and need.

1. Light signaling and flowering time control in plants.
2. Plant response to stress. proteomic and microarray profiling in different tissues and regions of a plant.
3. Screen for early or late photo-periodic flowering regulators influenced by the diurnal temperature differences.

Nuclear remodelling in Tetrahymena: Role of Dynamin related protein (Abdur Rahaman, Reader-F)

Nuclear remodelling is a universal process that occurs in all eukaryotes. It is relevant to human health, since a number of known human diseases are linked to nuclear remodelling. In spite of extensive research using higher eukaryotic systems, some basic questions related to nuclear remodeling remains unanswered. Specifically the mechanism of nuclear envelope expansion including the lipid addition to the nuclear envelope is not clearly understood. Tetrahymena undergoes closed mitosis and nuclear envelope expands ~10 folds during specific stages in cell conjugation. My group is interested on nuclear remodelling in Tetrahymena, specifically understanding the mechanism and cell cycle regulation of nuclear envelope expansion. Gene manipulation, generation of knockouts, maintenance of lethal alleles and in vivo structurefunction analysis are easily achieved in Tetrahymena. This makes it a suitable model organism to study nuclear remodeling.

Cell biology of pain (Chandan Goswami, Reader-F)

TRP channels at the peripheral neurons act as “pain receptors” and are sensitive to stimuli like low pH, high temperature, noxious compounds, immune system and psychological state. In most cases, the pain is "acute" and thus decays fast if not vanishes in absence of these stimuli. However, in case of long-lasting chronic pain, there is no effective medical treatment. The factors involved in the development of chronic pain remain unclear. The chronic pain can be partially explained by the permanent changes in the neuronal signaling events and by alternate neuronal connections. Understanding of different molecules, cellular components like mitochondria and cytoskeleton as well as their complex regulation in the context of pain chronification is the main focus of this lab.

Molecular and Cellular Targets of Anesthesia and Anesthesia-induced Neurotoxicity; Role of small GTPases in Development and Disease (Debasmita Pankaj Alone, Reader-F)

Understanding molecular mechanisms that lead to a clinical state of “Anesthesia” has been a struggle for anesthesiologists, physiologists, biochemists and behavioral biologists for a very long time now. Upon exposure to anesthetic agents the subject feels no pain, loses short term memory and remains unconscious. The required high concentrations of these drugs both influences the fluidity of the lipids and acts on proteins such as ion channels and receptors e.g. GABA, Glutamate

receptors, voltage gated and leak channels. My research aims to contribute by uncovering novel molecular targets of general anesthetics using molecular genetics in Drosophila melanogaster. Another major thrust would be to develop a fly model for understanding any neurotoxicity possibly associated with exposure to general anesthetics. This would also help establish the validity of conflicting opinions about influence of anesthetics on progression of neurodegenerative diseases i.e. actions of anesthesia are completely reversible versus increasing evidence that they might lead to irreversible changes by inducing apoptosis in the CNS. Possible outputs would involve developing new behavioral methodologies and employing various genetic, anatomical and behavioral assays to screen for neurotoxicity associated not only with general anesthetics but also with various other drugs and chemicals.

Microbial genome dynamics and plasticity, antibiotic resistance genes and mobile genetic elements (Harapriya Mohapatra, Reader-F)

My areas of research interests basically revolves around comparative genomic analysis of commensal and pathogenic bacteria. As antibiotic resistance has manifested itself as a serious public health problem all over the world. Complexity of the problem escalates manifold in developing countries due to numerous interlinked socio-economic factors. One of the projects aims at understanding the transmission dynamics of microbial resistome. Moreover, in nature seldom do bacteria exists in solitaire. It is increasingly evident that majority of pathogenic bacteria are derived from commensals that have acquired genes from foreign source. The second area of my research interest involves studying the evolution of pathogenic bacteria from their non-pathogenic counterpart.

Angiogenesis regulation, Genetics of Muscular Dystrophy, Genetics of coronary artery disease, gallstone disease and diabetes mellitus (Manjusha Dixit, Reader-F)

To delineate molecular mechanism contributing to the pathological changes in Facioscapulohumeral Muscular Dystrophy and to establish therapeutic regimes, role of Pitx1 in FSHD was determined. To test the hypothesis that up-regulation of Pitx1 contributes to the pathological changes in FSHD, DUX vectors and Pitx1 promoter fragment were cotransfected in C2C12 cells. Luciferase assay identified that PITX1 is direct transcriptional target of DUX4. Site directed mutagenesis of Pitx1 promoter fragment reduced luciferase activity significantly when cotransfected with DUX vector. Electrophoretic mobility shift assay further confirmed interaction between DUX4 and Pitx1. Also conditional muscle specific Pitx1 transgenic mouse line was developed, which can be animal model for FSHD.

Interdisciplinary approaches towards rational drug design and molecular medicine; Chemo/Pharmacogenomic profiling of traditional medicine and natural products (K. V. S. Badireenath, Reader-F)

Interdisciplinary approaches in the area of rational drug design and molecular medicine is the need of hour to drive high-throughput drug discovery. An increased understanding of molecular

principles of protein-ligand interactions indeed enabled drug design and discovery in a big way by thoroughly indexing data from various computational and experimental methods. The quality of hit compounds from virtual screening can be adequately increased based on the understanding the structure activity relationship of any drug using different data-mining strategies. Ultimately, the goal of applying such methods would yield reliable hit compounds which can be further validated in lab conditions.

Molecular mechanisms of eukaryotic translation initiation(Pankaj Vidyadhar Alone, Reader-F)

Protein biosynthesis is an important step in the life cycle of cells where genetic information is converted into functional protein information. Selection of an open reading frame is a key function of the translation initiation apparatus and a key regulatory step, which controls geneexpression. My research interests are to understand a) 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 supra molecular assembly of translation initiation complex. I am using a range of genetic, biochemical and biophysical techniques in the yeast model system.

Cellular mechanism of immune-regulation and its translational use in immuno-therapy (Subhasis Chattopadhyay, Reader-F)

Immune system is accountable for combating infectious diseases and cancer, in allergy, autoimmunity and immunopathology. The cellular, molecular and organismal levels to understand development, function, and regulation of the immune system from the most fundamental mechanisms to therapeutic applications are the major interests of Immunology Research. We would like to study immuno-regulatory T cells (Treg) and Toll Like Receptor. (TLR) response in cancers, infectious diseases and inflammatory responses to regulate the immunogenic T cell response and designing the cellular inhibitors of Tregs so that immunosuppressive Tregs in tumor and infectious diseases can be regulated. Research in animal model and also with the human blood samples from normal donors and patients with due consents and National guide lines are the prime candidates for such experimental studies.Such understanding will help us towards designing vaccine strategies to control various diseases.

Structural Biology of membrane and water soluble proteins, de novo protein design, and structure based drug design (Rudresh Acharya, Reader-F)

Our research focuses on structural biology of membrane, and soluble proteins. We use X-ray crystallography as a tool to elucidate the structures of proteins. We are interested in elucidating structures viroporins. The channel structure provides insights into molecular mechanism for channel activity, and also aid in desiging antiviral drugs. Our interest is also to determine the structures of TM domain of bacterial histidine kinase sensors (HKs) to decipher the molecular mechanism for signal transduction across the membrane. This understanding is essential in

general, and critical for pharmaceutically relevant therapeutic targets. Our research also focuses on understanding helix-helix interactions in membrane proteins with respect to dynamics, stability and structure-function correleations. The knowledge based parameters will be put into test by computational protein design of transmembrane proteins and characterization by various biophysical experiments. We are also open to widen our interests on the other systems.

Structural Virology (Tirumala Kumar Chowdary, Assistant Professor)

We are interested in biology of emerging infectious viruses, with emphasis on viral entry into host cell and virus-host protein interactions. We use molecular virology, structural biology, biophysical and biochemical techniques to study viral cell-entry machinery and its interactions with cellular receptor(s). Broad goal of our research is to develop knowledge for novel therapeutic strategies that prevent viral entry, and hence infection.

Neural circuits and neuroendocrine regulation (Praful S. Singru, Reader-F)

We have been interested in studying the complexity of neural circuitries, the multisynaptic pathways, and the neuroactive substances involved in the regulation of feeding, energy balance, reward and neuropsychiatric disorders. We are also exploring the neural pathways and interaction of neurotransmitters in the preoptic area and hypothalamus which links reproduction with energy status, and governs the neuroendocrine regulation of seasonal reproductive cycle and reproductive behavior.

Research Publications:

- Sanyasi S, Kumar A, Goswami C, Bandyopadhyay A, Goswami L (2014) A carboxy methyl tamarind polysaccharide matrix for adhesion and growth of osteoclast-precursor cells. Carbohydrate Polymers, 101, 1033-1042
- Pati R, Mehta R, Mohanty S, Padhi A, Sengupta M, Baskarlingam V, Goswami C, Sonawane A. (2014) Topical application of zinc oxide nanoparticles reduce bacterial skin infection in mice and exhibit antibacterial activity by inducing oxidative stress response and cell membrane disintegration in macrophages. Nanomedicine S1549-9634(14)00114-2.
- Pradhan N, Pratheek BM, Garai A, Kumar A, Meena VS, Ghosh S, Singh S, Kumari S, Chandrashekar TK, Goswami C, Chattopadhyay S, Kar S, Maiti PK. (2014) Induction of apoptosis by Fe(salen)Cl through caspase-dependent pathway specifically in tumor cells. Cell biology international 38, 1118-31.
- Kumar A, Bhandari A, Sarde SJ, Goswami C. (2014) Sequence, synteny, phylogeny and variants analyses of heparin cofactor II. Immunobiology 219, 713-28.
- Kumar A, Bhandari A, Sarde SJ and Goswami C. (2014) Molecular phylogeny of C1 inhibitor depicts two immunoglobulin-like domains fusion in fishes and ray-finned fishes specific intron insertion after separation from zebrafish. Biochemical and Biophysical Research Communications. 450, 219-26.

- Kumar A, Sahu SK, Mohanty S, Chakrabarti S, Maji S, Reddy RR, Jha AK, Goswami C, Kundu CN, Rajasubramaniam S, Verma SC, Choudhuri T. (2014) Kaposi Sarcoma Herpes Virus Latency Associated Nuclear Antigen Protein Release the G2/M Cell Cycle Blocks by Modulating ATM/ATR Mediated Checkpoint Pathway. PLoS One. 9(6):e100228.
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- Kumar A, Bhandari A, Goswami C (2014) Surveying genetic variants and molecular phylogeny of cerebral cavernous malformation gene, CCM3/PDCD10. Biochemical and Biophysical Research Communications 455, 98-106.
- Kumari S, Kumar A, Sardar P, Yadav M, Majhi RK, Kumar A, Goswami C (2015) Influence of membrane cholesterol in the molecular evolution and functional regulation of TRPV4. Biochemical and Biophysical Research Communications 456, 312-9.
- Majhi RK, Sahoo SS, Yadav M, Chattopadhyay S, Goswami C. (2015) Functional Expression of TRPV Channels in T cells And Their Implications in Immune Regulation. The FEBS Journal. 282, 2661-81.
- Majhi RK, Saha S, Kumar A,Swain N, Goswami L, Mohapatra PP, Maity A, Sahoo V, Kumar A, Goswami C.(2014) Sperm specific expression of temperature-sensitive ion channel TRPM8 correlates with vertebrate evolution. PeerJ (Pre Print)
- Das Sourajit S, Nanda Gargi G, Alone Debasmita P, 2014. Artemisinin and Curcumin inhibit Drosophila brain tumor, prolong life span, and restore locomotor activity. IUBMB Life 66: 496-506.
- Padhy Biswajit, Nanda Gargi G, Chowdhury Mahesweta, Padhi Debanand, Rao Aparna, Alone Debasmita P, 2014. Role of an extracellular chaperone, clusterin in the pathogenesis of pseudoexfoliation syndrome and pseudoexfoliation glaucoma. Experimental eye research 127: 69-76.
- Nanda Gargi G, Padhy Biswajit, Samal Sujata, Das Sujata, Alone Debasmita P, 2014. Genetic association of TCF4 intronic polymorphisms, CTG18.1 and rs17089887, with Fuchs' endothelial corneal dystrophy in an Indian population. Investigative ophthalmology & visual science 55(11):7674-80.
- Phom Limamanen, Achumi Bovita,Alone Debasmita P, Muralidhara M, Yenisetti S.C., 2014. Curcumin's Neuroprotective Efficacy in Drosophila Model of Idiopathic Parkinson's Disease is Phase Specific: Implication of its Therapeutic Effectiveness.Rejuvenation Res., 17(6): 481-9.
- Rath S, Das L, Kokate SB, Pratheek BM, Chattopadhyay S, Goswami C, Chattopadhyay R, Crowe SE, Bhattacharyya A. Regulation of Noxa-mediated apoptosis in Helicobacter pylori-infected gastric epithelial cells. FASEB J. 2015 Mar;29(3):796-806.

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- Shivaram Singh, Ayaskanta Singh, Debasis Misra, Bijay Misra, Girish Pati, Sanjib Kar, Manas Panigrahi, Pallavi Bhuyan, Kaumudi Pattnaik, Chudamani Meher, Omprakash Agrawal, Niranjan Rout, Palok Aich. (2015). Risk factors associated with the development of non-alcoholic fatty liver disease in Indians: A case control study. Journal of Clinical and Experimental Hepatology (in press)
- Sushri Priyadarshini and Palok Aich. (2015) Understanding effects of Psychological Stress on physiology and disease through human stressome - An integral algorithm. Current Bioinformatics (in press)
- A, Sur, B. Pradhan, A. Banerjee & P. Aich. (2015) Immune activation efficacy of indolicidin is enhanced upon conjugation with carbon nanotubes and gold nanoparticles. PLoS One 10 e0123905.
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Conference/seminar:

- Goswami C : UGC Refresher's course at Sambalpur University: 29-30th Oct 2014
  Title: Science of sensation and pain: A modern approach (Total 4 lectures)
- Goswami C : Invited seminar in Department of Life Sciences, Sambalpur University: 30th Oct 2014
  Title: Science of sensation and pain: A modern approach
- Goswami C : Nobel Evening Lectures, IOP Bhubaneswar. 7th Nov 2014.
  Title: "The Nobel Prizes in Chemistry in 2014: For the development of super-resolved fluorescence microscopy",
- Goswami C : International Symposium on Genetic Analysis: Translational and Developmental (iNSGTD-2014) and Annual Meeting of Society of Biotechnologists (India), 23rd Nov 2014, Burdwan University,
  Title: Understanding the cellular and molecular basis of TRPV-mediated channelopathies
- Goswami C : 5th Meeting of the Asian Forum of Chromosome and Chromatin Biology, JNCASR, Bangalore, 17th Jan, 2015.
  Title: Importance of TRP channels in differentiation: some unique regulations
- Goswami C : 2nd International Conference on Frontiers in Biological Sciences (InCoFIBS-2015), NIT Rourkela, 22nd to 24th Jan, 2015
  Title: Influence of membrane cholesterol in the molecular evolution and functional regulation of TRPV4

- Goswami C : Invited seminar at Special Centre for Molecular Medicine, JNU, New Delhi, 1st June, 2015

  Title: Functional Expression of Transient Receptor Potential Vanilloid Channels (TRPV) in T cells And Macrophages: Their Implications in Immune Regulations and infection

- Goswami C : Invited seminar at National Institute of Plant Genome Research, New Delhi, 2nd June, 2015

  Title: Plant-animal interactions: Importance of thermo-sensitive ion channels

- Goswami C : Invited seminar talk at Department of Biochemistry, Freie University, Berlin. 3rd July 2015

  Title: The molecular and cellular mechanism behind the TRPV3-mediated channelopathy (Olmsted Syndrome)

- Goswami C : 40th FEBS Congress, The biochemical basis of Life, Berlin, Germany 4-9th July

  Title: Influence of membrane cholesterol in the molecular evolution and functional regulation of TRPV4

- Goswami C : Invited seminar talk at Blaue Grotte seminal hall, Charite Campus Benjamin Franklyn, Berlin. 10th July 2015

  Title: "Cross talk between TRP channels and sterols & steroids"

- Goswami C : Leibniz Institute for Neurobiology, Magdeburg, Germany, 15th July 2015

  Title: "Importance of TRPV ion channels in neuronal functions and in different pathophysiologies"

- Alone Debasmita P: Genetic association ofTCF4intronic polymorphisms, CTG18.1 and rs17089887 with Fuchs' endothelial corneal dystrophy in Indian population, 18th February, 2015 at ASIA-ARVO 2015 held at Yokohama, Japan

- Alone Debasmita P: Assessing the penetrance of CTG18.1 allele in Indian population: a diagnostic tool for FECD? on 7th February, 2015 at 1stInternational Conference on Translational Research:From Basic Science to Clinical Application; Organized by: Indian Society for Translational Research, New Delhi at KIIT University Bhubaneswar.

- Alone Debasmita P: Genetic association of TCF4 intronic polymorphisms, CTG18.1 and rs17089887, with Fuchs' endothelial corneal dystrophy in an Indian population, November 21st -23rd, 2014 at International Symposium on genetic analysis Translational and Developmental and Annual meeting for society for Biotechnologists (India), Department of Zoology, The University of Burdwan.

- Alone Debasmita P: Artemisinin and curcumin regress Drosophila brain tumour and restores normal brain function, 16-18th November 2014, 6th World Congress on Preventive and Regenerative medicine, KIIT University, Bhubaneswar, Odisha.

- Alone Debasmita P: Establishment of the role of natural products as anti-cancer agents against brain tumour: proof from a Drosophila study, March 12-13, 2014, Cytogenetics Laboratory, Department of Zoology, Banaras Hindu University, Varanasi 221005.

- ChattopadhyayS: Invited talk for "Refresher Course in Life Science" entitled "Understanding Cellular Immunology" organized by PG DEPARTMENT OF ZOOLOGY, Utkal University, 4th March, 2014.

- ChattopadhyayS: Invited talk entitled "Neuro-immunology" for a National seminar on "Neurodegeneration: Challenges and Management" organized by School of Pharmaceutical Sciences, Siksha O Anusandhan University, Bhubaneswar-751003, on 10th March 2014.
- ChattopadhyayS : Invited talk entitled T cell response associated to sensing and sensation receptors in the National Symposium on "Emerging trends in Biotechnology: present scenario and future dimensions" organized by Post Graduate Department of Biotechnology, Utkal University, Bhubaneswar on 29th March, 2014.
- ChattopadhyayS : Invited talk entitled "Experimental Cellular Immunology" at Trident Academy of Creative Technology, Chandrasekharpur Bhubaneswar- 751024, Odisha, INDIA Bhubaneswar on 13th December, 2014.
- ChattopadhyayS : Invited talk entitled "Cellular Immuno-regulatory Responses: From Experiments towards Translational Implications" in 1st International Conference on Translational Research: From Basic Science to Clinical Application, Organized by: Indian Society for Translational Research, New Delhi, KIIT University, Bhubaneswar, National Centre for Cell Science (NCCS) Pune and Institute of Life Sciences (ILS), Bhubaneswar. Date: 5th – 7th February, 2015, Venue: KIIT University, Odisha, INDIA.
- Pankaj V. Alone: Intricacies of translation initiation process: eIF2 mutant affects the fidelity of AUG codon selection independent of Met-tRNA$_i^{Met}$ binding affinity. IISER-Kolkata, Department of Biological Sciences 2015,
- Charles Antony and Pankaj V Alone: eIF5^{G31R} mutant selectively utilizes UUG as a start codon under starvation conditions. Translational Control Meeting, Cold Spring Harbor Laboratory, New York USA. September 2014.
- Pankaj V. Alone: Intricacies of translation initiation process: eIF2 mutant affects the fidelity of AUG codon selection independent of Met-tRNA$_i^{Met}$ binding affinity. National Symposium on Frontiers of Biology: The DAE Spectra. SINP Kolkata, January 2015.
- Ramanujam S: Current Trends in Condensed Matter Physics, NISER, 19-22nd Feb. 2015. Diversity in Cytoskeleton: "The Legacy of Prokaryotes".
- Ramanujam S: Cell Mechanics Meeting, Raman Research Institute & NCBS, 24-26th April, 2015. "Cytoskeleton in Prokaryotes: Assembly, Dynamics & Diversity".
- Konkimalla VB : Regional Science Centre. May 21, 2015. Bhubaneswar, India
- Konkimalla VB : 3rd International Work Conference on Bioinformatics and Biomedical
- Engineering (IWBBIO-2015). Apr 15-17, 2015. Granada, Spain.
- Palok Aich : Stress and mathematical modelling, Feb 23-24, 2015, NISER, Bhubaneswar, India
- Palok Aich : Probiotics show promise in intervening bacterial and viral infection, 2nd PAi conference along with an international symposium on probiotics and microbiome: Gut and beyond. Nov 3-4, 2014. India Habitat Centre, New Delhi, India.
- Palok Aich : Effects of probiotics on human health, Daflorn Ltd., Bulgaria, July 12-15, 2014

- Palok Aich : Probiotics and Future. Centre for Human Microbial Ecology, Translational Health Science and Technology Institute (THSTI), July 10, 2014
- Palok Aich : World Digestive Day on Assessment of gut microobiota in health and disease, Department of Gastroenterology, S.C.B. Medical College, Cuttack, India. May 29, 2014
- Invited Lecture. National symposium on emerging trends in biotechnology: Present scenario and future dimensions, 29-30 March 2014, PG department of biotechnology, Utkal University, India.
- Singru PS: National Symposium on emerging trends in Biotechnology, Department of Biotechnology, Utkal University, March 29-30, 2014.
- Singru PS: International Conference on Frontiers in Comparative Endocrinology and Neurobiology-2014 (FCEN-2014). September 25-28, 2014.
- Singru PS: International Symposium on Translational Neuroscience and 32ndAnnual Conference of Indian Academy of Neurosciences, NIMHANS, Bengaluru, November 1-3, 2014.
- Singru PS: SERB School in Neuroscience, VIII Edition, IISER-Pune, December 8-21, 2014.

Grants and Awards:

- Goswami C : Selected as a member of "Board of academics", Utkal University. Bhubaneswar, India (Since 2010-till now)
- Goswami C : "Member, Board of studies", Ravenshaw University, Cuttack (Since 2011-till now)
- Goswami C : Elected as an executive member (2013-2015) of All India Society for Cell Biology
- Goswami C: Served as a "Resource person" for UGC refreshers course at Sambalpur University, 2014.



School of Chemical Sciences

Prof. V Chandrasekhar, Professor

Prior to joining NISER as Director in January 2014, Prof. Chandrasekhar worked at the Tata Institute of Fundamental Research, Centre for Interdisciplinary Sciences, Hyderabad as a Senior Professor and Dean (2012-14) and at IIT Kanpur at the head of the Department of Chemistry and Dean of Faculty Affairs. His current research interests are in the area of molecular materials, main-group- and organometallic chemistry. He is the recipient of several national and international awards including the Shanti Swarup Bhatnagar Award, the Friedrich-Wilhelm Bessel Award, and the national J. C. Bose Fellowship. He is a fellow of all the academies of sciences in India as well as the academy of sciences of the developing world, Trieste, Italy.

Prof. T. K. Chandrashekar, Sr. Professor

Our research activities are centered on synthesis and application of tetrapyrrole pigments and related macrocycles. Mainly focuses on; (1) To understand such macrocycles in the biological world; (2) Structure – Function correlations; (3) To find out their potential applications as Non-liner Optical materials, Photodynamic therapeutic drugs and receptor properties and (4) Use as versatile catalysts for many industrial inorganic reactions.

Dr. A. Srinivasan, Professor

Pyrrole Based Receptor Materials. Our research interests are: (1) synthesis of various metallocenyl incorporated calixpyrrole and calixphyrin – normal and expanded derivatives, structural analysis and receptor properties; (2) Calixbenzophyrins with Aggregation Induced Enhanced Emission Characteristics and applications as Hg(II) chemosensor; (3) Synthesis and structural analysis of normal, expanded and contracted porphyrinoids; (4) N-confused porphyrinoids – as Sensitizer for Photodynamic therapeutic applications and (5) Metal assisted macrocyclic synthesis.

Dr. Sanjib Kar, Reader F

Transition metal complexes are important in catalysis, materials synthesis, photochemistry, and biological systems. Display diverse chemical, optical and magnetic properties. In that context we are exploring the synthesis, structural characterization, spectroscopic properties (Raman, IR, NMR), electrochemistry, magnetic properties and chemical reactions of novel transition metal complexes.

To design and synthesis of newer classes of iron and manganese complexes incorporating selective combination of porphyrin and corrole ligand functionalities in order to achieve synthesis of the relevant iron and manganese complexes whose oxidation levels, electronic properties and mode of reactivity can be tuned by selective introduction of suitable donor or acceptor groups in the porphyrin/corrole frameworks. We will analyze the use of high-valent iron and manganese

complexes of corrole and porphyrinin atom transfer and dioxygen evolvingcatalysis. Study of transition metal complexes of corrole and porphyrin will lead to discovery of excellent catalysts, in terms of stability and efficiency, for a variety of synthetic reactions. We will also investigate the efficacy of these complexes to intervene tumor growth. Preliminary study indicates that the proposed compounds indeed is able to induce apoptosis in vitro, an elaborate investigation is warranted to fully understand their mechanism of action and also the effectiveness in suppressing the tumor in vivo. Thus the present work will have a great translational importance in therapeutic intervention of tumor.

Water oxidation catalyzed at the oxygen-evolving center (OEC) in photosynthesis is one of the most important and fundamental chemical processes in nature. A manganese cluster consisted by four manganese ions in higher plants plays an important role as a catalyst for water oxidation and oxygen evolution. It is our aim to establish artificial OEC models not only for understanding and simulating the photosynthetic OEC, but also to construct artificial photosynthesis, which is attracting a great deal of interest to convert solar energy into fuels.

The enzyme family cytochrome P-450 (cytochrome P-450s are oxidation enzymes, which bear a thiolate group as an axial ligand and catalyze the oxidation of organic substances by oxygen activation) catalyzes the incorporation of one oxygen atom from O_2 into a variety of organic substrates. We prepare chemical models (metal porphyrin) of cytochrome P-450 for catalytic oxygenation of olefins and hydrocarbons.

Dr. Arindam Ghosh, Reader-F

Our group works on method developments in the field of small molecules as well as large bio-molecules, digital signal processing techniques applicable to spectroscopy. Currently we are working on four different projects. The first aims at investigating, both theoretically and experimentally, the noise profiling of different rapid data acquisition techniques. The second project try to find solution against some of the fundamental challenges of NMR such as background noise, overlapping of signals, presence of undesired signals etc using digital signal processing techniques. The third project focuses on developing a MATLAB based programming package which will both simulate NMR spectra and help in product operator formalism at the same time. In addition we also work on NMR metabonomics and method developments associated with it.

Dr. B. L. Bhargava, Reader-F

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 the 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 the 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 be studied using molecular dynamics.

Dr. Chandra Shekhar Purohit, Reader-F

Peptide Nucleic Acid as a Tool for Sequence Specific DNA Cleavage. The manipulation of DNA serves as a tool for genetic engineering and DNA nanotechnology. It can even be possible to use these tools in cancer therapy for these following reasons. Cancer is caused by unregulated cell division in the tissue. One of the chemotherapy approaches for its cure is to damage the DNA, thereby stopping the cell to divide further which leads to apoptosis of the cell. cis-Platin is one of the chemical agent used to treat cancer. The function of cis-Platin is to cross linking two DNA strands, thereby stopping the cell division. Another way of stopping cell division is to damage the DNA which cannot be repaired by the cellular mechanism. Single nick on the DNA by cleaving phosphate bond is usually repaired by the enzymes. However, a second damage around the damaged site is hard to repair and leads to apoptosis. Because of possible chemotherapy agents and other uses in biotechnology, there has been a lot of interest in preparing molecules and metal complex that cleave DNA. The major disadvantage with these molecules is their non-sequence specific cleavage of DNA. Therefore, new chemical agents are required which can cleave DNA with sequence specificity. In principle, this is possible if these molecules will have two components. One, which targets the DNA sequence specifically, and binds to it and a second component, cleaves the DNA at that position. This strategy will be used to synthesize few molecules and study their properties during the project execution.

Dr. C. Gunanathan, Reader-F

Chemistry of Pincer Complexes: Developing Sustainable Catalytic Processes. Sustainable development is accepted as an essential goal for achieving societal, economic and environmental objectives. Chemists have a prominent role to play for such a development by devising new environmentally benign methodologies. Discovery of new reactions to make advanced synthetic intermediates and target molecules in minimal steps also could save time, investment and minimize chemical waste.

Chemistry of Pincer Complexes is an important and rapidly growing discipline in Science. The focus of our research is centered on developing new pincer complexes and their applications as catalysts for synthesis, bond activations, and activation of small molecules. Hence, our group opens up a research discipline that focus on the fundamental studies of design and synthesis of new pincer complexes, and their organometallic chemistry with the perspective of developing efficient and green catalytic transformations through new discoveries. We also plan to foray into multi-component reactions and development of new lanthanide complexes for catalysis.

Dr. Jogendra Nath Behera, Reader-F

There is a considerable interest in multimetallic oxides incorporating heavy main group (lead and bismuth) and transition metals because of their attractive properties, such as ferro- and piezoelectricity, multiferroism, catalysis, and superconductivity. However, the preparation of lead-containing mixed oxides by traditional high-temperature solid state synthesis is often difficult to

control because of the volatility of PbO. It is well-known that some heterometallic coordination complexes with suitable ligands can be used as single-source precursors (SSPs) to obtain crystalline oxide materials upon their decomposition at significantly lower temperatures compared with the solid state or multisource precursor approaches. The most common application of metal β-diketonates as precursors for the metals and metal oxides is based on their high volatility and clean, low-temperature decomposition pattern. To understand the importance of lead-containing transition hetero-bimetallic oxides, we are synthesizingc respective hetero-bimetallilc diketonates as single source precursors by both solution and solid-state methods.

While metal-organic frameworks have shown much promise and potential in interactions with small molecules (i.e; gas adsorption, etc), few studies report electronic or ionic conductivity in such porous compounds. To induce electronic conductivity, we will develop new frameworks with select metal cations and ligands to enhance electron transfer throughout the framework.

The most remarkable characteristic of MOFs relevant to catalysis, which makes them unique, is the lack of non-accessible bulk volume and thus, the mass transport in the pore is not hindered. Secondly, different strategies can be applied to introduce catalytically-active sites to facilitate the reaction inside MOFs. One approach is to utilize the metal-connecting points which coordination environments is saturated with coordinated water or other solvent molecules that can be easily removed without destroying the parent framework In another approach, the catalytic sites are incorporated directly into the bridging ligands used for the construction of MOFs. Importantly, the MOFs allow thedesired incorporation of catalytic sites in the controlled fashion, oriented towards the pore interiorand specifically organic-grafting, therefore, can offer unique applications in heterogeneous catalysis.

Dr. Moloy Sarkar, Reader-F

We are mainly interested in the photophysical behavior of electron donor-acceptor (EDA) molecules in both conventional solvents and in room temperature ionic liquids. We are interested to study important photo-processes such as electron transfer, proton transfer reactions etc. of different EDA molecules by examining the spectral and temporal behavior of the systems using steady state and time-resolved absorption and fluorescence techniques.

Dr. Nagendra K. Sharma, Reader-F

Specialization in Bio-organic chemistryand dealing with following research area, Design, Chemical Synthesis and biological evaluation of Nucleic Acid & Peptide analogues, Synthesis of Inhibitors, to study the DNA/Protein and protein/protein Interaction in vitro, Mechanistic studies of Isoprenoids Enzymes and biosynthesis of natural products.

Dr. Prasenjit Mal, Reader-F

Ion sensing, particularly as it could be applied to the emerging area of nano-technology and in

parallel provide a platform to the drug-discovery, is a key area in which scientific and technological progress may be translated into economic growth. Prasenjit Mal has developed several new concepts in supramolecular chemistry while working in Prof. Michael Schmittel's laboratory at University of Siegen (Germany) as a Humboldt fellow, in Dr. Jonathan R. Nitschke's laboratory at University of Cambridge and also at NISER Bhubaneswar and so has proved his abilities in this related domain i.e., development of transition metal ion sensor (submitted). In next few years, he is going to work in an area where the major focus will be to develop ratiometric fluorescent probes for monitoring transition metal ion triggered cellular uptake of bioactive molecules. Cellular delivery of bioactive molecules by passive diffusion is usually restricted to small nonpolar molecules, while large or polar/charged compounds are not membrane permeable unless actively transported to the interior of the cell by specific mechanisms (e.g. endocytosis). Beside the general challenge of effective cellular delivery, accumulation of a drug (or diagnostic agent) at its target site is a central aim of modern delivery techniques to make products more effective and selective and, as a result, safer. In general, fluorescence-based probes provide highly sensitive or accurate informationthat are suitable for the visualization of trace metal ions in biological environments. Specific requirements in terms of probe design will be taken into account for terpyridine/phenanthroline metal binding unit and proper functionalization of the probe for conjugation to other molecules. The terpyridine chelating unit is known to be an efficient binder for transition metal like Zn(II) or Fe(II), and also the phenanthroline unit can easily accommodate Cr(III) . The project includes organic synthesis, photophysical characterization and probe application to live cells using fluorescence microscopy. Thus, successful execution of the proposed idea would lead both to the introduction of new tools into the toolkit of chemical biology, in addition to preparation of new materials that might be of potential use for are of medicinal chemistry.

Dr. S. Peruncheralathan, Reader-F

Over the decades chemistry has changed the way from alchemy to nanoworld. However, one facet remains constant; that's the ability to create molecules in a stereo and regio controlled manner. In this regards, synthetic chemists play a vital role in assembling molecules by using different strategies. Among them, the use of catalysis to promote organic transformations is a key tool. Our research focuses on developing new catalytic approaches for synthesizing fine chemicals and enantiopure target molecules those are having unexplored physical and biological properties.

We are interested in engaging our research activities in the following areas: Enantioselective Organocatalysis, Metal-Mediated Molecular Synthesis

Dr. Sharanappa Nembenna, Reader-F

Main Group Organometallic and Synthetic Inorganic Chemistry. Development of new ligand systems, Synthesis and characterization of main group metal complexes, Metal complexes with metal-metal bonds, Synthesis of low oxidation state metal complexes

Dr. Sudip Barman, Reader-F

Graphene is new allotrope of carbon, a 'thinnest material in the world'. It is two-dimensional sheet of sp^2 hybridized carbon. In spite of profound interest and continuing experimental success by experimental scientists, widespread implementation of graphene has yet to occur. Just like other newly discovered carbon allotrope (Carbon nano tube, Flulerene) material synthesis and processibility have been the rate-limiting steps in evaluation of graphene application. The outstanding electrical and mechanical and chemical properties of graphene make it attractive element for application in electronics. However, efforts to make patterned conducting graphene have been hampered by the lack of specialist methods for electrical modification of graphene for its application. One of the main interests of my work is to develop new synthetic route for large scale production of graphene. The functionalization of graphene will be done by using well-known chemical reactions.

Dr. V. Krishnan, Reader-F

The chemistry in my group will be interdisciplinary which includes inorganic, polymer and organic. My research focuses on the development of new synthetic routes for application in catalysis, and materials chemistry and fall into the following general areas viz., cooperative catalysts for CO_2 fixation, chiral counterions, hybrid inorganic-organic materials.

Publications

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2. Anand Pariyar, Suranjana Bose, Achintesh Narayan Biswas, Sudip Barman and Pinaki Bandyopadhyay,A non-heme cationic Fe(III)-complex intercalated in montmorillonite K-10: synthesis, characterization and catalytic alkane hydroxylation with H_2O_2 at room temperature, Catal. Sci. Technol., 2014, 4, 3180-3185.
3. Synthesis and characterization of robust three-dimensional Chiral Metal Sulfates:J. N. Behera,* J. Bhattacharjee, S. R. Marri and P. Dahiya, RSC. Adv., 2014, 4, 50435.
4. Synthesis, Structure and Photoluminescence Properties of Open-Framework Bismuth Sulfates with Layered and Three Dimensional Structures" S. R. Marri and J. N. Behera* J. Solid State Chem. 2014, 210, 15-21.
5. A Highly Selective Ratiometric Detection of F-based on Excited-State Intramolecular Proton-Transfer (Imidazole) Materials, K. Dhanunjayarao, V. Mukundam, Krishnan Venkatasubbaiah, , J. Mater. Chem. C. 2014, 2, 8599-8606.

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10. Probing the aggregation behavior of 4-Aminopththalimide and 4-(N, N-dimethyl) amino-N-methylpththalimide: A combined photophysical, crystallographic, microscopic and theoretical (DFT) study. Majhi, D.; Das, S. K.; Sahu, P. K.; Pratik, S. Md.; Kumar, A.; Sarkar, M. Phys. Chem. Chem. Phys., 2014, 16, 18349-18359.
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15. Catalytic C-N Bond Formation in Guanylation Reaction by N-Heterocyclic Carbene Supported Magnesium(II) and Zinc(II) Amide Complexes, A. Baishya, M. Kr. Barman, T. Peddarao and S. Nembenna* J. Organomet. Chem. 2014, 769, 112-118.
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17. Photoenolization via excited state double proton transfer induces "turn on" fluorescence in diformyl diaryl dipyrromethane: K. C. Gowri Sreedevi, Ajesh P. Thomas, K. H. Aparna, Renuka Pradhan, M. L. P. Reddy, U. Lourderaj and A. Srinivasan, Comm. Commun. 2014, 50, 8667-8669.

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39. V. Mukundam, K. Dhanunjayarao, C-N Chuang, D-Y Kang, M-K Leung, K-H Hsieh, Krishnan Venkatasubbaiah, Design, Synthesis, Photophysical and Electrochemical Properties of 2-(4,5-diphenyl-1-p-aryl-1H-imidazol-2-yl)phenol-based Boron Complexes, Dalton Trans. 2015, 10228 - 10236.

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Publication (Book Chapter)

1. Gunanathan, C.; Milstein, D. Catalysis by Pincer Complexes: Synthesis of Esters, Amides, and Peptides. Szabó, K. J.; Wendt, O. F. (Eds). Pincer and Pincer-Type Complexes: Applications in Organic Synthesis and Catalysis, First Edition. Wiley-VCH. Weinheim (2014) pp. 1-30.
2. Nonlinear Optical Properties of Porphyrins and Expanded Porphyrins: Arvind Chaudhary, A. Srinivasan and T. K. Chandrashekar, in The Handbook of Porphyrin Science; K. M. Kadish, K. M. Smith; R. Guilard; World Scientific: Singapore, 2014, Vol. 32, Chapter169, pp 271-366.
3. Hydrogen bonds involving sulfur: New insights from ab initio calculations and gas phase laser spectroscopy." Himansu S. Biswal*; Book Chapter in the Springer series, Challenges and Advances in Computational Chemistry and Physics, Editor: Prof. Steve Scheiner, 2015; Chapter-2,15-45.

Conferences

1. XVI NOST Conference, April 4-7, 2014, Agra, India by Drs. Chandra Shekhar Purohit, S. Peruncheralathan, Prasenjit Mal and Chidambaram Gunanathan.
2. IGCBIC-2014, IISc-Banglore by Drs. Nagendra Sharma and Chandra Shekhar Purohit.
3. Networking-Cum-Discussion, meet for the INSPIRE Faculty Awardees, March 20-21, 2015; Tezpur University, Assam by Dr. Himansu S. Biswal.
4. Spectroscopy and Dynamics of Molecules and Clusters (SDMC- 2015), February 19-22, 2015; Nainital, Uttarakhand, by Dr. Himansu S. Biswal.
5. Second International Conference on Education in Chemistry", December 12-14, 2014; HBCSE-TIFR, Mumbai, by Dr. Himansu S. Biswal.
6. Synthesis and Characterization of Fluorescent Tetracoordinated Boron Complexes, Boron in the Americas conference (BORAM XIV), June 15th-19th June 2014, Newark, NJ, USA by Dr. Krishnan Venkatasubbaiah.

School of Mathematical Sciences

Varadharajan Muruganandam, Professor

Fourier Algebra and Fourier-Stieltjes Algebra: I am generally interested in the study of a Fourier algebra and Fourier-Stieltjes algebra of a locally compact group G. They are commutative Banach algebras and can be identified with the predual of the Von-Neumann algebra of the group and the dual of C*-algebra of G respectively. If the group G is amenable, then the space of multipliers of A(G) can be identified with B(G). In 1989, there appeared a path-breaking paper due to Cowling and Haagerup (M. Cowling and U. Haagerup, Completely bounded multipliers of the Fourier algebra of a simple Lie group of real rank one, Invent. Math. 96 (1989), 507-549) which connects operator algebras and multipliers of A(G); and creates certain exotic invariants called Haagerup constants. I gave a simpler proof of their work. Encouraged by this paper, Eymard suggested me to look into the Fourier algebras of hypergroups.

Besides, there is a general problem in this field which reads as follows: For every $\lambda \geq 1$, does there exist a von-Neumann algebra Γ such that $\lambda(\Gamma) = \lambda$? I am fascinated by this problem. I am exploring the possibility of having the von-Neumann algebras associated to hypergroups. As there is much to be done in the context of Fourier algebras of hypergroups, I initiated the study of Fourier algebras of hypergroups with particular reference to Fourier-Jacobi algebras which turn out to be Fourier algebras of Gelfand-pairs associated to simple Lie groups of rank one for some discrete parameters.

There is a long way to go and my current concern is to study the amenability of hypergroups on one hand and Fourier algebras of hypergroups that arise from H-type groups on the other hand.

Courses Taught

Complex Analysis, Representation Theory of Compact Groups, Analysis-III, General Mathematics-II

Supervision of PDF, Ph.D./M.Sc./Summer students

- Post-Doctoral Fellow: Safdar Quddus
- M.Sc. Thesis of Vishal, NISER, Bhubaneswar
- M.Sc. Project of Prajakta Bedekar, NISER, Bhubaneswar
- M.Sc. Thesis of Gaurav Kumar (continuing), NISER, Bhubaneswar
- M.Sc. Thesis of Prajakta Bedekar (continuing), NISER, Bhubaneswar

Conference/Workshop organized

- Annual Foundation School-I (December 1-27, 2014) at NISER, Bhubaneswar

Conference/workshop attended

Prof. V. Muruganandam visited I.I.T. Guwahati from June 23 - July 5, 2014, as a resident faculty in MTTS Programme conducted by I.I.T. Guwahati. During this visit he has delivered a lecture on Harish-Chandra - A mathematical Profile on June 27, 2015.

Participation in School/Institute Administration

Dean (Academic Affairs), Member-Academic Council, Member-PGCI, Member-UGCI, Member-PGCS, Member-UGCS

Anil Kumar Karn, Associate Professor

Order structure of C*-algebra: I am interested in the study of the order structure of a C*-algebra. Let us recall that the self-adjoint part of a C*-algebra may be characterized by as an abstract-M space. (An abstract-M space is a Banach lattice with some additional properties.) Further, we note that the self-adjoint part of a non-commutative C*-algebra (for example: B(H), dim(H) ≥ 2) is not a Banach lattice. However, a `non-commutative' lattice-type structure can be `seen' in the self-adjoint part of a non-commutative C*-algebra. This structure is a lattice if and only if the $C*-algebra is commutative. I am very close to find an abstract characterization of this structure. As soon as this gap is filled, a non-commutative Banach latice theory may be proposed. This programme may lead to an abstract order theoretic characterization of a non-commutative C*-algebra. Not to mention seperately that this programme uses heavily the theory of matrix ordered spaces.

Publications

- Orthogonality in sequence spaces and its bearing on ordered Banach spaces, Positivity, 18(02) (2014), 223-234.
- An operator summability in Banach spaces (with D. P. Sinha), Glassgow Math. J., 56(02) (2014), 427-437.

Courses Taught

Analysis-II (Ph.D.), Advanced Functional Analysis, Analysis-II

Supervision of PDF, Ph.D./M.Sc./Summer students

- Post-Doctoral Fellow: Antara Bhar
- Ph.D. thesis of Anindya Ghatak (continuing), NISER, Bhubaneswar
- M.Sc. Project of Amudhan Krishnaswamy, NISER, Bhubaneswar
- M.Sc. Thesis of Manasa Manjunatha, NISER, Bhubaneswar
- M.Sc. Thesis of Amudhan Krishnaswamy (continuing), NISER, Bhubaneswar

Seminar/Talks delivered

- Orthogonality in C*-algebras, during the conference on Recent Advances in Operator Theory and Operator Algebras (December 9-19, 2014), at ISI Bangalore.
- p-compactness: story of a definition, during the conference on Geometry of Banach Spaces and Operator Theory (March 26-29, 2015), at IIT Kanpur.

Conference/Workshop attended

- International Conference on Recent Advances in Operator Theory and Operator Algebras (December 9-19, 2014), at ISI Bangalore.
- Conference on Geometry of Banach Spaces and Operator Theory (March 26-29, 2015), at IIT Kanpur.

Participation in School/Institute Administration

Chairperson (SMS), Member-Academic Council, Member-PGCS, Member-UGCS

Deepak Kumar Dalai, Reader-F

Algebraic Attacks and Algebraic Immunity of Stream ciphers: Cryptology is the science of secure communications where Mathematical techniques are used to hide the information for secure communication. Stream Cipher is one of the class of techniques. Algebraic attack is one of the cryptanalysis of all techniques which is very effective in the case of stream cipher. Algebraic Immunity (AI) is a cryptographic term which measures the strength of a cipher (technique) against algebraic attack. In this research topic, we study the AI of different stream ciphers and find different ways to implement algebraic attacks on stream ciphers.

Courses Taught

Math Lab-II, Elementary Number Theory, Computation Laboratory-I, Discrete Mathematics, Cryptology

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Thesis of Manish Gaurav, NISER, Bhubaneswar
- M.Sc. Thesis of Atif Siraj Ansari, NISER, Bhubaneswar
- M.Sc. Thesis of Nikhil Kumar Bansal, NISER, Bhubaneswar
- M.Sc project of Akshay Singh Yadav on "Visual Cryptography", NISER, Bhubaneswar
- M.Sc project of Aman Chandna on "Cryptographic Significant Boolean Functions", NISER, Bhubaneswar

Conference/Workshop organized

- National workshop on Cryptology at IIITDM, Jabalpur

Participation in School/Institute Administration

Member - PGCS, Member – UGCS

Sanctioned/On-going Sponsored Projects

- Principal Investigator: Dr. Deepak Kumar Dalai
  Project Title: Algebraic Immunity (AI) of Bent Boolean Functions.
  Funding Organisation: SERB, DST, Govt. of India.
- Principal Investigator: Dr. Deepak Kumar Dalai
  Consultancy Title: Design and development of tool to verify cryptographically significant Boolean functions with high Algebraic Immunity along with sample verification.
  Funding Organisation: WESEE, Navy Consultancy, Ministry of Defence, Govt. of India.

Sanjay Parui, Reader-F

My research interest includes Harmonic Analysis on Euclidean spaces and Heisenberg group. I am now working on problems related to Dunkl transform on Euclidean spaces. Dunkl transform is a generalization of Fourier transform. We don't have explicit formula for Dunkl kernel and very little is known for translation operator. I am planning to develop Littlewood Paley g function theory for Dunkl Hermite operator which may lead to multiplier theory for Dunkl Hermite operator. I am interested in establishing L^p, L^q mapping property for wave operators related to Dunkl and Dunkl Hermite Operator.

Publications

- Revisiting Beurling's theorem for Fourier-Dunkl transform (with S. Pusti), Integral Transforms and Special Functions, to appear.

Courses Taught

Algebra-II (Linear Algebra), Harmonic Analysis, General Mathematics-II (Summer), Complex Analysis

Supervision of PDF, Ph.D./M.Sc./Summer students

- Ph.D. thesis of Anoop V. P. (continuing), NISER, Bhubaneswar
- M.Sc. Thesis of B. Suryanarayan (continuing), NISER, Bhubaneswar

Academic Visits/Collaboration outside NISER
Collaboration with IIT Kanpur

Participation in School/Institute Administration
Member - PGCS, Member - UGCS

Kamal Lochan Patra, Reader-F

Laplacian Spectrum of Graphs: The Laplacian is an important matrix associated with a graph, and the Laplacian spectrum is the spectrum of this matrix. The Laplacian eigenvalues have found

numerous applications in various fields. Specially, the second smallest and the largest eigenvalues are used in theoretical chemistry, combinatorial optimization and communication networks. I work on the relationship between the structural properties of a graph and its Laplacian spectrum.

Courses Taught

Algebra-II (Ph.D.), Elementary Number Theory, Representations of Finite Groups

Supervision of PDF, Ph.D./M.Sc./Summer students

· M.Sc. Project of Aadil Aman, NISER, Bhubaneswar

- M.Sc. Thesis of Rishikant Rajdeepak, NISER, Bhubaneswar
- M.Sc. Project of Abhishek Guin, NISER, Bhubaneswar
- M.Sc. Thesis of Aadil Aman (continuing) on "Characterization of graphs up to rank 5", NISER, Bhubaneswar
- M.Sc. Project of Aman Chandna (continuing) on "Flows in networks", NISER, Bhubaneswar NISER, Bhubaneswar
- Summer Project of Param Shah on "Rank and Nullity of Graphs", NISER, Bhubaneswar

Participation in School/Institute Administration
Member-UGCI, Convenor-UGCS, Hostel Warden

Binod Kumar Sahoo, Reader-F

A. A. Ivanov et al. introduced the notion of representations of geometries with p+1 points per line, where p is a prime number, in 1994 for p=2 and in 2001 for a general prime p. Motivated by the theory they developed, I work on the question of existence of representations of incidence geometries possibly in non-abelian groups. This work using the notion of representations of geometries also helps to look for the possibility of constructing new geometries and giving new constructions to known geometries. I also work on the minimum size blocking sets of the projective spaces with respect to varying sets of lines.

Publications

- Binary codes of the symplectic generalized quadrangle of even order (with N.S.N. Sastry), Designs, Codes and Cryptography (to appear).

Courses Taught

General Mathematics-II, Algebra-I (Group Theory), Algebra-IV (Field Theory)

Supervision of PDF, Ph.D./M.Sc./Summer students

- Ph.D. thesis of Bikramaditya Sahu (continuing), NISER, Bhubaneswar

- M.Sc. Project of Soumyadip Das, NISER, Bhubaneswar
- M.Sc. Project of Vaibhav Pandey, NISER, Bhubaneswar
- M.Sc. Thesis of Soumyadip Das, NISER, Bhubaneswar

Academic Visits/Collaboration outside NISER

- Research visit to ISI, Bangalore during June 9 – July 11, 2014.

Seminar/Talks delivered

- Blocking sets of hyperbolic lines in W(q) and two applications, at ISI Bangalore in June 2014.
- Invited talk: Six lectures during AFS-I (December 1-27, 2014) at NISER, Bhubaneswar.

Participation in School/Institute Administration

Member-PGCS, Member-UGCS, Member-NISER Annual Report Committee, Member-NEST(2015) Committee

Sanctioned/On-going Sponsored Projects

Principal Investigator: Binod Kumar Sahoo
Title: The study of the existence of representations of dual polar spaces in non-abelian groups
Funding Agency: SERB, DST, Govt. of India

Brundaban Sahu, Reader-F

Supercongruences - The numbers which occur in Apéry's proof of the irrationality of ζ(2) and ζ(3) have many interesting congruence properties. Work started with F. Beukers and D. Zagier, then extended by G. Almkvist, W. Zudilin and S. Cooper recently has complemented the Apéry numbers with set of sequences known as Apéry-like numbers which share many of the remarkable properties of the Apéry numbers. We study supercongruences properties of Apéry-like numbers.

Differential Operators - There are many interesting connections between differential operates and modular forms. Using Rankin-Cohen type differential operators on Jacobi forms/Siegel modular forms, we study certain arithmetic of Fourier coefficients.

Convolution sums and applications - We compute convolution sums of divisor function using the theory of modular forms and quasi modular forms and apply those to find number of representations of an integer by certain quadratic forms.

Publications

- On the number of representations of an integer by certain quadratic forms in sixteen variables (with B. Ramakrishnan), International Journal of Number Theory, 10 (2014), 1929-1937.

- Supercongruences for sporadic sequences (with R. Osburn, A. Straub), Proc. Edinb. Math. Soc., to appear.
- Rankin-Cohen brackets on Jacobi Forms and the adjoint of some linear maps (with Abhash Kumar Jha), The Ramanujan Journal, to appear.
- Identities for the Ramanujan Tau function and certain convolution sum identities for the divisor functions (with B. Ramakrishnan), IMNT Proceedings in honour of Professor R. Balasubramanian, Lecture Notes Series in Ramanujan Mathematical Society, to appear.

Courses Taught

Algebra-IV (Field Theory), Algebra-III (Rings and Modules), Modular forms of one variable

Supervision of PDF, Ph.D./M.Sc./Summer students

- Ph.D. Thesis of Abhash Kumar Jha (continuing), NISER, Bhubaneswar
- Ph.D. Thesis of Moni Kumari (continuing), NISER, Bhubaneswar
- M.Sc. Project of Gaurav Kumar, NISER, Bhubaneswar
- M.Sc. Project of B. Suryanarayan, NISER, Bhubaneswar
- M.Sc. Project of Sagar Srivastava, NISER, Bhubaneswar
- M.Sc. Project of Vaibhav Pandey (continuing), NISER, Bhubaneswar

Seminar/Talks delivered

- Construction of Jacobi cusp forms, International Conference on Automorphic Forms (February 13-14, 2015), KSOM, Kozhikode, India.
- Jacobi Cusp Forms and the adjoint of linear maps constructed with the Rankin-Cohen brackets, 29th Automorphic Forms Workshop (March 2-5, 2015), University of Michigan, Ann Arbour, USA.
- A short course in group theory, AFS-I (December 1--27, 2014), NISER, Bhubaneswar.

Conference/Workshop attended

- Discussion meeting on Mock-Modular forms (April 24-28, 2014), HRI, Allahabad.
- Advanced School and Workshop on L-functions and modular forms (September 1-12, 2014), ICTP, Trieste, Italy.
- International Conference on Automorphic Forms (February 13-14, 2015), KSOM, Kozhikode, India.
- 29th Automorphic Forms Workshop (March 2-5, 2015), University of Michigan, Ann Arbour, USA.

Participation in School/Institute Administration

Member-UGCS, Member-PGCS

Sanctioned/On-going Sponsored Projects

Principal Investigator: Dr. Brundaban Sahu
Project Title: Modular Forms and Supercongruences
Funding Organisation: SERB, DST, Govt. of India

Nabin Kumar Jana, Assistant Professor

Spin Glass and Related Problems: Spin glass theory has been introduced as a part of statistical physics to deal with the unusual glassy behaviour of different amorphous magnetic substances. However its application covers many other subjects as well. Our attention mainly is on the mean field models of this subject.

Courses Taught

Probability Theory, Analysis-I, General Mathematics-I (summer), Advance Probability

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Thesis of Abhishek Samantray, NISER, Bhubaneswar
- M.Sc. Thesis of Manas Singh Sakrwar, NISER, Bhubaneswar
- M.Sc. Project of Satrajit Mandal, NISER, Bhubaneswar
- M.Sc. Project of Kavita Meena, NISER, Bhubaneswar
- M.Sc. Thesis of Satrajit Mandal (continuing) on "Large deviation theory", NISER, Bhubaneswar

Conference/Workshop attended

- Lectures on probability and stochastic processes IX", Indian Statistical Institute, Kolkata, December 12-16, 2014.

Participation in School/Institute Administration

PGCS Convenor - SMS, Member - Computer Advisory Committee, Member - PGCI, Member - Web Committee, Departmental Seminar organizer

Shyamal Krishna De, Assistant Professor

My research interests involve two areas, namely multiple hypothesis testing for sequentially collected data and multistage or purely sequential methods of estimation. For testing simple versus simple and some special types of composite hypotheses, I have been developing stopping and decision rules such that desired error rates such as Generalized Familywise Error Rates (GFWER) and tail probabilities of False Discovery Proportion (FDP) and False Non-discovery Proportions (FNP) are controlled at pre-specified levels keeping the expected sample size as low as possible. I am interested in developing sequential procedures for testing multiple composite

hypotheses that can control both False Discovery Rate (FDR) and False Non-discovery Rate (FNR) at some prescribed levels. In another direction of sequential multiple testing, I plan to develop methodologies for discriminating between two or more distributions controlling the probabilities of misclassification at some desired level.

In the area of sequential estimation, my interest is to develop the theory and methodology for fixed width, fixed accuracy, fixed proportional closeness, and bounded length interval estimation of certain parameters of interest such that attained coverage probabilities are nearly the same as the prescribed level. In a non-parametric setting, I am also interested to develop sequential and multistage procedures for minimum risk point estimation and bounded-length interval estimation of Gini index which is considered to be the most widely used measure of economic inequality.

Publications

- Shyamal K. De and Michael Baron (2015), Sequential Tests Controlling Generalized Familywise Error Rates, Statistical Methodology, Volume 23, March 2015, Pages 88-102.
- Yifan Xu, Shyamal K. De, and Shelemyahu Zacks (2014), Exact Distribution of Intermittently Changing Positive and Negative Compound Poisson Processes Driven By An Alternating Renewal Process and Related Functions, Probability in the Engineering and Informational Sciences, Volume 29, Issue 3, Pages 385-397.

Courses Taught

Probability Theory, Introduction to Stochastic Processes

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Thesis of Kavita Meena (continuing) on "Statistical Modelling Using R", NISER, Bhubaneswar
- M.Sc. Project of Abhishek Guin, NISER, Bhubaneswar

Academic Visits/Collaboration

- Interdisciplinary Statistical Research Unit, Indian Statistical Institute, Kolkata, India, 2015.
- Department of Statistics, Temple University, Philadelphia, USA, 2014.
- Department of Mathematical Sciences, Binghamton University, New York, USA
- Department of Mathematics, The University of Texas at Dallas, Texas, USA
- Department of Statistics, University of Connecticut, Connecticut, USA
- Department of Mathematics and Statistics, American University, Washongton DC, USA
- Department of Mathematics and Statistics, Indian Institute of Technology Kanpur, India

Seminar/Talks delivered

- Invited Talk: Stepwise Methods of Multiple Testing Controlling Desired Error Rates in

Sequential Trials, Interdisciplinary Statistical Research Unit, Indian Statistical Institute Kolkata, India, 2015.

- Invited Talk: Controlling False Discovery Proportion and False Non-discovery Proportion for Multiple Testing in Sequential Experiments, New England Statistical Symposium, School of Public Health at Harvard University, Boston, USA, 2014.
- Invited Talk: Controlling Error Rates for Multiple Hypothesis Testing in Sequential Experiments, Seminar at the Department of Statistics, Temple University, Philadelphia, USA, 2014.

Conference/Workshop attended

- New England Statistical Symposium, School of Public Health at Harvard University, Boston, USA, 2014.
- International Workshop on Applications of Systems and Mathematical Biology in Public Health, NISER, Bhubaneswar, India, 2015.

Conference/Workshop organized

- International Workshop on Applications of Systems and Mathematical Biology in Public Health, NISER, Bhubaneswar, India, 2015, co-organized with Dr. Palok Aich, School of Biological Sciences, NISER.

Participation in School/Institute Administrations

Member-UGCS

Tanusree Khandai, Visiting Professor

I am interested in the representation theory of infinite dimensional Lie algebras. Specifically, I work on the integral representations of the toroidal Lie algebras which are generalizations of the affine Kac-Moody Lie algebras.

In the past I have looked into finite dimensional as well as the graded integrable representations of multiloop Lie algebras. Since toroidal Lie algebras are universal central extensions of multiloop Lie algebras, representations of the graded multiloop Lie algebras can also be thought of as level zero representations of the toroidal Lie algebras. In the case when the centre acts non-trivially, S. Eswara Rao classified the irreducible integrable representations of the toroidal Lie algebra which have finite dimensional weight spaces. It has however been observed that the category of such representations is not completely reducible. Hence it is interesting to look at the homological properties of this category.

Courses Taught

Algebra-II (Linear Algebra)

Academic Visits/Collaboration

- Institute of Mathematical Sciences, Chennai, July 1-6, 2015

Seminar/Talks delivered

- Invited talk at: International Conference on "Infinite Dimensional Lie Theory And Its Applications", HRI, Allahabad, Dec 15-20, 2015

Conference/Workshop attended

- International Conference on "Infinite Dimensional Lie Theory And Its Applications", HRI, Allahabad, December 15-20, 2015
- AFS-1, NISER, December 2014

Vellat Krishna Kumar, Visiting Professor

Courses Taught

Advanced PDE, Differential Geometry, General Mathematics-I, Nonlinear Analysis

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Project of S. Bibek Sankar, NISER, Bhubaneswar

Ashwin S. Pande, Visiting Professor

I am trying to find some more examples on the application of Topological Stacks to Topological T-duality. I am also trying to complete a work on the crossed product by R of a certain class of C*-algebras proposed by Dadarlat and Pennig.

Courses Taught

Differential Equations, Computation Laboratory-II, Analysis-IV, Math Lab-3

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Project of Abinash Meher on "Symmetry", NISER, Bhubaneswar
- M.Sc. Project of Abinash Meher on "The Schottky Group", NISER, Bhubaneswar
- M.Sc. Project of Akshay Singh Yadav on "The Phase Plane and phenomena", NISER, Bhubaneswar

B. Subhash, Visiting Faculty

Vector Field Problem: The problem of finding the number of linearly independent vector fields on a

sphere was a long standing one which was solved by Adams, using algebraic topological methods. This raised a lot of questions, like what is the maximum number of linearly independent vector fields on a manifold? When can an n-dimensional manifold have n linearly independent vector fields (parallelizable), etc. These sort of questions are collectively known under the name of vector field problems. This problem has been addressed for various manifolds like Projective spaces, Grassmann manifolds, Stiefel manifolds and entire or partial results have been obtained. The tools of algebraic topology and k-theory have been effectively used to answer some of them. I am looking at the vector field problem for a class of manifolds that are quotients of the complex projective Stiefel manifold; I am interested in finding and understanding the co-homology algebra and the k-groups of these homogeneous spaces in order to solve the vector field problem for these classes of manifolds.

Courses Taught

Analysis-II, Topology, Algebraic Topology

Supervision of PDF, Ph.D./M.Sc./Summer students

- M.Sc. Project of T. Assaimani, NISER, Bhubaneswar

Post-Doctoral Fellows

Antara Bhar (Mentor: Anil K. Karn)

Safdar Quddus (Mentor: V. Muruganandam)

Doctoral Students

Abhash Kumar Jha (Advisor: Brundaban Sahu)

Anindya Ghatak (Advisor: Anil K. Karn)

Anoop. V. P. (Advisor: Sanjay Parui)

Bikramaditya Sahu (Advisor: Binod Kumar Sahoo)

Moni Kumari (Advisor: Brundaban Sahu)

Departmental Seminars

- Dr. Kuntal Banerjee, Harish-Chandra Research Institute, Allahabad: "Circle homeomorphisms, Arnold tongues and Herman rings" on April 2, 2014
- Dr. Shanta Laishram, Indian Statistical Institute, Delhi: "Powers in products of terms of Pell's and Pell-Lucas Sequences" on April 7, 2014
- Mr. Subham Giridhar, SMS, NISER, Bhuaneswar: "Elementary Number Theory" on August 4, 2014
- Prof. Shalabh, Department of Mathematics & Statistics, Indian Institute of Technology, Kanpur: "Measurement Error Models - An Introduction" on August 7, 2014
- Mr. S Bibek Sankar, SMS, NISER, Bhubaneswar: "Exploring Chaos" on August 11, 2014

- Professor S. G. Dani, TIFR-Mumbai and IIT Bombay: "Lattice points in regions of the plane and spaces of higher dimension" on August 22, 2014
- Ms. G. Priyanga, SMS, NISER, Bhubaneswar: "Mathematical Modeling" on August 25, 2014
- Dr. Mahabir Prasad Jhanwar, University of Calgary, Canada: "Cryptographic Accumulators using Lattices" on September 1, 2014
- Mr. Abhash Kumar Jha, SMS, NISER, Bhubaneswar: "The Stone-Čech Compactification" on September 8, 2014
- Dr. Ghurumuruhan Ganesan, EPFL, Lausanne: "Infection Spread and Stability in Random Graphs" on September 9, 2014
- Prof. Parashar Mohanti, Department of Mathematics & Statistics, Indian Institute of Technology, Kanpur: "Compleletely bounded multipliers on L^p" on September 10, 2014
- Dr. Tanusree Khandai, SMS, NISER, Bhubaneswar: "Integrable representations of Multiloop Lie algebras of type A_1" on September 11, 2014
- Dr. Rahul Garg, Israel Institute of Technology, Haifa, Israel: "The lattice point counting problem on the Heisenberg groups" on October 10, 2014
- Dr. Jaban Meher, IISC, Bangalore: "Product of eigen forms" on October 13, 2014
- Dr. Suchismita Das: "How to measure uncertainty in the weighted lifetime distribution" on October 15, 2014
- Ms. Rajula Srivastava, SMS, NISER, Bhubaneswar: "Tree t spanners in 2 connected outerplanar graph" on October 20, 2014
- Mr. Abhash Kumar Jha, SMS, NISER, Bhubaneswar: "Adjoint of some linear maps on the space of Jacobi cusp forms" on October 27, 2014
- Ms. Moni Kumari, SMS, NISER, Bhubaneswar: "Euler's famous prime generating polynomial" on November 3, 2014
- Prof. B. Ramakrishnan, HRI, Allahabad: "Representations of integers as sums of squares" on November 10, 2014
- Prof. Debasis Kundu, Department of Mathematics & Statistics, Indian Institute of Technology, Kanpur: "A Journey Beyond Normality" on November 17, 2014
- Prof. Debasis Kundu, Department of Mathematics & Statistics, Indian Institute of Technology, Kanpur: "Analyzing Periodic Data: Statistical Perspectives" on November 20, 2014
- Dr. Safdar Quddus, SMS, NISER, Bhubaneswar: "Noncommutative Toroidal SL(2,Z) Orbifold" on November 21, 2014
- Prof. Kailash C. Misra, North Carolina State University, Raleigh, North Carolina, USA: "Lie algebras and Combinatorial Identities" on December 1, 2014
- Dr. Pinaki Sarkar: "Key Pre–Distribution Schemes In Wireless Sensor Network Security" on January 2, 2015

- Dr. Sarath Sasi, SMS, NISER, Bhubaneswar: "Weighted Eigenvalue Problem in the Exterior Domain" on January 5, 2015
- Dr. Pritam Ghosh: "Dynamics of outer automorphisms of free groups" on January 12, 2015
- Mr. Gaurish Korpal, SMS, NISER, Bhubaneswar: "Celebrating 110th birthday of D. R. Kaprekar" on January 15, 2015
- Dr. Atish Sahu, Nagaland University SASRD, Medziphema: "Construction of Neighbor Balanced designs" on January 16, 2015
- Ms. Moni Kumari, SMS, NISER, Bhubaneswar: "L-functions" on January 27, 2015
- Prof. A. Sankaranarayanan, TIFR, Mumbai: "Riemann zeta-function and its influence on a problem of Srinivasa Ramanujan" on January 28, 2015
- Mr. Anoop V. P., SMS, NISER, Bhubaneswar: "Hardy-Littlewood Maximal Functions on Sphere" on January 29, 2015
- Dr. Sudeshna Basu, George Washington University, USA: "Stability of ball properties in Banach spaces" on February 2, 2015
- Mr. Anindya Ghatak, SMS, NISER, Bhubaneswar: "Order theoretic properties in C*-algebra and its generalization" on February 3, 2015
- Dr. Gautam Borisagar, Zakir Husain Delhi College: "Iwahori-Hekce model for supersingular representation for GL_2(Q_p)" on February 5, 2015
- Dr. B. G. Manjunath, Dell International Services Pvt. Ltd.: "Gaussian structure of non-Gaussian distributions and contemporary theorems" on February 12, 2015
- Dr. B. Subhas, SMS, NISER, Bhubaneswar: on February 23, 2015
- Dr. Amit Tripathi, Indian Statistical Institute, Bangalore: "Vector Bundles and Geometry of Hypersurfaces" on March 9, 2015
- Dr. Sumit Mohanty, IIT Kanpur: "Maximization of Combinatorial Schrodinger Operator's Smallest Eigenvalue with Dirichlet Boundary Condition" on March 10, 2015
- Dr. Manas Ranjan Sahoo, IIT (BHU), Varanasi: "Vanishing viscosity and weak asymptotic approach to systems of conservation laws admitting δ_∞-waves" on March 12, 2015
- Dr. Vishnu Narayan Mishra, Sardar Vallabhbhai National Institute of Technology: "Approximation of functions by positive linear operators" on March 16, 2015
- Dr. Karam Deo Shankhadhar, Universidad de Chile, Chile: "Converse theorem for Jacobi cusp forms" on March 20, 2015
- Dr. Safdar Quddus, SMS, NISER, Bhubaneswar: "Ultrafilters of N and functionals on D(l_2)" on March 25, 2015

School of Physical Sciences

Dr. Bedangadas Mohanty, Associate Professor

The research group (consisting of 4 PhD students, one research Associates and two scientific officers) is focused in establishing the phase diagram of strong interactions using a system formed by colliding heavy-nucleus at high energies. The phase diagram of strong interactions have a very rich phase structure, which includes: a hot and dense de-confined phase of quarks and gluon, and a low temperature phase of hadrons. In addition it offers the possibility to study transitions of different orders and possible existence of a critical point. Further a de-confined phase of quarks and gluons, the fundamental constituents of visible matter in Universe, allows for the interesting possibility to study its properties like viscosity, conductivity etc. The high-energy nuclear physics group at NISER is pursuing these physics areas through experimental programs at the Relativistic Heavy Ion Collider (RHIC) Facility at Brookhaven National Laboratory, USA and Large Hadron Collider (LHC) Facility at CERN, Switzerland.

The group leads the Beam Energy Scan Program at RHIC to establish the QCD phase diagram and earlier helds the Deputy spokesperson position in the STAR experiment at RHIC, currently the member of council of STAR experiment and Collaboration board of ALICE experiment at LHC. In the LHC experiment the group is assigned to coordinate all activities related to physics related to production of hadrons in light quark sector carried out in India. In future it intends to participate in high-energy programs at FAIR facility at GSI, electron Ion collider facility at BNL, USA and INO program in India.

The significant results that have come out from the research of the group in its short period of existence in NISER is: At RHIC - Demonstration of existence of partonic collectivity at very high-energy heavy-ion collisions and its disappearance as the collision energy is lowered (PhD thesis of 1st student from SPS, NISER) and the experimental results on the search for QCD crtical point in the phase diagram. Both these are published in Physical Review Letters. At LHC – Evidence of re-scattering effects in low impact parameter heavy-ion collisions which reduces as the impact parameter increases. This is through the study of resonances produced in the collisions, which have small life time compared to system lifetime. The group has now started to build a gas based detector laboratory to cater to the needs to high energy experiment. With integrated MSc students the first resistive plate chamber detector has been built at NISER.

Dr. Sanjay Swain, Associate Professor

The research group led by Dr. Swain carries out research in experimental high-energy physics. They are involved in the following large international collaborations:

- The CMS and ALICE experiments at the European Centre for Nuclear Research (CERN),Geneva, Switzerland
- The STAR experiment at Brookhaven National Laboratory, Upton, USA

The research activity taken up by the group is described below.

This year the focus of the activities has been around the analysis of the data taken in these experiments. Specifically in CMS we have been concentrating on looking for new physics (beyond standard model) by studying the production of B hadrons decaying to dimuons. In ALICE experiment we have concentrated on studying the resonance production and their properties in heavy-ion collisions. For STAR experiment we are involved in studying the azimuthal anisotropy of produced charged particles to understand collectivity in the heavy-ion collision system. Some of us are also involved in phenomenological study of the collectivity in heavy-ion collisions to extract transport properties of the QCD matter.

Dr. Prolay Kumar Mal - Assistant Professor
(Ramanujan fellow, 2012-17)

The field of experimental particle physics holds the promises to validate new theories Beyond the Standard Model (BSM) along with the scopes for achieving further precision on the Standard Model (SM) measurements. The recent discovery of the SM Higgs boson at the LHC experiments (ATLAS and CMS) has finally culminated the long-standing puzzle of electroweak symmetry breaking (at least within the context of the SM), while broadening the scopes for beyond the Standard Model (BSM) physics involving the Higgs boson itself. For example, the SM Higgs boson can decay into potential dark matter candidates and identifying such rare decay modes for the SM Higgs boson would uniquely mark the signature of BSM physics. After the current long shutdown period, the LHC will resume its Run II in 2015 at higher center-of-mass energy (13 TeV). At this unprecidented high energy a much larger volume of dataset would be recorded with the upgraded CMS detectors. The group is strongly focussed to pursue such dark matter searches involving the SM Higgs boson.

Dr. Subhasis Basak, Reader-F

Presently the group in working on Charmonium spectroscopy with overlap fermions and 2+1+1 highly improved staggered quark (HISQ gauge) configurations

Dr. Chetan Gowdigere, Reader-F
Dr. Yogesh Kumar Srivastava, Assistant Professor

The group led by Dr. Srivastava and Dr. Gowdigere are currentlyinvolved in research on issues related to black holes in general relativity as well as string theory. The activities of this group are described below.

1. Along with project students Siddharth Satpathy, Himanshu Raj and Abhass kumar, they have egun and completed the investigation on th smoothness of horizons in multiple M2 branes and multiple lack hole solutions. First they investigated the case of collinear configuration and found that there was only finite differentiability of all the fields. Then they investigated the case of oplanar on figuration and found that they have identical finite differentiability. This led them

to conjecture that more generic configurations with no symmetries will also have identical finite differentiability as the collinear and coplanar configurations; which they eventually proved by actually analyzing the generic configuration.

2. Another project in which they are involved, is calculation of quasinormal modes for various systems with horizon, especially higher dimensional black holes, black branes etc. In AdS/CFT context, such calculations tell interesting quantities in the dual field theory side. Being a strong-weak duality, such field theory quantities are quite difficult or impossible to calculate directly on the field theory side.

This group has been involved in helping with organizing an international conference on string theory, ISM 2014, to be held in Puri (Odisha) in December 2014. Conference involves many other string theory groups in India with financial and administrative commitments. Number of participants for this conference is about 120 with about one-third participants from abroad. They are expecting a very active and intellectually stimulating conference, with many of the top researchers from around the world participating in this conference."

Dr. Joydeep Bhattacharjee, Reader-F

The group led by Dr. Bhattacharjee focuses on studies related electronic and optical properties of different class of solids and nano-structures. The activities of his group are described below.

- The structural effects on electron-electron and electron-hole coulomb, exchange and correlation interactions become increasingly important with decreasing system size. At nanoscale they are extremely crucial in determining the optical properties, towards which, we perform extensive ab-initio many-body perturbation theory based calculations for accurate estimation of the ground and excited states. Based on the new understanding obtained from such calculations we are exploring the possibility of structurally functionalized type-II heterojunctions ideal for photovoltaic applications.
- Another area of focus of this group is the studies related to grapheme and carbon nanotubes. Since their discovery, graphene and carbon nanotubes have been long proposed as ideal building blocks for robust nano-electronic circuitry mainly due to their tunable electron transport property and structural robustness. Inspired by recent advancements in their controllable synthesis, we aim to design novel carbon based simple nanostructures which can be used as active elements like inductor, capacitor, diodes and transistors for electronic circuitry and spintronic applications at nanoscale. Research in this direction involves extensive calculation of mesoscopic electron transport using Greens functions and other techniques.

Dr. V. Ravi Chandra, Assistant Professor

In the last year this research group has worked on three problems addressing various

issues pertaining to magnetism on the Kagome lattice.

- In the first project, in collaboration with Ms. Meenu Kumari (Int. M. Sc student, NISER), we analysed the entanglement content of the ground state phases of the spin-1/2 antiferromagnet on the Kagome lattice. Unlike usual studies focussing on the entanglement of one half of the system with the rest, we focussed on the entanglement of the basic motifs of the lattice (e.g. the triangle, the hexagon etc) with the rest of the system for finite lattice sizes, as a function of the strength of a next nearest neighbour interaction. Analysis of the entanglement spectra and entropy showed a puzzling symmetric behaviour for both a small ferromagnetic and antiferromagnetic next nearest neighbour coupling. This part of the project became Ms. Meenu Kumari's Master's thesis. Currently, we are focusing on putting together entanglement information from individual motifs to analyse the system in the thermodynamic limit.
- In a second project, in collaboration with Amit Keren's group at Technion (Israel), we analysed using several experimental measurements (magnetisation, ESR, mu-SR, susceptibility) the properties of a Kagome compound [Cu(1,3-benzendicarboxylate)]. Our group contributed to the data analysis of the ESR experiments which combined with the magnetisation measurements was necessary to determine the Hamiltonian coupling constants of a very anisotropic spin-1/2 Hamiltonian. This research effort resulted in a publication (O. Ofer et. al, Phys. Rev. B 89, 205116 (2014)).
- We are currently working on the generalising the strategy used above for determination of coupling constants to other frustrated lattices and more complicated interaction terms. Finally, in collaboration with R. Moessner and M. Maksymenko at MPIPKS (Dresden), we have been studying the interplay between exchange and dipolar interactions for classical spins on the Kagome lattice. Using a combination of variational mean field theory, spinwave calculations and Monte Carlo simulations we find a transition between a non-magnetic 120 degree state to a ferrimagnetic state as we increase the strength of the dipolar interaction. Currently, a manuscript with the details of the analysis is under preparation.

Dr. Prasanjit Samal, Assistant Professor

The group led by Dr. Samal investigates the electronic and optical properties of nano-structures and nano-clusters using density-functional-theory (DFT). Below, they describe their research activities.

- We are working on new density functionals that provide more accurate estimates of molecular properties (structures, energies, chemical shifts etc.) and electronic as well as optical properties of nanoparticles and clusters. Firstly, our aim is to reconstructing the exact exchange-correlation potential or kernel from accurate wave-function based results for model systems. Secondly, we are further improving tuned range separated hybrid density functionals encompassing proposed excited-state methods. All the above mentioned developments are aimed at calculating more accurately the charge transfer and double excitations which are now issues in TDDFT.(This work is being carried out in collaboration with Prof. R. Baer at Herbew University, Israel)

- We are interested in studying the effect of dimensionality on the electronic, structural and optical properties of hydrogenated silicon nanoclusters. Hydrogenated silicon nanostructures have drawn increasing attention in the past one decade because of the visible luminescence was discovered in porous silicon, and more recently, optical gain was observed in silicon nanocrystals. Optical properties are thus of special interest because of the potential application for making optoelectronic devices. Low dimensionality of silicon nanostructures enlarges the smaller indirect band gap of bulk silicon into larger direct gaps, facilitating reasonably high visible photoluminescence (PL) from the nanostructures compared with the poor photoluminescence from bulk silicon. And now the most important thing which is noticed is the effect of quantum confinement in nanoclusters. As the size of bulk silicon decreases beyond the limit of its free-exciton Bohr radius (43 Å) the quantum confinement effect significantly alters the optical behavior of the system, resulting in possible excitations in the visible range. A unified DFT and MD approach will be very useful to study nanoscale phenomena. (This work is being carried out in collaboration with Prof. M. Cococcioni at University of Minnesota, U.S.A.)

- Our first attempt in this regard is to use novel (orbital-based) density functionals in practical TDDFT calculations for real molecules. Secondly, to work on time-dependent DFT in real time, for strong laser-molecule interactions. The ultimate goal of this TDDFT research plan will be the extension of the first principle molecular dynamics studies to include excited states with the help of time-dependent DFT. We are working on methods that hold the promise to be able to treat linear and nonlinear response and excitation properties of very large and complex systems in which many-body effects are dominating. (This work is being carried out in collaboration with Prof. Stephan Kummel at University of Bayereuth, Germany)

Dr. A. V. Anil Kumar, Reader-F

The group led by Dr. Kumar aims to understand the complexity in understanding the interaction between charged colloidal particles in solutions in order to unravel some basic physics. Their research activity is described below.

The interactions between charged colloidal particles in solution can be complex and varied. One particularly interesting case is when the particles attract one another at small separations, but repel at larger separations. These competing interactions lead to very rich phase behavior in these systems like formation of cluster fluids. Our investigations on a highly size-asymmetric binary colloidal mixtures shows that counter ion distributions around the colloidal particles are nonlinear and this leads to highly non-additive interactions between the two components. In such an asymmetric mixture, even though likely charged, larger colloidal particles form a cluster fluid which is in very good agreement with experimental findings. Similar effects may be observed in the case highly charge-asymmetric mixtures also. We are investigating the effect of this charge/size polydispersity in colloidal mixtures on phase behavior and dynamical properties using classical molecular simulation methods such as Monte Carlo and molecular dynamics. (This work is being carried out in collaboration with Prof. J. Horbach at German Aerospace Center (DLR), Köln, Germany)

Dr. Sumedha, Reader-F

Her research group is primarily interested in understanding and developing mathematical and numerical approaches to disordered systems. Some of the recent works involves using large deviation approach to study disordered systems. We have used the theory of large deviations to get the phase diagram of a p-spin random field model on a random graph.

- Besides that i am also interested in applying methods of statistical mechanics to study problems in biology and computer science. We are working on understanding the phase-diagram of various constraint satisfaction problems in computer science. We have been able to solve the random K-Satisfiability problem exactly on a tree graph for arbitrary K. The exact results clearly reflect on the multi-critical behaviour of the problem and its connection to the computational complexity.
- Hard core lattice gas models serve as foundation on which many models of complex physical systems ranging from glasses to granular materials can be mapped. One of the long standing questions about lattice gases is related to understanding the order-disorder transition in a lattice gas as a function of range of exclusion. We have developed an entropic sampling algorithm which allows us to study the problem for extended hard core exclusion.

Dr. Colin Benjamin, Reader -F

The group led by Dr. Benjamin focuses on theoretical studies related to novel quantum effects in various systems. Presently the group is studying the following topics.

- In a generic quantum system non-local effects are quite obvious. In this context dephasing processes can lead to vanishing non-local or quantum effects because of the emergence of the classical. However in quantum dot attached to ferromagnetic leads when one operates it as a pure spin pump one counter-intuitively observes the opposite, dephasing processes which lead to the emergence of non-local effects.
- Understanding Photosynthesis has hitherto been done using chemical processes which dont have much to do with the wavenature of particles. Recently in a dramatic twist excitions which carry information related to photosynthetic processes were revealed to show quantum beats. How do we understand the wave nature at such high temperatures. Clearly, a best possible way would be to simulate another quantum system which behaves exactly similar to the photosynthetic mechanism and see how it changes as room temperature effects are brought forth.

Dr. Subhankar Bedanta, Reader-F

The area of focus for the group led by Dr. Bedanta is nanomagnetism and multiferroics. The details of their research activities are mentioned below.

- They prepared thin films of Co/Al_2O_3 on Si substrate by varying the substrate rotation using sputtering method. The magnetization reversal in a single Co layer has been studied by

performing longitudinal magneto-optic Kerr (LMOKE) microscopy at room temperature. LMOKE measurements reveal that the magnetic domains and the reversal process strongly depends on the substrate rotation, however the anisotropy is moderately modified.

- Further magnetic/non-magnetic multilayers have been prepared by sputtering in order to study the inter-layer coupling effects on the magnetization reversal processes. In a bilayer of $Co/Al_2O_3/Co$ deposited on Si-substrate we have observed layer-by layer magnetization reversal evidenced by the stepped hysteresis and different domain images corresponding to two cobalt layers in the LMOKE microscopy. The layer-by-layer magnetization reversal is observed to be different for thicker Al_2O_3 spacer layer. In future we plan to study Co/Au/Co multilayers to study the effect of RKKY interactions in addition to the dipolar and Neel coupling.

- The group has started working in fabrication and characterization of magnetic antidot lattices (MALs) of Cobalt films. They prepared MALs of Cobalt by photolithography followed by sputtering deposition. The domain structure and domain wall dynamics in such MAL revealed that domain engineering is possible in MALs. Further the relaxation dynamics in such MALs has been studied as a function of the angle between the easy axis and the magnetic field. In future the group is going to fabricate nanodimensional MALs.

- The group has studied the angle dependent magnetization reversal in superferromagnetic thin films. It has been found that by applying the magnetic field at various angles to the easy axis the size, shape and relaxation dynamics of SFM domains can be very well controlled. In future we plan to prepare magnetic nanoparticles of Co and CoFe by both chemical and sputtering deposition. Then by putting them on substrates and varying the concentration of nanoparticles, the effect of inter-particle interaction effects can be studied. In particular focus will be given to understand the mechanism of "superferromagnetism".

- The group also focuses on the magnetization reversal process in epitaxial thin films of Fe on MgO (001) substrates. In this system both cubic and uniaxial anisotropy co-exist which led the reversal process to happen via either two 90° or two 180° domain wall motions. In future the group plans to work on preparation of Fe/C_{60} multilayers to study the effect of C_{60} on the magnetism of Fe and vice-versa.

- The group has also started preparing heterostructures of $La_{0.7}Sr_{0.3}MnO_3$(2-5nm)/$BiFeO_3$(20-50nm)/$SrTiO_3$ (substrate) with (001) orientation bilayers where we intend to observe the exchange bias in multiferroics. $BiFeO_3$ (BFO) is a room temperature multiferroic material and has a very strong magnetoelectric coupling. $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) is a room temperature ferromagnet with a T_C~ 350 K. In this heterostructure the electrical control of magnetic exchange bias effect will be studied.

Dr. Pratap Kumar Sahoo, Reader-F

The group led by Dr. Sahoo carries out experimental investigation of nano-photonic and plasmonic structures. The research areas are discussed below.

- Surface plasmons are electromagnetic excitations that propagate along a metal-dielectric interface, or along chains of metallic nanoparticles. Our goal is to study the generation and manipulation of surface plasmons, with the aim to achieve nanoscale control over the propagation of electromagnetic energy. Surface plasmons and photons do not couple efficiently due to their different dispersion relations. This mismatch can be overcome by using nano and micro-structuring or near-field coupling techniques.
- Also optical excitation by coupling a foreign atom by ion implantation to propagate surface plasmons and its anisotropic optical response due to the strong transverse and longitudinal plasmons coupling is a hot recent research area. Ion beams are also indispensable tools to dope materials with optically active ions. Ion irradiation can also lead to nanoscale changes in the structure and shape of materials such as colloids, Si nanostructures and lithographic masks. The thermal spike that is generated along the ion track leads to anisotropic deformation, with the material expanding perpendicular to the ion beam. Continuum modeling is used to determine the fundamental mechanisms behind these ion-solid interactions. The first attempt in this regard is to fabricate the nanostructures using various lithographic techniques, thin film deposition and energetic low and swift heavy ion beam implantation and study the strong interaction of light with nano structured materials which lead to the design of plasmonic devices with optimized properties.

Dr. Kartikeswar Senapati, Reader-F

The group led by Dr. Senapati is exploring three separate experiments involving hybrid thin film structures consisting superconducting and ferromagnetic materials. The first one is proximity effect between superconducting and magnetic oxide films, which we plan to look from a band structure perspective using photoemission spectroscopy. This is running in collaboration with UGC-DAE consortium Indore and Institute of Physics Bhubaneswar. The second experiment was to explore the magnetic coupling between ferromagnetic insulators via a superconducting layer using SQUID magnetometry. This experiment was carried out in the national user facility at Institute of physics Bhubaneswar. The third experiment was to study a series of spin-filter Josephson junctions (NbN-GdN-NbN) with varied degree of spin filtering in barrier. Both the normal state conductance and the superconducting state conductance were measured under various magnetic field and microwave irradiation. This experiment was done in collaboration with the University of Cambridge UK. We intend to improve further all three experiments in the coming year.

Dr. Ashok Mohapatra, reader-F

This group aims to study the coherent Rydberg excitation in a thermal vapor cell with the motivation to realize a single photon source using Rydberg blockade. Rydberg blockade is a phenomenon where more than one atom within the blockade volume can't be excited to the Rydberg state using a monochromatic laser beam due to strong Rydberg-Rydberg interaction. The basic idea is to combine the single excitation due to Rydberg blockade and the 4-wave mixing technique to generate a single photon from a mesoscopic ensemble of atoms within a single blockade volume.

The lab is under development to carry out these experiments. Since the last academic year, we are involved in procuring the equipments. The single photon source will be useful for quantum information. Also, the mesoscopic ensemble of atoms inside the blockade volume can be used as a qubit to build a quantum computer. The extracted single photon can be used to transfer the information between two far distant qubits.

Dr. Ritwick Das, Reader-F

The research group led by Dr. Das focuses on nonlinear photonics, plasmonics and waveguide optics. The main areas of research are described below.

- Optical Parametric Oscillators or OPOs provide an alternative and practical route to reach those spectral regions that are inaccessible to conventional laser technology, by exploiting nonlinear optical properties of non-centro-symmetric crystals. An interesting configuration of OPOs is singly-resonant OPOs or SROs where only one of the generated waves oscillates between a pair of mirrors forming a very stable source of generating coherent radiation. The frequency tunability is achieved by either changing the properties of the crystal such as temperature or angular orientation with respect to the pump beam, or by inserting a frequency selective element in the cavity such as an etalon which manipulates the longitudinal resonance condition. In the present research work, the main idea is to generate high-power, continuous-wave, coherent radiation in the mid-infrared that is tunable from 2-6 μm. This wavelength region is extremely crucial for carrying out absorption spectroscopy of trace-gas molecules such as methane, formaldehyde, nitrogen, carbon-dioxide and many more.
- The research work essentially comprises study of modal interaction between bandgap-guided modes in a dielectric medium and surface plasmon modes. The dispersive properties of the waveguides, anti-crossing behavior and propagation loss features are being investigated in detail. Another interesting feature that involves the existence and excitation of 'Tamm-plasmon' states is also being investigated. The major goal of this research activity is to provide alternative as well as efficient route for signal processing in the miniaturized photonic integrated circuits and realization of efficient biochemical sensors.

Dr.Prolay Mal, Assistant Professor

The field of experimental particle physics holds the promises to validate new theories Beyond the Standard Model (BSM) along with the scopes for achieving further precision on the Standard Model (SM) measurements. The recent discovery of the SM Higgs boson at the LHC experiments (ATLAS and CMS) has finally culminated the long-standing puzzle of electroweak symmetry breaking (at least within the context of the SM), while broadening the scopes for beyond the Standard Model (BSM) physics involving the Higgs boson itself. For example, the SM Higgs boson can decay into potential dark matter candidates and identifying such rare decay modes for the SM Higgs boson would uniquely mark the signature of BSM physics. After the long shutdown period, the LHC Run II

at center-of-mass energy (13 TeV) has begun. At this unprecedented high energy large volume of dataset are being recorded with the upgraded CMS detectors. The group is strongly focussed to pursue such dark matter searches involving the SM Higgs boson as well as precision measurements with the top quark.

Dr. Ravi Chandra, Assistant Professor

The focus of Dr. Chandra's research group is the study of correlated low temperature phases in frustrated magnets. These systems are notable for a characteristic lack of any "usual" order in the ground state whether it be magnetic or involving other symmetries like lattice translations. Nevertheless the ground states are quite more complicated than the simply described uncorrelated phases of paramagnets. The origin of these phases typically are either competing coupling constants in the Hamiltonian or a lattice geometries where lowering of individual bond energies and the energy of the system as a whole simultaneously is not possible.

One of the systems under investigation by the group is the spin-1/2 antiferromagnet on the pyrochlore lattice. This system has been investigated in the past using techniques like perturbation theory (starting from the decoupled tetrahedra limit), Variational Monte Carlo (VMC), and Contractor Renormalisation. No detailed exact diagonalisation (ED) study till now has been reported. In a preliminary study in collaboration with M. Sc student JyotismanSahoo we analysed a section of the lattice in the [111] direction using the Hamiltonian of a "breathing" pyrochlore lattice, with the tetrahedral of opposite orientation having different antiferromagnetic couplings. Initial scrutiny of ED data shows no signs of dimer order in the system or order in the spin chirality operator found on the VMC studies. The spin correlations are short-ranged for both two and four point correlations and an analysis of the Schmidt values of the tetrahedron unit indicate that the triplet sector does make a substantial contribution to the low temperature phase at the uniform lattice point (where the two couplings in the problem are equal). A more detailed analysis of the data and for a lattice size of 36 sites is currently underway.

Of continuing interest to the group is the interplay of dipolar and exchange interactions in frustrated magnets (Reference: M. Maksymenko, V. R. Chandra, R. Moessner, Phys. Rev. B 91, 184407 (2015)) and the characterisation of the low temperature phases of frustrated magnets using entanglement measures.

Dr. Nishikant Khandai, Reader-F

Nishikanta Khandai's group is interested in the areas of cosmology, large scale structure and galaxy formation. Cosmology is an observationally driven field. Over the last decade independent observations have confirmed that the Universe is currently in a phase of accelerated expansion. We attribute this to a mysterious form of energy which permeates all of space also known as dark energy. In its simplest form dark energy can be parametrized by a cosmological constant, a constant energy density filling space homogeneously. We can measure the contribution of dark energy to the total energy density of the Universe because we can measure the expansion history of the Universe accurately. Other than that it is a complete mystery. However it is an important

mystery, since it constitutes nearly ~ 74% of the energy density of the Universe.The second mystery is an unknown form of matter, dark matter, which makes up ~ 22% and the rest is in baryonic or normal matter. Unlike ordinary baryonic matter, dark matter cannot be seen directly, it is weakly interacting or cold, but its presence and properties are inferred from its gravitational effects on visible matter, radiation and the large scale structure of the Universe. Independent observationshave formed a consistent picture, the so-called standard model of cosmology,namely the Lambda-Cold Dark Matter (LCDM) model, a flat universe dominated by dark energy, supplemented by dark matter and atoms with density fluctuations seeded by a Gaussian, adiabatic and in a nearly scale invariant process. With time these perturbations grow due to gravitational instability and form deep potential wells in which gas can cool and form hierarchically the first stars, proto-galaxies, galaxies and clusters of galaxies that we see today. Galaxy formation is indeed a complex and extremely non-linear process and in order to understand and interpret observations we need to resort to numerical simulations. For our research we use numerical simulations as a tool to understand the rich process of galaxy formation and large scale structure in a Universe driven by dark matter and dark energy.

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Conference/Workshop proceedings:

1) SharmiliRudra, Akhilesh P. Nandan, HimangshuNeog, S. Biswas, S. Mahapatra, B. Mohanty, and P. K. Samal, "Cosmic ray spectroscopy using plastic scintillator detector," Proceedings of the DAE Symposium on Nuclear Physics, vol. 59, 870-871 (2014).
2) HimangshuNeog, SharmiliRudra, M. R. Bhuyan, S. Biswas, B. Mohanty, Rudra- narayanMohanty, P. K. Sahu, and S. Sahu, "Fabrication of Resistive Plate Chamber using Bakelite," Proceedings of the DAE Symposium on Nuclear Physics, vol. 59, 874-875 (2014).
3) S. Sahu, M. R. Bhuyan, S. Biswas, B. Mohanty, and P. K. Sahu, "Development of Data logger for atmospheric pressure, tempera- ture and relative humidity for gas-filled detector," Proceedings of the DAE Symposium on Nuclear Physics, vol. 59, pp. 876-877 (2014).
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5) RajendraNathPatra, Amit Nanda, SharmiliRudra, S. Biswas, B. Mohanty, T. K. Nayak, P. K. Sahu, S. Sahu, "Development of a triple GEM detector prototype," 7th International Conference on Physics and Astrophysics of Quark Gluon Plasma (ICPAQGP 2015), 2-6 February, 2015, VECC, Kolkata, India.
6) V. Ravi Chandra, Quantum entanglement in macroscopic matter, ICTS Bangalaore, January 2015.
7) B. Mohanty, 5th Asian Triangle Heavy-Ion Conference, Osaka, Japan, August 5-8, 2014.
8) B. Mohanty, Topical Meeting on High Moment Analysis in High Energy Collisions, CCNU, Wuhan, China, July 10-16, 2014.
9) B. Mohanty, Workshop on High Density QCD (QCD 2015), TIFR, Mumbai, January 27-30, 2015.
10) B. Mohanty, International Conference on the physics and astrophysics of quark gluon plasma, VECC, Kolkata, February 2-6, 2015.
11) Mukesh K. Shukla, Samir Kumar and Ritwick Das, "High-power, single-frequency, single-pass second-harmonic-generation by optimally focused Yb-fiber laser" Proc. of Advanced Solid State Lasers (ASSL) 2014, Shanghai, China, Nov. 2014.
12) Mukesh K. Shukla, Samir Kumar and Ritwick Das, "High-power frequency-doubled Yb-fiber laser", Proc. of 12th International Conference on Optoelectronics, Fiber Optics and Photonics: PHOTONICS 2014, IIT Kharagpur, India, Dec. 2014
13) Ritwick Das, R. Jha, T. Srivastava, "Accurate refractive-index sensing with Tamm-plasmon and surface-plasmon based hybrid configurations", Proc. of 12th International Conference on Optoelectronics, Fiber Optics and Photonics: PHOTONICS 2014, IIT Kharagpur, India, Dec. 2014.
14) P. K. Sahoo, DAE BRNS symposium on Multiscale Modelling of Materials and Devices (MMMD-2014), BARC Mumbai, 30th Oct. 02 Nov 2014.
15) P.K. Sahoo, International conference on "Polymers on Micro-and Nanoscale" ICNP-2015, Mahatma Gandhi University, Kottayam, Kerala, 10-12 April 2015.

Conferences organized

1) Title: "Current trends in condensed-matter physics – 2015"
   Organizing committee members: J. Bhattacharjee, P. Samal, A.V. Anil Kumar, C. Benjamin, Sumedha, V. Ravi Chandra, P. K. Sahoo, S. Bedanta, K. Senapati
   Venue: NISER, I.O.P. Campus, Bhubaneswar
   Duration: 19-22 February 2015

2) Title: "Asia-Europe-Pacific School on High Energy Physics"
   Organizing committee members: S. Swain and P. Mal
   Venue: Hotel Toshali Sands, Puri
   Duration: 4-17 November 2014

3) Title: "Indo-Japan workshop on magnetism at Nanoscale (IJWMN-2015)"
   Convener: S. Bedanta
   Venue: NISER, Bhubaneswar from
   Duration: 9-12 January 2015

Projects from non-DAE schemes:

1) **Title:** Engineering magnetic domains in Co antidot arrays
PI: Dr.Subhankar Bedanta,
Funding agency: DST-SERB
Amount sanctioned: Rs. 49.92 lakhs

2) **Title:** Electric field induced spin wave spectra in multiferroicantidot lattice arrays
PI: Dr. Subhankar Bedanta,
Funding agency: DST
Amount sanctioned: Rs. 17.24 lakhs

3) **Title**: Beam Energy Scan Program with Relativistic Heavy Ion Collisions and Development of a Gas based detector facility at NISER
PI: Dr. Bedangadas Mohanty
Funding agency: DST-SERB
Amount sanctioned: Rs. 39 lakhs

Projects from DAE schemes:

1) **Title**: Theory of solid state quantum computation with Dirac Superconductors
PI: Dr.Colin Benjamin
Funding Agency: DAE Mid-term appraisal approved by SG19 of DAE
Amount sanctioned: Rs. 70 Lakhs

Talks (Invited and contributory):

1. JoydeepBhattacharjee "Activation of Graphenic Carbon Due to Substitutional Doping by Nitrogen", February 16, 2015, Nanodays, SNBNCBS Kolkata
2. Yogesh Srivastava, "Quantum Field Theory", SERC preparatory school at IISER, Bhopal (2015).
3. S. Biswas, "Proposal to join RD51 collaboration of NISER"IWAD and 14th RD51 Collaboration Meeting, 27-31 October, 2014, VECC, Kolkata.

4. S. Biswas, "Activities on GEM detector development at NISER-IoP, India," RD51 mini week, CERN, Switzerland, December 08-11, 2014.
5. S. Biswas, "ALICE TPC upgrade for High-Rate operations," 7th International Conference on Physics and Astrophysics of Quark Gluon Plasma (ICPAQGP 2015), 2-6 February, 2015, VECC, Kolkata, India.
6. S. Bedanta, Physics seminar at S. N. Bose institute for basic science, Kolkata in April 2014.
7. S. Bedanta, Physics seminar at Saha Institute of Nuclear Physics (SINP), Kolkata in May 2014
8. S. Bedanta, Physics seminar at ForschungszentrumRosendorf, Dresden, Germany, May- 2014.
9. S. Bedanta, Physics seminar at Institute of Material Research (IMR), Tohoku University, July 2014.
10. S. Bedanta, Invited lecture at Indo-Japan workshop on Magnetism at Nanoscale held at NISER, Bhubaneswar in January-2015.
11. S. Bedanta, Invited lecture at Neutron scattering conference held at Bhaba Atomic research center (BARC), Mumbai in January-2015.
12. Colin Benjamin, Seminar on Research work done in NISER, Bhubaneswar at NewDelhi on June 13, 2014.
13. S. Bedanta, Physics seminar at Indian Association for Cultivation of Sciences (IACS), Kolkata in February 2015.
14. S. Bedanta, Invited lecture at Indo-UK conference on magnetization processes held at Durham University, Durham, UK in March-2015.
15. P. Mal, "Search for the Higgs□invisible decays at the LHC" at XXI DAE-BRNS HEP Symposium, IIT Guwahati, Dec 8-12, 2014
16. B. Mohanty, Invited Plenary Talk on Experimental Overview of the QCD Phase Diagram, at the 5th Asian Triangle Heavy-Ion Conference, Osaka, Japan, August 5-8, 2014.
17. B. Mohanty, Invited talk on Baselines for high moment analysis to study QCD phase diagram, at the Topical Meeting on High Moment Analysis in High Energy Collisions, CCNU, Wuhan, China, July 10-16, 2014
18. B. Mohanty, Invited Talk on Search for critical point in QCD Phase Diagram, at the Workshop on High Density QCD (QCD 2015), TIFR, Mumbai, January 27-30, 2015
19. B. Mohanty, Invited Plenary Talk on Search for QCD critical point in the beam energy scan program, at the International Conference on the physics and astrophysics of quark gluon plasma, VECC, Kolkata, February 2-6, 2015.
20. N. Khandai, Invited Astrophysics seminar, Harish-Chandra Research Institute, 17th December 2014.
21. N. Khandai,Invited Astrophysics seminar, Indian Institute of Science, 3rdMarch 2015.
22. N. Khandai, Invited speaker at UGC-DRS Sponsored National Seminar on 100 years of General Theory of Relativity, Utkal University, March 10-11 2015.
23. R. Das, "Dispersion management in optical fiber communication systems" – DST Women Scientists Programme at Sophitorium Engineering College, Jatni on 31st October 2014 and 13th March 2015.
24. P.K. Sahoo, "Ion beam synthesized UV emitting Embedded Si nanocrystals", II Physicalisches Institute, University of Goettingen, Germany, June 2014.
25. P.K. Sahoo, "Interface dynamics during ion beam induced homo/hetero-epitaxial crystallization", Schol of Physical Sciences at NISER Bhubaneswar, Oct. 2014.
26. P.K. Sahoo, "Self sub-wavelength periodic nano-patterned surface for antireflection and spectroscopic application", Seminar at Department of Physics, MNIT Jaipur, Rajstan, Dec. 2014.

Recognitions

1) S. Bedanta was selected as a "visiting associate professor" at International collaborative center (ICC-IMR) of Institute of Materials Research (IMR) at Tohoku University, Sendai in Japan for the year 2014. In this framework visited Tohoku University in June-July 2014 for one month and in December 2014 for 3 weeks.

Doctoral degree awarded to Ph.D. Students:

1) Student's name: Md. Nasim
   Thesis title: Azimuthal Anisotropy Measurements For Identified Particles Produced In Au+Au Collisions at $\sqrt{h}_{NN}$= 7.7 – 200 GeV
   Supervisor: Dr. B. Mohanty

2) Student's name: SubhashSingha,
   Thesis title: Identified particle production in p+p and Pb+Pb collisions at LHC energies
   Supervisor: Dr. B. Mohanty

Outreach program:

1) Dr. S. Bedanta delivered a lecture to school students in Salipur, Cuttack, Odisha in July 2015.
2) Ritwick Das delivered lectures on "Lasers & Nonlinear Optics" at Paradip College, Paradip (Odisha) and Gopabandhu Science College, Athgarh (Odisha) as a part of Optical Society of India's (OSI) Foundation Lecture Series (2014-15).

Major research facilities in School of Physical Sciences:

1. **Cryogenic Free Physical Property Measurement System:** This is an equipment for measurements of electronic transport and magnetization properties of various materials at high fields and low temperatures. The system is capable of cooling small specimens down to 2 Kelvins without needing any liquid Helium supply using a closed cycle Helium gas compressor with pulse-tube cold head. The superconducting solenoid can provide a field up to 9 Tesla parallel and perpendicular to the specimen. This instrument will support various low temperature research activities in the institute such as (i) proximity effect between superconducting and magnetic layers, (ii) transport in Josephson devices, (iii) multi-ferroic materials research (iv) transport in semiconducting and superconducting nanowires, (v) nano-magnetism in patterned magnetic arrays, etc.

2. **Low-temperature magnetoresistance set-up:** A low-temperature cryostat has been procured and is going to be installed in the Laboratory of Nanomagnetism and Magnetic Materials (LNMM) in School of Physical Sciences, NISER in 2015-2016. With this set-up magnetoresistance can be measured down to 1.7 K and in a magnetic field of about 7 Tesla. This cryostat has two optical windows with which in future the set-up can be modified to a low-temperature magneto-optic Kerr effect measurement set-up.

School of Humanities and Social Sciences

Dr. Pranay Swain, Reader-F (Chairperson)

Public Policy and Governance: Public policy research aims at facilitating a better understanding of issues related to governance and public affairs and bridging the gap by offering insights. It also attempts to analyse the actual implementation of policies by drawing upon comparative and international perspectives in public policy.

Voluntary Sector and Development: with the third sector assuming increasingly significant and creating a huge niche in social development the aim is to enhance our knowledge of the sector through independent and critical research. We also aim to better understand the value of the sector and how this can be maximized in terms of developmental interventions in an array of sectors.

Contemporary Social Issues: In order to achieve effective solutions to societal problems that involve science and technology, there is a need to understand the changing priorities and the patterns in social life. With technology driven life-style gripping the young generation, the resultant social issues must be addressed with fair amount of details. Our aim is to deep dive into the social transformation due to digital life style and offer valuable insights.

Dr. Debashis Pattanaik, Assistant Professor

Social networks for co-creation of knowledge: My research work is related to the understanding of knowledge diffusion and role of social networks. Social networks provide rich and systematic means of assessing informal networks In addition to mapping information flow; it also helps us in relational characteristics of knowledge, access, and engagement. My research focuses on analysis of the dimensions of relationships that precede or lead to effective knowledge sharing, and an understanding and tools and techniques that improves a network's ability to create and share knowledge.

Dr. Rooplekha Khuntia, Assistant Professor

Business Ethics and Organizational Behaviour: Human behaviour is a result of their individual characteristics as well as the context in which they are placed. My research is about people working in organizations and understanding their behaviour from a person-situation interaction perspective. Exploring people's behaviour within a broader context of work culture, leadership characteristics as well human values and personal belief systems as applied to ethical decision making is the core of my research. Also included in my research is work stress and work life balance - the challenges of a dynamic evolving world like.

Dr Joe Varghese Yeldho, Assistant Professor Visiting Faculty

Critical History and Narratives of Race

Event Studies, Pedagogy and the Public Sphere, Architecture and Performance, Topology and Affordances

Dr. Sujata Kar, Assistant Professor

Banking and Fincial Economics

Publication

- Swain, P.K. (2014) Entrepreneurship in Social Sector: Looking at the Definitional Aspects through ITC E-choupal and Bakul Foundation, International Journal of Business, Management and Social Sciences, Vol IV, No. 3, 35-40 (ISSN: 2249-7463)

Conferences

- Indian Securities Market: Finding Inroads to Rural and Reluctant Investors, workshop on 'Financial Inclusion in Indian Securities Market'Organized bythe Securities and Exchange Board of India (SEBI) at SEBI Bhawan, Mumbai on 23 January 2015.
- Entrepreneurship in Social Sector: Looking at the Definitional Aspects through ITC E-choupal and Bakul Foundation, International Conference on Impact of Political Refurbish with reference to Commerce, Economics and Social Sciences, organized by International Association of Academicians and Researchers, Surat, 6 October 2014

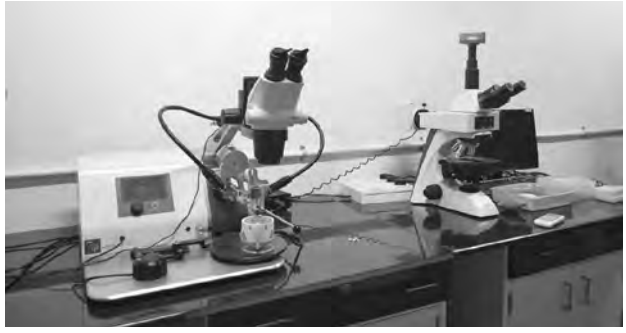
Invited Talks

- Attaining Millennium Development Goals: Tracking the Progress in India, UGC Sponsored Refresher Workshop on Development Discourse, Academic Staff College, Sambalpur University, 16 July 2014
- Third Sector: Creating a Niche and almost Living up to it –Blending Theory with Practice, UGC Sponsored Refresher Workshop, Academic Staff College, Sambalpur University, 16 July 2014
- Financial Capability: People-centred approach to rethink Financial Inclusion, organized by Xavier Institute of Management (XIM), Bhubaneswar in collaboration with The German Development Cooperation (GIZ), on 20 May 2014

Colloquium and Seminars

Prof. Binay K Pattnaik, Director, ISEC-Bangalore: People's Science Movement in India: A Sociological Analysis, 31 October 2014

Prof. Binay K Pattnaik, Director, ISEC-Bangalore: Science Popularization Movement in Odisha: A Sociological Formulation, 2 November 2014



Research and Development Projects: Extramural Funding

New Project Sanctioned During 1st April 2014 to 31st March 2015											
School	Funding Agency									Total	Fund Sanctioned (Rs)
	DAE	DST	DBT	SERB	CSIR	ICMR	IFCPAR	MES	MOD		
SPS		1		2						3	16490708.00
SCS				1	1					2	670000.00
SMS										0	0.00
SBS			1	1		1				3	12991900.00
									GRAND TOTAL	**8**	**30152608.00**

Details of the Projects

Project Sanctioned During 1st April 2014 to 31st March 2015					
SL No.	**Title of the Project**	**Source of Funding**	**Name of the Principal Investigator**	**School**	**Amount Sanctioned (Rs)**
1	Engineering magnetic domains in Co antidot arrays.	SERB	Dr. Subhankar Bedanta	SPS	4992858.00
2	Josephson coupling through ferromagnetic barriers.	DST	Dr. Kartik. Senapati	SPS	7595850.00
3	Beam Energy Scan program with Relativistic Heavy-Ion Collisions and Development of a Gas based Detector facility at NISER	SERB	Dr. Bedangadas Mohanty	SPS	3902000.00

4	Finding aggregation induced emission active materials design, synthesis and photophysical studies of sterically hindered triary lethenes and tetraary lethenes.	SERB	Dr. Moloy Sarkar	SCS	370000.00
5	Design and synthesis of heterogeneous dirhodium based metal organic framework catalysts.	CSIR	Dr Jogendra Nath Behera	SCS	300000.00
6	Understanding phosphorylation-mediated changes in subcellular localization and functioning of Siah Proteins in the context of Helicobacter pylori-mediated gastric cancer.	SERB	Dr. Asima Bhattacharyya	SBS	3022000.00
7	Role of TRPV ion channels in the regulation of mitochondrial function and dynamics relevant in the context of neuronal abnormality and other pathophysiological conditions.	DBT	Dr. Chandan Goswami	SBS	8912000.00
8	Synthesis and characterization of noval hydrogels and heir interaction will cells for potential application in bone tissue engineering.	ICMR	Dr. Chandan Goswami (Ad-hoc Project)	SBS	1057900.00
				TOTAL	**30152608.00**

MOUs signed

- The German Academic Exchange Service- Deutscher Akademischer Austauschdienst (DAAD) for students exchange programme in Biology

Third Graduation Ceremony

The 3rd graduation ceremony of NISER was held on 9th June 2014. Honorable Chief Guest Padma Vibhushan Dr. Anil Kakodkar, former Chairman AEC and former Chariman Board of Governors Padma Bhushan Prof. Shri Krishna Joshi, Former Director General CSIR graced the occasion to deliver the convocation address and awarded the degrees to the graduated students.

Two PhD scholars and 37 MSc. Integrated programme students graduated in the third convocation ceremony. K. Sandeep Rao of the school of chemical sciences was awarded a gold medal for outstanding overall performance of the year. He was also awarded a silver medal for best academic performance in chemistry. Similarly, Sabyasachi Barik from the school of physical sciences, Vishal Gupta from the school of mathematical sciences and Priyanka Mishra from the school of biological sciences received the silver medals for the best academic performance in their respective schools. Offers for doctoral programmes poured in from reputed universities in Paris, Texas, Michigan, Wisconsin-Madison, Maryland, Stony Brook, Louisiana, Houston, Toulouse, Connecticut, Cologne and South Dakota, besides the IITs, the Tata Institute of Fundamental Research and the National Institute of Immunology in the home country.

Infrastructure

Existing Infrastructure in Transit campus

- It has an infrastructure worth Rs 15 cores including an academic-cum-administrative building of 5000 sq. meters within Institute of Physics campus.
- A hostel for girls of 1781 Sqr. meter inside Institute of physics campus.
- Initial expenditure of Rs 56 crores for the laboratories of different schools in the transit campus which include

Permanent Construction of NISER's Campus at Jatni

The academic complex at permanent campus comprises of a total built up area of 72,700 square metres spread in 11 buildings. The residential township has a built up area of 102,000 square metres comprising nine buildings for hostels, adequate number of faculty and staff quarters and one Directors' Bungalow. The sports complex is going to have a student activity centre, aquatic sports complex and playground.

Public Outreach Programmes

The school of Physical Sciences under the leadership of Prof J Maharana and North Orissa University, Baripada jointly organized a summer course of Excitements in Physics for Physics teachers drawn from various colleges and universities of Orissa during 3-8 June 2013. This event was very well received by the teaching community of the state.

Other such initiatives include:

- S. Bedanta: INSPIRE camp at New College, Kolkhapaur, Maharasthra, 2014
- P. Samal: National Seminar on "Recent Advances in Physics" at Department of Physics, North Orissa University, Baripada, Odisha, February 23rd, 2014
- A. Mahapatra: National Seminar on "Recent Advances in Physics" at Department of Physics, North Orissa University, Baripada, Odisha, February 23rd, 2014
- P. K. Sahoo: National Seminar on "Recent Advances in Physics" at Department of Physics, North Orissa University, Baripada, Odisha, February 23rd, 2014
- B. Mohanty: Origin of Mass, Science Day Celebrations, NM institute of Engineering and Technology, Bhubaneswar
- B. Mohanty: Why do basic Science, Modern Public School, Balasore

Miscellaneous

Public Awareness on Plantation and go-green

Plantation drives have been a regular feature at NISER permanent campus being constructed at Jatni. Every year while celebrating the significant days such as: Republic Day, Independence Day and NISER Foundation Day, the staff, students and faculty members of NISER participate in the go-green drive sending out a message to the stakeholders and public at large to care for and preserve our immediate environment. Over a thousand of saplings have so far been planted at the Jatni cite of NISER's permanent campus.

Vigilance Awareness Week

The vigilance awareness week was observed during 28 Oct 2014 - 02 Nov 2014. All the employees of NISER took the oath of official secrecy and pledged for maintenance of honesty and transparency while delivering their work. Essay and debate competitions were held on topics related to transparency and e-governance which saw participation of members of NISER family in a large number.

Sadbhavana Diwas

The Sadbhavana Diwas was observed 20th August 20143. All the officers and employees took the Sadbhavana Pledge for maintaining communal harmony.

Official Language Implementation

TheOfficial Language Implementation Committee (OLIC) of NISER observed the Raajbhasha Hindi Pakhwada during 16-30 September 2014. celebration of Hindi Fortnight was held at NISER. During the fortnoghtat, various activities such as a weeklong competition of Hindi Debate, Hindi Essay, Hindi Rhymes, etc. wereas held for all the students, faculty members and staffs including family members, of NISER.

Moreover, the implementation of Hindi in official work has already been ensured and use of Hindi within the sphere of official work has been gaining momentum.

NEST - 2014

Outstanding Intake

NEST, the nation-wide test that NISER conducts to select the most deserving candidates for admission into its flagship programme, has been extremely popular and effective. The response to NEST-2014 was extremely good. More than 33000 applications were received which is a significant increase over the previous year. The largest numbers of applications was from Odisha followed by Kerala and Uttar Pradesh. The entrance test was held at 70 centres across the country on 31st May 2014.The number of intake in the MSc programme was increased to 100 in the academic session of 2014-15. Moving forward, once NISER settles down in the new campus the intake will be increased to the approved strength of 200. The admissions to the PhD programmes were conducted through an even more rigorous process that included short listing of eligible applicants followed by in-house written tests and interviews.

The National Eligibility and Screening Test (NEST), 2013 was conducted successfully by NISER and UM-CBS. There was a significant increase in the number of application over the previous year. Around 24500 applications were received out of which around 18800 candidates appeared for the test. After due process of counseling 60 students were admitted to the MSc programme.

NISER Act

NISER has an affiliation with Homi Bhabha National Institute (HBNI), a deemed University within the Department of Atomic Energy, for the award of degrees. Efforts are on to make NISER has not yet become a Constituent Institute of HBNI. Considering the vision and size of NISER and to keep the Institute at par with other Institutes of national importance such as IITs, IISc, IISERs, etc. a separate NISER Act is deemed imperative and must be made at the very earliest. A draft Act and Rules & Bylaws has been approved by the BoG, NISER and been sent to DAE for further processing at the AEC and higher levels.

Students Activities

Annual Cultural Festival: Udbhava

Udbhava is the annual cultural festival of NISER organized by the Students Gymkhana. Typically spread over several days the festival offers a potent window to our students to unfold their other forms of creativity. The annual fest includes events like : food fest, NISER ball, Rangoli, JAM (Just a

Minute), Talent Show, DJ Nite, Spelling Bee, Treasure Hunt, Mime, Shipwreck, They extend the activities to the entire NISER family. Udhava-15 was conducted during 23 October- 04 November, 2014.

SPIC-MACAY NISER Chapter

It is heartening to note that after a long association with SPICMACAY for quite some time, our students now have a formal NISER chapter. The student volunteers pull out from their busy schedule some valuable time to organize various events round the year. During the past academic year quite a number of events were organized. There was a mime art performance by Mr. Arusam Madhusudan on 19 March 2015.

A Rural School Initiative was conducted during 22-27 December 2014. Apart from few workshops some of the exponents of Indian Classical Music and dance including the likes of Vidushi Sonal Mansigh, Pt. Hariprasad Chaurasia, Us. Bahauddin Dagar, Pt. Viswamohan Bhat, Vidushi Ashwini Deshpande, Vidushi Aruna Mohanty, etc. took the NISER fraternity to an entirely different zone of tranquility.

Sports

It is not just a coincidence than the words like "students", "science" and "sports" start with the same letter. Sports wise also, our students have quite a busy annual calendar. Apart from the regular

sporting activities, the students organize their NISER Premier League and NISER Football League twice a year and the Annual Sports Meet. This year also, our Students participated in the Inter IISER Sports Meet held at IISER-Mohali. Going forward, I am sure the students will have better sports infrastructure when our Sports Complex with the Students Activity Centre, Gym, aquatic complex, etc. are ready.

Drama and Music Club

Gitanjali beyond shores, conceptualized, scripted and directed by Dr. Sudeshna Basu, takes a fresh look at "Song Offerings". It is an aesthetic combination from the poems, songs from the Gitanjali in Bengali, and a tight yet touching narrative holds the entire program together. The near hypnotic effect that it had on famous personalities of the time and its popularity all over the world "Gitanjali Beyond Shores" is the international version of song offerings embracing readings from Tagore not only in English, but also in different languages like German,

Spanish, French and Italian by distinguished performers. The program on the 'the Untold Story Concept" held on 6th February 2015 had exciting slides to accompany the narration and music. On an ongoing basis, DMC puts up cultural events on occasions like the Independence Day, the Republic Day etc.

Social Initiative: ZARIYA

The social service club of NISER has been actively taking measures to address some major societal issues which include education of children residing in the slums opposite to our campus, donation of clothes to the needy and cleanliness drives.Our students at NISER have given an expression of their compassionate minds by forming an organization named "Zariya" to serve as a medium for translating their concern and feeling for their fellow beings.

The success of rehabilitating an out-of-school child back to schooling after removing him from the clutches of child labour gave them the confidence to undertake such noble acts at a larger scale. The students associated with Zariya have now started teaching children from the nearby slum area who have not been fortunate to be at the schools. They already have identified 39 children of ages between 3 and 10 and are now beingprepared to be sent to schools. This magnificent effort comes from them with some financial support fromvaried people including NISER faculty. A part of their scholarships is spared too to meet some of theexpenses. As soon as these children are ready, they are to be enrolled in some good schools to continuewith their education.

Walking book fairs organise periodic book exhibition to aid the social club, Zariya. Portion of the profits made gets invested in creating the library of books in the slums for the slum kids, opposite Institute of Physics campus. They also hold personal reading and story-telling sessions to create a habit of readings among the slum kids.

What I wish to highlight here is, this noble initiative was founded by some of our outgoing students. I can see them here. I hope and pray that the efforts that you put in to kick-start the initiative are carried forward in its true sense. Please join me in giving a heart-felt round of applause to the initiative.

List of Administrative Staff

SL No	Name of the Employee	Designation
1	Dr. A. K. Naik	Registrar
2	Shri Y. K. Srinath	Finance Officer
3	Shri Deepak Srivastava	Stores & Purchase Officer
4	Mrs. Shabnam Khanum	Assistant Personnel Officer
5	Shri Dinesh Bahadur Singh	Assistant Personnel Officer
6	Shri Rajeev Kumar Singh	Assistant Personnel Officer
7	Shri. Bibhupada Tripathy	Administrative Officer-III
8	Shri Ramakant Kar	Administrative Officer-III
9	Smt. A B Rosy	Office Assistant (MS)
10	Shri D. Lingaraj	Office Assistant (MS)
11	Shri Sujit Kumar Bastia	Office Assistant (MS)
12	Smt. Smruti Kanungo	Office Assistant (MS)
13	Ms. Monalisa Baliarsingh	Office Assistant (MS)
14	Shri Vijay Singh	Office Assistant (MS)
15	Shri Madhusudan Padhy	Office Assistant (MS)
16	Ms. Lipsa Das	Office Assistant (MS)
17	Smt. Lopamudra Sahoo	Office Assistant (MS)
18	Shri Nabin Kumar Sahoo	Office Assistant (MS)
19	Ms. Banita Pradhan	Office Assistant (MS)
20	Smt. Elina Das	Office Assistant (MS)
21	Shri Amarendra Kumar Behera	Office Assistant (MS)
22	Shri Ranjan Kumar Das	Office Assistant (MS)
23	Shri Abhaya Kumar Mohanty	Assistant Personnel Officer
24	Shri Hiralal Das	Assistant Personnel Officer
25	Smt. Apolina Lakra	Office Assistant (MS)
26	Shri Susanta Kumar Sethi	Operator (General Function)
27	Ms. Sasmita Sahoo	Operator (General Function)
28	Ms. Sandeepa Sahoo	Operator (General Function)
29	Shri Subrat Ranjan Hota	Operator (General Function)
30	Shri Jogendra Jena	Operator (General Function)
31	Shri Tusar Kanta Sahoo	Operator (General Function)
32	Shri Pradeep Kumar Mishra	Assistant Personnel Officer
33	Shri Chandra Sekhar Mahapatra	Assistant Personnel Officer
34	Shri Gopal Krishna Rath	Assistant Personnel Officer
35	Shri Purna Chandra Sahu	Assistant Personnel Officer
36	Ms. Bishnupriya Das	Operator (General Function)
37	Shri D. Govinda Rao	Deputy Controller of Accounts

Scientific and Technical Staff

SL No	Name of the Employee	Designation
1	Shri Ranjan Kumar Rana	Scientifc Assistant 'C' Electrical
2	Shri Jitendra Narayan Dash	Scientifc Assistant 'C' Library
3	Shri Dipak Kumar Rout	System Administrator
4	Shri Deepankar Dash	System Manager
5	Shri Susanta Kumar Parida	Laboratory Operator
6	Shri Bikash Chandra Behera	Laboratory Operator
7	Shri Ramprasad Panigrahi	Laboratory Operator
8	Dr. Shyamasree Basu	Scientific Officer 'E'
9	SK Safatulla	Tradesman (Library)
10	Dr. Sudakshina Prusty	Scientific Officer 'E'
11	Ms. Anuradha Das	Laboratory Operator
12	Smt. Smita Prusty	Laboratory Operator
13	Shri Sanjaya Kumar Mishra	Laboratory Operator
14	Shri Alok Kumar Jena	Laboratory Operator
15	Shri Deepak Kumar Behera	Laboratory Operator
16	Shri Rudranarayan Mohanty	Laboratory Operator
17	Shri Pravakar Mallick	Laboratory Operator
18	Shri V.A. Sakthivel	Laboratory Operator
19	Ms. Suchismita Dash	Library Technician
20	Shri Rabindra Kumar Maharana	Library Technician
21	Shri Gunda Santosh Babu	Scientific Officer 'D'
22	Shri Subhransu Sekhar Panda	Operator (Lab. Function)
23	Shri Mukesh Kumar Meena	Operator (Lab. Function)
24	Shri Arun Kumar	Scientific Officer 'E'
25	Shri Amit Sankar Sahu	Operator (Lab. Function)
26	Dr. Saurabh Chawla	Scientific Officer 'C'
27	Shri Souvagya Mahapatra	Scientific Officer 'D' Civil
28	Shri Dilip Jha	Scientific Officer 'D' Electrical
29	Dr. Saikat Biswas	Scientific Officer 'D'
30	Shri Saikat Hira	Scientific Officer 'E'
31	Shri Amit Kumar Panigrahi	Scientific Officer 'C'
32	Shri Bhagaban Dhal	Scientific Officer 'C'
33	Shri Pramod Kumar Nath	Scientific Officer 'C'
34	Shri Binod Bhagat	Scientific Officer 'C'
35	Dr. Ranbir Singh	Scientific Officer 'D
36	Shri Ajit Kumar Raut	Scientific Assistant 'B'
37	Shri Ajit Kumar Mohanty	Scientific Assistant 'B'

Audited Statement of Accounts
&
Statutory Auditor's Report
Financial Year 2014-15

National Institute of Science Education and Research, Bhubaneswar

Auditor

J PRADHAN & CO.
CHARTERED ACCCOUNTANTS
L-3/69, Acharya Vihar, Bhubaneswar-751013, Odisha
Tel.: 0674-2542418, Email: jmpbbsr@yahoo.com

J PRADHAN & CO.
Chartered Acccountants

L-3/69, Acharya Vihar,
Bhubaneswar-751013, Odisha
Tel.: 0674-2542418, 9437012300
Email: jmpbbsr@yahoo.com

INDEPENDENT AUDITORS' REPORT

TO
THE MEMBERS OF
National Institute of Science Education and Research
IOP Campus, Sachivalaya Marg
Bhubaneswar

Report on the Financial Statements

We have audited the accompanying financial statements of **National Institute of Science Education and Research** (**"The Institute"**), which comprise the Balance Sheet as at 31st March, 2015, Income & Expenditure Account and Receipts & Payments Account for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the 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 the maintenance of adequate accounting records for safeguarding of the assets of the Institute and for preventing and detecting the 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 internal financial control, 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.

Contd.....P2

An audit involves performing procedures to obtain audit evidence about the amounts and 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 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 evaluating the appropriateness of 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 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 a true and fair view in conformity with the accounting principles generally accepted in India, of the state of affairs of the Institute as at **31st March, 2015**, its Income & Expenditure Account and Receipts & Payments Account for the year ended on that date.

for **J Pradhan & Co.**
Chartered Accountants
Firm Reg. No. 326206E

CA. Jyotirmay pradhan
Partner
Membership No. 057455

Place: Bhubaneswar
Date: 28th August, 2015

BALANCE SHEET AS AT 31ST MARCH, 2015

Amount (₹.)

Particulars	Schedule	As at 31st March, 2015	As at 31st March, 2014
CORPUS/CAPITAL FUND AND LIABILITIES			
CORPUS/CAPITAL FUND	1	6,802,717,987	6,450,874,209
RESERVES AND SURPLUS	2	-	-
EARMARKED/ENDOWMENT FUNDS	3	-	-
SECURED LOANS AND BORROWINGS	4	-	-
UNSECURED LOANS AND BORROWINGS	5	-	-
DEFERRED CREDIT LIABILITIES	6	-	-
CURRENT LIABILITIES AND PROVISIONS	7	48,011,879	31,619,939
TOTAL		**6,850,729,866**	**6,482,494,148**
ASSETS			
FIXED ASSETS	8	858,126,038	630,148,352
INVESTMENTS- FROM EARMARKED/ENDOWMENT FUNDS	9	-	-
INVESTMENTS-OTHERS	10	61,694,105	36,674,466
CURRENT ASSETS, LOANS, ADVANCES ETC.	11	5,730,909,723	5,815,671,330
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)		-	-
TOTAL		**6,850,729,866**	**6,482,494,148**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTIGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy.Controller of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

Date:28th August, 2015
Place: Bhubaneswar

J. PRADHAN & CO. FRN-326206E Chartered Accountants

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2015

Amount (₹.)

Particulars	Schedule	For the Year Ended 31st March, 2015	For the Year Ended 31st March, 2014
INCOME			
Income from Sales/ Services	12	-	-
Grant / Subsidies	13	356,280,170	-
Fees / Subscriptions	14	8,041,730	9,297,075
Income from Investment	15	-	-
Income from Royalty, Publication etc.	16		-
Interest Earned	17	50,708,956	33,000,965
Other Income	18	-	-
Increase/(decrease) in stock of Finished goods and work-in-progress	19	-	-
TOTAL(A)		**415,030,856**	**42,298,040**
EXPENDITURE			
Establishment Expenses	20	197,138,290	157,005,747
Other Administrative Expenses etc.	21	73,705,488	49,111,449
Expenditure on Grants, Subsidies etc.	22	-	-
Interest	23	-	-
Depreciation(Net total at the year-end-corresponding to Schedule 8)		154,344,572	116,302,068
TOTAL(B)		**425,188,350**	**322,419,264**
Balance being excess of Expenditure over income(B-A)		10,157,494	280,121,224
Add: Depreciation Adjustment		-	
Add: Prior Period Expenditure		436,570	
Less: Prior Period Income		372,011	31,059
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**10,222,053**	**280,090,165**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTIGENT LIABILITES AND NOTES ON ACCOUNTS	25		

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller
of Accounts

(Prof.V. Chandrasekhar)
Director

(CMA T.K.Srinath)
Finance Officer

Date:28th August, 2015
Place: Bhubaneswar

J. PRADHAN & CO. FRN-322104E Chartered Accountants

RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2015.

Amount (₹.)

RECEIPTS	For the Year Ended 31st March, 2015	For the Year Ended 31st March, 2014	PAYMENTS	For the Year Ended 31st March, 2015	For the Year Ended 31st March, 2014
I.Opening Balances			**I. Expenses**		
			a) Establishment Expenses		
a) Cash in Hand	3,606	1,000	**(corresponding to Schedule 20)**		
b) Bank Balances:			I. Pay and Allownaces	120,180,233	104,862,078
I) In current accounts	201,397,624	49,074,799	II. Manpower (Outsourced)	16,445,493	13,633,693
II) In deposit accounts	-	-	III. Staff Welfare Expenses	-	3,584,372
iii) In Savings accounts	541,646,711	281,514,682	Iv. Other Expenditure	-	20,185,987
			v. New Pension Contribution	9,269,040	7,871,972
			b) Administrative Expenses		
II. Grants Received			**(corresponding to Schedule 21)**		
a) From Government of India	518,346,000	2,200,000,000	I. Laboratory Consumable	-	24,250,679
b) From State Government	-	-	ii.Computer Consumables	-	589,568
c) From other sources	-	-	iii. Rent, Rates & Taxes	-	3,084,222
			Iv. Duties & Taxes	-	473,739
III. Income on Investments	-	-	v. Other Expenditure	46,080,096	24,636,935
			vi. Prior Period Expenses	-	-
IV. Interest Received			vii. Niser XII plan	12,466,892	
On Bank Deposits	50,708,956	33,000,965			
			II. Payments made against funds for various projects	-	-
V. Other Income					
a) Registration Fee (Msc & Phd)	7,486,454	6,155,815			
			III. Investments and deposits made	-	-
b) Mess Dues	-	19,970			
c) Students Dues	703,800	315,300			
			IV. Expenditure on Fixed Assets & Capital Work- in- progress		
d) Application fees	1,000	18,600			
e) Receipts of CIF, SCS	71,900	78,035	a) Purchase of Fixed Assets	375,443,893	111,416,433
f) RTI Application Fees	339	260	b) Expenditure on Capital WIP	5,125,794	176,245,036
g) Sale of Tender paper	265,500	78,300			
h) Earned Leave Received		12,713	**V. Refund of Surplus money/loans**	-	-
I) License Fees	175,602	182,496			
j) Misc. Receipt	-	69,423	**VI.Finance Charges(Interest)**	-	-
k) Transcript Fees	32,500	19,702			
l) Identity Card/Health Card(Deplicate) Fee	1,175	-	**VII. Other Payments**		
m) Income From IGCAR	420	-	a) Sundry Creditors	19,390,030	29,808
n) Summer course fee	12,000	-	b) Deposits Opened (LC)	25,019,639	30,435,222
			c) Advance to Staff & Suppliers and Other	23,013,241	6,169,465
VI. Amount Borrowed		-	d) Fellowship	21,289,892	66,965
			e) Scholarship	18,306,041	2,977,259
VII. Any other receipts (Loans, Advances & Expenses Recovered)			f) NISER R&D	1,017,919	-
a) Security Deposit		67,313	g) DCS & EM Mumbai	-	1,300,000,000
b) E.M.D	5,489,290	2,940,927	h) DCSEM-Medical Expenses	-	55,327
c) Fellowship	322,500	182,500	i) Ext.Support Seminar/ Scholarship	-	3,000,000
d) NISER R&D	35,000	3,188,728	j) CERN Entry Fee	-	458,703
e) Conference/ Seminar		103,317	k) Deans Allowance Receivable	66,000	-
f) Prior Period Income	372,011	30,559	l) Prepaid Expenses	543,231	-
h) Duties & Taxes	149,727	-	m) Lapsed Deposits (EMD/SD)	60,000	-
I)CBS, MUMBAI - (Msc Program Registration Fees)	80,000	-	n)Security Deposit (Refundable)	2,382	-
j)DCSEM-Medical Expenses-Receivable	53,754	-			
			VIII. Closing Balances		
			a) Cash in hand	8,682	3,606
			b) Bank Balances:		
			I) In current accounts	163,931,706	201,397,624
			II) In deposit accounts	-	-
			iii) In savings accounts	469,695,665	541,646,711
TOTAL	**1,327,355,869**	**2,577,055,404**	**TOTAL**	**1,327,355,869**	**2,577,055,404**

For J PRADHAN & CO.
Chartered Accountants

(CA. Gyanendra Pradhan)
Partner
Mem. No. 057455
Date:28th August, 2015
Place: Bhubaneswar

J. PRADHAN & CO. FRN-326206E Chartered Accountants

(D. Govinda Rao)
Dy. Controller of Accounts

(Prof. V. Chandrasekhar)
Director

(CMD. Y. K. Srinath)
Finance Officer

Schedule -1 : Corpus / Capital Fund
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
Balance as at the beginning of the year	7,550,000,000		5,350,000,000	
Add: Contribution towards Corpus/Capital Fund			2,200,000,000	
Add: XII Plan New Project	188,346,000			
Advance Materials for Different Applications Grant	11,400,000			
Basic Research in Cellular and Molecular Grant	10,000,000			
Centre for Fundamental Studies Grant	5,896,000			
Experimental Condensed Matter Ultra Cold Atom Grant	31,600,000			
Experimental High Energy Physics Programme Grant	15,100,000			
Microbes Immunity and Research Biology Grant	21,900,000			
Novel Organic Compounds for Biomedical Grant	83,400,000			
Outreach Programmes in Maths.and Systems Biology	50,000			
Theoretical High Energy and Condensed Matter Grant	9,000,000			
Less: Reccuring Expenditure	26,280,170			
		7,712,065,830		7,550,000,000
Add/(Deduct): Balance of net income/ (expenditure) transferred from the Income and Expenditure Account	-	(1,109,347,844)	-	(1,099,125,791)
Balance as at the year end		**6,602,717,987**		**6,450,874,209**

Schedule -2 : Reserves & Surplus
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
1. Capital Reserve:				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deduction during the year	-	-	-	-
2. Revaluation Reserve				
As per last Account	-		-	
Addition during the year	-		-	-
Less: Deduction during the year	-	-	-	
3. Special Reserve				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deduction during the year	-	-	-	-
4. General Reserve				
As per last Account	-		-	
Addition during the year	-		-	
Less: Deduction during the year	-	-	-	-
TOTAL		-		-

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No. 057455

J. PRADHAN & CO. FRN-326206E Chartered Accountants

(D. Govinda Rao)
Dy. Controller of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA. Y.K.Srinath)
Finance Officer

Schedule -3 : Earmarked/Endowment Fund
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Fund-wise break up								Totals			
	Fund WW		Fund XX		Fund YY		Fund ZZ		Current year(2014-15)		Previous year(2013-14)	
a) Opening balance of the funds		-		-		-		-		-		-
b) Additions to the funds:												
i. Donations/grants	-		-		-		-		-		-	
ii. Income from Investments made on account of funds	-		-		-		-		-		-	
iii. Other additions	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL (a + b)		-		-		-		-		-		-
c) Utilisation/Expenditure towards objectives of funds												
i. Capital Expenditure												
Fixed Assets	-		-		-		-		-		-	
Others	-		-		-		-		-		-	
Total		-		-		-		-		-		-
ii. Revenue Expenditure												
Salaries, Wages and allowances	-		-		-		-		-		-	
Rent	-		-		-		-		-		-	
Other Administrative expenses	-		-		-		-		-		-	
Total		-		-		-		-		-		-
TOTAL (c)		-		-		-		-		-		-
Net Balance at the year end (a+b-c)		-		-		-		-		-		-

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No.057455

J. PRADHAN & CO. * Chartered Accountants * FRN-326206E

(D.Govinda Rao)
Dy.Controller of Accounts

(Prof.V.Chandrashekar)
Director

(CMA Y.K.Srinath)
Finance Officer

Schedule -5 : Unsecured Loans and Borrowings
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
1. Central Government		-		-
2. State Government (Specify)		-		-
3. Financial Institutions		-		-
4. Banks:				
a) Term Loans	-		-	
b) Other Loans (specify)	-	-	-	-
5. Other Institutions and Agencies		-		-
6. Debenture and Bonds		-		-
7. Fixed Deposits				
8. Others(specify)		-		-
TOTAL		-		-

Schedule -6 : Deferred Credit Liabilities
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
a) Acceptances secured by hypothecation of capital equipment and other assets	-	-
b) Others	-	-
TOTAL	-	-

For J PRADHAN & CO.
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller
of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

J. PRADHAN & CO. FRN-326206E Chartered Accountants

Schedule -5 : Unsecured Loans and Borrowings
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
1. Central Government		-		-
2. State Government (Specify)		-		-
3. Financial Institutions		-		-
4. Banks:				
a) Term Loans	-		-	
b) Other Loans (specify)	-	-	-	-
5. Other Institutions and Agencies		-		-
6. Debenture and Bonds		-		-
7. Fixed Deposits				
8. Others(specify)		-		-
TOTAL		-		-

Schedule -6 : Deferred Credit Liabilities
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
a) Acceptances secured by hypothecation of capital equipment and other assets	-	-
b) Others	-	-
TOTAL	-	-

For J PRADHAN & CO.
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller
of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA. Y.K.Srinath)
Finance Officer

J. PRADHAN & CO. FRN-326206E Chartered Accountants

Schedule -7 : Current Liabilities and Provisions
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
A. CURRENT LIABILITIES				
1. Acceptances		-		-
2. Sundry Creditors:				
a) For Goods	81,796		95,641	
b) Others - EMD	11,529,460		6,040,170	
		11,611,256		6,135,811
3. Advances Received		-		-
4. Interest accured but not due on:				
a) Secured loans/borrowings		-		-
b) Unsecured Loans/borrowings		-		-
5. Statutory Liabilities				
a) Overdue		-		-
b) Others				
Professional Tax Payable	-		-	
TDS (Non Salary)	161,220		(2,380)	
TDS (Salary)	-		13,873	
		161,220		11,493
c) Other Recoveries Payables				
Statutory Deposit	59,000		59,000	
		59,000		59,000
6. Other Current Liabilities				
a) Student Dues				
Internal amenitie S.D.	262,000		162,000	
Excess Prog. Regd. Fees	5,200		5,200	
Caution Money (Hostel)	13,000		13,000	
Sports Fee	55,424		55,424	
Caution Money (Labrotary)	13,000		13,000	
Caution Money (Library)	899,000		691,000	
Fellowship DST	-		896,838	
Caution Money (Institute)	1,616,000		1,250,000	
Mess Advance	1,301,647		1,444,400	
Programme Registration	186,000		186,000	
Student Welfare Fund	90,440		60,640	
Mess Dues	19,970		19,970	
Earned Leave Payable	12,713		12,713	
		4,474,394		4,810,185
b) Security Deposit				
Thames Consultant Pvt. Ltd.	22,722		20,677	
Jena Travels	101,000		101,000	
Pest Control India Pvt. Ltd.	360		7,200	
Biswajit Mishra	126,694		126,694	
Nirmal Chandra Sar	16,980		16,980	
Larsen & Turbo Ltd.	445,000		445,000	
Numeric Power Systems Ltd.	14,343		14,343	
Deepak Ku Das	29,747		27,334	
Laser Science Services (I) Pvt Ltd	450,900		450,900	
Tathagata Engineering	3,292		3,292	
		1,211,038		1,213,420
c) Other Payables				
NPS Employees Subscription	885,210		-	
		885,210		-
TOTAL(A)		**18,402,118**		**12,229,909**

Contd.....P9

Schedule -7 : Current Liabilities and Provisions
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
B. PROVISIONS				
1. For Taxation	-		-	
2. Gratuity	-		-	
3. Superannuation / Pension	-		-	
4. Accumulated Leave Encashment	-		-	
5. Trade Warranties / Claims	-		-	
6. For Expenses	-			
Advertisement Charges	-		14,884	
Audit Fees Payable	44,944		44,944	
Fellowship Payable	9,369,675		1,817,065	
Contiriigency Expenditure Payable	81,371		77,198	
Hire Charges Vehicle Payable	508,936		108,322	
House Keeping Expenses Payable	37,798		14,045	
Honorarim/Remuneration Payable	395,000		205,000	
News Paper & Magazine Payable	2,222		1,957	
Outsourced Manpower Payable	752,981		478,683	
Medical Expenses Payble	145,806			
Postage & Telegram Payable	18,794		38,802	
Repair & Maintenance Exp. Payable	-		54,505	
Electricity charges payble	66,566			
Professional update allowance payble	2,338,125			
Pay and Allowances Payable	11,136,039		11,833,295	
Stipend to Trainee Payable	-		21,354	
Telephone & Telex Payable	91,550		72,765	
PRIS Payable	4,565,788		4,588,849	
Niser RD Payble	35,000		-	
Water Charges Payable	19,166		18,262	
Sub-total (B)		**29,609,781**		**19,390,030**
Total (A+B)		**48,011,879**		**31,619,939**

For J PRADHAN & CO.
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

J. PRADHAN & CO. FRN-326206E Chartered Accountants

Schedule -8 : Fixed Assets
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

			GROSS BLOCK					DEPRECIATION			NET BLOCK	
				Addition during the year								
Sl. No.	Particular of Assets	Rate	WDV as on 01.04.2014	more than 180 days	less than 180 days	Deductions (/ (Sale / Adjustt.) during the year	Cost/valuation at the year-end	Depreciation for the year	Deductions during the year	Total upto the year-end	As at the current year-end	As at the Previous year-end
1	Land	-	27,617,405	-	-	-	27,617,405	-	-	-	27,617,405	27617405
2	Furniture & Fixtures	10%	54,519,194	135,423,675	81,032,148	-	270,975,017	23,045,894	-	23,045,894	247,929,123	54519194
3	Computers	60%	3,469,177	4,325,343	3,487,568	-	11,282,088	5,722,982	-	5,722,982	5,559,106	3469177
4	Software	60%	614,869	195,275	1,209,553	-	2,019,697	848,952	-	848,952	1,170,745	614869
5	Lab Equipments	15%	260,237,928	7,903,509	67,072,489	-	335,213,926	45,251,652	-	45,251,652	289,962,274	260237928
6	Tools Equipments	15%	206,276			-	206,276	30,941	-	30,941	175,335	206276
7	Books	60%	9,370,010	595,491	3,051,413	-	13,016,914	6,894,725	-	6,894,725	6,122,189	9370010
8	Journals	100%	29,376,785	6,017,352	55,019,910		90,414,048	62,904,092	-	62,904,092	27,509,956	29376785
9	Air Conditioners	15%	1,896,388			-	1,896,388	284,458	-	284,458	1,611,930	1896388
10	Vehicles	15%	662,954			-	662,954	99,443	-	99,443	563,511	662954
11	Bicycle	15%	5,013			-	5,013	752	-	752	4,261	5013
12	Machinery & Equipments	15%	51,306,035	837,134	4,878,896	-	57,022,065	8,187,393	-	8,187,393	48,834,672	51306035
13	EPABX	15%	15,685			-	15,685	2,353	-	2,353	13,332	15685
14	Kitchen Equipments	15%	4,828,227	2,170,257	268,493	-	7,266,977	1,069,910	-	1,069,910	6,197,067	4828227
15	Telephones	10%	10,253			-	10,253	1,025	-	1,025	9,228	10253
16	Capital Assets(WIP)	-	186,012,153	5,130,850		-	191,143,003	-	-	-	191,143,003	186012153
17	NISER XII Plan Asset (WI	-	-	3,702,901		-	3,702,901	-	-	-	3,702,901	0
	TOTAL		**630,148,352**	**166,301,787**	**216,020,470**	**-**	**1,012,470,610**	**154,344,572**	**-**	**154,344,572**	**858,126,038**	**630,148,352**

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No. 057455

(D.Govinda Rao)
Dy.Controller of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

Schedule -9 : Investments from Earmarked/Endowment Funds
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and Joint Ventures	-	-
6. Others (to be specified)	-	-
TOTAL	-	-

Schedule -10 : Investments-Others
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and Joint Ventures	-	-
6. FD against LC's	61,694,105	36,674,466
TOTAL	61,694,105	36,674,466

For **J PRADHAN & CO.**
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller
of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA. Y.K.Srinath)
Finance Officer

J. PRADHAN & CO. FRN-328204E Chartered Accountants

Schedule -11 : Current Assets, Loans, Advances etc.
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
A. CURRENT ASSETS:				
1. Inventories:				
a) Stores and Spares	-		-	
b) Loose Tools	-		-	
c) Stock-in-trade				
Finished goods	-		-	
Work-in-progress	-		-	
Raw Materials	-	-	-	-
2. Sundry Debtors:	-			
a) Debts Outstanding for a period exceeding six months	-		-	
b) Others	-	-	-	-
3. Cash balances in hand	8,682		3,606	-
4. Bank Balances	-		-	
a) SBI	163,931,706		201,397,624	
b) UBI	415,614,351		483,330,305	
c) IOB	33,767		-	
d) IOB	54,047,547	633,636,053	58,316,406	743,047,941
5. Post office Savings Accounts		-		-
Total(A)		**633,636,053**		743,047,941
B. LOANS, ADVANCES AND OTHER ASSETS:				
1. a) Staff				
Anil K. Kam	9,442		20,211	
Arun Kumar	3,000		3,000	
Balraj Singh	-		19,000	
Chethan N Gowdigere	-		(2,347)	
D.B. Singh	-		17,500	
Deepak Srivastav	3,369		3,826	
Vijay Singh	8,000		8,531	
Nliadri Bihari Sahu	505,993		-	
U.Laduraj	-		3,000	
Prafulla Singru	6,000		6,000	
Debasmita P. Alone	102,899		-	
Susanta Ku Sethi	7,000		-	
V Chandrasekhar	16,240		-	
Ranbir Singh	392,500		-	
Saurabh Chawla	20,000		-	
Subashis Basak	240,000		-	
Koushik Mandal	300,000		-	
KVS Badrinath	78,250		-	
Pranaya Ku Swain	4,760		-	
Protik Mohanta	20,000		-	
Festival Advance to Staff	46,850		47,000	
Contigency Adv. to Students	-		131,570	
		1,764,303		**257,291**
b) Other Entities engaged in activities similar to that		-		-
c) Others				
NBHM Support DHA	167,174		167,174	
Deans Allowance Receivable	72,000		-	

Contd....P13

Schedule -11 : Current Assets, Loans, Advances etc.
(Schedule forming part of Balance Sheet as at 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)		Previous Year(2013-14)	
Advances to Suppliers				
Balmer Lawrie & Co. Ltd.	761,007		444,332	
Blue Star Ltd.	105,175		-	
Director IMMT BSSR	112,922		-	
Cheap Tubes, USA	39,080		39,080	
DHL Express India Pvt. Ltd.	-		12,515	
Exim Logistics Pvt Ltd	2,000,000		-	
Redington Pte Ltd.	-		1,004,782	
Kurt J Lesker	32,901		-	
Malvern Instruments Ltd.	144,620		-	
National Centre for Cell Sc.	5,000		-	
Carl Zeiss Microlmaging GmbH, Germany	30,778		354,755	
Perkin Elmer (India) Pvt Ltd	-		196,630	
Eureka Forbes Ltd.	-		41,905	
HCL Infosystem Ltd.	19,828		19,828	
MTI Corporation USA	87,762		1,430	
M/s A One Hospitality	96,603		-	
SDMC Symposium	-		280,000	
Scholarship -ICMR	(33,942)		(31,094)	
Scholarship -UGC	5,376,538		4,551,310	
Scholarship-INSPIRE	15,063,774		498,898	
CBS Mumbai	70,000		150,000	
DCS & EM,Mumbai	4,800,000,000		4,800,000,000	
Scholarship -CSIR	6,506,357		3,752,558	
Ramalingaswami Fellowship DBT Receivable	-		247,500	
Ramanujam Fellowship DST Receivable	85,000		75,000	
DCS & M,VECC,Kolkata	246,210,423		246,210,423	
		5,076,953,000		**5,058,017,026**
Security Deposit		**16,827,442**		**675,550**
2. Advances and other amounts recoverable in cash or				
a) on Capital Account		-		-
b) Prepayments		-		-
c) Others				
JEST-2010	7,038		7,038	
DST Receivable	-		112,652	
DCSEM-Medical Expenses Receivable	70,986		124,740	
R&D Receivable	1,095,459		77,540	
CERN Entry fee	-		13,203,673	
KYPY 2013	11,833		11,833	
Electricity Charges Receivable	378		378	
Prepaid Expenses	543,231		135,668	
		1,728,925		**13,673,522**
3. Income Accured:				
a) On Investments from Earmarked/Endowment	-		-	
b) On Investment-Others	-		-	
c) On Loans and Advances	-		-	
d) Others	-	-	-	-
4. Claims Receivables		-		-
Total (B)		**5,097,273,670**		**5,072,623,389**
TOTAL(A+B)		**5,730,909,723**		**5,815,671,330**

For J PRADHAN & CO.
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No.057455

J. PRADHAN & CO. * Chartered Accountants * FRN-114104E

(D. Govinda Rao)
Dy. Cont. of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

Schedule -12 : Income from Sales/Services
(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
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 Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
(Irrevocable Grants & Subsidies Received)		
1) Central Government	356,280,170	-
2) State Government(s)	-	-
3) Government Agencies	-	-
4) Institutions/Welfare Bodies	-	-
5) International Organisations	-	-
6) Others (Specify)	-	-
TOTAL	356,280,170	-

For **J PRADHAN & CO.**
Chartered Accountants

CA. Jyotirmay Pradhan
Partner
Mem. No. 057455

(D. Govinda Rao)
Dy. Controller
of Accounts

(Prof.V.Chandrasekhar)
Director

(CMA. V.K.Srinath)
Finance Officer

J. PRADHAN & CO. * Chartered Accountants *

Schedule -14 : Fees/Subscriptions

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
1. Registration Fees (Msc & Phd)	7,481,294	6,146,765
2. Application Fees	1,000	18,600
3. License Fees	175,602	182,496
4. Sale of Tender Paper	265,500	78,300
5. CIF, SCS Receipt	71,900	78,035
6. RTI Application Fees	339	260
7. EMD Forefeiture Account	-	4,800
8.Lapsed Deposits (EMD/SD)	-	2,698,694
9.Transcript Fees	32,500	19,702
10.Identity card/Health Card fee	1,175	-
11.Income from IGCAR	420	-
12.Summer course fees	12,000	-
13. Miscellaneous Receipts	-	69,423
TOTAL	**8,041,730**	**9,297,075**

Schedule -15 : Income from Investments

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Investment from Earmark Fund		Investment Others	
	Current Year(2014-15)	Previous Year(2013-14)	Current Year(2014-15)	Previous Year(2013-14)
(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	-	-	-	-

For **J PRADHAN & CO.**
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Schedule -16 : Income from Royalty, Publication etc.

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
1) Income from Royalty	-	-
2) Income from Publications	-	-
3) Others (specify)	-	-
TOTAL	-	-

Schedule -17 : Interest Earned

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
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	50,708,956	33,000,965
b) With Non-Scheduled Banks	-	-
c) With Institutions	-	-
d) Others	-	-
3) On Loans:		
a) Employees/ Staff	-	-
b) Others	-	-
	-	-
4) Interest on Debtors and Other Receivables		
TOTAL	**50,708,956**	**33,000,965**

For **J PRADHAN & CO.**
Chartered Accountants

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(CMA) Y.K.Srinath)
Finance Officer

Schedule -18 : Other Income

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
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. Miscellaneous Income	-	-
TOTAL	**-**	**-**

Schedule -19 : Increase/(Decrease) in Stock of Finished Goods & Work-in-progress

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
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 Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
a) Pay and Allowances	128,473,754	108,588,801
b) Manpower (Outsourced)	16,951,882	14,112,376
c) Stipend to Trainee	246,592	101,271
d) Contribution to NPS	10,154,250	8,616,047
e) Staff Welfare Expenses	6,174,275	5,583,162
f) Fellowship to Phd Scholars	27,398,241	14,979,813
g) Fellowship to Post Doctoral Scholars	1,568,752	316,800
h) Contigency to PHD Students	1,154,745	413,465
I) Honorarium & Scholarship	5,015,799	3,904,323
j) T.A on Transfer	-	389,689
TOTAL	**197,138,290**	**157,005,747**

For **J PRADHAN & CO.**
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(CMA T.K.Srinath)
Finance Officer

Schedule -21 : Other Administrative Expenses
(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
Graduation Ceremony Expenses	106,229	258,062
45th Orissa Economic Association Conference	-	100,000
Freight & Forwarding Expenses	64,970	74,730
Foundation Day Expenses	231,884	259,671
Purchases (Consumables)	14,346,601	26,370,591
Office Maintenance	110,887	156,796
Repair & Maintenance	7,291,477	2,324,692
Advertisement	1,340,110	1,659,450
Audit Fees	44,944	44,944
Bank Charges & Commission	32,053	-
CRA Service Charges	40,310	42,985
Electricity Charges	437,317	498,794
Fuel for DG set	99,480	41,888
Hospitality Expenses	1,684,740	440,537
Membership Fees	141,230	-
Housekeeping Expenses	395,154	289,077
Legal Fees	6,360	-
Meeting Expenses	217,539	388,014
News Papers and Periodicals	42,961	26,275
Other Academic Expenses	113,868	8,270
Outreach Programme	-	21,047
Postage & Courier	336,927	354,018
Printing & Stationery	1,505,499	1,540,825
Recruitment Expenses	-	97,007
Rent, Rates & Taxes	3,795,068	3,064,292
Seminar/Workshop Expenses	89,428	22,629
SPIC Macay Expenses	-	19,602
Star QCD Meeting Expenses	-	67,505
Telephone & Internet charges	1,894,858	2,277,564
Travelling & Conveyance	7,097,043	4,545,850
Vehicle Maintenance Expenses	5,687,829	3,788,276
Vigilance Awareness Weak-2013	-	5,500
Water Charges	210,552	198,962
Lapsed Deposit(EMD&SD)	60,000	-
TET, BET & Raman Analysis Charges	-	123,596
NISER XII PLAN		
Domestic Travel	634,293	-
Fellowships	40,258	-
Foreign Travels	3,525,610	-
Office Expenses	94,913	-
Other Expenses	13,829,826	-
Supplies & Materials	8,155,070	-
TOTAL	**73,705,488**	**49,111,449**

For **J PRADHAN & CO.**
Chartered Accountants

(CA. Jyotirmay Pradhan)
Partner
Mem. No.057455

(D. Govinda Rao)
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(Prof.V.Chandrasekhar)
Director

(CMA Y.K.Srinath)
Finance Officer

Schedule -22 : Expenditure on Grants, Subsidies etc.

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
a) Grant given to Institutions/Organisation	-	-
b) Subsidies given to Institutions/Organisation	-	-
TOTAL	-	-

Schedule -23 : Interest

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2015)

Amount (₹.)

Particulars	Current Year(2014-15)	Previous Year(2013-14)
a) On Fixed Loans	-	-
b) On Other Loans (Including Bank Charges)	-	-
c) Others (specify)	-	-
TOTAL	-	-

For **J PRADHAN & CO.**
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(CA. Jyotirmay Pradhan)
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(CMA Y.K.Srinath)
Finance Officer

SCHEDULE 24-SIGNIFICANT ACCOUNTING POLICIES

(Schedule forming part of the accounts for the period ended on 31.03.2015)

1. Basis of Preparation of Financial Statements

The Financial Statements have been prepared on accrual basis following going concern concept, accounting standards and in accordance with the Generally 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 is provided on written down value method as per rate specified in the Income-Tax Act, 1961.

4. Capital Assets (WIP)

The Institute is at project stage. Hence capital expenditure incurred on construction activities including Electrical Furnishing, Electrical Installation, Electrical Transformer & Office Automation were therefore shown as Capital Work-in-Progress in the FY 2014-15.

5. Recognition of Income & Expenditure

Income & Expenditure are generally recognised on accrual basis & provision is made for all known liabilities.

Lab consumables and stores consumables purchased during 2014-15 is treated as recurring expenditure and the consumables are transferred to respective schools of study. Necessary records are maintained at the school concerned.

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6. Foreign Exchange Transactions

Lab consumables relating to foreign exchange transactions are recorded at exchange rates prevailing on the date of the transactions.

7. Accounting For Sales

Not Applicable.

8. 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 not shown as a deduction from the cost of the related assets as the project is under progress.
c) Government grants/subsidy is accounted on realization basis.

9. Lease

Lease rentals are expensed with reference to lease terms.

10. Retirement Benefits

Liability towards gratuity payable on death/retirement and provision for accumulated leave encashment benefit to employees is not applicable at present.

For J PRADHAN & CO.

Chartered Accountants

(CA. Jyotirmay Pradhan)	(D. Govinda Rao)	(Prof.V.Chandrasekhar)	(CMA Y.R.Srinath)
Partner	Dy. Controller of Accounts	Director	Finance Officer
Mem. No. 057455			

Schedule -25 : Contingent Liabilities and Notes on Accounts

(Schedule forming part of the accounts for the period ended on 31.03.2015)

		Amount (₹.)
A) CONTINGENT LIABILITIES		
1.	Claims against the Entity not acknowledge as debts	NIL
2.	Liability for partly-paid investments	NA
3.	Liability on account of outstanding forward exchange contracts	NA
4.	Guarantee and Letters of credit outstanding	NIL
5.	Bills discounted	NIL
6.	Other items for which the entity is contingently liable	NIL

B) NOTES ON ACCOUNTS

1. PRIOR PERIOD INCOME

(a) Rs.77167/- received/adjusted from the M.Sc., students caution money deposit against payment of their mess bill during 2013-14.

(b) Rs.294844/- received from SATHEA a/c during F.Y.2014-15 against institute contribution to ICM 2010 during F.Y. 2010-11.

2. PRIOR PERIOD EXPENDITURE

(a) Rs.131570/- adjusted of Contingency advance to Students(M.Sc.,) paid during F.Y.2011-12.

(b) Rs.25000/- of Institute recurring expenditure has accounted to PLAN (non- recurring expenditure) during 2013-14. Now the same has reversed/adjusted to during F.Y.2014-15

(c) Rs.280000/- of SDMC advance payment during F.Y.2013-14 has taken into consideration as a expenditure during F.Y.2014-15.

Contd.....P23

3. LIEN AGAINST FD:

Lien against FD shown in Receipt & Payments account relates to items under import and the same is in order.

4. Corresponding figures for the previous year have been regrouped/ rearranged, where ever necessary.

5. Schedule 1 to 25 are annexed to and form an integral part of the Balance Sheet as at 31st March, 2015 and the Income & Expenditure Account for the year ended on that date.

For **J PRADHAN & CO.**

Chartered Accountants

(CA. Jyotirmay Pradhan)	**(D. Govinda Rao)**	**(Prof.V.Chandrasekhar)**	**(CMA Y.K.Srinath)**
Partner	Dy. Controller of Accounts	Director	Finance Officer
Mem. No. 057455			

J PRADHAN & CO. FRN-326206E Chartered Accountants

राष्ट्रीय विज्ञान शिक्षा एवं अनुसंधान संस्थान भुवनेश्वर
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