ANNUAL REPORT

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Audited Statement of Accounts

2017 - 2018

150 YEARS OF CELEBRATING THE MAHATMA

National Institute of Science Education and Research
(NISER) Bhubaneswar

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The present Board of Governors has been reconstituted with effect from April 2017. The last meeting of the previous BOG was held on 20th March, 2017. The outgoing members were felicitated by Prof. V Chandrasekhar, Director NISER. Some memories of the outgoing Board is presented below:

ACADEMIC COUNCIL

CHAIRMAN

Prof. Sudhakar Panda,
Director, NISER

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School of Computer Sciences, NISER

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Chairperson,
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Chairperson,
School of Earth & Planetary Sciences, NISER

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Ms. Manaswini Kar
Student Representative - Invitee

SECRETARY

Dr. A. K. Naik
Registrar, NISER

FROM THE DIRECTOR'S DESK

"The will to win, the desire to succeed, the urge to reach your full potential... these are the keys that will unlock the door to personal excellence." *- Confucius*

Yet another year whistled past us leaving traces of magnificence, cheerfulness and possibilities for the days to come. I am extremely pleased to present the annual report of National Institute of Science Education and Research (NISER) Bhubaneswar for the year 2017-18.

NISER does recognize that modern scientific research is carried out in an ecosystem where members of the scientific community attain intellectual agility unconstrained by the limitations of disciplinary conventions from the past. Faculty and Students are given generous material support in the pursuit to realize this objective. To deliver on the additional responsibility and to do justice to the public money invested in it, NISER has been pursuing a number of initiatives to engage with the larger community in general and Scientific community in particular in whatever possible way it can.

It has been more than three years since NISER has shifted to the permanent campus at Jatni. In February 2016. The Prime Minister, Shri Narendra Modi dedicated the Institute to the nation. Since then the entire campus community has been, with a renewed enthusiasm, on a mission mode to achieve and to serve the country through its concerted contribution. In response to the Prime Minister's call, the scientific community of NISER hopes to augment the environment of innovation and foster cutting edge research to meet the unique needs of the country. The Prime Minister had urged NISER to work towards a green campus, and a zero-emission, zero-discharge campus and I have no hesitation in saying that we are right on the expected track.

It is quite encouraging to note that though the National Entrance Screening Test (NEST), the admission test for the flagship 5 years Integrated MSc programme is being conducted for just over a decade, its popularity has reached great heights. NEST-2017 was conducted at 123 venues in 59 cities across the country on 27th May 2017. With 68554 applicants for admission into the academic session starting in July 2017, the application to seat ratio has become an enviable 318 applicants for every single seat. Similarly the admissions to the PhD programs are conducted through an even more rigorous process that includes short-listing of eligible applicants followed by in-house written tests and interviews.

The teaching and research laboratories of the schools of Physics, Chemistry, Mathematics and Biology have been well equipped to provide the students the required opportunities. Some of the major facilities that we have added during the past one year to our already fairly rich research infrastructure are: Microfocus single crystal X-ray machine, Micro-Raman Spectrometer (~ Rs. 3.5 Crs), Non-Cryo Transmission electron Microscope (~ Rs. 5 Crs), Chemical Vapour Deposition System, Q-RT PCR, Live cell imaging system, Table top ultra-centrifuge, etc.

We applaud the achievements of our extremely talented faculty members in various avenues as

they have continuously been pushing the frontiers. We are extremely proud of their academic fellowships and awards, publications in high impact journals, being invited talks, conference presentations, engagement in collaborative efforts with leading Universities abroad, etc. Publications in scientific journals reinforces the quality of research that is done here. During the academic year of 2017-18, our faculty members and students of different schools have published over two hundred academic papers in high impact journals underlining their commitment to creating a niche in the global scientific community.

I place on record our gratitude to the Department of Atomic Energy for its extremely generous and continuous financial support to establish NISER in the forefront of research and development. To add further extramural funding is also coming thick and fast from various sources underpinning our pursuit of research. Research being done here in our laboratories must translate into tangible benefits to humankind justifying the public funding that we receive and also reinforcing our commitment to pay back to the society at large. During the financial year ending in March 2018, our faculty members have added sixteen new research projects with funding to the tune of Rs 8.49 crores from non-DAE sources. Some of the major non-DAE sources include Deptartment of Science and Technology (DST), Deptartment of BioTechnology, (DBT) Science and Engineering Research Board (SERB), Indo-French Centre for the Promotion of Advanced Research (CEFIPRA), and Council of Scientific and Industrial Research (CSIR).

Integrated MSc students those graduated in 2017 bagged offers for Ph.D. positions from various universities in India and abroad. In India, they had secured positions at TIFR, NCBS and IITs. From abroad, students received offers from various Universities including many Universities under top 50 global rankings in respective subjects. , some of them are University of Yale, Purdue, Wisconsin-Madison, Stony Brook, Texas A&M, Johns Hopkins, Michigan, Jerusalem, Minnesota, Calgary, Nebraska, Maryland, Warwick, California, Paris Sud, Southern California, etc. Similarly the graduating PhD students have secured post-doctoral fellowship from esteemed places like University of Lowa Carver College of Medicine, University of Michigan Dept of Radiation Oncology, National University of Singapore, CCMB-Hyderabad, IIT-Bombay, HRI-Allahabad, IIT-Delhi, Ariel University-Israel, Technion University-Israel, JNCASR-Bangalore, IISc-Bangalore, IISER-Kolkata, etc.

NISER has been conscious of its responsibility to reach out to society. As part of the outreach activity it conducts regular workshops and training programs round the year, particularly in the discipline of Chemistry, Mathematics, Physics and Biology. Faculty members, scientific staff and students from this school have been doing a commendable job in this regard catering to the students and teachers from the state of Odisha and other parts of the country.

Apart from all these, NISER community has always extended its helping hands to the society at large. Its continous endeavour has always been to do those kind of science that could ultimately be transalted into socially meaningful actions paving ways for problem solving. As mandated, NISER has been imparting through its academic programmes the right kind of education to its students, to become socially responsible citizens and to contribute to the society that they live in. The community needs related to health, sanitation, drinking water, energy, livelihood, etc are always of paramount importance to the entire NISER family. Going forward, NISER hopes to augment its problem solving contribution.

Finally, I am extremely thankful to the editorial team in bringing out this comprehensive Annual Report. Their efforts are sincerely appreciated.

Prof. Sudhakar Panda
DIRECTOR

ABOUT THE INSTITUTE

National Institute of Science Education and Research (NISER), is an initiative of the Government of India. The primary objective of the Institute is to train and nurture human resources in the Sciences for the knowledge economies of the future. This is in tune with a general shift in social and national thought that seeks to create new sites of knowledge production centered in our country.

Such a strategic shift in perspective has been necessitated by the realization that the unique circumstances of our nation demand unique scientific and pedagogic responses. Consequently, we are called upon to question and account for conventional categorizations of science, technology, environment, learning, innovation, design and being. The predominant discourse that seeks to structure these superficially hard categories is predicated on justifications that till date have not moved beyond regimes of hierarchy, control and access. These strictures are an inherent feature of "Institutionalized Science" where Newtonian principles of organizing domains of cognition and mechanisms of representation constrain debates on what new conceptualizations of science ought to be like. More problematically this stifles the potential for inter-disciplinary approaches of learning. This means we continue to think in and with straight jacketed binaries such as natural / artificial, real / virtual or being / thing. The founding of this Institute is rooted in the understanding that the contexts we inhabit are dynamic and in flux, while we have not begun to think in terms of solutions to most of these problems we realize that they exist and that we need to quickly participate in the process of finding out some answers.

NISER recognizes that modern scientific research is carried out in interstices amongst fuzzy domains and blurred boundaries. This entails encouraging a new scientific culture where members of our community attain to an intellectual agility unconstrained by the limitations of disciplinary conventions from the past. Faculty and Students will be given generous material support in the pursuit to realize this objective. Time and conversational space will be devoted to nascent propositions and hypothesis and the significantly small student-faculty ratio, an eventual full strength of 2000 students and 300 faculty, manifests the Institutes investment and hope in the future.

ACADEMIC OVERVIEW

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

At NISER, students are admitted for a 5 year Integrated M.Sc (iM.Sc) program or for a Ph. D program. In the Integrated M Sc program, students learn all core subjects in basic sciences and specific courses in the humanities in the first year, following which they select their stream of choice in the basic sciences. Each school has its own program of core and elective courses and a student can finally graduate with one major and two minors in the areas of their choice. NISER has also added two more schools, one in Computer Sciences (CS) and other one being Earth and Planetary Sciences (EPS). NISER has already started post-B.Sc Integrated Ph.D programme in Physics since 2016. Going forward, it will be extended to other schools as well.

NISER shifted from its transit campus at Institute of Physics, Bhubaneswar to its permanent campus at Jatni, Khurda and the Institute has been dedicated to the nation by Honorable Prime Minister of India Shri Narendra Modi on February 07, 2016. The permanent campus has over 870 students spread over five batches of students admitted to the flagship M. Sc programme through a pan-Indian entrance test known as National Entrance Screening Test (NEST). NISER also cariies out Doctoral Programme in all Basic Sciences and Humanities and Social Sciences.

CURRICULUM

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

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

NISER recognizes that modern scientific research is carried out in a domain transcending conventional academic boundaries. The undergraduate students and research scholars are being nurtured in the ambience of this scientific culture. Going forward, there would be many centres of research in inter-disciplinary areas opening more and bigger windows for cutting edge scientific research. NISER has started an integrated post-B. Sc Ph.D programme in Physics since Academic Session 2016-17. Going forward, NISER will extend the integrated Ph.D programme to other schools too.





School of Biological Sciences

The School of Biological Sciences (SBS) is one of the major schools at NISER established in September 2007. Since its inception, SBS has been involved in mixing and imparting traditional wisdom with modern technology by developing a research programs along with a vibrant teaching curriculum. SBS promotes scholarly and innovative thinking to conduct cutting edge research in diverse areas ranging from molecular to organismic biology. To facilitate the process, the school offers 5-year integrated MSc programme, PhD programme and Post-Doctoral programme to motivate and train students. SBS aims to establish as a center of excellence with its efforts grown up rapidly and signs of its achievements are being noticed at national and international levels in terms of work and student placements. To further strengthen the SBS research program, an Integrated PhD program initiative is under progress.

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 as well as PhD programme. The syllabus for the integrated MSc programme is designed not only to teach basic principles but also to have hands on practical experience by research projects as a part of the curriculum. Till date, 104 integrated MSc students and 26 PhD students have been graduated from the School. The Integrated MSc students are in BARC training school program, also pursuing research in various institutes in India as well as abroad. The PhD students are doing their postdoctoral research in abroad. Currently, 141 integrated MSc students and 105 PhD students are in School of Chemical Sciences.

Facilities for Research and Teaching:

- Microfocus single crystal X-ray Diffractometer

School of Mathematical Science

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

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

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

The Ph.D. degree is generally a four year program culminating in an original piece of mathematical research for a thesis and eventual publications in good and scholarly journals. While the thesis is in a specific area, the coursework leading up to this is designed to provide breadth to prepare the students for successful careers in the academics. Besides, there are many opportunities for our students to enrich their background in mathematics. Students are strongly encouraged to talk in

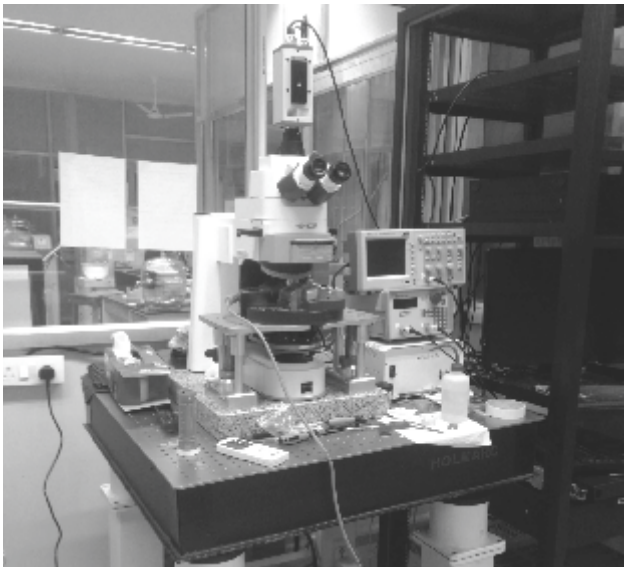
the research seminars in the school, and to attend national/international conferences as well as regional meetings amply supported by NISER.

Facilities for Research and Teaching

- 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 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 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 conveyed approval to host NISER students for the Ph.D programme in Humanities and Social Sciences. The institute has started the Ph.D program in Humanities and Social Sciences from the even semester of academic year 2015-16.

LIBRARY

Libraries are reservoirs of strength, grace and wit, reminders of order, calm, and continuity, lakes of mental energy, neither warm nor cold, light nor dark ... In any library in the world, I am at home, unselfconscious, still and absorbed. -Germaine Greer

The Central Library acts as the main learning resource centre of the Institute and is privileged to support the Institute's march towards its vision –to be the pioneer research institute in India. The Library not only acquires, organizes and disseminates knowledge; it has put its foot ahead towards policies and procedures, systems and services and created a sophisticated atmosphere which offers assimilation and generation of new knowledge through single window.

Library presently holds over 20,000 Print books, Rich collection of E Books (Approx. 10,000 subscribed eBooks from Springer and Elsevier & Open access eBooks from NCBI, Intech Open, Online book page, Project Gutenberg), 58 Scholarly print journals, 9 Electronic databases, 600 bound volume journals and approx. 3850 ejournals (With archive for ejournals subscribed from IOP,AIP, Nature, Springer and Wiley) subscribed from major STM Publishers ,Learned Societies and Interdisciplinary Publishing houses across the globe. Library has print archive for Ars Combinatoria journal (1976-2017).

NISER Library is having institutional membership of American Mathematical Society (2011-Present) and Canadian Mathematical Society (2013- Present) and gets benefits on subscription to society publications and online databases (depending on membership category).

Library collection comprises of the following:

Books:	20000
EBooks:	10000
Print Journals:	58
Bound Volume journals:	600
Current subscribed journals:	3850
No. of CD/DVD:	212
Thesis submitted by students:	108

Library Services:

The library offers several innovative services to the user community as:

- Current awareness service –New arrival alert

- Display of Books to make the latest books available to faculty and students
- Alert service to the users such as: New arrival, overdue notice, Collect notice, Different email alerts regarding services.
- Self services (Check-in) of issued books through book dropper installed inside library
- Web based public access catalogue to check status of library resource, auto renewal of issued books, fine status of users, to put hold on issued books.
- Article on request from STM Publishers and other premier research institutes of India.
- User awareness programme on various resources.
- Procurement of books for Departmental libraries.
- Technical processing of books purchased by Faculties from Contingency grant annually.
- Display of publisher's catalogue for assisting faculties for recommending books for library.

Library Facilities:

- **RFID based book circulation system:** Library is fully automated with KOHA and also integrated with RFID Devices which controls the circulation system for issue, return, searching of books and weeding out of miss- selved books.
- **Wi-Fi access:** Library is functional with Wi-Fi service in order to enable internet accessibility for the easy access of eresources avail at Institute library.
- **Centralized AC** in reference section and six tower ACs installed in reading area.
- **Remote Access facility** to current students and faculties through cloud based RemoteXs Software.

  https://elibraryniser.remotexs.in/user/login
- **Conference Room:** Library is also having Air conditioned conference room that is used for library committee meetings, meeting with journal publishers, service providers to library and as discussion room for major interest of library.

Library Timing: Library remains open from 9:00am to 9:00 pm. throughout the year and 9:00 am to 5:30pm on Institute holidays.

Library Committee:

Institute library committee constitutes one member from each school, FIC as Chairman of library committee and Acquisition-In-Charge as member secretary of the committee. The committee was constituted by Director, NISER on March 30, 2017 and the tenure of the committee is for a period of two years. The committee meetings are conducted bi-monthly and as and when required to discuss about the development of library activities, procurement of books, journals, databases and queries received from users etc.

In December 2017 the Library welcomed Dr. Praful Singru as Chairman, Library Committee who brings to the position a combination of knowledge and a deep abiding love for library. Other subcommittees for library are constituted for Annual Stock verification of Library resources and Infrastructure Development of library to facilitate more reading space and sophisticated learning environment.

Initiatives taken:

- Empanelment of fresh batch of suppliers for purchase of books for central library and Departmental libraries.
- Committee approved procurement of Classic books for the library in all basic science disciplines. Library will have Classic books collection on Physics, Chemistry, Mathematics, Biology and Humanities soon.
- Collection development policy of library is reformed and student recommendations are allowed by library committee.
- iThenticate- the anti plagiarism software is shortly to be operational by library.
- Relaxation on whopping fine on issued books lost by registered users is considered by library committee.
- Library committee approved certain budget for procurement of Hindi Books as per Parliamentary list for promotion of Rajbhasha.

The Institute Library has been shifted to its permanent building from a transit location

Self Check in Kiosk and Book dropper are installed in Library for convenience of its users.

INTERNATIONAL AFFAIRS AND RESOURCE PLANNING (IARP)

IARP is extending all type of support to the NISER faculties and students for having international research collaborations. Some of the major activities / events which were conducted during the year 2017-18 by IARP are described below:

1. Focal Point Meeting on India – EU Collaborations at New Delhi on April 12th, 2017

The Focal Point Network initiative which was launched in 2010 with the objective to increase the participation of Indian in the EU framework programme for Research and Innovation. This activity is now run under the INDIGO-POLICY initiative (www.indigoprojects.eu). INDIGO-Policy is a BILAT project funded by the European Commission under the EU Seventh Framework, which is composed of 8 European and Indian partners. This project aims to support the advancement of policy cooperation between India and Europe in Research and Innovation.

2. Entrepreneurship Workshop

Since, many of our students are getting inclined to innovation and start-ups, IARP began an effort to plan workshops by the leading industrialist at NISER. The first one was organized on Aug 12-13, 2017 by Dr. Sriram Srinivasa Raghavan, VP, Evolva Bioscience and CEO of 2 start-up biotech industries. This event was preceded by a popular talk on innovation by Dr. Satyaprakash Dash of DBT-BIRAC, GOI, on Aug 06, 2017.

3. Science Communication

We had a formal inaugural session of Science Communication Mission of NISER on Friday, April 7, 2017 unveiled officially by the then Director, Professor V. Chandrasekhar. We invited many eminent people to deliver talks and also to organize workshops to impress upon the students of NISER that Science Communication can take it further to promote innovation and entrepreneurship.

4. Publication of NISER's Triannual News Letter "VIBES"

Link to download an electronic copy of Volume – 2, Issue – 2, May – August is given below:

http://www.niser.ac.in/sites/default/files/newsletter/VIBES_Vol-2_Issue-2.pdf

5. One Day Workshop on IPR

Intellectual Property Rights (IPRs) are concerned with the protection of tangible and intangible property rights. It provides material awards and recognition to the inventors and contributors for their investment. Hence, it enhances motivation to disseminate scientific and technological information which in turn stimulates research and development for improvement of the quality of life. Science and innovation are like two sides of same coin and to protect our rights on our discovery it was felt

to keep NISER faculties updated with Indian and International IPR policies. For this purpose, a one day Workshop on IPR at NISER was organized in collaboration with DAE IPR Cell on November 7, 2017. More than 50 faculty members from NISER and Institute of Physics (IOP) had participated in this workshop.

6. Visit of European Union Delegation

An European Union delegation consisting of Ms. Tania FRIEDERICHS, First Counsellor and Head of Research & Innovation, Dr. Vivek DHAM Advisor- Research & Innovation, Mr. Alain Ghislain BAETENS First Secretary Embassy of Belgium, Ms. Anna Maria Linnea LUNANDER Counsellor, Innovation and Science, Embassy of Sweden, Ms. Inger MIDTKANDAL Science and technology Counsellor Royal Norwegian Embassy, Mrs. Hanne MELGAARD Deputy chief of Mission / Minister Counsellor Royal Norwegian Embassy, Dr. Srinivas KAVERI Director CNRS office in India Embassy of France in India, Dr. Indraneel GHOSE, Senior Thematic Advisor for Education, Research and Innovation, Embassy of Switzerland in India, Mr. Andrzej Stuczynski Third secretary Economic Section, Embassy of the Republic of Poland, Mr. Sune KAUR-PEDERSEN Counsellor, Innovation and Research/ Deputy Head of Innovation Centre Denmark, Royal Danish Embassy, Dr. Hilda Viola FARKAS Counselor for Science & Technology, Embassy of Hungary, Dr. Massimo SPADONI Scientific Attaché Embassy of Italy, had visited NISER on February 22, 2018 to discuss various relevant aspects of possible research collaborations. On this occasion a meeting consisting of all Deans, Chairpersons of Schools, and also the faculty members who are having international collaborations was conducted which was chaired by the Director NISER.

7. FRRO

Foreigner (visitor) registration which is mandatory as per Government of India rules is being facilitated through IARP. Online login IDs were created for each School / Department. The link for Form C registration of a foreign visitor is given here:
https://indianfrro.gov.in/frro/FormC

8. Alumnus Registration

The IARP office is also assigned with the task of handling alumni affairs. The alumni online registration system was activated, the link to the form for alumni registration is given below:
https://docs.google.com/forms/d/e/1FAIpQLSdkpHiGBcWMogxuznrTXnPATThmUCDimGX4H7Lc1pqlVie86w/viewform?c=0&w=1.

The process for organizing first Alumni Meet is also going on in which there is proposal to form the NISER Alumni Association which further continues the Alumni related activities in the Institute.

COMPUTER CENTRE

1. The following programme have been organized by Computer Centre during 2017-18:

a. Workshop on Linux Operating System was organized and conducted by Computer Centre on November 4th, 2017 at LH-5 where mostly students and some staff and one faculty member have participated. Hands on training on the basics of Linux operating system were provided along with basic theory and practical aspects.

Speakers: Dr. U Lourderaj, FIC-CC,
Mr. Saikat Hira(SO-E(Computer))
Mr. A Anandaraman(SO-D(HPC))

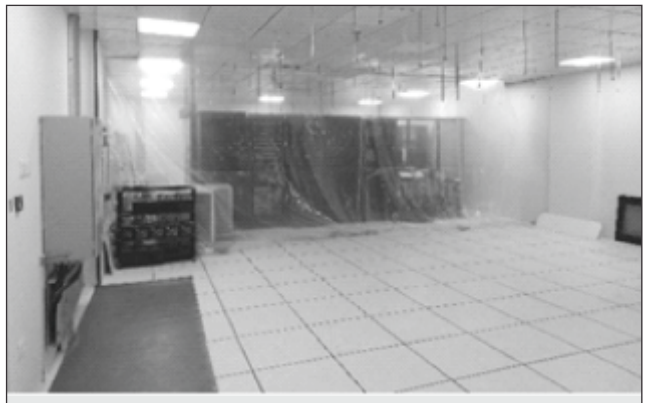
2. Infrastructure:

A state of the art Tier-II Data Centre is being commissioned at Computer Centre to provide uninterrupted IT related services to NISER fraternity and for hosting future HPC clusters for any School or R&D project. Progress of Data Centre Project:

Cold Aisle Containment Entry

Cold Aisle Containment Passage in between Server Racks

UPS along with battery bank in Electrical UPS Room



Row 1 with Cold Aisle Containment at present

FACULTY

School of Biological Sciences

Sl. No.	Name & Designation	Field of Specialization
1.	Prof. B Ravindran Adjunct Professor	Host pathogen interaction
2.	Dr. Palok Aich Associate Professor	Systems Biology
3.	Dr. Asima Bhattacharyya Associate Professor	Cancer Biology
4.	Dr. Chandan Goswami Associate Professor (Chairperson)	Cell Biology of Ion channels
5.	Dr. Abdur Rahaman Reader-F	Biochemistry and Cell Biology
6.	Dr. Harapriya Mohapatra Reader-F	Microbiology
7.	Dr. Kishore CS Panigrahi Reader-F	Plant Biology
8.	Dr. Debasmita Pankaj Alone Reader-F	Human Genetics
9.	Dr. Manjusha Dixit Reader -F	Human Genetics
10.	Dr. Pankaj Vidyadhar Alone Reader-F	Molecular Biology
11.	Dr. Praful Singru Associate Professor	Neurobiology
12.	Dr. Subhasis Chattopadhyay Reader-F	Immunology
13.	Dr. V Badireenath Konkimalla Reader-F	Pharmaceutical Biology
14.	Dr. Rudresh Acharya Reader-F	Macromolecular X-ray Crystallography, Structural Bilogy, De Novo Protein Design

15.	Dr. Tirumala Kumar Chowdary Reader-F	Structural Virology
16.	Dr. Ramanujam Srinivasan Reader-F	Bacterial Pathogenesis, Cytoskeletal Dynamics and Functions
17.	Dr. Renjith Mathew Reader-F	Complex cell and tissue architectures – development and homeostasis
18.	Dr. Sanjitha Banerjee Ramanujan Fellow (Feb 2016-2020)	Host-pathogen interactions

School of Chemical Sciences

Sl. No.	Name & Designation	Field of Specialization
1.	Prof. T.K. Chandrashekar Sr. Professor	Inorganic Chemistry Bio-Inorganic Chemistry-Expanded porphyr in Chemistry
2.	Prof. A. Srinivasan Professor (Chairperson)	Inorganic Chemistry Bio-Inorganic Chemistry-Pyrrole Based Receptors
3.	Dr. M. Sarkar Associate Professor	Physical Chemistry Fluorescence Spectroscopy
4.	Dr. Sanjib Kar Associate Professor	Inorganic Chemistry Bio-inorganic chemistry: Metals in Medicine
5.	Dr. Arindam Ghosh Reader-F	Physical Chemistry Methodology development in NMR
6.	Dr. B.L. Bhargava Reader-F	Physical Chemistry Computational studies of Materials
7.	Dr. C.S. Purohit Reader-F	Organic Chemistry Bio-organic and Organic Synthesis
8.	Dr. C. Gunanathan Associate Professor	Organic Chemistry Organomettallic Chemistry and Catalysis
9.	Dr. J.N. Behera Associate Professor	Inorganic Chemistry Law temperature multiferroics from single source source precursors and Porous Magnetic Materials
10.	Dr. N.K. Sharma Reader-F	Inorganic Chemistry Bio-Organic and Organic Synthesis

11.	Dr. Prasenjit Mal Associate Professor	Inorganic Chemistry Supramolecular chemistry and Photochemistry
12.	Dr. S. Peruncheralathan Reader-F	Organic Chemistry Synthetic Organic chemistry and Asymmetric Catalysis
13.	Dr. Sharanappa Nembenna Reader-F	Inorganic Chemistry Main Group Organometallic chemistry and Low oxidation state metal chemistry
14.	Dr. Subhadeep Ghosh Reader-F	Physical Chemistry Single Molecule Spectroscopy, Molecular Dynamics
15.	Dr. Sudip Barman Associate Professor	Physical Chemistry Synthesis and Functionalization of Graphene
16.	Dr. U. Lourderaj Associate Professor	Physical Chemistry Theoretical and Computational Chemistry
17.	Dr. V. Krishnan Reader-F	Inorganic Chemistry Catalysis and Materials Synthesis
18.	Dr. Himansu Sekhar Biswal Reader-F	Laser Spectroscopy and Instrumentation
19.	Dr. P.C. Ravikumar Reader-F	Inorganic Chemistry
20.	Dr. Suman Chakrabarthy Reader-F	Computational modeling and simulation of complex molecular systems
21.	Dr. Bidraha Bagh Assistant Professor	Inorganic and Organometallic Chemistry

School of Mathematical Sciences

Sl. No.	Name & Designation	Field of Specialization
1.	Prof. Madumbai Seshachalu Narasimhan Honorary Fellow	Moduli of Vector Bundles, Partial Differential Equations, Mathematical Physics, Representation Theory
2.	Prof. V. Muruganandam Professor	Harmonic Analysis

3.	Dr. Anil Kumar Karn Associate Professor	Theory of operator spaces
4.	Dr. Sanjay Parui Reader-F	Harmonic Analysis
5.	Dr. Biond Kumar Sahoo Reader-F	Representations of Geometries
6.	Dr. Brundaban Sahu Associate Professor	Number Theory
7.	Dr. Deepak Kumar Dalai Reader-F	Cryptography
8.	Dr. Kamal Lochan Patra Reader-F	Algebraic Graph Theory
9.	Dr. Nabin Kumar Jana Assistant Professor	Probability Theory
10.	Dr. Shyamal Krisha De Assistant Professor	Topology
11.	Dr. Manas Ranjan Sahoo Assistant Professor	Differential Equations
12.	Dr. Jaban Meher Assistant Professor	Number Theory
13.	Dr. Amit Tripathi Assistant Professor	Algebraic Geometry
14.	Dr. Ritwik Mukherjee Assistant Professor	Differential Geometry
15.	Dr. Sutanu Roy Assistant Professor	Functional Analysis
16.	Dr. Panchugopal Bikram Assistant Professor	Functional Analysis
17.	Dr. Dinesh Kumar Keshari Assistant Professor	Functional Analysis
18.	Dr. K. Senthil Kumar Assistant Professor	Number Theory
19.	Dr. Md. Ali Zinna Assistant Professor	Algebra

School of Physical Sciences

Sl. No.	Name & Designation	Field of Specialization
1.	Prof. Ashoke Sen Honorary Fellow	String Theory
2.	Prof. Jnanadeva Maharana Adjunct Professor	String Theory
3.	Prof. Subhendra D. Mahanti Adjunct Professor	Theoretical Condensed Matter Physics
4.	Prof. Nu Xu Adjunct Professor	Experimental High Energy Physics
5.	Prof. Meenakshi Narain Adjunct Professor	Experimental High Energy Physics
6.	Prof. Bedangadas Mohanty Professor	Experimental High Energy Physics
7.	Dr. Subhankar Bedanta Associate Professor	Experimental condensed matter physics (Nanomagnetism and multiferroics)
8.	Dr. Subhasis Basak Reader-F	HEP Theory: Lattice QCD
9.	Dr. Sanjay Kumar Swain Associate Professor	Experimental HEP: LHP Physics
10.	Dr. A.V. Anil Kumar Reader-F	Statistical Mechanics and Modeling of Soft Matter
11.	Dr. Ashok Mohapatra Reader-F	Ultra cold Atoms and Bose-Einstein Condensation
12.	Dr. Chethan N. Gowdigere Reader-F	String Theory
13.	Dr. Colin Benjamin Reader-F	Theoretical CMP and Quantum Information
14.	Dr. Joydeep Bhattacharjee Reader-F	Computational Condensed Matter Physics
15.	Dr. Kartikeswar Senapati Reader-F	Experimental CMP

16.	Dr. Prasanjit Samal Reader-F	Theoretical CMP, Atomic and Molecular Physics
17.	Dr. Pratap Kumar Sahoo Reader-F	Nano fabrication and Ion/Photon matter interaction
18.	Dr. Prolay Kumar Mal Reader-F	Experimental High Energy Physics (Collider experiments)
19.	Dr. Ritwick Das Reader-F	Nonlinear optics, and Integrated Optics
20.	Dr. Sumedha Reader-F	Special Mechanics and Interdisciplinary Applications
21.	Dr. Yogesh Kumar Srivastava Reader-F	String Theory
22.	Dr. V. Ravi Chandra Reader-F	Theoretical Condensed Matter Physics
23.	Dr. Nishikant Khandai Reader-F	Astrophysics and Cosmology
24.	Dr. Anamitra Mukherjee Reader-F	Condensed Matter Physics
25.	Dr. Victor Roy Assistant Professor	High Energy Nuclear Physics (Theory/Phenomenology)
26.	Dr. Ajaya Kumar Nayak Assistant Professor	Condensed Matter Experiment: Magnetism
27.	Dr. Amaresh Kumar Jaiswal Assistant Professor	Theoretical high energy nuclear physics
28.	Dr. Sayantani Bhattacharyya Reader 'F'	String Theory
29.	Dr. Tuhin Ghosh Assistant Professor	Cosmic Microwave Background Radiation, Dust Polarization, Primordial gravitational waves from cosmic inflation
30.	Prof. Rupak Mahapatra Visiting Professor	Dark Matter

School of Humanities and Social Sciences

Sl. No.	Name & Designation	Field of Specialization
1.	Dr. Pranay K. Swain Reader-F	Public Policy and Governance,Science-Society, Interface, Contemporary Social Issues
2.	Dr. Debashis Pattanaik Assistant Professor	Social Innovation, Social Network Analysis, Social Study of Sciences and Technology
3.	Dr. Rooplekha Khuntia Assistant Professor	Business Ethics, Ethical Cynicism, Organizational Behavior and Leadership
4.	Dr. Joe Varghese Yeldho Assistant Professor	Critical History and Narratives of Race
5.	Dr. Amarendra Das Assistant Professor	Natural Resource Management, Public Economics
6.	Dr. Amarjeet Nayak Reader 'F'	English, Postcolonial Theory and Literature, Translation Studies, Speculative Fiction, Indian English Literature, Diaspora Studies
School of Earth and Planetary Sciences		
1.	Prof. R. Ramesh Sr. Professor	Global Change, Stable Isotope Mass Spectrometry, Mathematical modeling, Oceanography and Paleoclimatology.
2.	Prof. Subhanjoy Mohanty Visiting Professor	Planetary Science
School of Computer Sciences		
1.	Dr. Rishiraj Bhattacharyya Reader – F	Cryptography
2.	Dr. Anisur Rahaman Molla Assistant Professor	Theoretical Computer Science
3.	Dr. Subhankar Mishra Assistant Professor	Graph Theory, Cyber Security, Smart Grid

COURSES OFFERED

School of Biological Sciences

The courses offered are:

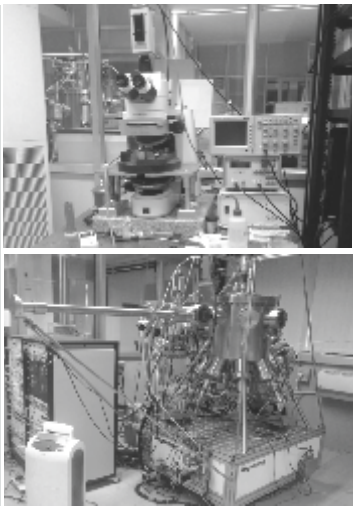
Endocrinology, Plant Developmental Biology, Quantitative Biology, Biological techniques: Theory and practice, Science of Life, Biology II: Cellular and Genetic basis of life, Biophysics and Biostat, Cell biology, Genetics, Ecology, Advance Molecular Biology, Advance Neurobiology, Cancer biology, Advanced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

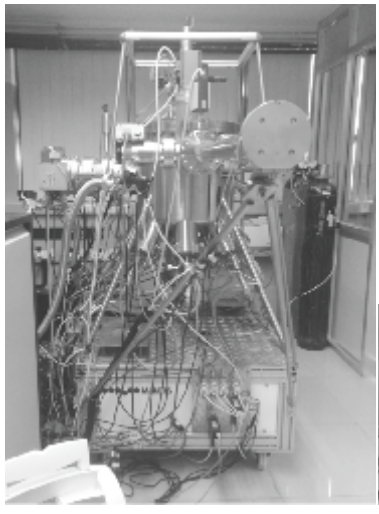
School of Chemical Sciences

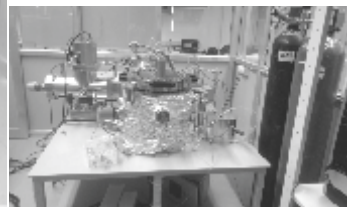
Theory: Chemistry I, Quantum Chemistry I, Physical Methods in Chemistry II, Nuclear Magnetic Resonance, Basic Inorganic Chemistry, Polymer Chemistry, Advanced Organic Chemistry, Classics in Molecules, Physical Organic Chemistry, Organic Chemistry I, Organic Chemistry II, Organic Chemistry III, Supramolecular 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, II & III, Algebra-I








(Group Theory), Discrete Mathematics, Algebra-II (Linear Algebra), Probability Theory, Elementary Number Theory, Algebra-III (Rings and Modules), Differential Equations, Topology, Analysis-IV (Calculus of Several Variables), Algebra-IV (Field Theory), Complex Analysis, Optimization Theory, Differential Geometry, Functional Analysis, Representation of Finite Groups, Measure Theory, Advanced PDE, Advanced Probability and Stochastic Process, Nonlinear Analysis, Commutative Algebra, Advanced Linear Algebra, Information &Coding Theory, Algebraic Topology, Operator Algebra, Harmonic Analysis.

School of Physical Sciences

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

Host pathogen interaction
(Dr. Prof. B. Ravindran, Adjunct Professor):

"Very broadly my laboratory is interested in studying Immunobiology of infectious diseases. We use a variety animal models and human diseases to seek insights into pathogenesis of disease processes, analysis of parasite components that induce host responses (inflammation and adaptive immune response), immunoregulatory network that determine pathology and/or outcome of infection process. More specifically, we characterize host response in the context of co-infections in animal models and in human communities. The experimental models allow us to understand effect of two pathogens with opposing immune response in the host. The other major project in the laboratory is directed towards inflammation mediated by pathogens and endogenous molecules broadly classified as DAMPs and the interplay and cross-talk between the two. We expect these studies to offer insights into how mammalian hosts 'deal' with pathogens and non-pathogenic commensal microbes. Our studies on regulation of inflammation and innate immunity have also led us into understanding macrophage biology and approaches to re-programme macrophage activity in inflammatory diseases. Investigations on co-infections in human communities have given us opportunities to address genetic basis of infectious diseases and relationship between some of the infectious diseases and auto immunity".

Systems Biology
(Dr. PalokAich, 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 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
(Dr. 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 framework 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
(Dr. 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 structure function analysis are easily achieved in Tetrahymena. This makes it a suitable model organism to study nuclear remodeling.

Cell biology of pain
(Dr. Chandan Goswami, Associate Professor):

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. As these TRP channels are also present in a number of non-neuronal cells, we also explore the importance of TRP channels in other cells such as in T cells, macrophages, osteoclasts, osteoblasts, keratinocytes and in sperm cells.

Molecular pathogenesis of age-related neurodegenerative disorders
(Dr. Debasmita Pankaj Alone, Reader-F):

With the shifting demographics towards older age, there is a major concern for age-related disorders. 90% of individuals dying each year are due to age-related causes. Understanding the genome, epigenome and proteome between healthy and diseased state of these individuals pave a way for unravelling bio-markers for early diagnosis and/or therapeutics for various diseases. Our goal is to find these underlying players that change the micro-environmental niche differently in a diseased state during the developmental process of aging and hence are responsible for these age related-disorders. We are currently focusing on understanding the pathomechanism of two neurodegenerative eye disorders (Glaucoma, the leading cause of irreversible World Blindness and Corneal Endothelial Dystrophies) as well as Cancer using a plethora of cellular, biochemical, genetics, genomics and molecular biology techniques involving human samples, Drosophila models as well as in vitro cell lines.

Antibiotic resistance and virulence: Focus on membrane proteins and persistence phenomenon
(Dr. Harapriya Mohapatra, Reader-F):

Over past few years opportunistic pathogenic bacteria have exhibited drastic increase in drug resistance. Our lab is involved in comparative study of multidrug resistant environmental and clinical bacterial isolates. We work on Klebsiella pneumoniae and Enterobacter cloaceae on two different aspects of drug resistance: Role of membrane proteins in resistance and virulence: In Enterobacter cloaceae, rise of efflux pump mediated drug resistance is of concern, especially in clinical settings, owing to non-specificity of pumps towards efflux substrate(s). Research work done over the years have developed a fair

understanding on structural aspects of the efflux pump proteins. However, understanding on their physiological significance is just beginning to be explored. We are interested unravelling the diversity of efflux pump genes present in multidrug resistant clinical bacterial isolates, develop an understanding on the regulation of multidrug efflux pumps under different physiological and environmental conditions including host-pathogen interactions. At present we are studying modulation of expression of acrAB-tolC efflux proteins in Enterobacter sp.

Persister cell formation as a mechanism of drug tolerance: Another aspect of drug resistance in bacteria is the formation of persister cells. Certain wild type populations of bacteria, when subjected to antimicrobial agents, undergo a rapid cell death, with a small fraction of the population surviving. Though being genetically identical to the wild type parent, they enter into a non-dividing, non-metabolising state, allowing them to 'persist' in presence of the drug. Such sub-populations of "persister cells" have been implicated in the recalcitrance of infections to antimicrobial treatment as well as in the chronicity of diseases. Our lab has previously found an environmental isolate of Klebsiella pneumoniae that exhibited persistence and could survive in the presence of antimicrobial compounds belonging to different classes. Our long term goal now is to gain insight to molecular pathways regulating formation of persister cells in clinical and environmental isolate of K. pneumoniae.

We utilize various microbiological, biochemical, molecular biology and cell culture techniques for understanding these mechanisms.

Novel angiogenesis regulators and their role in tumorigenesis, understanding molecular mechanism and genetics of Gallbladder Cancer (Dr. Manjusha Dixit, Reader-F):

Abnormal growth of new blood vessels plays an important role in many diseases, including cancer. To treat cancer, various potential anti-angiogenesis drugs have been tested with limited success. Blocking just one regulatory pathway may not be enough. Till date, all these angiogenic-switch regulatory molecules and their mechanism are not known. In order to do that, my research group is interested towards the validation and elucidation of the molecular mechanism of putative angiogenic regulators. We are also interested in finding out the role and molecular mechanism of these newly identified angiogenesis regulators, in tumorigenesis and tumor angiogenesis. Another major area includes understanding molecular mechanism of gallbladder cancer and establishment of genetic risk factors in Indian population. Based on distinctive environmental risk factors and genetic composition of population, it's very important to establish molecular mechanism in our own population. This will also help in developing population specific and personalized therapeutic strategies.

Interdisciplinary approaches in development of cancer therapeutics
(Dr. V. Badireenath Konkimalla, Reader-F):

Rational drug discovery and development requires a streamlined interdisciplinary effort from researchers working in a specialized area. From active collaboration, drug discovery process can be and has been shortened to a great extent by addressing bottlenecks in drug discovery (such as high-throughput screening, specificity and chemoresistance). Our research efforts focus on some of these unaddressed questions that would potentially contribute in chemotherapy. On the other hand, while novel compounds are in great demand to be translated as a drug, nevertheless, it is hard to predict its activity (anti-cancer, anti-diabetic or as any chemotherapeutic) in the first instance. Therefore, as a pre-screening step we first try to understand the cellular response of the ligand or its affinity to a molecular target by applying different computational and experimental methods (biochemical, molecular biology, microscopy or on cell lines).

Molecular mechanisms of eukaryotic translation initiation
(Dr. 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 gene expression. 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 and Immunological investigation towards altered host cell responses
(Dr. Subhasis Chattopadhyay, Reader-F)

The fundamental consequences of cellular responses towards altered physiological processes during infection, cancer and/or tumor progression, inflammation and immunogenic responses in various cases of altered host cell functions and phenotypes are the prime interest of our ongoing research. We have been working in the field of host cell responses and cellular immunology with special interest of ongoing immune-regulatory responses, cellular function and phenotypes associated to cell mediated immunity (CMI) of T cells and accessory antigen presenting cells. Currently, we have major interest groups, where we are investigating expression and function of Toll Like Receptor (TLR) and Transient Receptor Potential (TRP) Channels in CMI, analyzing cellular and immunological response(s) of host cells associated to experimental cellular inflammation, Chikungunya virus (CHIKV) infection, mice model of tumor progression as major projects. Research with cell lines, primary cells, 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 be helpful towards designing immuno-therapeutic strategies to control various diseases.

Structural Biology of membrane and water soluble proteins, de novo protein design (Dr. 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 of viroporins. The channel structure provides insights into molecular mechanism for channel activity, and also aid in designing 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 correlations. 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 (Dr. Tirumala Kumar Chowdary, Reader - F):

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 (Dr. Praful S. Singru, Associate Professor):

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.

Understanding the mechanisms of gastric cancer progression and metastasis (Dr. Asima Bhattacharyya, Associate Professor):

Gastric cancer is a major cause of mortality. Although various causative agents have been

associated with this disease, Helicobacter pylori, a microaerophilic, gram-negative bacterium has been identified as one of the main carcinogens causing gastric cancer and contributing in gastric cancer metastasis. Like many epithelial-origin solid tumors, dissemination or gastric cancer (gastric cancer metastasis) is mediated by epithelial to mesenchymal transition (EMT), a mechanism that converts immotile epithelial cells into motile and invasive mesenchymal cells. Hypoxia is known to aggravate the EMT and metastatic properties. The molecular events in H. pylori and hypoxia-driven gastric cancer progression and metastasis are complex and multi-factorial. We are involved in identifying the molecular events and pathways that contribute in gastric cancer progression and metastasis.

Development and maintenance of complex architectures in biology
(Dr. Renjith Mathew, Reader-F):

Biology is rife with compartmentalizations - topics, classes, segments, stages, groups; so on and so forth. These are mostly artificial boundaries set for human convenience. Studying development has classically involved studying the development of an organism from when it is a single celled zygote to when the structures necessary for its survival as a full organism have developed, or the development of tissues or organs from precursor cells, for example. Biological phenomena however operate in reality as a continuum of interlinked complex processes that start at the beginning and end at the end. What if developmental biology is taken beyond this somewhat abstract border? That is what we plan to do in our lab. The processes that drive the developmental programmes do not stop when we consider development to be complete. They continue to operate to maintain the structure and function of different organs and tissues post-establishment, till the death of the organism. For this homoeostatic function they constantly resist degenerative influences, a fight they gradually lose as the organism ages, resulting in degeneration of organ and tissue architectures.

Thus by continuing the study of development beyond "development" we hope to reveal how tissues and organ structures degenerate with age. This will help to understand the mechanistic basis for functional loss with age. We conduct these experiments using Drosophila melanogaster, a favorite tool of developmental biologists, as our model organism. Our research currently investigates the Drosophila respiratory system, and will progressively include more tissue and organ types. We combine classical methods of developmental biology with modern tools. This involves visualizing organ structure at cell and tissue levels using advanced staining and microscopy techniques. After establishing the tissue architecture of young adult organs, we will analyze the changes occurring to these structures with age. Once the senile phenotype of organ structure is determined, we will employ genetic and biochemical tools to reveal the metabolic and genetic pathways that regulate or influence the senile degeneration.

Bacterial Pathogenesis, Cytoskeletal Dynamics and Functions
(Dr. R. Srinivasan, Reader F)

The identification of cytoskeleton in bacteria represents a major paradigm shift in biology. The bacterial cytoskeleton provides a framework to understand the mechanical basis of spatial organization and functions, such as cell integrity, cell shape establishment, DNA segregation, and cell division. Such force requiring functions in eukaryotic cells require the coordinated action of molecular motors with the cytoskeleton. However, no molecular motors have been identified so far in bacteria. So, how do bacterial cytoskeletal proteins generate force in the absence of molecular motors? Our long-term goal is to address this question and in order to do so we focus on the two of the cellular processes that underlie any living cell: partitioning of its genetic (mitosis) and cytoplasmic (cytokinesis) components. We are also interested in studying the role of cell division and morphology control in intracellular pathogens *(e.g. Salmonella and Mycobacteria)*. Further, we have recently become interested in the evolutionary divergence of division mechanisms in organelles as it was intracellularization of a bacteria that lead to the development of organelles like mitochondria and chloroplast in eukaryotic lineages. While these studies will add new knowledge to the field of cytokinesis and membrane fission, we are also interested in identifying small molecules targeting these novel cytoskeletal (especially the ones portioning the virulence plasmids) and developing next generation antibiotics.

Research Facilities created in the School:

- Animal cell culture facility
- Green house and Phytotron facility for plant development research
- Fly facility
- Microbial facility
- Radioactivity
- Imaging facility
- Proteomics and genomics and drug discovery facility
- Flow cytometry facility
- Crystalization and X-ray diffraction facility
- Low-temperature storage facility
- Computational facility
- Animal house transit facility (for Mouse, rat and Zebra Finch)

Publications (1st April 2017 – 31st Mar 2018)

1. Kar UP, Dey H, Rahaman A (2018) Tetrahymenadynamin related protein 6 self assembles independent of membrane association. J. Biosci. 43, 139-48.

2. Pillai AN, Shukla S, Gautam S, Rahaman A. (2017) Small phosphatidate phosphatase (TtPAH2) of Tetrahymena complements respiratory function and not membrane biogenesis function of yeast PAH1. J. Biosci. 42, 613-621.

3. Pillai AN, Shukla S, Rahaman A. (2017) An evolutionarily conserved phosphatidate phosphatase maintains lipid droplet number and endoplasmic reticulum morphology but not nuclear morphology. Biol. Open 6, 1629-1643.

4. Kar U.P., Dey H. Rahaman A. (2017) Regulation of dynamin family proteins by post-translational modifications. J. Biosci. 42, 333-344.

5. Palani S*, Srinivasan R*, Zambon P, Kamnev A, Pananghat G, Balasubramanian M.K. (2018). Evidence that a steric clash in the upper 50KDa domain of the motor Myo2p leads to cytokinesis defects in fission yeast. (*equal contribution). J. Cell Sci. 131.

6. Palani, S, Chew, T. G, Ramanujam, S, Kamnev, A, Harne, S, Chapa-y-Lazo, B, Hogg, R, Sevugan, M, Mishra, M, Gayathri, P and Balasubramanian, M. K. (2017) Motor Activity Dependent and Independent Functions of Myosin II Contribute to Actomyosin Ring Assembly and Contraction in Schizosaccharomycespombe. Curr. Biol. 27, 751-757.

7. Mishra M, Kumar S, Majhi RK, Goswami L, Goswami C, Mohapatra H. (2018) Antibacterial efficacy of polysaccharide capped silver nanoparticles is not compromised by AcrAB-TolC efflux pump. Frontiers in Microbiology (In press).

8. Mohapatra DP, Singh SK, Sahoo M, Patole S, Mishra M, Debata NK and Mohapatra H. (2018) Retrospective study on clonal relationship of multidrug resistant Klebsiella spp. indicates closed circulation and initiation of clonal divergence. Journal of Medical Microbiology. (In press).

9. Mishra M, Patole S, Mohapatra H. (2017) Draft genome sequences non-clinical and clinical Enterobacter cloacae isolates exhibiting multiple antibiotic resistance and virulence factors. Genome announcement. 5, e01218-17.

10. Patole S, Mishra M, Mohapatra H. (2017) Draft genome sequences of clinical and non-clinical isolates of Klebsiella spp. exhibiting non-heritable tolerance towards antimicrobial compounds. Genome announcement. 5, e01217-17.

11. Singh SK, Mishra M, Sahoo M, Patole S, Sahu S, Misra SR, Mohapatra H. (2017) Antibiotic resistance determinants and clonal relationships among multidrug-resistant isolates of Klebsiellapneumoniae. Microbial Pathogenesis. 110, 31-36.

12. Singh SK, Ekka R, Mishra M, Mohapatra H. (2017) Association study of Multiple Antibiotic Resistance and Virulence: A strategy to assess extent of risk posed by bacterial population in aquatic environment. Environmental Monitoring and Assessment. 189: 320.

13. Singh SK, Mishra M, Sahoo M, Patole S, Mohapatra H. (2017) Efflux mediated colistin resistance in diverse clones of Klebsiellapneumoniae from aquatic environment. Microbial Pathogenesis. 102, 109-112.

14. Kokate SB, Dixit P, Das L, Rath S, Roy AD, Poirah I. Chakraborty D, Rout N,Singh SP, Bhattacharyya A*. (2018) Acetylation-mediated Siah2 stabilization enhances

PHD3 degradation in Helicobacter pylori-infected gastric epithelial cancer cells. FASEB J. (Accepted) Doi: 10.1096/fj.201701344RRR. Published by Federation of American Societies for Experimental Biology.

15. Das L, Kokate SB, Dixit P, Rath S, Rout N, Singh SP, Crowe SE, Bhattacharyya A. (2017) Membrane-bound ß-catenin degradation is enhanced by ETS2-mediated Siah1 induction in Helicobacter pylori-infected gastric cancer cells. Oncogenesis. 6, e327.

16. Dash TK, Konkimalla VB. (2017) Selection of PGlycoprotein Inhibitor and Formulation of Combinational Nanoformulation Containing Selected Agent Curcumin and DOX for Reversal of Resistance in K562 Cells. Pharm Res. 34, 17411750.

17. Dash TK, Konkimalla VB. (2017) Selection and optimization of nanoformulation of P-glycoprotein inhibitor for reversal of doxorubicin resistance in COLO205 cells. J Pharm Pharmacol. 69, 834843.

18. Konkimalla VB. (2017) An Improved Comparative Docking Approach For Developing Specific Glycogen Phosphorylase Inhibitors Using PentacyclicTriterpenes. Curr Top Med Chem. 17, 16401645.

19. Dash TK, Konkimalla VB. (2017) Comparative Study of Different NanoFormulations of Curcumin for Reversal of Doxorubicin Resistance in K562R Cells. PharmaceuticalResearch. 34, 279289.

20. Dash TK, Konkimalla VB. (2017) Formulation and Optimization of Doxorubicin and Biochanin A Combinational Liposomes for Reversal of Chemoresistance. AAPS PharmSciTech. 18, 11161124.

21. Pal S, SalunkeGawali S, Konkimalla VB. (2017) Induction of Autophagic Cell Death In Apoptosis Resistant Pancreatic Cancer Cells Using Benzo [α] Phenoxazines Derivatives, 10 Methyl Benzo [α] Phenoxazine 5 One And Benzo [α] Phenoxazine5One. Anticancer agents in medicinal chemistry. 17, 115125.

22. Nayak M, Pradhan A, Giri SS, Samanta M, Konkimalla VB, Saha A. (2018) Molecular characterization, tissue distribution and differential nutritional regulation of putative Elovl5 elongase in silver barb (Puntiusgonionotus). Comp BiochemPhysiol B BiochemMolBiol. 217, 2739.

23. Yadav M, Goswami C (2017) TRPV3 mutants causing Olmsted Syndrome induce impaired cell adhesion and nonfunctional lysosomes. Channels11, 196-208.

24. Kumar A, Bhandari A, Sarde SJ, Goswami C (2017) Ancestry & molecular evolutionary analyses of heat-shock protein 47 kDa (HSP47/SERPINH1) Scientific reports7, 10394.

25. Saha S, Ghosh A, Tiwari N, Kumar A, Kumar A, Goswami C (2017) Preferential selection of Arginine at the lipid-water-interface of TRPV1 during vertebrate evolution correlates with its snorkeling behaviour and cholesterol interaction. Scientific reports 7, 16808.

26. Schoville SD, Chen YH, Andersson MN, Benoit JB, Bhandari A, Bowsher JH, Brevik K, Cappelle K, Chen MM, Childers AK, Childers C, Christiaens O, Clements J, Didion EM, Elpidina EN, Engsontia P, Friedrich M, García-Robles I, Gibbs RA, Goswami C, Grapputo A, Gruden K, Grynberg M, Henrissat B, Jennings EC, Jones JW, Kalsi M, Khan SA, Kumar A, Li F, Lombard V, Ma X, Martynov A, Miller NJ, Mitchell RF, Munoz-Torres M, Muszewska A, Oppert B, Palli SR, Panfilio KA, Pauchet Y, Perkin LC, Petek M, Poelchau MF, Record É, Rinehart JP, Robertson HM, Rosendale AJ, Ruiz-Arroyo VM, Smagghe G, Szendrei Z, Thomas GWC, Torson AS, Vargas Jentzsch IM, Weirauch MT, Yates AD, Yocum GD, Yoon JS, Richards S. (2018) A model species for agricultural pest genomics: the genome of the Colorado potato beetle, Leptinotarsadecemlineata (Coleoptera: Chrysomelidae). Scientific Reports8, 1931.

27. Kumar S, Majhi RK, Sanyasi S, Goswami C, Goswami L. (2018) Acrylic acid grafted tamarind kernel polysaccharide-based hydrogel for bone tissue engineering in absence of any osteoinducing factors. Connective Tissue Research59, 111-121.

28. Choudhury P, Kumar S, Singh A, Kumar A, Kaur N, Sanyasi S, Chawla S, Goswami C, Goswami L. (2018) Hydroxyethyl methacrylate grafted carboxy methyl tamarind (CMT-g-HEMA) polysaccharide based matrix as a suitable scaffold for skin tissue engineering. Carbohydrate Polymers. 189, 87-98.

29. Sanyasi S, Kumar S, Ghosh A, Majhi RK, Kaur N, Choudhury P, Singh UP, Goswami C, Goswami L. (2017) A modified polysaccharide-based hydrogel for enhanced osteogenic maturation and mineralization independent of differentiation factors. Macromolecular Bioscience17, 3.

30. Majhi R K, Maity A, Senapati MR, Behera PC , Mandal AK , Giri SC , Goswami C. (2018) Endogenous expression of thermo-sensitive ion channels TRPV1 and TRPV4 in immune tissues of avian species (duck, Anasplatyrhynchos). PeerJ (Preprint).

31. Priyadarshini S, Pradhan B, Aich P. (2018) Role of murine macrophage in temporal regulation of cortisol- and serotonin-induced adipogenesis in pre-adipocytes when grown together. Biol Open. 7, 8.

32. Pradhan B, Guha D, Naik AK, Banerjee A, Tambat S, Chawla S, Senapati S, Aich P. (2018) Probiotics L. acidophilus and B. clausii Modulate Gut Microbiota in Th1- and Th2-Biased Mice to Ameliorate Salmonella Typhimurium-Induced Diarrhea. Probiotics Antimicrob Proteins. (In press).

33. Priyadarshini S, Pradhan B, Griebel P, Aich P. (2018) Cortisol regulates immune and metabolic processes in murine adipocytes and macrophages through HTR2c and HTR5a serotonin receptors. Eur J Cell Biol(In press)

34. Pradhan B, Guha D, Murmu KC, Sur A, Ray P, Das D, Aich P. (2017) Comparative efficacy analysis of anti-microbial peptides, LL-37 and indolicidin upon conjugation with CNT, in human monocytes. J Nanobiotechnology. 15, 44.

35. Sahoo SS, Pratheek BM, Meena VS, Nayak TK, Kumar SP, Bandyopadhyay S, Maiti PK, Chattopadhyay S. (2018) VIPER regulates naive T cell activation and effector responses: Implication in TLR4 associated acute stage T cell responses. Scientific Reports 8, 7118.

36. Saswat T, Sahoo S, Muduli S, Debata NK, Chattopadhyay S, Chattopadhyay S. (2018) Epidemiological trends and molecular dynamics of Dengue, Chikungunya virus infection, co-infection and other undifferentiated fever during 2015-2016 in Odisha, India. Journal of Medical Virology (in press).

37. Hassan MK, Kumar D, Naik M, Dixit M. (2018) The expression profile and prognostic significance of eukaryotic translation elongation factors in different cancers. PLoS One. 13, e0191377.

38. Hansda AK, Tiwari A, Dixit M. (2017) Current Status and Future Prospect of FSHD Region Gene 1. J Biosci. 42, 345-353.

39. Kumar D, Hassan MK, Pattnaik N, Mohapatra N, Dixit M. (2017) Reduced expression of IQGAP2 and higher expression of IQGAP3 correlates with poor prognosis in cancers. PLoS One. 12, e0186977.

40. Tiwari A, Mukherjee B, Dixit M. (2017) MicroRNA Key to Angiogenesis Regulation: miRNA Biology and Therapy. Curr Cancer Drug Targets. 18 (3), 266-277.

41. Tiwari A, Pattnaik N, MohantyJaiswal A, Dixit M. (2017) Increased FSHD region gene1 expression reduces in vitro cell migration, invasion, and angiogenesis, ex vivo supported by reduced expression in tumors. Biosci Rep. 37.

42. Antony AC and Alone PV. (2018) Fidelity of HIS4 start codon selection influences 3-Amino-1,2,4-Triazole (3AT) sensitivity in GTPase Activating Protein (GAP) function defective eIF5. Journal of Genetics. (In press).

43. Antony A C, Alone PV. (2017) Defect in the GTPase activating protein (GAP) function of eIF5 causes repression of GCN4 translation. BiochemBiophys Res Commun. 486, 1110-1115.

44. Kumar A, Singh A, Panigrahy M, Sahoo PK, Panigrahi KCS. (2018) Carbon nanoparticles influence photomorphogenesis and flowering time in Arabidopsis thaliana. Plant Cell Rep. (In press).

45. Kumar A, Kumar A.A, Nayaka A.P, Mishra P, Panigrahy M, Sahoo P.K, Panigrahi K.C (2017) Carbohydrates and polyphenolics of extracts from genetically altered plant acts as catalyst for in vitro synthesis of silver nanoparticle. Int. J. Adv. Res. 5. 1997-2010.

46. Kumar A, Panigrahy M, Panigrahi K.C, 2017. Evaluation of soil parameters and optimization of a cost- effective growth conditions for Arabidopsis thaliana. Int. J. Adv. Res. 5. 1642-1651.

47. Padhy B, Hayat B, Nanda GG, Mohanty PP, Alone DP (2017) Pseudoexfoliation glaucoma and Alzheimer's-associated risk variant rs2279590 lies within an enhancer element and regulates CLU and PTK2B gene expression. Human Molecular Genetics 26, 4519-4529.

48. Kumar S, Singh U, Singh O, Goswami C, Singru PS. (2017) Transient receptor potential vanilloid 6 (TRPV6) in the mouse brain: Distribution and estrous cycle-related changes in the hypothalamus. Neuroscience344, 204-216.

49. Kumar S, Singh U, Goswami C, Singru PS. (2017) Transient receptor potential vanilloid 5 (TRPV5), a highly Ca2+-selective TRP channel in the rat brain: relevance to neuroendocrine regulation. Journal of Neuroendocrinology29, 4.

50. Hore G, Maity A, Naskar A, Ansar W, Ghosh S, Saha GK, Banerjee D.(2017) Scanning electron microscopic studies on antenna of Hemipyrellialigurriens (Wiedemann, 1830) (Diptera: Calliphoridae)-A blow fly species of forensic importance. Acta Trop. 172, 20-28.

51. Ghosh S. (2017) Application of Computational Methods in Planaria Research: A Current Update. Journal of Integrative Bioinformatics. 20170007.

52. Ghosh S (2017). Sialic acid binding lectins (SABL) from molluscs, a review and in silico study of SABL from Solengrandis and Limaxflavus 5.

53. Chawla S, Mahara K, Chandramohan B. (2018) Successful Treatment of Post Parturient Pelvic Prolaspse in Mice (Musmusculus) using Novel Hydro-Propulsion Technique. Journal of Exotic Pet Medicine. (In press).

54. Jena S, Parthasarathy S, Chawla S (2018) Identification and morphological characterisation of spiny rat louse (Polyplaxspinulosa) from a laboratory rat. Journal of Entomology and Zoology Studies. 5 (6).

55. Ghosh S (2018) Environmental pollutants, pathogens and immune system in earthworms. Environ SciPollut Res Int. 25, 6196-6208.

56. Ghosh S, Ansar W and Banerjee D (2018) Diagnosis of crime reporter flies in forensic entomology: A review. Indian J of Entomology, 80, 158-176.

57. Mundlapati VR, Sahoo DK, Ghosh S,

Purame UK, Pandey S, Acharya R, Pal N, Tiwari P, Biswal HS. (2017) Spectroscopic Evidences for Strong Hydrogen Bonds with Selenomethionine in Proteins. J PhysChemLett. 8, 794-800.

58. Chawla S, Jena S, Venkatsan B, Mahara K, Sahu N (2017) Clinical, pathological, and molecular investigation of Mycoplasma pulmonis-induced murine respiratory mycoplasmosis in a rat (Rattusnorvegicus) colony, Veterinary World, 10, 1378-1382.

Grants (1st April 2017 – 31st Mar 2018, Ongoing and newly approved)

1. Ongoing grant (2016- 2019) to Dr. Renjith Mathew (Total value 75 Lakh) From Department of Biotechnology (DBT)

   Title: A Drosophila model to study senile tissue degeneration of the respiratory system.

2. Ongoing grant (2017- 2020) to Dr. Renjith Mathew (Total value 45 Lakh) from Department of Science and Technology (DST ECR).

   Title: Degeneration of tissue structure and loss of function in respiratory system with age: analysis in a Drosophila model.

3. Ongoing grant (2016- 2019) to Dr. K C Panigrahi (Total value 75 Lakh) From Department of Science and Technology (DST-SERB).

   Title: Role of Putative domains of GIGANTEA in Arabidopsis.

4. Ongoing grant (2017- 2020) to Dr. K C Panigrahi (Total value 75 Lakh) From Department of Biotechnology (DBT)

   Title: Correlation on Auxin and light interaction in shaping root development in Arabidospsis.

5. Ongoing grant (2016- 2020) to Dr. S Ramanujam (Total value 75 Lakh) From Department of Biotechnology (DBT)

   Title: Assembly and Constriction of the Bacterial Cytokinetic Ring formed by the Tubulin homologue, FtsZ.

6. Ongoing grant (2016- 2020) to Dr. S Ramanujam (Total value 70 Lakh) from Department of Science and Technology

   Title:Cell Biological, Biochemical, Biophysical and Ultra-structural Characterization of Novel Mutants trapped in a Helical Intermediate Stage of Z-ring Assembly.

7. Ongoing grant (2017- 2020) to Dr. V B Konkimalla (From Rapid Grant for Young Investigators (RGYI), Department of Biotechnology (DBT).

   Title: Design, synthesis, screening and evaluation of reduced forms of amino/imino/thio 1,4-naphthoquinone derivatives for anti-proliferative properties.

8. Ongoing grant (2015- 2018) to Dr. Chandan Goswami (Total value 35 Lacs) From DST, SERB.

Title: Regulation of cytoskeletal components by TRPV receptors and vice versa relevant in cancer and neuropathic pain.

9. Ongoing grant (2015- 2018) to Dr. Chandan Goswami (Total value 89 Lacs) From Department of Biotechnology (DBT)

   Title: Role of TRPV ion channels in the regulation of mitochondrial function and dynamics relevant in the context of neuronal abnormality and other pathophysiological conditions.

10. Ongoing grant (2015- 2018) to Dr. Chandan Goswami (Co-PI, PI: Dr. Luna Goswami, KIIT University) (Total value 35 Lacs) From ICMR.

    Title: Synthesis and characterization of novel hydrogels and their interaction with cells for potential application in bone tissue engineering.

11. Ongoing grant (2016- 2019) to Dr. S Chattopadhyay [Co-PI- Dr. G. Goswami, SBS, NISER Bhubaneswar, Dr. S. Chattopadhyay, Institute of Life Sciences Bhubaneswar] From CSIR.

    Title: Immune regulatory role of TRPV in T cell activation and suppressive response" as PI funded by CSIR, India.

12. Ongoing grant (2016- 2019) to Dr. S Chattopadhyay [Co-PI: Dr. S. Chattopadhyay, Institute of Life Sciences Bhubaneswar] From DST-SERB.

    Title: Identification and characterization of differentially expressed host proteins for both S 27 and DRDE-06 strains of Chikungunya virus in mouse model: Implications in understanding its epidemic potential.

13. Ongoing grant (2016- 2019) to Dr. Debasmita Alone (Total value 24 Lacs) from CSIR

    Title: Role of Clusterin in the pathogenesis of Pseudoexfoliation Glaucoma

14. Ongoing grant (2017- 2020) to Dr. Debasmita Alone (Total value 24 Lacs) from ICMR
    Title: Genetic and mechanistic analysis of the pathomechanism of Fuchs endothelial corneal dystrophy

15. Ongoing grant (2016- 2019) to Dr. Manjusha Dixit rom DST-SERB

    Title: Molecular mechanistic study of interaction between FRG1 and IQGAP2 with special focus on angiogenesis and tumorigenesis.

16. Ongoing grant (2017- 2020) to Dr. Rudresh Acharya (Total value 60 Lacs) From Department of Biotechnology (DBT)

    Title: Mechanistic insights into functioning of polysaccharide lyases (PLs) belonging to class 5 (PL-5) from pathogenic bacteria such as Ralstoniapickettii, Pseudomonas aeruginosa.

17. Ongoing grant (2012- 2017) to Dr. Rudresh Acharya (Total value 63 Lacs) From Department of Biotechnology (DBT)

Title: Structural Characterization of Viral ion channel

18. Ongoing grant (2015- 2018) to Dr. Palok Aich (Co-PI) (PI: Dr. PunamPahwa, Other Co-PIs: Dr. Markus Hecker, Dr. ChandimaKarunanayake; Collaborators: Dr. AnuragSaxena, Dr. Philip Griebel and Dr. SomNiyogi)

    Title: Predictive Biomarkers of Cardiovascular Disease: Applied to College of Medicine Research Award (University of Saskatchewan, Canada).

19. Approved grant (2018-2021) to Dr. Asima Bhattacharyya by ICMR.

    Title: Understanding the effect of acetylation-mediated changes in subcellular localization and functioning of Siah proteins in the context of Helicobacter pylori-mediated gastric cancer.

Recognitions and Awards by Faculty and staff

- **Dr. Manjusha Dixit** has served as a Judge for Poster award session at "International Congress of Cell Biology"- CCMB Jan 27-31, 2018, Hyderabad.
- **Dr. Asima Bhattacharyya** served as a reviewer for following journals: Infection & Immunity, Clinical Science, FASEB J, Helicobacter, Scientific Reports, Environmental Science and Pollution Research, Journals of Gastroenterology, Pancreatology & Liver Disorders, American Journal of Respiratory Cell and Molecular Biology, Cell Communication and Signalling, Bioscience Reports, Peer J.
- **Dr. Asima Bhattacharyya** served as an Editorial board member: Journals of Gastroenterology, Pancreatology& Liver Disorders.
- **Dr. Asima Bhattacharyya** has been elected as a Member: Research advisory committee (RAC) for multi-disciplinary research unit (MRU) of SCB Medical College, Cuttack.
- **Dr. Renjith Mathew** served as Invited member of Resource Generation Group in International Bio-Olympiad.
- **Dr. Subhasis Chattopadhyay** has Secured 2nd position in Inter DAE sports meet in East Zone (Konark group) in the DAE Zonal level Table Tennis selection event held in Saha Institute of Nuclear Physics (SNIP), Kolkata dated 18/11/2017 representing NISER.
- **Dr. Subhasis Chattopadhyay** has Represented "Konark" Group (DAE East Zone) in the National level Table Tennis event towards XXXIII Annual DAE Sports & Cultural Meet 2017, dated 16th to 19th January, 2018 held in Rawatbhata Rajasthan Site.
- **Dr. Palok Aich** served as a member for Technical expert committee for BIRAC Seed funding, KIIT-TBI, Feb 5, 2018.
- **Dr. Chandan Goswami** was nominated as the "DAAD Research Ambassador for 2018-2022".

- **.Dr. Chandan Goswami** served as Guest Editor for PeerJ.
- **Dr. Chandan Goswami** won EMBL Travel Award for attending Symposium: Molecular and Cell Biology of Membranes at EMBL, Heidelberg, 21-23 May 2017.
- **Dr. Chandan Goswami** was selected as "Co-convener" for International Conference on Microscopy and XXXIX annual meeting of Electron Microscope Society of India, Bhubaneswar, Mayfair lagoon 18-20th July 2018.

Awards and recognitions by Students:

1. **Mr. Biswajit Padhy** (PhD student) fetched Award for outstanding nomenclature on research poster at International Mammalian Genome Meeting 2017, EMBL, Heidelberg, Germany.
2. **Ms. Gargi G. Nanda** (PhD student) fetched Best poster award in NextGen Genomics, Biology, Bioinformatics & Technologies 2017, Bhubaneswar, India.
3. **Ms. Bushra Hayat** (PhD student) fetched Travel award by The International Mammalian Genome Society to attend the trainee symposium and workshop at the EMBL conference, Mammalian Genetics and Genomics: From Molecular Mechanisms to Translational Applications, 2017.
4. **Ms. Gargi G. Nanda** (PhD student) fetched International Travel award for attending EMBL conference from Department of Biotechnology, India, 2017.
5. **Mr. Tathagata Mukherjee** (PhD student) own the First prize in oral presentation in "Indo Oncology Summit Conference 2018 held in Mayfair Lagoon, Bhubaneswar from 2nd to 4th February, 18.
6. **Ms. Anamika Singh** (PhD student)fetched Best Oral Presentation Award in (Student category) in "International Conference on Plant Developmental Biology & 3rd National Arabidopsis Meeting", at NISER Dec 2017.
7. **Mr. Abhishek Kumar** (PhD student) fetched Best Poster Award, Orissa Botanical Society (OBS), 2017,
8. **Mr. Linkan Das** (PhD student) fetched Best Poster Award in "International Conference on Plant Developmental Biology & 3rd National Arabidopsis Meeting", at NISER Dec 2017.
9. **Mr. S. Mukundan** (MSc student) fetched Best Poster Award 2017 (MSc Student category) in "International Conference on Plant Developmental Biology & 3rd National Arabidopsis Meeting", at NISER Dec 2017.
10. **Ms. Anamika Singh** (PhD student) fetched the DAAD exchange fellowship to Germany, Sand-witch PhD Programme, hosted by Prof. George Coupland, Max Plank Institute for plant Breeding research, Koln Germany. She has received full

support from DAAD for 14 months along with German language Course. Travel award and 15 days stay support by DAAD to Dr. Kishore Panigrahi as PI.

11. **Md. Khurshidul Hassan** (PhD student) received the Travel award to attend the International Congress of Cell Biology 2018 – CCMB, Hyderabad, 27-31st Jan.

12. **Mr. Ankit Tiwari** (PhD student) fetched the "Shri. K.N. Narasimhiah Award for best original paper presentation (oral) in cancer biology". National Symposium on Current Research in Biotechnology and Annual Meet of Society for Biotechnologists India (SBTI), September 15th - 16th, 2017.

13. **Mr. Rakesh Majhi** (PhD student) has won the "E. Vijayan oral presentation award" in Neuroscience, conference organized by Society of Biotechnologists India at Ooty, 2017.

Invited talks given by faculty members and scientific officers (1st April 2017-31st March 2018)

- Invited lecture given by Dr. Renjith Mathew at InDRC, IISER Bhopal, 8 Dec 2017.

  Title: Sub-cellular events of cell shape changes: A Drosophila terminal cell perspective.

- Invited lecture given by Dr. Renjith Mathew at IISER, Berhampur, 13 Mar 2018.

  Title: Sub-cellular events of cell shape changes: A Drosophila terminal cell perspective.

- Invited lecture given by Dr. Kishore Panigrahi at the University of Zadar, Croatia 02 April 2017.

  Title: "Auxin Binding protein in Moss, Physcomitrella Patens, and its lack of ER retention is a higher plant specific event in the evolution of Auxin signaling.

- Invited lecture given by Dr. Kishore Panigrahi at ICPDB 14 December 2017, NISER,

  Title: Role of Splice variant of CONSTANS in flowering time control in Arabidopsis Thaliana.

- Invited lecture given by Dr. Kishore Panigrahi at the International symposium on Photobiology, University of Matsue, Japan, 15-18 January 2018.

  Title "Carbon nano particles accelerates flowering in a photoperiod dependent manner in Arabidopsis.

- Invited lecture given by Dr. Kishore Panigrahi at the BJB College, Bhubaneswar, India, 15 March 2018.

  Title: "Light signaling in Plants".

- Invited lecture given by Dr. Kishore Panigrahi at the Ramadevi University, Bhubaneswar, India, 25th March 2018.

  Title: "Light signaling and flowering time control in Plants".

- Invited lecture given by Dr. Harapriya Mohapatra as Lead Speaker at National workshop on "Antimicrobial Resistance &

Alternatives to Antibiotic Use inAquaculture"; ICAR-CIFA, Bhubaneswar. 12-13 March 2018.

Title: "Antimicrobial Resistance: Forging ahead through formidable situation".

- Invited lecture given byDr. Asima Bhattacharyya at University of Lübeck, Germany: 16Oct, 2017.

  Title: Selective killing of metastatic gastric epithelial cancer cells.

- Invited lecture given byDr. Asima Bhattacharyya at University of Copenhagen, Denmark: 23 Oct, 2017.

  Title: Siah proteins in gastric cancer.

- Invited lecture given byDr. V Badireenath Konkimalla at National seminar at School of Pharmacy and LifeSciences. Centurion University of Technology and Management, Bhubaneswar, India. Mar 45, 2018.

  Title: "Quality control and standardization of ethnopharmaceuticals in the present era".

- Invited lecture given by Dr. V Badireenath Konkimalla at Symposium on Rational Drug Design. Feb 17, 2018. Faculty of Pharmaceutical Sciences, Siksha 'O' Anusandhan, Bhubaneswar, India.

  Title: "Rational Drug Design: past, present, future".

- Invited lecture given by Dr. Chandan Goswami at EMBL, Heidelberg, Germany, 21May 2017.

  Title: "Preferential selection of Arginine at the lipid-water-interface of TRPV1 during vertebrate evolution correlates with its snorkeling behaviour and cholesterol interaction".

- Invited lecture given by Dr. Chandan Goswami at Visvesvaraya Technological University (VTU), Bangalore. 28th June 2017.

  Title: "TRPV ion channels: Implication in human health and others aspects".

- Invited lecture given by Dr. Chandan Goswami at Work shop on "The Art of Scientific Writings", Organized by NISER, Bhubaneswar, India, 26 Oct 2017.

  Title: "Importance of lab records"

- Invited lecture given by Dr. Chandan Goswami at XXXV Annual Meeting of Indian Academy of Neuroscience & International Conference on 'Translational Neurosciences and its Application in Protection of Mental Health', at Ravenshaw University, Cuttack, 29Oct, 2017.

  Title: "Preferential selection of Arginine at the lipid-water-interface of TRPV1 during vertebrate evolution correlates with its snorkeling behaviour and cholesterol interaction".

- Invited lecture given by Dr. Chandan Goswami at UGC Refresher Course in Research Methodology for Research in Applied Science. 5 Feb 2018 Utkal University.

  Title: History of cell imaging.

- Invited lecture given by Dr.Palok Aich at DST Inspire Programme at KSBT, KIIT University, Bhubaneswar, Odisha, India, Feb 23, 2018.

  Title: Biological Sciences: Critical Thinking and Our Education.

- Invited lecture given by Dr.Palok Aich at KSBT, KIIT, Bhubaneswar, Odisha, India, Feb 12, 2018.

  Title: On Technical Writing.

- Invited lecture given by Dr.Palok Aich at Conference on "EPIGENETICS AND HUMAN DISEASE" organized by the Japan-India Forum for Advanced Study, Feb 07-09, 2018, Bose Institute, Kolkata, India.

  Title: Affluence of microbiome may be a luxury: Abundance and diversity may be a misnomer.

- Invited lecture given by Dr.Palok Aich at Invited Talk: GATC 2018 the Genomics Analysis and Technology Conference, Jan 7th - 9th, 2018, Institute of Science & Technology, Gauhati University & GATC.

  Title: Probiotics, Microbiome and Metagenomics.

- Invited lecture given by Dr.Palok Aich at NIRRH, Mumbai, Dec 06-07, 2017

  Title: Affluence of microbiome may be a luxury.

- Invited lecture given by Dr.Palok Aich at IISER-Pune, Dec 04-05, 2017.

  Title: Affluence of microbiome may be a luxury: Comes in plenty but a few may be required.

- Invited lecture given by Dr.Palok Aich at Euro-India International Conference on Experimental and Clinical Medicine (ICECM-2017) on 10-12 November, 2017, Kottayam, Kerala, India.

  Title: Role of select antimicrobial peptides and probiotics as an alternative to antibiotics.

- Invited lecture given by Dr. Palok Aich at National Conference on Science, Technology and Society, NISER July 22-23, 2017.

  Title: US and USER as the cluster is a topper in the roster.

- Invited lecture given by Dr. Subhasis Chattopadhyay at Press Club of Odisha, Bhubaneswar 10th-11 June, 2017 organized by Dhauli Trust.

  Title: "Science, religion and literature: Connectivity".

- Invited lecture given by Dr. Subhasis Chattopadhyay towards the Ideation to designing and Cyclic Tinkering Event held on 18th July, 2017 as part of the Tinkering Marathon: Launching of ATL program in DAV Public School, Chandrasekharpur, Bhubaneswar, India.

- Invited lecture given by Dr. Manjusha Dixit on "The Art of Scientific Writings", 26th Oct. 2017, NISER.

Title: National Ethical Guidelines for Biomedical and Health Research Involving Human Participants. Workshop.

- Invited lecture given by Dr. Pankaj V Alone at Yeast Biology meeting, JNU New Delhi, (Feb 8-10th 2018).

  Title: Suppressor mutation in helix 32 of 18S rRNA alters the defective fidelity of translation start site selection associated with hyper GTPase Activating Protein (GAP) function of eIF5.

- Invited lecture given by Dr. Saurabh Chawla at Opportunities and Challenges of Translational Research in the Frontier Areas of Animal Biotechnology.

  Title: "Animal models of wound healing: A translational approach for effective therapy and management".

- nvited lecture given by Dr. Saurabh Chawla at Work shop on "The Art of Scientific Writings". NISER, 26th Oct 2017,

  Title: Institutional Animal Ethics Committee and required documents".

- Invited lecture given by Dr. Saurabh Chawla at State level seminar on global production of herbal medicines and need for clinical trials: Opportunities and challenges in India. IMT college of Pharmacy- Puri, Odisha. Sept 2017.

  Title: "Journey of Herbal Drug – Plant to Patient: Bed to Bedside" .

- Invited lecture given by Dr. Saurabh Chawla at Seminar organized by Roland Institute of Pharmaceutical Sciences, Berhampur, Odisha.

  Title: "Importance of IAEC approval for animal experimentation and Importance of 3R's".

- Invited lecture and demonstration given by Dr. Saurabh Chawla at Work shop on "Light microscopies and Live Cell imaging", SBS, NISER. July 2018.

  Title: "Artificial insemination, in vitro fertilization and embryo manipulation".

Colloquium details
1st April 2017-31st Mar 2018

19th Jan 2018
Prof. K.P. Mohanan, IISER, Pune
Title: Trans-disciplinary Inquiry and Integration.

13th October, 2017
Prof. V. Nagaraja, Department of Microbiology and Cell Biology, Indian Institute of Science and president of Jawaharlal Nehru Centre for Advanced Scientific Research.
Title: Our strategies to counter resurgent drug resistant tuberculosis.

29th August 2017
Prof. Sandhya Visweswariah, Margdarshi Fellow (Wellcome-DBT), Chair MRDG & Co-Chair, Centre for Biosystems Science and Engineering, IISc.
Title: Cyclic nucleotides and bacterial pathogens: new messages from old messengers.

Seminar (1st April 2017 - 31st Mar 2018)

12th Apr 2018
Dr. Tikam Chand Dakal
Title: QTL mapping in Z. rouxii complex strains for osmo/halotolerance.

12th Apr 2018
Dr. Sabuj Bhattacharyya
Title: Assessing climate change vulnerability of an alpine small mammal in western Himalaya: An interdisciplinary approach.

12th Apr 2018
Dr. Swayamprava Dalai
Title: Ecotoxicity and its environmental impact.

12th Apr 2018
Dr. Atindra Kumar Pandey
Title: Ecotoxicological risk assessment and ecological restoration.

10th Apr 2018
Dr. Joyita Mukherjee
Title: Towards quantification of carbon cycle, food web and ecosystem health using systems ecology and modelling as tools with perspectives of Sundarbans Biosphere Reserve.

26th Mar, 2018
Dr. Pankaj V. Alone
SBS, NISER
Title: The code for deciphering genetic code: Understanding the molecular mechanism of eukaryotic translation initiation.

15th Mar 2018
Dr. Farah Ishtiaq
Title: Hitchhiking Parasites: The role of bird movement, hypoxia, immunity and climate change on parasite transmission.

15th Mar 2018
Dr. Randeep Singh
Title: Remote eye on the tiger: trailing the life history traits of elusive cat in tropical semi-arid habitat, Western India.

15th Mar 2018
Dr. Kaizar Hossain
Title: Transforming wastewater treatment to reduce carbon emissions and possible remedies for water scarcity.

13th Mar 2018
Dr. Shanmugam Mani
Title: Control of soil organic matter quality in southern Indian tropical forests: does precipitation limitation matter?

13th Mar 2018
Dr. Sourav Paul
Title: Ecology of coastal-aquatic systems of four continents: eco-physiological and quantitative approaches.

13th Mar 2018
Dr. K. Srikanth
Title: Cytotoxicity studies in different model cell lines exposed to nanoparticles and interference of co-exposure to other contaminants.

12th Mar 2018
Dr. Sreekanth P.M
Title: Biodiversity and Conservation of trees using molecular markers.

12th Mar 2018
Dr. Aniruddha Datta Roy
Title: Unraveling the biogeographic history of the Indian subcontinent.

12th Mar 2018
Dr. Rohit Kumar Mishra
Title: Investigating the biochemical and molecular response in rice: with reference to the phosphate transport pathway to arsenic accumulation.

1st Mar 2018
Dr. Javid Ahmad Dar
Title: Diversity, carbon sequestration potential and CO2 efflux of Indian tropical forests in response to climate change.

27th Feb 2018
Dr. Jitin Rahul
Title: An Investigation in to the effect of particulate matter (Dust) deposition on vegetation and analysis of floristic diversity along the highway.

27th Feb.2018
Dr. Sasmita Chand
Title: Contemporary Challenges in Industrial Waste Management.

16th Feb, 2018
Prof. Avinash Sonawane, School of Biotechnology, KIIT University
Title: How Mycobacterium tuberculosis evades host immune responses to facilitate its survival in lung macrophages and bone marrow stem cells?

12th Feb 2018
Dr. Pabitra Sahoo, University of South Carolina, USA.
Title: Axonal Stress granules: A novel target to accelerate axon regeneration post nerve injury.

11th Jan, 2018
Prof. Edwin Michael, University of Notre Dame
Title: Spatial Ecology, Mechanistic Models, and Predicting Macroparasite Elimination.

9th Jan 2018,
Dr. Abhishek Kumar, DKZF, Heidelberg
Title: Evolutionary Genomic Applications in Translational Biology and Medicine.

15th Dec, 2017
Dr. PrateekTripathi, The Scripps Research Institute, La Jolla, USA
Title: Understanding the mechanistic links between the circadian clock and plant metabolism for crop improvement.

14th Dec 2017
Dr. Vijay Tiwari, Institute of Molecular Biology (IMB), Mainz, Germany
Title: Epigenetic regulation of brain development and function.

22nd Nov 2017
Dr. Anjana Badrinarayanan, NCBS, Bengaluru
Title: Regulation of DNA double-strand break repair in bacteria.

16th Nov 2017
Prof. Kaushik Sengupta, Biophysics & Structural Genomics Division, SINP
Title: Lamin A: Principal modulator of nuclear structure, mechanics and homeostasis.

3rd Nov 2017
Eduardo Rojas Hortelano, Neurobiology Institute, Universidad NacionalAutonoma de Mexico.

Title: Touching things we cannot see: Parietal processing of tactile information.

2nd Nov 2017
Luis Daniel Rios-Barrera, EMBL Heidelberg, Germany.
Title: The contribution of vesicular trafficking to tracheal branch morphogenesis.

2nd Nov, 2017
Prof. Bhavni Shankar Rao, NIMHANS, Bangalore.
Title: The ever changing brain and treating neurological and psychiatric disorders.

24th Oct 2017
Dr. Aruna Kilaru, Department of Biological Sciences, East Tennessee State University
Title: Mammalian Endocannabinoids in Early Land Plants and Their Implications.

17th Oct, 2017
Dr. Paola Sofia Rodriguez Kuri, EMBL Heidelberg, Germany.
Title: In vivo dynamics of inflammasome activation in Zebrafish.

4th Oct, 2017
Dr. Bhabani Shankar Sahoo, University of Minnesota, Twin cities. University of Cambridge.
Title: Dense core secretary vesicle biogenesis and their role in physiological functions.

19th July, 2017
Dr. Eswarayya Rami Reddy, IISER Tirupati
Title: Root engineering for improvement of agricultural and ecological traits.

13th July, 2017
Dr. Ravi Manjithaya, JNCASR, Bangalore
Title: Regulation of Autophagy flux: Implications in neurodegenerative and infectious diseases.

12th May, 2017
Dr. Shubhasis Haldar, Department of Biological Sciences, Columbia University, New York, NY 10027.
Title: Chaperone Acts as a Mechanical Foldase: Investigation at Single Molecular Resolution.

11th May, 2017
Dr. Swarup Roy, Donald Danforth Plant Science Center.
Title: Heterotrimeric G-protein signaling in Plants.

9th May, 2017
Dr. Sudip Mondal
Title: High-throughput screening platform reveals potent Sig2R/PGRMC1 binding ligands against APP-induced neurodegeneration in C. elegans.

4th May, 2017
Dr. Amjad Husain, Department of Life Sciences. Glocal Technology Park, Glocal.
Title: Angiogenesis and Tumor Genomics; From Model to Personalized Therapy.

2nd May, 2017
Dr. Mohammed Saleem, Department of Life Sciences, National Institute of Technology, Rourkela, Odisha, India.
Title: Dissecting principles governing biological membrane remodeling.

20th Apr, 2017
Dr. DauDayal, M.D University, Rohtak
Title: Resolving the paradox of recombination evolution through experimental evolution model.

19th Apr, 2017
Dr. Rajiv Srivastava, BHU, India
Title: Targeting T cells to improve anti parasitic immunity.

18th April, 2017
Dr. Ajit Satapathy, TojoVikas Biotech Private Limited, Bangalore Bioinnovation Centre.
Title: Engineering and Application of Biomolecules.

13th April, 2017
Dr. Mithun Biswas, University of Freiberg, Germany.
Title: Molecular Simulations: A Window to the Biological World.

12th Apr, 2017
Dr. Sandeep Sharma, CSIR-Central Salt & Marine Chemical Research Institute,
Title: Plant phenotypic plasticity against environmental stresses.

6th Apr, 2017
Dr. Amit Sharma, Deakin University, Australia
Title: Photosynthetic Reaction Centre Structure and Dynamic Studies Using Serial Femtosecond Crystallography and Time Resolved Wide Angle X-ray Scattering.

5th Apr, 2017
Dr. Sanjay Kumar, Ohio State University Columbus, Ohio, USA
Title: TGF- Effectors as Novel Molecular Determinants of Mitochondrial Fusion.

4th Apr, 2017
Dr. Anupama Sahoo, Orlando, USA
Title: Molecular and functional regulation of Type II immune responses during allergic inflammation.

1st Apr, 2017
Dr. MuthamizhSelvan, Pondicherry University
Title: Ecology of sympatric large carnivores and human carnivore conflicts in Western Arunachal Pradesh.

31st Mar 2017 & 1st April 2018
Dr. Sabari S Thirupathy, University of Wisconsin-Madison.
Title: The crosstalk between replication and transcription.

Industry – Academia Talks

20th August 2018
Nilangi Andurlekar
Merck, Milipore
Title: Multiplexing

28th June 2018
Time- 11:30 AM
Melissa
Field Applications Leader for the Bioanalytics Division of Sartorius.
Title: Furthering Insight and Productivity in Cell Biology with Real-Time Quantitative Live-Cell Analysis.

19th Jan 2018
Amitava Mohanty
Beckman Coulter
Title: Advancement in the flow cytometry technology.

12th Oct, 2017
Dr. Puneet Kumar
Spinco Biotech
Title: "The Image Xpress Micro Platform- A complete solution for Automated Imaging and High Content Screening".

13th Sep, 2017
Dr. Park Jun,
Senior Application Scientist, Millipore Sigma
Title: Cell ASIC ONIX Microfluidic System; New Advancements in live cell imaging.

7th Sept, 2017
Dr. Anuj Gupta,
Senior Scientist- Next Generation Sequencing & Clinical Genomics, Agilent Technologies India Pvt Ltd.
Title: CRISPR-CAS9 & Genomics solutions: Harnessing the Power of CRISPR - A Tool for Cut & Paste from Agilent Technologies.

18th Aug 2017
Dr. Patrick Shaw Stewart
Douglas Instruments Ltd, Hungerford, UK
Title: Understanding random crystal screening with microseeding – how new strategies can improve productivity.

4-5th April 2017
Mr. Sunil Kumar Mohanty
Beckman Coulter
Title: Centrifuges and rotors: Maintenance and care.

Talks from Science Administration

27thDec, 2017
Dr. S. Sharma
Wellcome Trust/DBT India Alliance
Title: Funding Opportunities for Biomedical Researchers in India.

3rd Aug, 2017
Dr. Satya Prakash Dash
Head Strategy Partnerships & Entrepreneurship Development at BIRAC
Title: When a Banker met a Molecular Biologist: Sensing Signals, Serendipity and Multiple Futures for Fashioning an Innovation Driven Ecosystem.

Conferences, Workshops and Symposiums

3rd Orientation Workshop on Lab. Animal Sciences.
2-5th May 2017

The applications of next generation sequencing in health and disease.
8-9th September 2017

Dr. Arnab Mukhopadhyay
Title: Post-transcriptional RNA regulatory events determine dietary restriction-induced longevity.

Dr. Balamurugan Ramadas
Title: Healthy Gut Microbiome; Prospects for Intervention!

Dr. Rajshekar Chatterjee (Illumina)
Title: Unlocking the power of the Genome: Illunima NGS technology and its applications.
Dr. Dasaradhi Palakodeti
Title: Dissecting 3'UTR landscape of planaria Schmidtea mediterranea.

Dr. Divya Chandran
Title: Genomics-enabled discovery of the haustorial effector repertoire of an obligate biotrophic pathogen.

Dr. Jay Manikandan, Nanostring, Singapore
Title: Next Generation Translational 3D-Biology.

Dr. Vikrant Bhor
Title: Virome, Phageome and Gut Microbiome in Human Health and Disease.

Dr. Suman Paine
Title: Impact of maternal microbiome for neonatal gut flora establishment.

Dr. Abhilash Mohan
Title: A systems approach to biological data analysis.

Dr. Biswaranjan Pradhan
Title: Select antimicrobial peptides and probiotics as alternative to antibiotics: A genomics and metagenomics approach.

Dr. Sunil K Rahav
Title: Interative genomics identifies NCoR1 as a master repressor of tolerogenic program in dendritic cells.

Dr. Sagar Ashok Khulape
Title: Quasispecies reconstruction of type Asia Foot and Mouth Disease virus by Vp1 gene hypervariable C' terminal amplicons based approach.

The art of Scientific Writings
26th Oct 2017

Scientific writing is harder than doing experiments. Success in science is also partly related with improved writing skill and knowing of certain technical details. Therefore this event was mainly made for MSc and PhD students. Experienced scientists, reviewers and senior journal editors shared their views on scientific writings to the students. This event also had a very extensive panel discussion at the end. The speakers and their talk details are given below:

Prof. B. Ravindran (ILS/NISER Bhubaneswar)
Title: About writing a manuscript.

Dr. Ajay Pillai (NCCS, Pune)
Title: Laboratory ethics.

Dr. Chandan Goswami (NISER Bhubaneswar)
Title: Importance of lab records.

Dr. Harapriya Mohapatra (NISER Bhubaneswar)
Title: About Institutional Biosafety Committee and required documents.

Dr. Manjusha Dixit (NISER Bhubaneswar)
Title: About Institutional Human Ethics Committee and required documents.

Dr. Sourabh Chawla (NISER Bhubaneswar)
Title: About Institute Animal Ethics Committee and required documents.

Prof. Amitabha Chattopadhyay
(CCMB, Hyderabad)
Title: Scientific Writing: Myths, Necessity and the Process.

Dr. Ajay Pillai (NCCS, Pune)
Title: About writing grants.

One day symposium on
Processes and policies in Science
27th Oct 2017

Bio-medical research is also entangled by

policies implemented at different levels by the government and institutions. "Science", both as a process and profession is full of challenges. This one day seminar was aimed at deliberating different aspects which have become essential component of the biological research not only in India but all around the globe. Therefore this event was mainly made for MSc and PhD students as well as for PIs. Experienced scientists, reviewers and senior journal editors shared their views on scientific writings to the students. This event also had a very extensive panel discussion at the end. The speakers and their talk details are given below:

Prof. S. Panda
(The Director, NISER, Bhubaneswar)
Title: What DAE wants and what we need to do.

Prof. AmitabhaChattopadhyay
(CCMB, Hyderabad)
Title: Biological Science Research in India: opportunities and challenges.

Prof. M. C Dash (NISER, Bhubaneswar)
Title: Fostering scientific temper.

Prof. Soma Chattopadhaya (ILS, Bhubaneswar)
Title: Leading an experimental biology lab in India.

Prof. Amitabha Chattopadhyay (CCMB, Hyderabad)
Title: How to Write a Scientific Manuscript: Excitements, Challenges and Reality.

Prof. Tapas Kundu (JNCASR, Bangalore)
Title: PhD in India and Abroad.

Prof B.S. Shankaranarayana Rao
(NIMHANS, Bangalore)
Title: Ethics in Science.

One day symposium on
"Recent Advancement in Neuroscience"
28th Oct 2017

This one day event was organized by School of Biological Sciences. 6 eminent speakers have given elegant talks on different areas of neurobiology. This event was attended by nearly 300 participants. The speakers and respective talk titles are given below:

Prof. AmitabhaChattopadhyay
(CCMB, Hyderabad)
Title: Interaction of a Neurotransmitter Receptor with Membrane Cholesterol: Insights and Challenges.

Prof. Bikash R. Pattnaik
(University of Wisconsin-Madison, USA)
Title: Clinical trial in a dish using patient derived iPSC.

Dr. Vimlesh Kumar (IISER Bhopal)
Title: Understanding Regulation of Synaptic Signaling and Morphogenesis by Bin-Amphiphysin-Rvs (BAR) Family Proteins.

Prof. Tapas Kundu (JNCASR, Bangalore)
Title: Small molecule Activator of Master Epigenetic Enzyme, p300/CPB: Implications in Neural Disorders and Therapeutics.

Dr. AnindyaGhposh Roy (NBRC, Manesar, Gurgaon)
Title: Study of neuronal regeneration using the nematode C. elegans.

Dr. Sourav Banerjee (NBRC, Manesar, Gurgaon)
Title: Harmony or Conflict? Mechanism of synaptic plasticity by modulation of miRNAs via opposing control point.

International Conference on Plant Developmental Biology & 3rd National Arabidopsis Meeting
12-16th Dec 2017

Prof. George Coupland (MPIPZ, Koln)
How plants produce flowers in response to changing seasons.

Prof. Jorge Jose Casal (Institute for Agricultural Plant Physiology and Ecology (IFEVA), Argentina)
Dynamic connectivity between neighbour cues perceived by photo-sensory receptors and hormone signalling networks.

Dr. Stefan Kircher (Albert Ludwigs University, Freiburg, Germany)
Development of the root system in Arabidopsis seedlings: Impact of light and auxin.

Prof. Ute Hoecker (University of Cologne, Germany)
Control of plant growth and development by the light environment.

Prof. J. P. Khurana (University of Delhi, South Campus, New Delhi, India)
Rice bZIP48, an ortholog of AtHY5, exerts pleiotropic effects in light regulated plant development.

Prof. Sudip Chattopadhaya (NIT, Durgapur, India)
Functional interconnection of CAM7, HY5 and MYC2 in Arabidopsis seedling development

Prof. B. C Tripathy (Jawaharlal Nehru University, New Delhi, India)
Involvement of Phytochrome A in suppression of photomorphogenesis in rice seedlings grown in red light.

Dr. A.P. Sane (National Botanical Research Institute, Lucknow)
A tomato AP2/ERF domain gene, SlDREB3, regulates ABA associated growth processes and fruit ripening through a control over ABA

levels and signaling.
Prof. Sona Pandey
Heterotrimeric G-Protein signaling in Plants.

Dr. G. Venugopala Reddy (Department of Botany and Plant Sciences, UC Riverside, CA, USA)
Integration of spatial signals with intra and intercellular processes in the regulation and interpretation of transcription factor levels: Data driven multi-scale mathematical models.

Dr. Anand K. Sarkar (NIPGR, New Delhi, India)
Regulation of plant root developmental pattern by conserved small RNA pathway.

Dr. Ram Yadav (IISER Mohali, Punjab, India)
Gene regulatory network of epidermal and sub-epidermal cell population enriched transcription factors revealed regulatory hierarchies underlying the cell proliferation and differentiation in shoot apex.

Prof. Jason W. Reed (UNSC, Chappel Hill, USA)
SAUR proteins promote cell-expansion and guard-cell swelling.

Dr. Chloe Zubieta (CEA, Grenoble, France)
Tetramerisation of the MADS Transcription Factor, SEPALLATA 3, is required for floral meristem determinacy in Arabidopsis.

Prof. Imran Siddiqi (Center for Cellular and Molecular Biology, Hyderabad, India)
Control of male gametogenesis in Arabidopsis by SHUKR, a meiotically expressed lineage specific gene.

Dr. Anjan Banarjee (IISER- Pune, India)
Mobile RNAs play an activator-repressor role to control tuber development in potato- 3rd most important food crop on the planet.
Dr. P. V. Shivaprasad (NCBS, Bangalore, India)
Insights into micro-RNA biogenensis and their functions in plants.

Prof. Ben Scheres
Plant Meristems and Developmental Plasticity.

Prof. George Coupland (Max Planck Institute for Plant Breeding Research, Carl von Cologne, Germany)
Genomic and molecular-genetic analysis of divergence of annual and perennial life history in the Brassicaceae.

Dr. PrateekTripathi (The Scripps Research Institute, LA, USA)
Species migration in plants is associated to quantitative genetic changes in the circadian clock.

Dr. Francois Parcy (Biosciences and Biotechnology Institute, CEA. Grenoble, France)
A structural journey among floral regulators.

Dr. Federico Valvarde (CSIC- University of Seville, Spain)
A Systems Biology approach to gene function discovery in flowering time.

Dr. Kishore Panigrahi (NISER, Bhubaneswar)
Role of Splice variant of CONSTANS in flowering timecontrol.

Dr. Sourav Datta (IISER- Bhopal, India)
Opposite roles of BBX24 and BBX21 in light mediated development.

Dr. Utpal Nath (IISc- Bangalore, India)
The transition from proliferation to differentiation in the Arabidopsis leaf primordial cells is induced by the miR319-

targeted TCP proteins.
Prof. Ajay Parida (Institute of Life Sciences, Bhubaneswar, India)
Use of halophytes in generation of stress tolerant plants.

Prof. Ben Scheres (Wageningen University Research, Netherland)
Auxin mediated control of cell division

Prof. Klaus Palme (Albert Ludwigs University, Freiburg, Germany)
N-1-Naphthylphthalamic acid inhibits polar auxin transport by stabilizing the PIN protein complex.

Prof. Thomas Schmülling (Freie University, Berlin, Germany)
Cytokinin at the crossroad of growth regulation and stress defense.

Dr. Eswarayya Ramired dy (IISER- Tirupati, India)
Root cap derived cytokinin regulates primary root meristem size and lateral root branching in Arabidopsis.

Prof. Prakash P. Kumar (National University of Singapore, Singapore)
How does the gibberellin signaling DELLA protein regulate primary seed dormancy?

Prof. Sona Pandey (Donald Danforth Plant Science Center, St. Louis, MO, USA)
Novel heterotrimeric G-protein signaling mechanisms and their roles in regulating plant growth and development.

Prof. Jane Parker (Max-Planck Institute, Germany)
Plant intracellular immunitynetworks.
Prof. Neelima Sinha (U. C. Davis, USA)
The interaction between Cuscutaand its host, tomato.

Prof. Asish Nandi (Jawaharlal Nehru University, New Delhi, India)
Mechanism of Infection memory development in Arabidopsis.

Dr. Manoj Prasad (National Institute of Plant Genome Research, New Delhi, India)
Role of epigenetics and Proteasomal pathway gene(s) in combating virus infection in plants.

Dr. Fernando Andres (AGAP, INRA, CIRAD, Montpellier SupAgro, Univ Montpellier, Montpellier, France)
Genetic and molecular characterization of bud dormancy in apple.

Prof. Y.Y. Yamamoto (Gifu University, Japan)
Promoter switching in Arabidopsis and rice.

Prof. P. K. Trivedi (CSIR-National Botanical Research Institute, Lucknow, India)
Regulatory components of the flavonoid biosynthesis: exploitation for the improved crop productivity and human health.

Prof. R. P. Sharma (Central University Hyderabad, India)
The root as drill: Uncovering the metabolic responses undelaying soil penetration and overcoming soil hardness.

Prof. Sanjib K. Panda (Assam University, Silchar, India)
Transcriptomics reveal a transcriptional

regulation in rice for Abiotic stress tolerance.
Dr. Ravi Maruthachalam
(IISER- Thiruvananthapuram, India)
Do minichromosomes induce heritable mutations in normal chromosomes? A case study from Arabidopsis Thaliana.

Dr. Petra Bauer (HHU, Düsseldorf, Germany)
The Multiple layers of iron deficiency response regulation.

Dr. Andrija Finka (University of Zadar, Croatia)
Molecular mechanisms of acquired thermotolerance in plants.

Dr. Ashverya Laxmi (NIPGR, New Delhi)
Glucose regulated Arabidopsis HLP1 acts as a key molecule in governing thermotolerance.

Dr. Suresh kumar Balasubramanian (Monash University, Australia)
Epigenetics of ambient temperature response in plants.

IUMS-INSA Workshop on Host-Pathogen Interactions

23rd Feb 2018

The International Union of Microbiologists chapter of Indian National Science Academy, New Delhi and NISER jointly conducted this one-day Symposium on: "Host-Pathogen Interactions" at NISER. This one day symposium was aimed to promote interdisciplinary research. The one-day Symposium is aimed at imparting conceptual aspects of such complex interactions in different models – humans, mice, fish and insects. This event was attended by 150 participants. The speakers and respective talk titles are given below:

Dr. Deepa Agashe (NCBS, Bangalore),
Title: Experimental evolution of insect immune memory and pathogen resistance.

Prof. Dipankar Nandi (IISc, Bangalore),
Title: The roles of mouse Nitric oxide synthase 2 in a model of live bacteria-induced sepsis.

Prof. Satyajit Rath (IISER, Pune),
Title: Host-Parasite Interactions: Immunity Vs. Tolerance.

Dr. Varadharajan Sundaramurthy (NCBS, Bangalore)
Title: Host cellular determinants of intracellular Mtb survival.

Prof. Avinash Sonawane (KIIT, Bhubaneswar),
Title: Host- Mycobacteria interactions in Zebra Fish.

Prof. Bala Ravindran (ILS, Bhubaneswar)
Title: Host-Parasite Interactions: Infection Vs.

School of Chemical Sciences

Disease.

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, Associate Professor

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 O2 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, Associate Professor

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, Associate Professor

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 -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, Associate Professor

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, Associate Professor

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, Associate Professor

Graphene is new allotrope of carbon, a 'thinnest material in the world'. It is two-dimensional sheet of sp2 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, Associate Professor

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 CO2 fixation, chiral counterions, hybrid inorganic-organic materials.

Dr. P. C. Ravikumar, Reader -F

He did his Ph.D from IISc Bangalore under the guidance of Prof. A. Srikrishna in the field of total synthesis of natural products. Subsequently after completing his Ph.D he moved to Duquesne University, Pittsburgh USA in the group of Prof. Fraser Fleming as a postdoctoral associate in 2007. He then moved to Yale University in the group of Prof. Seth Herzon in 2009. For a short period he worked as adjunct faculty in Duquesne University. In 2010 he returned back to India and joined as assistant professor at I.I.T. Mandi. In December 2015 he moved to NISER Bhubaneswar as Reader F, currently he is setting up his research lab in the school of chemical sciences and planning to work on the area of developing new CH activation methodologies and its application to synthesis of natural product targets.

Facilities created for Research and Teaching for the year

- Microfocus single crystal X-ray Diffractometer

Symposia:

- IINCM-2017 (Inter IISER & NISER Chemistry Meet) 22.12.2017 to 24.12.2017

Awards and Honours:

Awards/ Recognition achieved by my Ph.D Students:

- **"Dr. P. K. Bhattacharyya Memorial Award"** for the best poster in Photochemistry to Mr. Debashis Majhi in ***"National Symposium on Radiation and Photochemistry (NSRP-2017)"*** at Manipal University, Manipal, India.
- **Best Poster Award** in Photochemistry to Ms. Manjari Chakraborty in ***"Trombay Symposium on Radiation and Photochemistry (TSRP-2018)"*** at Bhaba Atomic Research Centre, Mumbai, India.

Patent:

- **Prof. T.K.Chandrashekar**
  Novel porphyrin derivatives for photodynamic therapy (PDT): a process for the preparation thereof and their use as PDT agents and fluorescence probes for biological applications. 16th March 2018, IN 294263 A1

Publications

1. Rhodium (III) and Iridium (III) bipyricorrole complexes: Syntheses, Structures and Properties. B. Adinarayana, M. Murugavel, Mainak Das, N. R. Palepu and A. Srinivasan. Inorg. Chem. 2018, 57, 1840-1845.
2. Meso-Aryl [20]π Homoporphyrin: The simplest Expanded porphyrins with smallest Möbius Topology. K. S. Anju, Mainak Das, B. Adinarayana, C. H. Suresh and A. Srinivasan. Angew. Chem. Int. Ed. 2017, 56, 15667-15671.
3. In Vitro and In Vivo Demonstration of Human-Ovarian-Cancer Necrosis through a Water-Soluble Near-Infrared-Absorbing Chlorin: T. K. Chandrashekar J. Med. Chem.2018, 61(11), 5009-5019.
4. [24] π Core-modified Non-fused Pentaphyrin with Möbius Aromaticity. Arindam Ghosh, S. Dash, A. Srinivasan, M. S. R. Sahu, C. H. Suresh and T. K. Chandrashekar, Chem. Eur. J. 10.1002/chem.201803552.
5. Insights into the structure and dynamics at the hexadecane droplet-water interface in the presence of 1-alkanols as emulsifiers: Molecular dynamics studies.Sourav Palchowdhury and B. L. Bhargava.Journal of Molecular Liquids234, 249-259 (2017).
6. Solvation of methyl lactate in water: Molecular dynamics studies.Sourav Palchowdhury and B. L. Bhargava. Journal of Physical Chemistry B122, 2113-2120 (2018).
7. NMR Spectroscopic Evidences for Unusually Strong amide-N-HS Hydrogen Bonds in Biomolecules, V. Rao Mundlapati, Sanjeev Gautam, Dipak Kumar Sahoo, Arindam Ghosh and Himansu S. Biswal*, JPC Letters, 8 (2017) 4573

8. Spin-lattice and spin-spin relaxation studies on deep eutectic solvent (DES)/Choliniumtetrachloroferrate mixtures: Suitability of DES based systems towards magnetic resonance imaging studies, Abhilash Chandra, Prabhat Kumar Sahu, Subhayan Chakraborty, Arindam Ghosh, and Moloy Sarkar*, **Magnetic Resonance in Chemistry, 56 (2018) 120.**

9. A. S. Singh, R. K. Tiwari, M. M. Lee, J. N. Behera, S.-S. Sun and V. Chandrashekhar, Structural Tuning of Anion Templated Motifs with External Stimuli Through Crystal-to-Crystal Transformation, Chem. Eur. J. **2017**, 23, 762.

10. S. R. Marri, S. Mahana, D. Topwal and J. N. Behera, Synthesis and characterization of layered metal sulfates containing MII3(μ3-OH/F)2(M = Mg, Co) diamond Chains, Dalton Trans., **2017**, 46, 1105.

11. S. R. Marri, S. Rath, C. S. Rout and J. N. Behera, 3D cuboidal vanadium diselenide embedded reduced graphene oxide hybrid structures with enhanced supercapacitor properties, Chem. Commun., **2017**, 53, 228.

12. S. Bhowmick, A. Jana, S. R. Marri, P. Gupta, J. N. Behera, B. B. Mandal, and N. Das, Pyrazine based Pt(II) bis-alkynyl organometallic complexes: synthesis, characterization, and cytotoxic effect on A549 human lung carcinoma cells, ApplOrganometal Chem.,**2017, DOI**: 10.1002/aoc.3824.

13. R. K. Tiwari, and J. N. Behera, Organic-Inorganic hybrid three-dimensional metal sulfite-oxalate with honeycomb-like structures, Dalton Trans., **2017**, 46, 5911.

14. P. Koya, K. Yerraguntla, S. Jettiboina, P. R. Rao and J. N. Behera, A dense I1O3 hybrid superhydrophobic network, exhibits selectivity towards CO2 gas sorption, Inorg. Chem., **2017**, 56, 11184.

15. S. Rath, J. N. Behera, P. Bankar, M. A. More, D. Late, A. Gangan, B. Chakraborty and C. S. Rout, VSe2 reduced graphene oxide as efficient cathode materials for field emission, J. Phys. Chem. solids., **2017**, DOI: 10.1016/j.jpcs.2018.02.020.

16. R. K. Tiwari, J. Kumar and J. N. Behera, Organically-templated inorganic-organic hybrid metal (Zn and Cd) sulfite-oxalates with layered and three-dimensional structures, Dalton Trans., **2017**, 46, 15939.

17. S. R. Marri,, R. K. Tiwari, N. Chauhan, J. Kumar and J. N. Behera, Two novel 3D-MOFs(Ca-TATB and Co-HKUST): Synthesis, Structure and Characterization, Inorg. Chim.Acta, **2018**, 478, 8.

18. R. Gupta, S. Prabhakar, I. Khan, J. N. Behera and F. Hussain, Early lanthanoid substituted organic-inorganic hybrids of silico-and germano-tungstates: Synthesis, crystal structure and solid state properties, Indian J. Chem., **2018,** 57A, 52.

19. A. S. Singh, A. Ali, R. K. Tiwari, M. M. Lee, J. N. Behera, S.-S. Sun and V. Chandrashekhar, Thermally Induced 1D to 2D Polymer Conversion Accompanied by Major

Packing Changes In a Single-Crystal-to-Single-Crystal Transformation, CrystEngComm, 2018, 20, 2346.

20. J. K. Das, A. Samantara, A. K. Nayak, D. Pradhan and J. N. Behera, VS2: An Efficient Catalyst for Electrochemical Hydrogen Evolution Reaction in Acid Medium, Dalton Trans., 2018, DOI: 10.1039/C8DT02547A.

21. Maiti, S.; Mal, P., Soft–Hard Acid/Base-Controlled, Oxidative, N-Selective Arylation of Sulfonanilides via a Nitrenium Ion. J. Org. Chem. 2018,83, 1340-1347.

22. Maiti, S.; Bose, A.; Mal, P., Oxidative N-Arylation for Carbazole Synthesis by C–C Bond Activation. J. Org. Chem. 2018,83, 8127-8138.

23. Maiti, S.; Alam, M. T.; Mal, P., Soft–Hard Acid–Base Controlled C"H Trifluoroethoxylation and Trideuteriomethoxylation of Anilides. Asian J. Org. Chem. 2018,7, 715-719.

24. Choudhuri, K.; Pramanik, M.; Mandal, A.; Mal, P., S"HÅ"Å"Å"π Driven Anti-Markovnikov Thiol-Yne Click Reaction. Asian J. Org. Chem. 2018,7, 10.1002/ajoc.201800381.

25. Choudhuri, K.; Mandal, A.; Mal, P., Aerial dioxygen activation vs. thiol-ene click reaction within a system. Chem. Commun. 2018,54, 3759-3762.

26. Bal, A.; Maiti, S.; Mal, P., Iodine(III)-Enabled Distal C–H Functionalization of Biarylsulfonanilides. J. Org. Chem. 2018,ASAP Article, 10.1021/acs.joc.1028b01857.

27. Alam, M. T.; Maiti, S.; Mal, P., An Intramolecular C(sp2)–H Amidation Using N-Iodosuccinimide. Eur. J. Org. Chem. 2018, 4178-4186.

28. Maiti, S.; Mal, P., Dehydrogenative Aromatic Ring Fusion for Carbazole Synthesis via C–C/C–N Bond Formation and Alkyl Migration. Org. Lett. 2017,19, 2454-2457.

29. Maiti, S.; Achar, T. K.; Mal, P., An Organic Intermolecular Dehydrogenative Annulation Reaction. Org. Lett. 2017,19, 2006-2009.

30. Choudhuri, K.; Achar, T. K.; Mal, P., Iodine-Triggered Aerobic Oxysulfonylation of Styrenes. Adv. Synth. Catal. 2017,359, 3566-3576.

31. Bose, A.; Mal, P., Using weak interactions to control C-H mono-nitration of indolines. Chem. Commun. 2017,53, 11368-11371.

32. V. Mukundam, K. Dhanunjayarao, S. Samal, Krishnan Venkatasubbaiah*, Variation of para Substituent on 2-Phenol of Tetraaryl-Substituted Imidazole-Boron Difluoride Complexes: Synthesis,Characterization, and Photophysical Properties, Asian J. Org. Chem. 2017, 6, 1054–1062.

33. M. Ramesh, V. Mukundam, K. Dhanunjayarao, Krishnan Venkatasubbaiah* Cyclometalated Palladium Pre-catalyst for N-alkylation of Amines using Alcohols and Regioselective Alkylation of Sulfanilamide using Aryl Alcohols, Tetrahedron 2017, 73, 2225–2233

34. M. Ramesh, S. Samser, N. Sharma, U. Lourderaj, Krishnan Venkatasubbaiah* Isolation and Characterization of Regioisomers of Pyrazole-Based Palladacycle and Their Use in Alkylation of Ketones Using Alcohols, Organometallics 2017,36, 3343−3351.

35. V. Sathesh, R. V. R. N. Chinta, M. Ramesh, V. Mukundam, K. Dhanunjayarao, Krishnan Venkatasubbaiah*, Mercuration of ferrocenyl-p-tolyl sulfoxide and its conversion to 1,2-disubstituted ferrocenes, J. Organomet. Chem.2017, 853, 74-80.

36. V. Chandrasekhar, R. Suriya Narayanan, M. Ramesh, Krishnan Venkatasubbaiah, Organophosphorus Chem. 2018, 47, 363-423.

37. K. Dhanunjayarao, V. Mukundam, R. V. R. N. Chinta, Krishnan Venkatasubbaiah*, Synthesis of highly fluorescent imidazole based diboron complex, J. Organomet. Chem.2018, 865, 234-238. (Invited article)

38. S. Samal, B. P. R. Aradhyula, KrishnanVenkatasubbaiah*, Effect of methyl at the 1-phenyl of tetraaryl substituted imidazole boron difluoride complexes: Synthesis, characteriazation, photophysical and electrochemical studies, J. Chem. Sci. 2018, 130:95, 1–8. (Invited article)

39. Kiran Bharadwaj, Somnath Koley, Subhra Jana, Subhadip Ghosh* Model Free Estimation of Energy Transfer Timescale in a Closely Emitting Cdse/ZnS Quantum Dot and Rhodamine 6g FRET Couple ChemAsianJ 2018 (Accepted, DOI: asia.201801272)

40. Manas Ranjan Panda, Somnath Koley, Krishna Mishra, and Subhadip Ghosh* Probing of Reorganization Dynamics within the Different Phases of Thermotropic Liquid Crystals Chemistry Select 2018, 3, 1551-1560.

41. Siddharth Singh, Somnath Koley, Krishna Mishra and Subhadip Ghosh* An Approach to a Model Free Analysis of Excited State Proton Transfer Kinetics in a Reverse Micelle J. Phys. Chem. C 2018, 122, 732-740..

42. Somnath Koley, Manas Panda, Kiran Bharadwaj, and Subhadip Ghosh* Spectroscopic and Calorimetric Studies of Molecular Recognitions in a Dendrimer-Surfactant Complex. Langmuir 2018, 34, 817-825. (Invited article in Early Career Authors in Fundamental Colloid and Interface Science special issue)

43. Somnath Koley and Subhadip Ghosh* Encapsulation and Residency of a Hydrophobic Dye within the Water Filled Interior of a PAMAM Dendrimer Molecule. J. Phys. Chem. B 2017, 121, 1930−1940

44. Spin-lattice and spin-spin relaxation studies on deep eutectic solvent/Choliniumtetracholoferrate mixtures: Suitability of DES-based

systems towards magnetic resonance imaging studies. A. Chandra, P. K. Sahu, S. Chakraborty, A. Ghosh and Moloy Sarkar, MagnResonChem, 2018, 56, pp 120-126.

45. Free-radical Sensing by Naphthalimide-based Mesoporous Silica (MCM-41) Nanoparticles: A Combined Fluorescence and Cellular Imaging Study. G. Jha, S. Roy, P. K. Sahu, S. Banerjee, N. Anoop, A. Rahaman and Moloy Sarkar, Chem. Phys. Lett., 2018, 692, 334-332.

46. Difference in the Behavior of Dicationic and Monocationic Ionic Liquids as Revealed by Time Resolved-Fluorescence, NMR and Fluorescence Correlation Spectroscopy (FCS) Study. D. Majhi, S. Seth and Moloy Sarkar, Phys. Chem. Chem. Phys, 2018, 20, pp 7844-7856.

47. Evidence of Homo-FRET in Quantum Dot-Dye Hetrostructured Assembly. S. Saha, D. Majhi, K. Bhattacharyya, N. Preeyanka, A. Datta and Moloy Sarkar, Phys. Chem. Chem. Phys., 2018, 20, pp 9523-9535.

48. Striking Similarities in the Fluorescence Behavior Between Carbon Dots and Ionic Liquids: Towards Understanding the Fluorescence Behavior of Carbon Dots. S. Roy, N. Preeyanka, D. Majhi, S. Seth and Moloy Sarkar, J. Phys. Chem. C., 2018, 122, pp 12384-12394.

49. Haloarene-Linked Unsymmetrically Substituted Triarylethenes: Small Aiegens to Detect Nitroaromatics and Volatile Organic Compounds. M. Z. Baig, P. K. Sahu, M. Sarkar and M. Chakravarty, J. Org. Chem, 2017, 82, pp 13359-13367.

50. Quantum chemical investigation of the thermal denitrogenation of 1-pyrazoline
R. Pradhan and U. Lourderaj, Phys. Chem. Chem. Phys. 19, 27468 (2017)

51. Isolation and Characterization of Regioisomers of Pyrazole-Based Palladacycles and Their Use in -Alkylation of Ketones Using Alcohols R. Mamidala, S. Samser, N. Sharma, U. Lourderaj, and K. Venkatasubbaiah, Organometallics 36, 3343 (2017)

52. Classical Dynamics Simulations of Dissociation of Protonated Tryptophan in the Gas Phase
Y. Krishnan, N. Sharma, U. Lourderaj, and M. Paranjothy, J. Phys. Chem. A 121, 4389 (2017)

53. Krishnakumar, V.; Gunanathan, C. Ruthenium-Catalyzed Selective -Deuteration of Aliphatic Nitriles using D2O Chem. Commun. 2018, 54, 8705-8708 Link

54. Kisan, S.; Krishnakumar, V.; Gunanathan, C. Ruthenium-Catalyzed Deoxygenative Hydroboration of Carboxylic Acids ACS Catal. 2018, 8, 4772-4776 Link

55. Chatterjee, B.; Gunanathan, C. Selective Deuteration of Organic Compounds Catalyzed by Ruthenium Pincer Complexes. David Morales-Morales (Ed.) Pincer Compounds: Chemistry and Applications Elsevier. Amsterdam (2018)

pp. 519-538.Link (BOOK CHAPTER)

56. Thiyagarajan, S.; Gunanathan, C. Ruthenium-Catalyzed Olefination of Nitriles Using Secondary Alcohols ACS Catal. 2018, 8, 2473-2478 Link

57. Sahoo, P. K.; Gawali, S. S.; Gunanathan, C. Iron-Catalyzed Selective Etherification and Transetherification Reactions Using Alcohols ACS Omega 2018, 3, 124-136 Link (Invited article)

58. Balachandra C, Sharma N K*. Novel fluorophores: Syntheses and photophysical studies of Boron-aminotroponimines. Dyes and Pigments2017, 137, 532-538

59. Gade, C. R.; Sharma, N K.* Hybrid DNA i-motif: Aminoethylprolyl-PNA (pC5) enhance the stability of DNA (dC5)i-motif structure Bioorg. Med. Chem. Lett. 2017, 17, 5424-5428.

60. Balachandra C, Sharma N K* Direct/Reversible Amidation of TroponylAlkylglycinates via Cationic Troponyl Lactones and Mechanistic Insights, ACS Omega2018, 3, 997–1013

61. Gade, C. R.; Sharma, N K.*, Helical supramolecular self-assembly by prolamidethymidine/uridine analogues, Supramolecular Chemistry, 2018, 18, 965-969

62. "Electron Transfer Dissociation of Synthetic and Natural Peptides Containing Lanthionine/Methyllanthionine Bridges." A. B. Dolle, N. Jagadeesh, S. Bhaumik, S. Prakash, H. S. Biswal*, and K. H. Gowd; Rapid Commun. Mass Spectrom., (2018), 32, 831-843.

63. "Spectroscopic Evidences for Strong Hydrogen Bonds with Selenomethionine in Proteins." V. R. Mundlapati, D. K. Sahoo, S. Ghosh, U. K. Purame, S. Pandey, R. Acharya, N. Pal, P. Tiwari, and H. S. Biswal*;J. Phys. Chem. Lett., (2017), 8, 794-800.

64. "Thioamide, a Hydrogen Bond Acceptor in Proteins and Nucleic Acids." V. R. Mundlapati, S. Gautam, D. K. Sahoo, A. Ghosh, and H. S. Biswal*;J. Phys. Chem. Lett., (2017), 8, 4573-4579.

65. "N-Heterocyclic Carbene–Carbodiimide ("NHC–CDI") Adduct or Zwitterionic-Type Neutral Amidinate-Supported Magnesium(Ii) and Zinc(II) Complexes." A. Baishya, L. Kumar, M. K. Barman, H. S. Biswal, and S. Nembenna;Inorg. Chem., (2017), 56, 9535-9546.

66. "Nature and Strength of the Inner-Core H···H Interactions in Porphyrinoids." A. Singh, D. K. Sahoo, S. K. Sethi, S. Jena, and H. S.Biswal*;ChemPhysChem, (2017), 18, 3625-3633.

67. "Synthesis of Urea Derivatives Via Reductive Carbon Dioxide Fixation into Contracted Porphyrin Analogues." S. K. Patra, K. Sahu, B. Patra, D. K. Sahoo, S. Mondal, P. Mukherjee, H. S. Biswal*, and S. Kar;Green Chemistry, (2017), 19, 5772-5776.

68. Chemoselective Ullman Coupling at

Room Temperature: a facile access to 2-aminobenzo[b]thiophenes Manojkumar Janni,Annaram Thirupathi, Sahil Arora and S. Peruncheralathan, Chem. Commun., 2017, 53, 8439.

69. Copper Catalyzed Intramolecular N Arylation of Ketene Aminals at Room Temperature: Synthesis of 2 Amino-3-cyanoindoles. Annaram Thirupathi, Manojkumar Janni and S. Peruncheralathan, J. Org. Chem., 2018, 83, 8668.

70. Nickel Catalysed Site Selective C"H Functionalization of -Arylthioamides Debashrurhi BandyopadhyayÂ, Annaram ThirupathiÂ, Nagsen M Dhage, Nirmala Mohanta and S. Peruncheralathan, Org. Biomol. Chem. 2018, DOI: 10.1039/C8OB01712C.

71. Ashish Bahuguna, Suneel Kumar, Vipul Sharma, Kumbam Lingeshwar Reddy, Kaustava Bhattacharyya, P. C. Ravikumar and Venkata Krishnan, Nanocomposite of MoS2-RGO as facile, heterogeneous, recyclable and highly efficient Green catalyst for one-pot synthesis of indole alkaloids, ACS Sustainable Chem. Eng., 2017, 10, 8551. (Cover Page Article)

72. Bhowmik, T.; Kundu, M. K.; Barman, S., ACS Appl. Energy Mater. 2018, 1 (3), 1200-1209.

73. Kundu, M. K; Bhowmik , T.; Mishra, R.; Barman, S. ChemSusChem,2018, 11, 2388-2408.

74. Tanmay Bhowmik, Manas Kumar Kundu, and Sudip Barman,International Journal of Hydrogen Energy, 2017 42 212 -217

75. Sadhukhan, M.; Kundu, M. K.; Bhowmik, T.; Barman, S., Inter. J. Hydrogen Energy 2017, 42, 9371-9383.

76. Patra, S.K., Sahu, K., Patra, B., Sahoo, D.K., Mondal, S., Mukherjee, P., Biswal, H.S. and Kar, S.*, Synthesis of urea derivatives via reductive carbon dioxide fixation into contracted porphyrin analogues. Green Chemistry, 2017, 19(24), pp.5772-5776.

77. Sinha, W., Sommer, M.G., Hettmanczyk, L., Patra, B., Filippou, V., Sarkar, B. and Kar, S.*, Ruthenium–Ruthenium Bonded [Bis {corrolato ruthenium (III)}] n (n= 0,+ 1," 1) Complexes: Model Compounds for the Photosynthetic Special Pair. Chemistry-A European Journal, 2017, 23(10), pp.2396-2404.

78. Patra, B., Patra, S.K., Mukherjee, P., Maurya, Y.K., Sinha, W. and Kar, S.*, 2017. Grignard Reagent Mediated Demetallation of Silver Corrole Complexes. European Journal of Inorganic Chemistry, 2017(17), pp.2363-2368.

79. Patra, B., Sobottka, S., Sinha, W., Sarkar, B. and Kar, S.*, 2017. IsovalentAgIII/AgIII, AgII/AgII, Mixed valent AgII/AgIII and Corrolato Based Mixed Valency inb,b /Linked [Bis {corrolato silver}]n Complexes. Chemistry-A European Journal, 2017, 23(10), pp.3858-3863.

80. Garai, A., Sobottka, S., Schepper, R., Sinha, W., Bauer, M., Sarkar, B. and Kar, S.*, 2018. Chromium Complexes with Oxido and Corrolato Ligands: Metal Based Redox

Processes versus Ligand Non Innocence. Chemistry-A European Journal, 2018, 24(48), pp.12613-12622.

81. Patra, B., Sobottka, S., Mondal, S., Sarkar, B. and Kar, S.*, 2018. Metal coordination induced ring contraction of porphyrin derivatives. Chemical Communications, 2018,54(71), pp.9945-9948.

82. T. Peddrao, A. Baishya, S. K. Hota, S. Nembenna*Bimetallic aluminum alkyl and iodide complexes stabilized by a bulky bis-guanidinate ligand Journal of Chemical Sciences2018,130(7), 1486

83. S.M.Patil, R. S. Vadavi, U. Kendur, G. H. Chimmalagi, G. H. Pujar, S. D. Kulkarni, M. Nethaji, S. Nembenna, S. R. Inamdar, K. Gudasi, Synthesis, characterization and photophysical studies of zinc(II) complexes derived from a hydralazine hydrazineJ. Photochem. Photobiol., A2018, 351, 225-230

84. A. Baishya, L. Kumar, M. Kr. Barman, H. S. Biswal and S. Nembenna* N-Heterocyclic carbene-carbodiimide ("NHC-CDI") adduct or zwitterionic type neutral amidinate supported Mg(II) and Zn(II) complexes Inorg. Chem. 2017, 56, 9535-9546

85. A. Baishya, T. Peddarao and S. Nembenna* Organomagnesium amide catalyzed cross-dehydrocoupling of organosilanes with amines Dalton Trans.201746(18) 5880-5887

86. M. Kr. Barman, A. Baishya, and S. Nembenna* Magnesium amide catalysed selective hydroboration of esters Dalton Trans.2017, 46, 4152-4156

List of Conferences and Seminars attended

Prof A. Srinivasan

1. Metals in Medicine and Therapy: Invited talk, Vigyan Jyoti Program, 14th June 2018, IIT, Bhubaneswar.

Dr. Jogendra Nath Behera

1. Vanadium Chalcogenides/RGO hybrids for supercapacitor application, "National Conference on New Prospective to Advanced Functional Materials" /**NPAFM-2017**, December 15-17, **2017**, Ravenshaw University, Cuttack, Odisha.

2. High Energy Supercapacitors based on Metal Chalcogenides-RGO/CNTs Hybrids, Conference on Electrochemistry in Advanced Materials, Corrosion and Radiopharmaceuticals, **CAEMCR_2018**, February 15-17, 2018, BARC, Mumbai

3. Hybrid Materials for Clean Energy Applications, International Symposium on Functional Materials **(ISFM-2018)**: Energy and Biomedical Applications, **April 13-15, 2018, Punjab University, Chandigarh.**

Dr. Prasenjit Mal:

Supramolecular Catalysis in C-X (X = -O, -N, -S) Bond Synthesis
IIT Bombay, 10th July 2018

Hypervalent Iodine Mediated C-X (X = -O, -N, -S) Bond Synthesis
6th International Conference on Hypervalent Iodine Chemistry, 01. – 04. July 2018
Cardiff University, Cardiff, Wales, UK

Supramolecular Catalysis in C-X (X = -O, -N, -S) Bond Synthesis
IISER Kolkata, 21 May 2018.

Soft Force Relay in Organic Synthesis
Kaleidoscope 2016, July 5-8, 2017, International Centre Goa.

Dr. V. Krishnan

1. Novel Boron-based Hybrid Materials: Synthesis, Characterization and Photophysical Studies **(MTIC-XVII), IISER-Pune, December, 11-14th 2017**.
2. Inorganic-Organic Hybrid Materials: Synthesis, Characterization and Applications **(ICACCS 2018), Pachaiyappa's College, February, 2nd & 3rd 2018.**

Sponsored Projects
Imidazole containing polymers for the selective detection of fluoride ion and synthesis of boron-complexes,
(EMR/2017/000620);
Sanctioned amount: **Rs. 58,88,845**. Funding Agency: SERB-DST.

Dr. Subhadip Ghosh

1. FCS-2017 held in IIT-Guwahati.
2. Interm-2018 Congress held in Turkey.

Dr. Moloy Sarkar

- In National Workshop on Fluorescence and Raman Spectroscopy, FCS 2017, IIT Guwahati, India.
- In Analytix-2018, Miami, USA.

Awards/ Recognition achieved by my Ph.D Students:

"**Dr. P. K. Bhattacharyya Memorial Award**" for the best poster in Photochemistry to Mr. Debashis Majhi in "National Symposium on Radiation and Photochemistry (NSRP-2017)" at Manipal University, Manipal, India.

Best Poster Award in Photochemistry to Ms. Manjari Chakraborty in "Trombay Symposium on Radiation and Photochemistry (TSRP-2018)" at Bhaba Atomic Research Centre, Mumbai, India.

Dr. C. Gunanathan

1. Hydroelementation and Sustainable Catalysis. **Plenary Lecture** at *National Conference on Molecules and Materials for Sustainable Development(NCMM-18)*, Division of Chemistry, Karunya Institute of Technology and Sciences, Coimbatore. 6th April 2018.
2. Hydroelementation and Green Catalytic Transformations. *Advances in Catalysis,* Department of Chemistry, IIT Kanpur, India, January 12, 2018.

Dr. Nagendra K Sharma

Project Approved from Department of Biotechnology (DBT)-2018.

Title: CRISPR-RNA-Cas9 System: Syntheses and biochemical evaluation of Nucleobase modified tropolonyl-Ribose Nubcleoside in CRISPR-RNA".

Status: Under consideration with DBT for financial assistance.

Lecture in Seminar:

(i) UGC-National Seminar on Recent Advances on molecules of Chemical Biological Importance, Municipal College, Rourkela, Odisha, 6th-7th February 2018.

(ii) iCon Chem 2018 Conference, IISER-Tirupati, Tirupati, AP, India, 24th-26th May 2018.

(iii) SCS-NISER, Departmental Seminar, 18th April 2018.

Dr. H. S. Biswal

(i) **"Mass Resolved Laser Spectroscopy of Peptides and Its Implication in Drug Discovery"** March 03-05, 2017, Berhampur University, INDIA

(ii) **"Hydrogen Bonds with Chalcogens: A Marriage between Atomic Polarizability and Electronegativity"** September 10-14, 2017, "22nd International Conference on Horizons in Hydrogen Bond Research" University of Jyväskylä, **FINLAND.**

(iii) "Probing the Non-covalent Interactions in the Hydrophobic Core of Proteins with Laser Spectroscopy"December 18-20, 2017 "Biomolecular Dynamics: Experimental and Theoretical Perspective (BDETP-2017)" Department of Chemistry, National Institute of Technology (NIT), Rourkela (Odisha), INDIA.

(iv) **"Hydrophobic Core, Non-covalent Interactions and NMR Spectroscopy"** December 22-24, 2017, "INTER IISER & NISER CHEMISTRY MEET (IINCM-2017)" NISER, INDIA.

Invited talks:

Prof. T.K. Chandrashekar:

Invited Speaker: Advanced in Inorganic Chemistry: "Verification of Baird's rule on excited state Aromaticity using a bridged expanded porphyrin." July 29-31, 2018. IISC Bangalore.

Dr. Sudip Barman

(i) **Invited talk at Inter-IISER Chemistry Meet (IINCM–2017)**
22nd – 24th Dec, 2017
Title: Carbon Nitride supported Nanostructured Materials for Energy Conversion and Energy Storage systems

(ii) Nobel lecture at NISER: Noble Prize for Chemistry 2017;
Title: Development of Cryo-Electron Microscopy for the high-resolution structure determination of biomolecules in solution.

Dr. Sharanappa Nembenna

1. Inter-IISER Chemistry meet 2017 Organized by IISER Bhopal Jan-20-22, 2017.
   Title: *Main Group Catalysis: Molecular Compounds for Organic Transformations.*
2. Frontiers in Chemical Sciences, 2017 KUD Dharwad.
   Title: *N-Donor Ligand Supported Main Group Metal Complexes.*
3. "Modern Trends in Inorganic Chemistry" (MTIC-XVII) at CSIR-NCL and IISER Pune in association with S. P. Pune University, on December 11-14, 2017.
   Title: Diketiminate Analogues: Synthesis and Characterization of "Conjugated Bis-Guan*dines" and their Metal Complexes.*

Patent:

Prof. T.K.Chandrashekar

Novel porphyrin derivatives for photodynamic therapy (PDT): a process for the preparation thereof and their use as PDT agents and fluorescence probes for biological applications. 16th March 2018, IN 294263 A1.

School of Earth and Planetary Sciences

Research Activity

Response of a coastal tropical pelagic microbial community to changed salinity and temperature.

Studies on the responses of tropical microbial communities to changing hydrographic conditions are presently poorly represented. Our mesocosm experiments, conducted jointly with Universities of Gothenburg and Kristianstad, Sweden and the College of Fisheries, Karnataka, yielded the following results. A mesocosm study was conducted in southwest (SW) coastal India to investigate how changes in temperature and salinity will affect a tropical microbial community. The onset of algal and bacterial blooms, the maximum production and biomass, and the interrelation between phytoplankton and bacteria was studied in replicated mesocosms. The treatments were set up featuring ambient control (28 °C, 35 PSU), decreased salinity (31 PSU), increased temperature (31 °C) and a double stressed treatment with increased temperature and decreased salinity (31 °C, 31 PSU). The reduced salinity treatment had the most considerable influence manifested as significantly lower primary production, and the most dissimilar phytoplankton species community. The increased temperature acted as a positive catalyst in the double manipulated treatment, and higher primary production was maintained in this treatment. We investigated the dynamics of the microbial community with a structural equation model

approach, and found a significant interrelation between phytoplankton and bacterial biomass. Using thismethodology it became evident that direct and indirect effects influence the different compartments of the microbial loop. In the face of climate change, we conclude that in relatively nutrient replete environments, such as the tropical coastal zones, nutrient assimilation is dependent on salinity and temperature and will have significant effects on the quantity and the character of microbial biomass and production. This work was done in collaboration with Fisheries College, Mangalore and University of Gothenburg, Sweden.

Wind Strength Variability in the Western Arabian Sea since the Last Glacial Maximum: Southwest vs. Northeast Monsoon Modes

Both the southwest monsoon (SWM) and the northeast monsoon (NEM) winds are responsible for the variations in the biological productivity in the western Arabian Sea (WAS), as recorded in the Arabian Sea sedimentary planktic foraminiferal record. While earlier studies from this region ascribe the total observed variability predominantly to SWM, here we attempt to differentiate between the two monsoons based on the relative abundances of depth stratified planktic foraminifera assemblages. We observe a number of intervals of enhanced SWM. The first intensification (SWMI-I) occurred during ~16 to 12 ka and is possibly an outcome of early deglacial melting and stepwise increase in SWM strength after the end of the last glacial maximum (LGM). The second intensification (SWMI-II) is recorded at around ~10 ka, after the gradual strengthening from the end of the Younger Dryas cold episode. The last interval of intensification (SWMI-III) occurred around (~8.2 to 7.8 ka). In addition, there are two intervals of enhanced NEM: NEMI-I at around 19 to 17 ka and NEMI-II (~8.0 to 5.4 ka). These intervals of two enhanced NEM and three SWM wind strengths are bridged by decline in the SWM at different intervals, such as SWMD-I (~17 to 16 ka), SWMD-II (~12 to 11 ka) and SWMD-III (9.7 ka to 8.2 ka). This work was done in collaboration with University of Delhi.

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 to can 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.

Science Society Interface: Historically science has been steadily contributing in terms of shaping human thinking. As Herbert Spencer puts it Society has evolved through the three stages of evolution, namely theological, metaphysical and positive. Rational thinking and problem solving are two of the major hallmarks of science. However, there is need to continuously study the interactions between science and society that are designed to maintain the balance between scientific quality, political legitimacy and societal relevance

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

Dr Yeldho's research areas focus on Critical History and Narratives of Race, Event Studies, Pedagogy and the Public Sphere, Architecture and Performance, Topology and Affordances.

Dr Amarendra Das,
Assistant Professor

Dr Das teaches Introduction to Economics and Environmental Economics and Environmental Impact Assessment to the Integrated M.Sc students and Environmental Economics and Ecological Economics, New Institutional Economics and Research Methodology to Ph.D Students.

His teaching and research interest lies in Public Economics and Environmental Economics.

Publication

Das Amarendra (in press) "Turnaround in Maternal and Child Healthcare of India: Role of Institutional Innovation and ASHA" in Inclusive Innovation: Evidence and Options in Rural India, Editors Rajeswari S. Raina and Keshab Das, Springer.

Swain, P.K. and **Nayak, M.** (2017), Involuntary Displacement and Dispossession: Could The Key Social Actors Do Things Differently? Research Process, Vol 56, No. 2, pp 1-18

Conference Presentations

Das, Amarendra, Growth, Income Distribution and Poverty in Odisha in Transforming Odisha: Policies, Institutions and Innovations organized by Centre for Study of Contemporary Societies, Bhubaneswar on March 3-4, 2018 at KIIT, Bhubaneswar.

Das, Amarendra, Hurdles to Education for Adivasis in Odisha: Looking beyond Supply and Demand Lenses in Golden Jubilee Conference of Odisha Economics Association during February 10-11, 2018 at NCDS Bhubaneswar.

Das, Amarendra, Schooling of Scheduled Tribes in India: Lessons from the Education of Indigenous People of Brazil in CIES 2018 Conference, Mexico City, During March 25-29, 2018 at Hotel Hilton Reforma.

Yeldho, Joe. V. "Pedestrian as text: Heidegger, Correa and lessons from the urban 'elsewhere.' "Presented at Urban ARC: City and Technology (January, 2018), Indian Institute for Human Settlements, Bangalore.

Khuntia, R. Efficacy of Cognitive Behaviour Therapy on Depression: A case Report.27th Annual Conference of NAOP, IIT, Kharagpur, December 22-24, 2017.

Swain, P.K. Consumption of Popular perception of Science and Scientists: A deep dive into Students' Liberal choice for Science as a career, 43rd All India Sociological Conference on Neo-liberalism, Consumption and Culture, University of Lucknow, 9-12 November, 2017.

Nayak, Amarjeet. "Subaltern Literature in the Postcolonial Society: Exploring the Structural and Personal Violence" presented at the Annual

International Conference of The Indian Association for Commonwealth Literature and Language Studies (IACLALS), AMU, Aligarh, 8-10 February, 2018.

Nayak, Amarjeet, "Exploring Orality and Historiography through Dalit and Northeast Indian Life Writings" presented at "International Conference on Frames of Marginality: Interpreting and Interrogating Theory and Praxis", Bankura, 21-22 February, 2018.

Invited/Popular Talks

Das, Amarendra, "Economics Beyond Rationality" Nobel Talks at NISER on November 17, 2017.

Khuntia, R. Leadership Skills for Organization Building, Training Program for Empowering Rural Women Organized by V.V Giri National Labour Institute, Noida and State Labour Institute, Odisha, February 26-28, 2018, Bhubaneswar (Invited).

Swain, P.K. engaging with Tribal Youth for Collective Social responsibility, Samvaad-A Tribal Conclave, TATA Steel at Centre for Youth and Social Development, Bhubaneswar, 6 October 2017

Swain, P.K. Recent Issues in Social Sciences Research, Inaugural talk as the Chief Guest at the UGC Sponsored Refresher Course in Social Sciences, at the UGC Human Resource Development Centre, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, 4 September, 2017.

Swain, P.K. "Where to Draw the Lakshmanrekha: Ethics and Values in Social Sciences Research", UGC Sponsored Refresher Course in Social Sciences, at the UGC Human Resource Development Centre, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, 4 September, 2017.

Swain, P. K. 'NO' to Nuclear Weapons: The Message is Loud and Clear, Nobel Prizes 2017: An Exposition, 17 November 2017, NISER Bhubaneswar

Yeldho, Joe V. "The City as Text: Bhubaneswar and the necessity for narrating an inclusive future." Smart City Conclave (University of Heidelberg, German Chamber of Commerce, Xavier University). Bhubaneswar (September, 2017).

Yeldho, Joe V."Research Today: A Perspective." Department of Mechanical Engineering, Adi Sankara Institute of Technology, Kalady, Cochin (December, 2017).

Yeldho, Joe V. "Rhetoric and Science." Undergraduate Seminar, School of Biology, IISER, Trivandrum (February, 2018).

Training/Workshop

Das, Amarendra, "GDP and Sectors of Odisha" at RIPAES, training cum workshop, Bhubaneswar, on January 19, 2018.

Das, Amarendra, "Analysis of GSDP in Industrial Sector in Odisha over Time" RIPAES, training cum workshop, Bhubaneswar during January 20, 2018

Das, Amarendra, "Technological Capability of Eastern States in India: Scopes and Challenges" in the Workshop on Green Revolution in Eastern India: Constraints, Opportunities and Way

Forward Lecture Hall, NASC, Pusa, New Delhi during 9-10 October 2017.

Research Collaboration with non-DAE Institutions/Organizations

Das Amarendra, "Evaluation of Rural Drinking Water Schemes in Odisha" with NABCONS, Bhubaneswar.

Das, Amarendra, Authored a chapter "Economy and Employment" in the Second State Human Development Report, Government of Odisha with NIT Rourkela.

Swain, P.K. Bhubaneswar Smart City Ltd-Bhubaneswar Municipal Corporation for its Youth Connect Programme.

Swain, P.K. Department of Humanities and Social Sciences, IIT Madras.

Ongoing Research/Consulting Projects

Swain, P.K. Citizens Connect Programme, Bhubaneswar Smart City Ltd/Bhubaneswar Municipality Corporation/UNFPA: Safe Campus-Safe City and Better Style Better Life, Under its Youth Connect Programme since September, 2017.

Conferences Organized

Swain, P. K. National Conference on Science Technology and Society, 21-23 July 2017 at NISER Bhubaneswar.

Swain, P.K, Indian Sociological Society Research Committee Conveners and Management Committee Meetings, 21-22 July 2017, NISER Bhubaneswar.

Colloquium Organized by SHSS

Good Mental Health: Managing Stress Being Resilient, Prof. M. Manjula, Professor of Clinical Psychology, NIMHANS, Bangalore, **September 01, 2017.**

"Research and Innovation: putting learning to test", Prof. Manas K Mandal, Distinguished Professor, Department of Humanities and Social Sciences, IIT, Kharagpur, **March 09, 2018.**

Linguistic Variation through the Lens of Honorification, Dr. Anindita Sahoo, Asst Professor, IIT Madras, **24 November 2017.**

Markets and Gifts to the Early Medieval Buddhist Sangha Prof. P V Viswanath, Pace University, Lubin School of Business, New York, **03 May 2017.**

Demonetization, Professor Kishore C Samal, Nabakrushna Choudhury Centre for Development Studies, **November 13, 2017.**

Significance of October Revolution, Professor Bijay Kumar Bohidar, retired Professor, Ravenshaw University, **November 15, 2017.**

Awards/recognition

Das Amarendra, Elected as General Secretary Orissa Economics Association.

Outreach Programme

Special Lectures on Econometric Theory and Application, by Dr Vijay Mohan Pillai Associate Professor, Centre for Development Studies, Trivandrumduring 06-11 March, 2017 for Post Graduate and Doctoral students of NISER, Utkal University and Ramadevi University, Bhubaneswar.

School of Mathematical Sciences

Dr. 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 1, does there exist a von-Neumann algebra such that ( ) = ? 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.

Dr. 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.

Dr. 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.

Dr. 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.

Dr. Amit Tripathi, Assistant Professor

My research interest lies in the subject of complex algebraic geometry. More specifically, I study vector bundles over hypersurfaces in complex projective space. I study them from the point of view of finding cohomological obstructions to splitting a bundle into direct sum of line bundles as well as conditions for extending it over the ambient projective space.

In algebraic geometry, the study of vector bundles over projective space and its subvarieties is a theme which can be classified into following (by no means exhaustive) list of major open ended problems:

1) **Moduli space problem:** Giving a "geometrical" structure to the set of vector bundles with certain fixed invariants?

2) **Splitting problem:** Finding to what extend vector bundles on projective space or its subvarieties behave like line bundles?

3) **Extendibility:** Finding under what conditions does a bundle on a subvariety of $\p^n$ comes from restriction of bundle on $\p^n$ itself.

4) **Construction of new bundles:** How to construct nontrivial vector bundles of specific rank (> 1) on projective space?

5) **Relation between bundles and subvarieties:** What does the existence of a nontrivial vector bundle reveals about the geometry of that variety?

Each of the above question has been studied extensively over last few decades and though progress has been made, vector bundles (even of rank 2!) are very much mysterious objects over varieties as simple as P^n. So far I have been interested in the problems (2) and (3) above.

Dr. Shyamal Krishna De, Reader-F

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.

Dr. Manas Ranjan Sahoo, Assistant Professor

Systems of conservation laws which are not strictly hyperbolic appear in many physical applications. Generally solution space for such systems are not the usual space of the function of bounded variations. Here solution may be general distributions. Since the product of distributions appears, it is difficult to define a proper notion of solution for this case. Such kind of difficulty arises in the models like large scale structure formation of the universe, zero pressure gas dynamic system, etc. The aim is to define a proper notion of solution and get well-poesedness results of such systems. On the other hand it is important to understand the structure and the large time behaviour of the solution.

Dr. Kamal LochanPatra, 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.

Dr. Nabin Kumar Jana, Assistant Professor

Disordered systems pops up quite often in physics (spin glass), biology (artificial neural network), social sciences (matching) and many other places. To analyze, usually these systems are identified with the stochastic models. My main research interest is on the application of probabilistic tools to analyze these stochastic

Dr.Sanjay Parui, Reader-F

I work on Harmonic Analysis on Euclidean Spaces and Heisenberg Groups. At present my research interest is Spherical harmonics, Hermite and Laguere expansion and Dunkl Transform.

Dr. Binod Kumar Sahoo, Reader-F

I work on the problem of existence of representations of incidence geometries possibly in nonabelian groups. This helps us to look for the possibility of constructing new geometries and giving new constructions to know geometries. I also work on the study of minimum size blocking sets in projective spaces with respect to varying sets of lines.

Dr. Brundaban Sahu, Associate Professor

Supercongruences - The numbers which occur in Apéry's proof of the irrationality of $\zeta(2)$ and $\zeta(3)$ 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.

Dr. 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.

Dr. 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.

Conferences/ Training progtrammes organized:

The following programmes have been organized by the School of Mathematical Sciences during 2017-18:

a) Training Program in Mathematics (TPM-2017)

Duration: May 22, 2017 to June 17, 2017
No. of Participants: 130
Co-ordinator: Prof. V. Muruganandam

Objective: The main objective of TPM is to promote independent learning among students. It aims to provide solid foundation towards mastering the"art of doing Mathematics" on their own by a group of mathematicians drawn from the leading institutes of India, who have a penchant and commitment for teaching mathematics. Beside this programmes identifies young and talented students and motivate them to pursue Mathematics in their career.

b) Summer Outreach Program in Mathematics (SOPM-2017)

Duration: June 19, 2017 to July 1, 2017
No. of Participants: 35
Co-ordinators: Dr. Brundaban Sahu,
Dr. Kamal Lochan Patra and
Dr. Sutanu Roy

Objective: This program is an annual event of the school. The Summer Outreach Program in Mathematics provides training to students who are in Masters Program, in different branches of Mathematics. This program is intended to the students having less exposure to Mathematics. Few special lectures were given by eminent mathematicians.

c) J-Holomorphic Curves and Gromov-Witten Invariants-2017

Duration: July 10- 22, 2017
No. of Speakers: 09
No. of Participants: 52
Co-ordinator: Dr. Ritwik Mukherjee and
Dr. Somnath Basu

Objective: For the last twenty years, the theory of Gromov-Witten invariants and Mirror Symmetry has been an active area of research in the interface of Mathematics and Theoretical Physics (particularly String Theory). We are therefore organizing an introductory school at NISER in J-holomorphic curves and Gromov-Witten invariants with connections to Mirror Symmetry. Young mathematicians (PhD stduents and postdocs) who are interested in Differential Topology, Differential Geometry, Complex Algebraic Geometry and Symplectic Geometry are particularly encouraged to apply.

d) Quantum Groups and Noncommutative Geometry-2018

Duration: January 15-19, 2018
No. of participants: 52
No. of Speakers: 17

Co-ordinators: Dr. Sutanu Roy,
Dr. Panchugopal Bikram and
Dr. Arnab Mandal

Objective: The main goal of this conference is to bring experts, postdoctoral fellows and doctoral students together working on quantum groups, noncommutative geometry and closely related areas. This will be an occasion for the participating doctoral students and young researchers to meet and interact with several leaders of the field, and to learn about recent developments on important problems in these areas.

Departmental Seminars

1) Speaker: Somnath Basu
Affiliation: IISER Kolkata
Title: Geometric models of coverings of graphs

2) Speaker: Prof. Bart De Bruyn
Affiliation: Ghent University, Belgium
Title: Finite Fields

3) Speaker: Prof. Bart De Bruyn
Affiliation: Ghent University, Belgium
Title: Extremal generalized $2d$-gons

4) Speaker: Dr. Anirban Bose
Title: Real elements in groups of type F4

5) Speaker: Prof. S. Krishnan
Affiliation: IIT Bombay
Title: Hook Immanantal and Hadamard inequalities for q-Laplacians of trees

6) Speaker: Professor Mahan MJ
Affiliation: TIFR, Mumbai
Title: What is hyperbolic geometry?

7) Speaker: Professor Arup Bose
Affiliation: ISI Kolkata
Title: IIntroduction to free independence

8) Speaker: Samir Shukla
Affiliation: IIT Kanpur
Title: Connectedness of Certain Graph Coloring Complexes

9) Speaker: Dr. Rohit Dilip Holkar
Affiliation: IISER Pune
Title: Locally free actions of groupoids and proper correspondences

10) Speaker: Anup Dixit
Affiliation: University of Toronto
Title: On the generalized Brauer-Siegel Theorem

11) Speaker: Dr. Saswata Adhikari
Affiliation: IIT Madras
Title: Frames of twisted shift-invariant spaces in $L^{2}(\mathbb{R}^{2n})$ and shift-invariant spaces on the Heisenberg group

12) Speaker: Dr. Soumyashant Nayak
Affiliation: University of Pennsylvania
Title: The Many Forms of the Pythagorean Theorem

13) Speaker: Arvind Kumar
Affiliation: HRI, Allahabad
Title: Rankin-Cohen brackets and identities among eigenforms

14) Speaker: Rahul Kumar Singh
Affiliation: HRI, Allahabad
Title: Maximal surfaces, Born-Infeld solitons and Ramanujan's identities

15) Speaker: Mr. Biswajit Rajaguru
Affiliation: University of Kansas

Title: Projective normality of line bundles of the type $K_X+\pi^*L$ on a ramified double covering $\pi:X\to S$ of an anticanonical rational surface S

16) Speaker: Ami Viselter
Affiliation: University of Haifa, Israel
Title: Around Property (T) for Quantum Groups

17) Speaker: Debanjana Mitra
Affiliation: Virginia Tech, Blacksburg, USA
Title: Control theory in partial differential equations

18) Speaker: Bhargab Chattopadhyay
Affiliation: IIIT Vadodara
Title: Generalized Gini Index based on U-statistics

19) Speaker: Antar Bandyopadhyay
Affiliation: Indian Statistical Institute, New Delhi
Title: Random Graphs

20) Speaker: Soumalya Joardar
Affiliation: JNCASR, Bangalore
Title: Weyl algebra, Hyperbolic space and Noncommutative Hyperbolic plane

21) Speaker: Partha Sarathi Chakraborty
Affiliation: IMSc
Title: Instances of local index formula

22) Speaker: Satyaki Mazumder
Affiliation: IISER Kolkata
Title: Bayesian analysis of one dimensional chirp signal

23) Speaker: Pabitra Barik
Affiliation: IIT Madras
Title: Hitchin pairs on a singular curve

24) Speaker: Sudeep Stephen
Affiliation: The University of Newcastle, Australia
Title: Zero forcing in graphs

25) Speaker: Suprio Bhar
Affiliation: TIFR Bangalore
Title: Stochastic PDEs in the space of Tempered distributions

26) Speaker: Dr. Kunal Krishna Mukherjee
Affiliation: IIT Madras
Title: On dynamical system preserving weights

27) Speaker: Prof. Raj Srinivasan
Affiliation: University of Saskatchewan, Canada
Title: Non Homogenous Poisson Process and Its Applications

28) Speaker: Ananta Kumar Majee
Affiliation: University of Tübingen
Title: Rate of convergence of a semi-discrete finite difference scheme for stochastic balance laws driven by Levy noise

29) Speaker: Sabyasachi Mukhopadhyay
Affiliation: University of Hohenheim
Title: Modelling spatio-temporal variation in rainfall using a hierarchical Bayesian regression model

30) Speaker: Aprameyan Parthasarathy
Affiliation: Universität Paderborn
Title: Boundary values, resonances and scattering poles on rank one symmetric spaces

31) Speaker: Mr. Sayan Ghosh
Affiliation: IIT Bombay
Title: The Analysis of Incomplete Contingency Tables

32) Speaker: Riddhi Shah
Affiliation: JNU
Title: Dynamics of Distal Actions on Groups

33) Speaker: Kunal Krishna Mukherjee
Affiliation: IIT Madras
Title: Factoriality of q-deformed Araki-Woods algebras

34) Speaker: R. Srinivasan
Affiliation: Chennai Mathematical Institute
Title: The framework of quantum probability

35) Speaker: Prof. T. N. Shorey
Affiliation: NIAS, Bengaluru
Title: Explicit abc-conjecture and its recent applications

36) Speaker: Professor Kalyan Bidhan Sinha
Affiliation: JNCASR, Bangalore
Title: The Fundamental Theorem of Integral Calculus
Professor Komatsu Takao
Affiliation: Wuhan University
Title: Several identities related to the degenerate Bernoulli polynomials and numbers

37) Venue: Seminar Room, SMS
Speaker: Dr. Shanta Laishram
Affiliation: Indian Statistical Institute, Delhi

38) Speaker: Manas Kar
Affiliation: National Taiwan University in Taiwan
Title: Inverse problems for reconstructing inclusion and identifying unknown parameter

39) Speaker: Satyajit Guin
Affiliation: IISER Mohali
Title: Noncommutative complex and Kähler geometry

40) Speaker: Bhargab Chattopadhyay
Affiliation: Indian institute of Information Technology Vadodara
Title: Sequential Estimation of Gini Index

41) Speaker: Swagato K Ray
Affiliation: ISI Kolkata
Title: Euler's limit formula for the Gamma function

42) Speaker: Anupam Pal Choudhury
Affiliation: Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz
Title: Nematic Liquid Crystals in Lipschitz domains

43) Speaker: Deepika
Affiliation: IIT Kanpur
Title: Approximation Property and Its Variants in Weighted Spaces of Holomorphic Functions on Banach Spaces

44) Speaker: Vaibhav Vaish
Affiliation: ISI Bangalore
Title: Punctual gluing of t-structures and the motivic intersection complex of Shimura varieties

45) Speaker: Venkata Krishna Kishore Gangavarapu
Affiliation: IISER Pune
Title: Representation varieties of Fuchsian groups

46) Speaker: Aprameyan Parthasarathy
Affiliation: Universität Paderborn

47) Speaker: Anirvan Chakraborty
Affiliation: Ecole Polytechnique Federale de Lausanne, Switzerland
Title: Introduction to Functional Data Analysis

48) Speaker: Jyoti Prakash Saha
Affiliation: Ben-Gurion University
Title: Purity for families of Galois representations

49) Speaker: Anirvan Chakraborty
Affiliation: Ecole Polytechnique Federale de Lausanne, Switzerland
Title: Introduction to Functional Data Analysis

50) Speaker: Mr. Mithun Bhowmick
Affiliation: ISI Kolkata
Title: Theorems of Ingham, Levinson and Paley-Wiener on certain Lie groups

51) Speaker: Anirvan Chakraborty
Affiliation: Ecole Polytechnique Federale de Lausanne, Switzerland
Title: Introduction to Functional Data Analysis

Publication details

A Tripathi

MR3621660 Reviewed Tripathi, Amit Rank 3 arithmetically Cohen-Macaulay bundles over hypersurfaces. J. Algebra 478 (2017),1–11. (Reviewer: Sarbeswar Pal) 14J60
Review PDF Clipboard Journal Article

Anil Karn

MR3792779 Pending Karn, Anil Kumar Algebraic orthogonality and commuting projections in operator algebras. Acta Sci. Math. (Szeged) 84 (2018),no. 1-2, 323–353. 46B40 (46L05 46L30)
Review PDF Clipboard Journal Article

Mr3733834 Reviewed Bhar, Antara; Karn, Anil K. Compact factorization of operators with **Λ**-compact adjoints. Glasg. Math. J. 60 (2018),no. 1, 123–134. (Reviewer: Dirk Werner) 46B07 (46B20 46B28 46B50 47B07)
Review PDF Clipboard Journal Article

Binod Kumar Sahoo

A. Jena and B. K. Sahoo, Revisiting Eisenstein-type criterion over integers, The Mathematics Student 86 (2017), 77-86.

K. L. Patra and B. K. Sahoo, Bounds for theLaplacianspectral radius of graphs, Electronic Journal of Graph Theory and Applications 5 (2017), 276-303.

Brundaban Sahu

MR3816079 Pending Kumari, Moni; Sahu, Brundaban Rankin-Cohen brackets on Hilbert modular forms and special values of certain Dirichlet series. Funct. Approx. Comment. Math. 58 (2018),no. 2,257–268. 11F41 (11F60 11F68)
Review PDF Clipboard Journal Article

MR3816077 Pending Ramakrishnan, B.; Sahu, Brundaban; Singh, Anup Kumar On the number of representations of certain quadratic forms and a formula for the Ramanujan tau function. Funct. Approx. Comment. Math. 58 (2018),no. 2, 233–244. 11E25 (11E20 11F11)
Review PDF Clipboard Journal Article

MR3786648 Pending Ramakrishnan, B.; Sahu, Brundaban; Singh, Anup Kumar On the number of representations by certain octonary quadratic forms with coefficients 1, 2, 3, 4 and 6.

Int. J. Number Theory 14 (2018),no. 3, 751–812. 11E25 (11A25 11E20 11F11)
Review PDF Clipboard Journal Article

Deepak Kumar Dalai

MR3647758 Reviewed Dalai, Deepak Kumar; Sarkar, Pinaki Key predistribution schemes using bent functions in distributed sensor networks. Information security and cryptology, 367–385, Lecture Notes in Comput. Sci., 10143, Springer, Cham, 2017. 94A60
Review PDF Clipboard Series Chapter

Dinesh Kumar Keshari

MR3624676 Reviewed Bhattacharjee, M.; Eschmeier, J.; Keshari, Dinesh K.; Sarkar, Jaydeb Dilations, wandering subspaces, and inner functions. Linear Algebra Appl. 523 (2017),263–280. 47A13 (46E22 47A15 47A20 47A45)
Review PDF Clipboard Journal Article 2 Citations

MR3608656 Reviewed Ji, Kui; Jiang, Chunlan; Keshari, Dinesh Kumar; Misra, Gadadhar Rigidity of the flag structure for a class of Cowen-Douglas operators. J. Funct. Anal. 272 (2017),no. 7, 2899–2932. (Reviewer: Sanne ter Horst) 47B32 (47B35)
Review PDF Clipboard Journal Article 1 Citation

Jaban Meher

MR3786649 Pending Meher, Jaban; Shankhadhar, Karam Deo; Viswanadham, G. K. On the coefficients of symmetric power L-functions. Int. J. Number Theory 14 (2018),no. 3, 813–824. 11F30 (11F11 11M41)
Review PDF Clipboard Journal Article

MR3742459 Reviewed Meher, Jaban; Pujahari, Sudhir; Kotyada, Srinivas Zeros of L-functions attached to modular forms of half-integral weight. Bull. Lond. Math. Soc. 49 (2017),no. 5, 926–936. (Reviewer: Shaul Zemel) 11M41 (11F37 11F66)
Review PDF Clipboard Journal Article

MR3733760 Reviewed Meher, Jaban On weakly holomorphic quasimodular forms. J. Ramanujan Math. Soc. 32 (2017),no. 4, 339–353. (Reviewer: Eric Stade) 11F30
Review PDF Clipboard Journal Article.

K. Senthil Kumar

MR3691980 Reviewed Meher, N. K.; Senthil Kumar, K.; Thangadurai, R. On a theorem of Mahler. Proc. Amer. Math. Soc. 145 (2017),no. 11, 4607–4615. (Reviewer: Tomáš Vávra) 11K16
Review PDF Clipboard Journal Article

Kamal Lochan Patra

MR3716901 Reviewed Patra, Kamal Lochan; Sahoo, Binod Kumar Bounds for the Laplacian spectral radius of graphs. Electron. J. Graph Theory Appl. (EJGTA) 5 (2017),no. 2, 276–303. (Reviewer: Irena M. Jovanović) 05C50
Review PDF Clipboard Journal Article

Manas Ranjan Sahoo

Reviewed Nedeljkov, Marko; Neumann, Lukas; Oberguggenberger, Michael; Sahoo, Manas R. Radially symmetric shadow wave solutions to

the system of pressureless gas dynamics in arbitrary dimensions. Nonlinear Anal. 163 (2017),104–126. 35L65 (35L67 35Q31)
Review PDF Clipboard Journal Article

MR3680695 Reviewed Singh, Harendra; Sahoo, Manas Ranjan; Singh, Om Prakash Numerical method based on Galerkin approximation for the fractional advection-dispersion equation. Int. J. Appl. Comput. Math. 3 (2017),no. 3, 2171–2187. 65M60 (35R11 65M12)
Review PDF Clipboard Journal Article

MR3597137 Indexed Sahoo, Manas R. Density property of certain sets and their applications. Elem. Math. 72 (2017),no. 1, 9–14. 11J72
Review PDF Clipboard Journal Article

MR3583525 Reviewed Satynarayana, Engu; Sahoo, Manas R.; M, Manasa Higher order asymptotic for Burgers equation and adhesion model. Commun. Pure Appl. Anal. 16 (2017),no. 1, 253–272. 35Q53 (35A24 35B40)
Review PDF Clipboard Journal Article

Md. Ali Zinna

MR3773790 Pending Das, Mrinal Kanti; Tikader, Soumi; Zinna, Md. Ali Orbit spaces of unimodular rows over smooth real affine algebras. Invent. Math. 212 (2018),no. 1, 133–159. 14P25 (13C10 14R05 19A13 19A15)
Review PDF Clipboard Journal Article

MR3574218 Reviewed Keshari, Manoj K.; Zinna, Md. Ali Efficient generation of ideals in a discrete Hodge algebra. J. Pure Appl. Algebra 221 (2017),no. 4, 960–970. (Reviewer: Veronique Van Lierde)13C10 (13B22 19A15)
Review PDF Clipboard Journal Article 1 Citation

Nabin Kumar Jana

MR3584412 Reviewed Sumedha; Jana, Nabin Kumar Absence of first order transition in the random crystal field Blume-Capel model on a fully connected graph. J. Phys. A 50 (2017),no. 1, 015003, 14 pp. 82D25
Review PDF Clipboard Journal Article

Panchugopal Bikram

MR3699171 Reviewed Bikram, Panchugopal; Mukherjee, Kunal E0-semigroups of free Araki-Woods factors. Internat. J. Math. 28 (2017),no. 10, 1750075, 10 pp. (Reviewer: Marzieh Forough) 46L55 (46C99 46L40 46L53)
Review PDF Clipboard Journal Article

MR3661405 Reviewed Bikram, Panchugopal; Mukherjee, Kunal Generator masas in q-deformed Araki-Woods von Neumann algebras and factoriality. J. Funct. Anal. 273 (2017),no. 4, 1443–1478. (Reviewer: Claire Anantharaman-Delaroche) 46L10 (46L55 46L65)
Review PDF Clipboard Journal Article 4 Citations

Ritwik Mukherjee

MR3820512 Pending Biswas, Indranil; Mukherjee, Ritwik; Thakre, Varun Genus two enumerative invariants in del-Pezzo surfaces with a fixed complex structure. Geom. Dedicata 195 (2018),379–401. 53D45 (14J26 14J45 14N35)
Review PDF Clipboard Journal Article
MR3800492 Pending Biswas, Indranil; D'Mello,

Shane; Mukherjee, Ritwik; Pingali, Vamsi P. Rational cuspidal curves on del-Pezzo surfaces. J. Singul. 17 (2018),91–107. 14N35 (14H10 14J26)
Review PDF Clipboard Journal Article

Shyamal Krishna De

MR3749271 Reviewed De, Shyamal K.; Chattopadhyay, Bhargab Minimum risk point estimation of Gini index. Sankhya B 79 (2017),no. 2, 247–277. 62L12 (60G40 60G46 62G05 91B82)
Review PDF Clipboard Journal Article

Sutanu Roy

Mr3797195 Pending Roy, Sutanu; Woronowicz, Stanisław Lech Landstad-Vaes theory for locally compact quantum groups. Internat. J. Math. 29 (2018),no. 4, 1850028, 36 pp. 46L55 (46L08 81R50)
Review PDF Clipboard Journal Article

Mr3782060 Pending Roy, Sutanu; Timmermann, Thomas The maximal quantum group-twisted tensor product of C∗-algebras. J. Noncommut. Geom. 12 (2018),no. 1, 279–330. 81R50 (46L55)
Review PDF Clipboard Journal Article

MR3685176 Reviewed Goswami, Debashish; Roy, Sutanu Faithful actions of locally compact quantum groups on classical spaces. Lett. Math. Phys. 107 (2017),no. 7, 1375–1390. (Reviewer: Kenny De Commer) 81R50 (46L89)
Review PDF Clipboard Journal Article

School of Physical Sciences

Brief of Research Activity

Prof. Bedangadas Mohanty: Experimental High Energy Physics and Dark Matter Group

ALICE

A Large Ion Collider Experiment (ALICE) is a dedicated heavy-ion experiment at the Large Hadron Collider (LHC) in CERN, Geneva. Being the highest energy accelerator, LHC opens up new physics era both in high multiplicity small system (pp and p-Pb) collisions and heavy-ion collisions like Pb-Pb. NISER group is mainly involved in the measurement of the resonances production in pp, p-Pb, Pb-Pb and Xe-Xe collisions. The high multiplicity pp collisions at LHC energies hints towards the collectivity in small system similar to what is observed in heavy-ion collisions. We are actively involved in the multiplicity dependent production of K^{*0} and in pp collisions at 5.02, 7 and 13 TeV. The group is also involved in the analysis of K^{*0} production in p-Pb collisions at $\sqrt{s_{NN}}$ = 8.16 TeV and in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. In year 2017, ALICE has also collected data of Xe-Xe collisions at $\sqrt{s_{NN}}$ = 5.44 TeV. We are analyzing K^{*0} resonance production in Xe-

Xe data which might help in understanding the system size dependence of particle production at LHC energies.

It is expected that large angular momentum and intense magnetic field is produced in the initial stages of the non-central ultrarelativistic heavy-ion collisions. The angular momentum produced is expected to be of the order of $1.4x10^7$ in Pb-Pb collisions at 5.02 TeV, for impact parameter of 5 fm. Because of the inhomogeneity of the colliding nuclei in the transverse plane, a significant fraction of initial angular momentum must be transfered to the interaction region, in other words should be transferred to the quark-gluon plasma (QGP). Theoretical calculation predicts that for Au-Au collisions at 200 GeV, the transfered angular momentum is about 30% of the total initial angular momentum. As total angular momentum is a conserved quantity, transfered angular momentum need to be converted into other degrees of freedom inside the QGP medium. One of the main goals of heavy-ion program in ALICE at LHC is to look for the signatures of these effects in experiment. The two of the proposed signatures are the polarization of hyperon and spin alignment of vector mesons. We are analyzing and leading the spin alignment of vector mesons like K^{*0} and in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 and 5.02 TeV. The results show a hint of spin alignment at LHC energies, however the statistical and systematic uncertainties are large. We are expecting an increase in statistical precision with more data in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02

STAR

Major goal of the STAR (Solenoidal Tracker at RHIC) experiment at Relativistic Heavy-Ion Collider (RHIC) facility is to understand the properties of strongly interacting matter formed and study of the dynamics, mechanism of particle production and exploring the Quantum Chromo Dynamics (QCD) phase diagram in heavy-ion collisions. This goal can be achieved by varying the center of mass energy ($\sqrt{s_{NN}}$) of colliding nuclei. STAR took data for Au+Au nuclei collisions over a wide range of energies ($\sqrt{s_{NN}}$ = 7.7 – 200 GeV) in phase I of Beam Energy Scan (BES I) program. The group at NISER is mainly inviolved in the the study of identified particle production and conserved charge fluctiuations. At $\sqrt{s_{NN}}$ = 14.5 GeV, measurement of transverse momentum (pT) spectra, particle yields (dN/dy), average transverse momentum (<pT>) of ±,K±,p(p) along with extraction of freeze-out parameters are done. A similar measurement also has been performed for U + U collision at $\sqrt{s_{NN}}$= 193 GeV. Also to study the dynamics and the collective properties of the medium, the azimuthal anisotropy relative to the reaction plane are measured in terms of flowco efficients v_n for n=2,3,4 for K^{o}_{s}, and in U+U collision at $\sqrt{s_{NN}}$ =193 GeV.

Studying fluctuations of conserved quantities, such as baryon number (B), strangeness(S) and electric charge (Q), provides insights into the nature of phase transitions of matter created in high-energy nuclear collisions. The higher moments of multiplicity distributions of net-proton (proxy for net-baryon), net-kaon (proxy

for net-strangeness) and net-charge are expected to show large fluctuations near the QCD critical point. The STAR experiment performed measurements (over BES I energies) of various higher order moments and moments products of net-proton (|yP|<0.5, 0.4<pT(GeV/c)<0.8), net-charge (| |<0.5, 0.2<pT(GeV/c)<2.0) and net-kaon (|yK |<0.5, 0.2<pT(GeV/c)<1.6), where the net-proton moments product (S and 2) in most central (0-5%) collisions as a function of beam energy shows deviations from Poissonian baseline (unity) in the lower beam energies region (below $\sqrt{s_{NN}}$ = 27 GeV). With an increased pT acceptance window of i.e. 0.4<p_T (GeV)<2.0, of net-proton shows large non-monotonic behaviour, hinting towards a qualitative signal for a possible QCD critical point. We performed measurement of higher moments for net-proton, net-charge and net-kaon on recently recorded high statistics collision data in Au+Au collision at $\sqrt{s_{NN}}$ = 54.4 GeV from STAR experiment to add to the previous results. We also study correlations between proton and pion which are expected to be sensitive to the presence of a QCD critical point. In 2019-2021, STAR experiment plans to perform precision measurements of higher moments of multiplicity distributions with improved data statistics in phase II of Beam Energy Scan program for the search of QCD critical point.

SuperCDMS

SuperCDMS is a direct dark matter search experiment that uses cryogenic solid state detectors to look for nuclear recoil signals from dark matter. In SuperCDMS, NISER has been involved in calibration, background studies, search for lightly ionising particles (LIPS) and detector monte carlo(DMC) simulations. The calibration study involves using quasi-mono-energetic neutrons of known energy to determine the ionization yields of SuperCDMS detectors which plays a huge hand in calculating the uncertainty in their results. NISER is leading the background studies done to estimate the activity of Si-32 which forms a major background in SuperCDMS dark matter searches. LIPs can also be detected using SuperCDMS detectors and NISER is leading the efforts in this search. The inclusion of LIPS in GEANT4 software package is being developed by NISER group. NISER is also actively involved in DMC validation for SuperCDMS.

DINO

NISER is engaged in the backgrounds and calibration efforts in the first phase of DINO, a dark matter search experiment in Jaduguda laboratory, India. DINO proposes to use suitable scintillation crystal detectors operated at cryogenic temperatures for the detection of scintillation light due to possible WIMP induced recoiling nuclei. Neutrons are one of the most important background in this search as they interact with the detector materials in the same way as WIMPs. In underground laboratories, neutrons can be generated mainly by spontaneous fission of Uranium and radiogenic processes, such as by U/Th (,n) reactions on the rock materials and by

cosmogenic processes, such as interaction of cosmic ray muons with rock and shielding materials. NISER is involved in estimating the flux of both the cosmogenic and the radiogenic neutrons for Jaduguda laboratory facility.

Phenomenology

In parallel to the data anlysis of various high energy physics experiments, our group is also involved in the several analysis using QCD based models like PYTHIA, transport models like AMPT, UrQMD and thermal model like THERMUS and THERMINATOR. These models help in better understanding of the experimental results.

One of present interest of our group is to study the freezeout conditions in heavy-ion collisions. The Hadron Resonance Gas (HRG) model has been used to extract the freezeout hypersurface by comparing the hadron yields from data. The surface where the inelastic scattering among the hadrons ceases is known as the chemical freezeout surface. The partcle yield get fixed at this surface. The system continue to expand and the surface where the elastic scattering among hadrons ceases is known as the kinetic freezeout surface. At this surface the shape of the transverse momentum spectra get fixed. The different model assumes different freezeout schemes, the chemical and kinteic freezeout surfaces could be separate or together. We have worked with THERMUS model that compare the particle yields from data and provide the information of chemical freezeout surface.The THERMINATOR event generator that assume combined frezeout i.e. both yields and spectra are fixed at the same surface provide more information like the geometry of the fire-ball and velocity of expansion in addition to the thermal parameters as it compares the transverse momentum spectra. A single freezeout schemes for all hadrons has been studied since long. However this scheme is not sufficient in explaining the LHC data, hence other alternate schemes have been proposed. The identified hadron yield and spectra is analysed within three different freezeout schemes: 1. single unified freezeout of all hadrons (1FO), 2. Single freezeout of all hadrons with fugacoty factor $_s$ which accounts for non-equilibrium production of strangeness (1FO+ $_s$), and 3. Distinct freezeout hypersurface for hadrons with and without strangeness content (2FO). It is observed the 2FO scheme better describe the Pb-Pb data. We have extended this study to small systems like pp and p-Pb. For small systems the 1FO+ $_s$ gives better description than 2FO. So in large systems like Pb-Pb which are dominated by constituent interactions prefer 2FO while the small systems like pp and p-Pb with lesser constituent interaction prefer 1FO with varying degree of strangeness equilibration.

Hardware

1. Neutron detection:

Rare event experiments such as neutrino and dark matter are concerned with events due to background radioactivity comprising mainly of gamma, neutron and cosmic radiation. We have set up a neutron detector lab at NISER to

study various detectors suitable for use in such experiments to measure and understand the background at experimental sites such as SuperCDMS, DINO etc. The laboratory has an Americium-Beryllium source of 1 mCi activity and a digitizer based VME acquisition system. Studies are being carried out with liquid scintillator detectors for fast neutrons and studies with thermal neutron detectors are planned soon.

2. Advanced gas detectors:

a) Resistive Plate Chamber (RPC):

The CBM experiment at the upcoming FAIR facility currently requires a technology change for the detectors in its 3rd and 4th stations. RPC is a potential candidate to meet this requirement. RPCs operated in the avalanche mode have a capability to handle particle fluxes of MIPs (Minimum Ionizing Particles) of 1-2 kHz/cm2. The challenge in CBM is to operate RPCs at rates of 15 kHz/cm2. The rate capability of an RPC is inversely proportional to the average charge produced by a MIP, the resistivity of the electrode and the thickness of the electrode. Studies have shown that the challenge can be addressed by reducing the resistivity (typically 1012 ohm.cm) of the electrodes by two to three orders of magnitude. However, there are other problems in this method such as signal localization, leakage current etc. Theoretically it is also possible to increase the rate capability by operating the RPC in a low gain mode wherein, the charge produced per signal is small. We are performing simulations and experiments on RPC for the feasibility of operation in low gain mode. A 5 channel gas mixing system has been designed and procured. It is capable of mixing 5 different gases in fairly arbitrary ratios. It can provide 8 channels of output to operate 8 detectors simultaneously. NIM electronics is being used for the studies and VME acquisition system is being setup.

b) Micro Pattern Gaseous Detectors (MPGD):

MPGDs are slowly replacing most of the gaseous detectors in use in many high energy physics experiments. They have remarkable position resolution, reasonable time resolution and show excellent radiation hardness. They are most suitable to be used in forward regions of accelerator experiments and also being tested for space applications. They are also potential candidates to be used for societal applications such as medical imaging, diagnosis and contraband identification. We are in the process of studying these family of detectors for which a ISO-5 cleanroom of ~200 sq.ft has been constructed. An X-ray irradiation setup is in the process of being installed. We would be performing R & D related to these detectors for both societal and high energy physics applications.

Dr. Sanjay Swain, Associate Professor

The group led by Sanjay Swain, work in CMS experiment at LHC, CERN. The main focus of the group is to perform data analysis using pp collision data. The main areas of interest are

(i) B-physics: Here the group is involved in

rare B-decays such as Bs->mumu, B->K*+mumu and B->K+mumu. These are very rare decay modes and are good tool to look for physics beyond standard model. Currently also the group started working in lifetime analysis of Bs ->mumu decay. This has never been done at all so far. This measurement will be the first and can give us hint for NP phenomena.

(ii) Also the group is involved in SUSY analysis, particularly, the susy top-squark production using all hydronic decay mode. This decay is considered to be the most sensitive decay to look for susy top. Although they have not found any SUSY particle at LHC yet, but this measurement can push the limit to exclude the mass of SUSY as they get more and more data.

(iii). Apart from this, the group has taken many important roles in B-physics ad SUSY groups, such a student from NISER-CMS group are leading the triggering validation, data validation, implementing new trigger path which can be used to start new analysis in favorable condition."

Dr. Subhankar Bedanta, Associate Professor

The area of focus for the group led by Dr. S. Bedanta is broadly nanomagnetism where both static and spin dynamics in magnetic thin films are addressed. The details of their research activities are mentioned below.

- Domain engineering in magnetic antidot lattice (MAL) arrays: The group has systematically working in fabrication and characterization of magnetic antidot lattices (MALs) of Co, CoFeB, L10 ordered FePt and a few Heusler alloy based films. They prepared MALs of Co, CoFeB and Co/Pt by photolithography followed by sputtering deposition. However, MAL arrays in FePt and Heusler alloy films have been prepared by e-beam lithography. 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. The experimental results are reproduced by micromagnetic OOMMF simulations.
- Organic spintronics: The group also focuses on spin transfer across ferromagnetic/organic semiconductor interfaces. The group has successfully demonstrated that non-magnetic Fullerene (C60) can get magnetic moment of ~ 3 m in a Fe/C60 bilayer system. The magnetic interface has been quantitatively evaluated by polarized neutron reflectivity experiments performed at FRM II (Muenich, Germany) and Rutherford Appleton Laboratory (Oxford, UK). The interface magnetism is also probed via X-ray magnetic circular dichroism (XMCD) measurements performed at the synchrotron lab ALBA, Spain. These results bring possibilities towards further exploration for future spintronic devices.
- Spin pumping in ferromagnetic/heavy

metal heterostructures: The group has recently installed the ferromagnetic resonance spectroscopy and developed in-house for measuring inverse spin Hall efect (ISHE). They investigated the spin pumping and calculated the spin mixing conductance in Co/Pt thin films having different buffer and capping layers. Recently the group has performed ISHE experiments in ferromagnetic (FM)/topological insulator (TI) heterostructures, in which the surface metallic state in the TI as a replacement of heavy metals. At present the group is exploring various antiferromagnetic (AFM) thin films to measure the ISHE in the direction of AFM spintronics.

- Micromagnetic study of skyrmions: By performing micromanetic simulations using the OOMMF package the group has successfully studied the formation and stability of skyrmions for variable anisotropy (K) and Dzyaloshinskii-Moriya interaction (DMI). At present the group is focusing on such skyrmion manipulation by electrical current in various device geometries in both ferromagnetic and antiferromagnetic systems.

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

The group is working in those topics of string theory that address black holes and also the topics of gauge-gravity duality. The next to most recent research is on settling the question of horizon smoothness in the most generic multi-blackhole space-time. The most research is on studying various aspects of three dimensional Cherns-Simons-matter superconformal theories primarily monopole operators in these theories.

Dr. Yogesh Kumar Srivastava, Reader-F

In past one year, He has been working with PhD students Deepali Mishra and Swayamsidha Mishara and collaborators Amitabh Virmani and Sudipta Mukherji on new solution generating techniques in supergravity and problems in AdS cosmologies.

With Deepali Mishra and Amitabh Virmani, he has found a generalization of Garfinkle-Vachaspati solution generating technique which has found many uses in String theory. The project is now complete (arXiv: 1808.04981) and they are working on generalizing this technique to different supergravity theories. These techniques are quite useful in constructing black hole microstates in String theory.

With Swayamsidha Mishra and Sudipta Mukherji, he has been working on AdS cosmologies. They are working on a technique relating how scalar fields in different FRW spacetimes can be related.

With Swayamsidha, He is also working on BMS

symmetries in String theory.

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. Prasanjit Samal, Reader-F

Research Areas: Density-Functional Theory (DFT) and its application in Atomic and Molecular Physics, Computational Materials Science, Condensed Matter Physics, Quantum Theory of Solid-State and theoretical quantum chemistry.

Research Interests: Our group research focuses on the Methodological developments of ground and excited-state Density-functional theory formalism (static and time-dependent), nanomaterials, electronic and optoelectronic devices, molecular electronics and renewable energy. We develope advanced DFT methodology based simulations ranging from data-driven to computationally-demanding but very accurate quantum mechanical to predict, understand and design materials and catalysis. Currently we are focussing on the following topics:

- Development of the semilocal and hybrid exchange-correlation functionals within density functional theory and Screened meta-GGA hybrids for solids.
- Exchange-correlation functionals for low dimensional systems based on the density matrix expansion based techniques and the development of Colle-Salvetti type

correlation energy functional.

- Development of the Pseudo-potential approach for meta-GGA functionals in plane wave basis set codes.
- Development of the accurate semi-local exchange potential for band gap calculations.
- TDDFT applied to molecules and solids with meta-GGA kernels. Applying meta-GGA range-separated functionals in the time-dependent DFT.
- Development of dielectric dependent meta-GGA level range-separated hybrid functionals.
- Use of non-local van der Waals density functionals with semi-local exchange-correlation functionals.
- Study of non-local electron correlation in biological molecules and their interaction with metal surfaces.
- Study of the meta-GGA level hybrid functionals in the prediction of excited state properties: A comprehensive comparison with many body GW approximations.

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 behaviour 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 behaviour 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

Dr. Sumedha's group is interested in understanding and developing mathematical and numerical approaches to study disordered systems. The recent work involves:

1. Effect of quenched disorder on first order transitions. Typically correlation length is finite near the first order transitions and they are more stable than the continuous

transitions. It is found though that in two dimensions, even an infinitesimal amount of quenched disorder either destroys transition, or converts it into a continuous transition. What happens in higher dimensions is still not clear. They have looked at three models with random field disorder: Random field Ising Model, p-spin interaction model and random crystal field Blume Capel model. They found that typically there is a threshold of disorder, beyond which the transition is always continuous.

2. Phase transitions in random k-Satisfiability problems. In computer science, it is now believed that computational complexity is connected to phase transitions. K-satisfiability is one of the most fundamental complex optimization problems. The problem is known to undergo phase transitions as a function of the ratio of constraints and variables. While polynomial time algorithms are known to solve the problem for $k = 2$, for $k \geq 3$ the problem is known to be NP-complete. They define the model on a tree and find that the solvability threshold for $k = 2$ matches the exact value of the threshold on regular random graphs. For higher k, the values are very close to those predicted using other techniques. Their method can be extended to many other optimisation problems.

3. Stochastic modelling of cellular processes. They are interested in understanding the role of stochasticity in biological processes. They are working on stochastic modelling of dynamics of FtSz monomers, which result in the formation of Z-ring, which plays a crucial role during cell division in bacteria.

Dr. Colin Benjamin, Reader -F

The research activity of the group concerns two broad fields

(a) Theoretical Nanoscience- The focus here is on aspects of non-local edge mode transport in the quantum spin Hall state, aspects of edge mode transport in quantum hall state of transition metal dichalcogenides and methods for observing quantum spin Hall effects in the adiabatic quantum pumping regime of graphene. Students worked or working on theoretical nanoscience:

(I) Arjun Mani, from June, 2014-May, 2018. Ph. D submitted on May 28, 2018,

(ii) Subhajit Pal, from December 2015-continuing, and Tusaradri Mohapatra, from December,2017-continuing.

(iii) Research Associates: Dr. Sudin Ganguly worked in DST SERB project.

(b) Quantum information theory and Game theory- The focus here is on two aspects-one, quantum walks and exploring Parrondo's games in quantum walks and second on equilibrium solutions like Nash equilibrium and Pareto optimality of classical and quantum games. Students worked or working on QI & game theory:

(i) N. Vyas and J. Rajendran (Aug. 2016-June

2017) submitted their master's thesis on "Quantum Hawk-Dove game" and "Parrondo's paradox in quantum walks" in May2017.

(ii) S. Sarkar, (Aug. 2017-June 2018) submitted his Master's thesis on "Classical and quantum games in the thermodynamic limit" in May 2018.

(c) Senior Research Fellow Arjun Mani is working with me on his Ph. D thesis from December 2014 onwards. He delivered his synopsis presentation successfully in Jan. 2018 and submitted his thesis in May, 2018.

(d) Senior Research Fellow Subhajit Pal has been promoted to this level in August 2017 and is working on his PhD thesis from July 2015 onwards.

(e) Junior Research Fellow T. Mohapatra worked on her Predoctoral project from Jan.-May2018.

(f) Masters student Shubhayan Sarkar worked on his Masters thesis on "Classical and quantum games in the thermodynamic limit" from July 2017-May 2018.

Dr. Pratap Kumar Sahoo, Reader-F

The group led by Dr. Sahoo carries out experimental investigation of nano-materials and ion matter interaction. The main two research areas are mentioned below.

Tunnel devices are very important for technological application. The basic phenomena can be understood in terms of the physics behind the electron and phonon-tunnel device, which depends on the device geometry. The group is involved to fabricate novel structure with low cost techniques for tunnel devices. Recently they have synthesized crystalline-amorphous-crystalline (c-a-c) stature which can be used as phonon-tunnel junction devices. Similar structures like c-a-c with p-n-p electronics devices also of great interest which can be fabricated using low energy ion beam facility.

Single Nanorod based n-n-p transistor: Tandem p-n junctions have been synthesized in ZnOnanorods (NRs) by implantation of 50 and 350 keV O+ ions. We have demonstrated the single nanorod based p-n, p-n-p and p-n-p-n type tendom junction after successive ion implanation using suitable ion energy and ions. These Nanorods are also highly luminescence, which can be used as phodiodes and photo transistors.

New Phase synthesis using ion beams: In general, study of stable phases of Ni-Bi system would be quite interesting for superconducting, ferromagnetic and often their coexistence at certain conditions. We have synthesized NiBi and NiBi3 phases using ion energy range from 1 MeV to 120 MeV and optimize the parameter for highest mixing rates where the stable phase can exit. We show the swift heavy ion (120 MeV Au ions) induced electronic energy loss plays an important role to enhance the interface mixing

of Ni-Bi stable phases as a function of ion fluence. Also, a molten-like surface morphology has been realized due to latent thermal spike along the ion track upon swift heavy ion irradiation. The enhanced mixing and evolution of molten like surface morphology after ion irradiation has been explained on the basis of the inelastic thermal spike model calculations. These calculations were extended for the higher energies to understand the threshold energy of molten phase which may transfer the materials to a stable phase to realize the suitable properties for technological applications.

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 unconventional superconductivity in hybrid superconductor-ferromagnet systems. In particular, the group is involved in various experiments to generate and tune spin-triplet supercurrent in artificial structures. The large range of this type of super-current is immediately attractive for the field of low temperature spintronics. We are attempting several methods for addressing the issue such as embedding an exchange spring in a Josephson junction and forcing a spin-singlet supercurrent through natural domain walls existing in well known ferromagnets. These experiments are being carried out in collaboration with UGC-DAE CSR, Indore and University of Cambridge UK. This group is also trying to look into aspects of superconductivity in nanoscale superconductor-ferromagnet hetero-structures such as core-shell nano-particles and nanowires with superconducting core and magnetic shell and vice versa.

Dr. Ashok Mohapatra, Reader-F

Currently, the group is working on 2 major projects.

1. Study of coherent Rydberg excitation in a thermal and ultra-cold atomic vapor.

The long term objective of the project is to realize strong photon-photon interactions

using the non-linearity mediated by Rydberg blockade interaction. Rydberg blockade is the phenomenon where more than one atom within the blockade volume can not be excited to the Rydberg state using a monochromatic laser beam due to strong Rydberg-Rydberg interaction. Recently the group has demonstrated the blockade interaction in thermal atomic vapour which has a potential application in quantum information processing and quantum computation. The group is also involved in developing an ultra-cold set up to study blockade interaction as well as interaction facilitated enhanced Rydberg excitation.

2. Study of light propagation in all optical waveguides

Strong cross phase modulation is an optical non-linear process which can be used to modulate the refractive index of a medium using a strong pump light field. A probe light field propagating through such a medium will experience the modulated refractive index. This system is analogous to the time evolution of a quantum system in a potential and in this case the potential can be easily engineered by using various intensity patterns of the control light field. The objective of this project is to study a variety of problems like probe propagation in synthetic magnetic field, random potential, periodic potential etc. Recently the group has successfully guide a probe light through pump light with Laguree-Gaussian intensity profile. Also different spatial modes of a two-dimensional harmonic oscillator potential are observed due to all optical waveguide generated using a pump field in rubidium vapour.

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.

Prolay Kumar Mal, Reader-F
(Ramanujan Fellow 2013-18)

The Standard Model (SM) of Particle Physics is the theoretical framework explaining the dynamics of the subatomic particles viz., quarks, leptons and gauge bosons, and their interactions. The discovery of the SM Higgs boson by 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). However, in spite of its great accuracy in explaining the wide range of experimental data over the past few decades, it has several shortcomings and it is believed to be a low-energy limit of a more fundamental theory. For example, it cannot provide appropriate explanation for the dark matter candidate and mass hierarchy problem.

Dr. Mal's primary research focuses on the understanding of the basic mechanism responsible for the electroweak symmetry-breaking and to probe new physics beyond the standard Model (BSM) of Particle physics. He works with the CMS detectors at the Large Hadron Collider (LHC) involving the top quark and Higgs boson. In particular, during the current LHC Run II at $\sqrt{s}$=13-14 TeV, he looks for the signatures of dark matter and flavor-changing neutral current (FCNC) decays of the top quark.

In addition, he is leading the NISER-CMS group in terms of CMS detector upgrade program scheduled in next few years. During this period the LHC is scheduled to undergo several luminosity upgrade programs where the number of interactions per proton-proton branch crossing would heavily be increased. In such an environment, any physics analyses would require event filtering based on the tracking detector. Dr. Mal is actively involved in the CMS upgrade program for developing suitable track triggering mechanism, as well as in building the tracking detector for High-Luminosity LHC (HL-LHC). Furthermore, he pursues the performance studies for the present CMS tracker using the Monte Carlo simulations apart from his participation in CMS detector operations.

Dr. V Ravi Chandra, Reader-F

1. We completed the study of the ground state phase diagram of the spin-1/2 Heisenberg antiferromagnet on the pyrochlore lattice using exact diagonalisation. The results were published (Ref: V. R. Chandra and J. Sahoo, Phys. Rev. B 97, 144407 (2018)) and presented at several conferences.
2. We are in the process of carrying out a

comprehensive study of dynamical correlations in the phases of the spin-1/2 J_1 - J_2 antiferromagnets on the square and triangular lattices using exact diagonalisation. These models have a correlated non-magnetic phase sandwiched between two ordered states and the nature of the transition and the correlated phase is hotly debated. While the ground state correlations have been studied in some detail for these models, we plan to present details of the excitation spectrum as the system undergoes these transitions using evaluations of dynamical correlations relevant for neutron scattering measurements. We have developed large scaleexact diagonalisation based programs for the evaluation of dynamical correlations and are analysing currently data for a system size of 36 spin-1/2 sites and hope to eventually present data for 40 spin-1/2 sites. Preliminary results for lower system sizes were part of the Master's thesis of Mr. Siddharth Mansingh.

3. We are currently studying the effects of the role of anisotropies like the xxz anisotropyand Dzyaloshinskii-Moriya interactions on the low temperature phases of generic two dimensional exchange coupled quantum magnets. These anisotropies are among the simplest naturally occurring perturbations to ideal Heisenberg magnets and investigating their role is crucial in interpreting measured data for many magnetic materials. Two branches of our research in thisinvolve studying the effect of these perturbations together on frustration induced correlated states in several canonical two dimensional magnets. Secondly, we are studying topological properties of magnonic band structures using a unifiedspin wave analysis for general Bravais lattices with a basis. The aim of this project is to analyse several existing magnonic topological insulators (MTI) as a special case of a more general Hamiltonian and look for parameter regimes in which new MTIs can be found.

Dr. Nishikant Khandai, Reader-F

In the last one year we have been looking at a couple of problems in large scale structure. Along with my PhD student Saili Dutta we have been looking at the properties of HI selected galaxies in the local Universe. By looking at sub-populations, e.g. color-magnitude, of the HI selected galaxies we are able to show that different populations contribute to different regimes of the HI mass function.

The low mass end is dominated by faint blue and bluer galaxies, the knee is dominated by bright blue galaxies and the high mass end is dominated by red galaxies. The last part is puzzling since redder populations are associated with gas-poor early type galaxies. We are investigating this population of red galaxies and a preliminary analysis of their images show that these may be dusty galaxies. With undergrad student Biprateep Dey we have further explored how to predict properties of HI selected galaxies from observational properties of their optical

counterparts. We are using a machine-learning approach to tackle this problem. We are able to show that we can reproduce the distribution of HI masses and HI velocity widths separately. However to correctly predict the number of HI detections we need to jointly predict the HI mass-velocity for each galaxy. With undergrad student Divya Rana and faculty Anamitra Mukherjee (co-advisor) we have explore the similarities between granular gases and self-gravitating systems. By considering the same initial conditions in the slightly non-linear regime we have been able to show that the evolved systems show similar characteristics in their distribution as well as their clustering. A couple of projects are underway with Suchetana Chatterjee (Presidency) and Raghunathan Srianand (IUCAA). In the former we are looking at the x-ray signal in galaxy groups and how it can be used to study the property of the central supermassive blackhole. In the latter we are looking at the metal lines in the lyman-alpha forest and how these can be used to study the IGM and ICM around galaxies and clusters of galaxies. Both these projects involve analysing cosmological hydrodynamical simulations.

Courses Taught

1/Fall 2017 - P474 Introduction to Cosmology
2/Spring 2018 - P457 General Relativity

Student Supervision

1/Biprateep Dey - MSc Project (24 credits)
2/Divya Rana - MSc Project (24 credits)

Dr. Anamitra Mukherjee, Reader-F

(a) The collaborations started with Prof. Tanusri-Saha-Dasgupta at SNBCBS and Prof. Arun Paramekanti at University of Toronto for studying the physics of strongly correlated Nickel oxide systems has led to a paper that is under review at present.

(b) With his student Gour Jana, he has completed the work on the project of studying the Hubbard model with next nearest hopping. In this work he has shown that their approach of Monte Carlo-Mean Field theory can capture Fermi liquid to non Fermi liquid crossover, magnetic phases and spin liquid behavior in this model and can be used to study the impact of temperature of these. The paper is being finalized for submission.

(c) With his student Gour Jana, they are now looking to study super conducting instability in the above mentioned model.

(d) He has started co-guiding another PhD student Sayan Jana of IOP, jointly with Dr. Arijit Saha, faculty member of IOP. They have looked at the impact of strong correlation physics of topological phases in the 2 dimensional Lieb lattice. They have shown how a band topological insulator becomes a topological Mott insulator using slave rotor mean field theory. We have also shown how the edge states evolve under increasing correlation effects.

The work for this project is complete, they are

writing up the paper.

Dr. Ajaya Kumar Nayak,
Assistant Professor

Dr. Nayak joined NISER in December 2016. During the mentioned period he has mostly focused on building his lab for experimental work. His research is mostly focused on "Study of magnetic skyrmions/antiskyrmions for racetrack based memory application. His other focus areas are study of anomalous/ topological Hall Effect in non-collinear antiferromagnets, designing compensated ferrimagnetic materials for antiferromagnetic spintronics and exchange bias in magnetically inhomogeneous systems. A brief description of the ongoing work is mentioned below.

(I) Magnetic skyrmions/antiskyrmions:

Magnetic skyrmions are topologically stable vortex-like objectswith a swirling spin configuration. The topologically stable spin texture of skyrmions helps them to move in much less current density in comparison to the conventional domain walls. Magnetic materials with broken inversion symmetry, where the asymmetric Dzyaloshinskii–Moriya interaction modifies the uniform magnetic state to a swirling state, are considered to be suitable candidates to achieve skyrmions. In a very recent work, it has been demonstrated that the tetragonal Heusler compounds with D2dcrystal symmetry are potential candidates for realizing magnetic antiskyrmions [Nature 548, 561 (2017)]. The presence of antiskyrmions was demonstrated with help of Lorentz Transmission Electrom Microscopy in a thin lamella of Mn-Pt-Sn compound. The existence of antiskyrmions in bulk Mn-Pt-Sn system is also shown by magnetic entropy change measurements over a large temperature range. In a very recent work, the group has utilized the available facilities at NISER to discover a new antiskyrmion hosting Heusler system with help of topological Hall Effect and ac-susceptibility measurements. The manuscript is currently under review. The group has also focused on macromagnetic simulation to understand the physics behind the observed skyrmion phase.

(ii) Designing compensated ferrimagnetic systems:

Recently, there is a renewed interest in spintronics based on antiferromagnetic materials. This is due to the fact that antiferromagnets do not exhibit any stray fields and are very stable against any external perturbation. However, their demerit is that they do not show any spin polarization. In contrast, compensated ferrimagnets can display a zero net magnetic moment with a large spin polarization. In this direction the group has performed significant work to design a Mn-Pt-In based compensated ferrimagnetis system that shows zero magnetic moment. It is also planned to utilize the above mentioned system to design compensated skyrmions, which are expected to show zero skyrmion Hall effect required for application purpose.

(iii) Anomalous/topological Hall Effect in

non-collinear antiferromagnets:

Theanomalous Hall Effect (AHE) in general roughly scales with the magnetization of a ferromagnet. Hence, no AHE should be observed in an antiferromagnet due to its zero net magnetic moment. Recently, it has been found that alarge AHE can be found in case of a non-collinearantiferromagnets. The origin of the present effect is explained in terms of anon-vanishing Berry-phasecurvature. In this direction the group has performed substantial study to find out field dependent topological Hall Effect in the low temperature phase of Mn3Sn.

(iv) Exchange bias in magnetically inhomogeneous materials:

The exchange bias (EB), which is generally described as a shift of the magnetic hysteresis loop along the field axis, arises due to the interfacial exchange interaction of a ferromagnet and an antiferromagnet. The EB has been studied extensively in various systems, such as fine particles, layered films and inhomogeneous bulk materials. Recently, an extremely large EB of about 3.5 T has been reported in a compensated ferrimagnetic system that consists of some ferromagnetic clusters. It was found that the exchange bias field in this system inversely proportional to the net magnetization of the compensated magnetic state. In this direction a new Mn-Pt-In based system is designed that give EB field more than 2.5 T. A detailed study is going on to explore the origin of such a large EB effect. In a similar fashion it is also found that the multi-glass perovskite SmFeO3exhibits magnetic compensation-induced sign reversal of exchange bias.

Dr. Victor Roy, Assistant Professor

The present research of our group is mainly focused on the study of large-electromagnetic field produced in the initial state of high-energy heavy ion collisions and its effect on space-time evolution of QCD matter and other experimental observables.

We have successfully determined the correction to the single particle distribution function in presence of magnetic field within relaxation time approximation method. We also investigated the combined evolution of magnetic field and fluid vorticity within ideal magnetohydrodynamics limit.

Dr. Amaresh Kumar Jaiswal, Assistant Professor

The current research of their group is focused on the space-time evolution of QCD matter formed in high-energy heavy ion collisions. In ultra-relativistic heavy ion collisions, a deconfined phase of quarks and gluons called quark-gluon-plasma (QGP) are created over the nuclear volume. The current research interest of the group is to formulate relativistic hydrodynamic equations, which takes into account the spin of fermions in the plasma. Polarization of observed hadrons will carry the signature of this effect that we are trying to incorporate in our formulation. We are also interested in studying the anisotropy of

dileptons due to polarization of the virtual photon that produces the lepton pair. Recently we have started working on propagation of heavy quarks such as charm and bottom through the medium. In particular, we are interested in the flow of bound state of bottom quark known as bottomonium. We aim to achieve this by considering the thermal decay of bottomonium in a spatially anisotropic medium created in non-central heavy ion collisions.

Dr. Tuhin Ghosh,
Assistant Professor

The group led by Dr. Tuhin Ghosh focuses on certain aspects of Cosmology and Galactic Astrophysics. The activities of this group are described below.

a) Missing baryon problem – The standard Lambda Cold Dark Matter (LCDM) model of the Universe predicts that only 4.9% of the total matter is made up of baryons (visible matter). However, observationally we can only account for 70% of the total baryonic matter using different probes. The remaining unaccounted 30% of the baryonic matter could be present as hot gas in the intergalactic filamentary structure connecting two galaxies. With Baibhav Singari (3rd Year Int-M.Sc. student at NISER), we search for the hot gas signal by stacking the all-sky Planck thermal Sunyaev-Zeldovich map (a tracer of hot gas with temperature 107 K) and using different component separation technique than the one proposed by Tanimura et al. 2017.

b) Spectral properties of the polarized dust emission – The primary limiting factor in the quest of B-mode polarization in Cosmic Microwave Background (CMB) introduced by the primordial gravitational wave is polarized emission from Galactic dust. Observations of Galactic dust is one of the highlights and last legacy of the Planck space mission. The multifrequency capability of the Planck survey allows us to study the structure of the Galactic magnetic field and its coupling with interstellar matter and turbulence. In our work, we use the Planck legacy data and characterize the spectral energy distribution of the polarized dust emission. No evidence for a loss of correlation in the dust B-mode map has been found through our analysis between Planck HFI frequency channels.

c) Testing statistical isotropy of the CMB map - Minkowski Tensors (MTs) are recently used to study the statistical isotropy of temperature fluctuations of the Cosmic Microwave Background Radiation (CMB). In collaboration with Dr. Pravabati Chingangbam (IIAP) and Joby P. K. (IIAP), we have calculated MFs directly on the sphere and compute the net alignment of the structures seen in the Planck CMB data. We do not find any significant deviation between the data and the Monte-Carlo CMB simulations that are statistically isotropic. In future, we are planning to apply MFs to study the characteristic scale of the dust filamentary structures seen in the Herschel data.

Non-Gaussianity study of diffuse Galactic emission at 408 MHz – The red shifted 21 cm signal from epoch of reionization gets

contaminated by diffuse Galactic emission, especially by the synchrotron emission. We use 408 MHz map and studied if there exists a clean sky region where the Galactic emission can be approximated by a Gaussian random field. Most of the existing component separation methods assume foreground to be Gaussian. We apply two statistical tools – binned bispectrum estimator and Minkowski functional to show that the assessment of foreground emission being Gaussian is valid only at low brightness temperature T < 25 K and at angular scales of 3 degrees or less. For high brightness regions (T > 25 K), non-Gaussianity of foreground emission needs to be taken into account in the component separation methods. We have collaborated this work with Prof. Jasjeet Bagla (IISER Mohali) and his PhD student Sandeep Rana.

Publications (Journals):

ALICE

1. π0 and meson production in proton-proton collisions at $\sqrt{s}$=8 TeV. S. Acharya et al. (ALICE Collaboration), Eur. Phys. J. C 78 (2018) 263.
2. Measurement of Z0-boson production at large rapidities in Pb-Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 780, 372 (2018).
3. D-meson azimuthal anisotropy in mid-central Pb-Pb collisions at $\sqrt{s_{NN}}$=5.02 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Rev. Lett. 120, 102301 (2018).
4. Search for collectivity with azimuthal J - hadron correlations in high multiplicity p-Pb collisions at $\sqrt{s_{NN}}$= 5.02 and 8.16 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 780, 7 (2018).
5. Production of deuterons, tritons, 3He nuclei and their anti-nuclei in pp collisions at $\sqrt{s}$= 0.9, 2.76 and 7 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Rev. C 97, 024615 (2018).
6. Systematic studies of correlations between different order flow harmonics in Pb-Pb collisions at $\sqrt{s_{NN}}$= 2.76 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Rev. C 97, 024906 (2018).
7. Production of 4He and anti-4He in Pb-Pb collisions at $\sqrt{s^{NN}}$= 2.76 TeV at the LHC. S. Acharya et al. (ALICE Collaboration), Nucl. Phys. A 971, 1 (2018).
8. Kaon femtoscopy in Pb-Pb collisions at $\sqrt{s}$NN = 2.76 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Rev. C96, 064613 (2017).
9. J/ elliptic flow in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Rev. Lett. 119, 242301 (2017).
10. Constraining the magnitude of the Chiral

Magnetic Effect with Event Shape Engineering in Pb-Pb collisions at $\sqrt{s_{NN}}$= 2.76 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 777, 151 (2018).

11. Charged-particle multiplicity distributions over a wide pseudorapidity range in proton-proton collisions at $\sqrt{s}$=0.9, 7 and 8 TeV. S. Acharya et al. (ALICE Collaboration), Eur. Phys. J. C 77, 852 (2017).

12. The ALICE Transition Radiation Detector: construction, operation, and performance. S. Acharya et al. (ALICE Collaboration), Nucl. Instr. Meth. A881, 88 (2018).

13. First measurement of jet mass in Pb-Pb and p-Pb collisions at the LHC. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 776, 249 (2018).

14. J/ production as a function of charged-particle pseudorapidity density in p-Pb collisions at $\sqrt{s_{NN}}$=5.02 TeV. D. Adamova et al. (ALICE Collaboration), Phys. Lett. B 776, 91 (2018).

15. Energy dependence and fluctuations of anisotropic flow in Pb-Pb collisions at $\sqrt{s_{NN}}$=5.02 and 2.76TeV. S. Acharya et al. (ALICE Collaboration), JHEP 07, 103 (2018).

16. Measurement of deuteron spectra and elliptic flow in Pb-Pb collisions at $\sqrt{s_{NN}}$= 2.76 TeV at the LHC. S. Acharya et al. (ALICE Collaboration), Eur. Phys. J. C 77, 658 (2017).

17. Searches for transverse momentum dependent flow vector fluctuations in Pb-Pb and p-Pb collisions at the LHC. S. Acharya et al. (ALICE Collaboration), JHEP 09, 032 (2017).

18. Anomalous Evolution of the near-side jet peak shape in Pb-Pb collisions at $\sqrt{s_{NN}}$= 2.76 TeV. J Adam et al. (ALICE Collaboration), Phys.Rev.Lett. 119, 102301 (2017).

19. Measuring $K^{0}_{S}K^{\pm}$ interactions using Pb-Pb collisions at $\sqrt{s_{NN}}$=2.76 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 774, 64 (2017).

20. Evolution of the longitudinal and azimuthal structure of the near-side jet peak in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV. J Adam et al. (ALICE Collaboration), Phys. Rev. C 96, 034904 (2017).

21. Insight into particle production mechanisms via angular correlations of identified particles in pp collisions at $\sqrt{s}$ = 7 TeV. J Adam et al. (ALICE Collaboration), Eur. Phys. J. C77, 569 (2017).

22. Measurement of D-meson production at mid-rapidity in pp collisions at $\sqrt{s}$ = 7 TeV. S. Acharya et al. (ALICE Collaboration), Eur.Phys.J. C77, 550 (2017).

23. Linear and non-linear flow modes in Pb-Pb collisions at $\sqrt{s_{NN}}$= 2.76 TeV. S. Acharya

et al. (ALICE Collaboration), Phys. Lett. B773, 68 (2017).

24. Measurement of electrons from beauty-hadron decays in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV and Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV. J Adam et al. (ALICE Collaboration), JHEP 07, 052 (2017).

25. Centrality dependence of the pseudorapidity density distribution for charged particles in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. J Adam et al. (ALICE Collaboration), Phys. Lett. B 772, 567 (2017).

26. Energy dependence of forward-rapidity J/ and (2S) production in pp collisions at the LHC. S. Acharya et al. (ALICE Collaboration), Eur. Phys. J. C 77, 392 (2017).

27. Production of muons from heavy-flavour hadron decays in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. S. Acharya et al. (ALICE Collaboration), Phys. Lett. B 770, 459 (2017).

28. Production of (1385) $^{\pm}$ and (1530)0 in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. D. Adamova et al. (ALICE Collaboration), Eur. Phys. J. C 77, 389 (2017).

29. Azimuthally differential pion femtoscopy in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV. D. Adamova et al. (ALICE Collaboration), Phys. Rev. Lett. 118, 222301 (2017).

30. Measurement of the production of high-pT electrons from heavy-flavour hadron decays in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV. J Adam et al. (ALICE Collaboration), Phys. Lett. B 771, 467 (2017).

31. Production of π^0 and mesons up to high transverse momentum in pp collisions at 2.76 TeV. S. Acharya et al. (ALICE Collaboration), Eur. Phys. J. C 77, 339 (2017).

32. Enhanced production of multi-strange hadrons in high-multiplicity proton-proton collisions. J Adam et al. (ALICE Collaboration), Nature Physics 13, 535 (2017).

33. Flow dominance and factorization of transverse momentum correlations in Pb-Pb collisions at the LHC. J Adam et al. (ALICE Collaboration), PRL 118, 162302 (2017).

34. Measurement of azimuthal correlations of D mesons and charged particles in pp collisions at $\sqrt{s}$ = 7 TeV and p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV. J Adam et al. (ALICE Collaboration), Eur. Phys. J. C 77, 245 (2017).

STAR

35. Transverse spin-dependent azimuthal correlations of charged pion pairs measured in p +p collisions at $\sqrt{s}$ = 500 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Lett. B 780, 332 (2018).

36. Beam-Energy Dependence of Directed Flow of , anti-, K±, K0S and in Au+Au Collisions. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. Lett. 120, 62301 (2018).

37. Azimuthal transverse single-spin asymmetries of inclusive jets and charged pions within jets from polarized-proton collisions at $\sqrt{s}$ = 500 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. D 97, 32004 (2018).

38. Coherent diffractive photoproduction of rho0 mesons on gold nuclei at 200 GeV/nucleon-pair at the Relativistic Heavy Ion Collider. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. C 96, 54904 (2017).

39. Measurements of jet quenching with semi-inclusive hadron+jet distributions in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. C 96, 24905 (2017).

40. Bulk Properties of the Medium Produced in Relativistic Heavy-Ion Collisions from the Beam Energy Scan Program. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. C 96, 44904 (2017).

41. Measurement of D^0 azimuthal anisotropy at midrapidity in Au+Au collisions at $\sqrt{s_{NN}}$= 200 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. Lett. 118, 212301 (2017).

42. Global Lambda hyperon polarization in nuclear collisions: evidence for the most vortical fluid. L. Adamczyk et al. (STAR Collaboration), Nature 548, 62 (2017).

43. Measurement of the cross section and longitudinal double-spin asymmetry for di-jet production in polarized pp collisions at $\sqrt{s}$ = 200 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. D 95, 71103 (2017).

44. Di-Jet imbalance measurements in Au+Au and pp collisions at $\sqrt{s}$NN = 200 GeV at STAR. L. Adamczyk et al. (STAR Collaboration), Phys. Rev. Lett. 119, 62301 (2017).

45. Energy dependence of J/psi production in Au+Au collisions at $\sqrt{s_{NN}}$= 39, 62.4 and 200 GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Lett. B 771, 13 (2017).

46. Direct virtual photon production in Au+Au collisions at $\sqrt{s_{NN}}$=200GeV. L. Adamczyk et al. (STAR Collaboration), Phys. Lett. B 770, 451 (2017).

Super CDMS

47. Results from the Super Cryogenic Dark Matter Search Experiment at Soudan. R. Agnese et al. (SuperCDMS Collaboration), Phys. Rev. Lett. 120, 061802 (2018).

48. Low-Mass Dark Matter Search with CDMSlite. R. Agnese et al. (SuperCDMS Collaboration), Phys. Rev. D 97, 022002 (2018).

Phenomenology

49. 3D Simulation of Electron and Ion Transmission of GEM-based Detectors. Purba Bhattacharya, Bedangadas Mohanty, Supratik Mukhopadhyay, Nayana Majumdar, Hugo Natal da Luz, Nuclear Inst. and Methods in Physics Research, A 870, 64 (2017).

50. Criticality in a Hadron Resonance Gas model with the van der Waals interaction. Subhasis Samanta, Bedangadas Mohanty, Phys. Rev. C 97, 015201 (2018).

51. Freezeout systematics due to the hadron spectrum. Sandeep Chatterjee, Debadeepti Mishra, Bedangadas Mohanty, Subhasis Samanta, Phys. Rev. C 96, 054907 (2017).

52. A Review of Elliptic Flow of Light Nuclei in Heavy-Ion Collisions at RHIC and LHC Energies. Md. Rihan Haque, Chitrasen Jena, Bedangadas Mohanty, Advances in High Energy Physics Volume 2017, Article ID 1248563, 15 pages.

53. Contrasting freezeouts in large versus small systems. Sandeep Chatterjee, Ajay Kumar Dash and Bedangadas Mohanty, J.Phys. G44 (2017) no.10, 105106.

54. Sudhir Pandurang Rode, Partha Pratim Bhaduri, Amaresh Jaiswal and Ankhi Roy, "Kinetic freeze-out conditions in nuclear collisions with 2-158A GeV beam energy within a non boost-invariant blast wave model", [arXiv: 1805.11463]. Physical Review C 98 (2018) 024907.

55. Enrico Speranza, Amaresh Jaiswal and Bengt Friman, "Virtual photon polarization and dilepton anisotropy in relativistic nucleus nucleus collisions", Physics Letters B 782 (2018) 395-400 [arXiv: 1802.02479].

56. Wojciech Florkowski, Bengt Friman, Amaresh Jaiswal, Radoslaw Ryblewski and Enrico Speranza, "Spin-dependent distribution functions for relativistic hydrodynamics of spin-1/2 particles", Physical Review D 97 (2018) 116017 [arXiv:1712.07676].

57. Amaresh Jaiswal and Partha Pratim Bhaduri, "Effect of anisotropic escape mechanism on elliptic flow in relativistic heavy-ion collisions", Physical Review C 97 (2018) 044909 [arXiv:1712.02707].

58. Ashutosh Dash and Amaresh Jaiswal, "Metric anisotropies and emergent anisotropic hydrodynamics", Physical Review D 97 (2018) 104005 [arXiv: 1711.07130].

59. Wojciech Florkowski, Bengt Friman, Amaresh Jaiswal and Enrico Speranza, "Relativistic fluid dynamics with spin" Physical Review C 97 (2018) 041901 (Rapid Communication) [arXiv:1705.00587].

60. "Probing helicity and the topological origins of helicity via non-local Hanbury-Brown and Twiss correlations", Arjun Mani, Colin Benjamin, Scientific Reports7: 6954 (2017).

61. "Strained graphene based highly efficient quantum heat engine operating at maximum power", Arjun Mani, Colin Benjamin, Phys. Rev. E 96, 032118 (2017), Citations-6.

62. "How to implement a genuine Parrondo's paradox with quantum walks?" Jishnu Rajendran, Colin Benjamin, Royal Society open science 5, 171599 (2018). This work on seeing a genuine Parrondo's paradox with quantum walks, published in Royal Society Open Science has been featured in Live Science, a website devoted to the science geek, see Weird Paradox Says 2 Losses Equals a Win. And It Could Lead to Fast Quantum Computers by Marcus Woo, Citations-2.

63. Tuning the 0 – π Josephson junction with a high spin molecule: Role of tunnel contacts, exchange coupling, electron-electron interactions and high spin states, S. Pal, Colin Benjamin, Scientific Reports 8: 5208 (2018).

64. Helical thermoelectrics and refrigeration, A. Mani, Colin Benjamin, Phys. Rev. E 97, 022114 (2018), Citations-1.

65. Role of helical edge modes in the chiral quantum anomalous Hall state, A. Mani, Colin Benjamin, Scientific Reports 8:1335 (2018).

66. Playing a true Parrondo's game with a three state coin on a quantum walk, J. Rajendran, Colin Benjamin, EPL (Euro Phys. Lett.) 122, 40004 (2018).

Preprints:

67. "Negating van Enk-Pike's assertion on quantum games OR Is the essence of a quantum game captured completely in the original classical game?", Nilesh Vyas, Colin Benjamin, arXiv:1701.08573.

68. Are thermal fluctuations the sole reason for finite longitudinal resistance in quantum anomalous Hall experiments? A. Mani, Colin Benjamin, arXiv: 1803.04995.

69. Yu-Shiba-Rusinov bound states induced by a spin flipper in the vicinity of a s-wave superconductor, S. Pal, Colin Benjamin, 1801.06401.

70. Spin flip scattering engendered quantum spin torque in a Josephson junction, Subhajit Pal, Colin Benjamin, arXiv:1803.10105

71. Emergence of Cooperation in the thermodynamic limit, Shubhayan Sarkar, Colin Benjamin, arXiv:1803.10083

72. V. R. Chandra and J. Sahoo, Phys. Rev. B 97, 144407 (2018)

73. Dr. Tuhin Ghosh F. Levier, J. Neveu, E. Falgarone, F. Boulanger, A. Bracco, T. Ghosh, F. Vansyngel, On the statistics of the polarized sub millimetre emission maps from thermal dust in the turbulent, magnetized, diffuse ISM, accepted in A&A, 2018.

74. F. Vansyngel, F. Boulanger, T. Ghosh, Benjamin D. Wandelt, J. Aumont, A. Bracco, F. Levrier, Peter G. Martin, L.

Montier, Statistical simulations of the dust foreground to CMB polarization, A&A, 603, A62, 2017.

75. T. Ghosh, F. Boulanger, Peter G. Martin, A. Bracco, F. Vansyngel, J. Aumont, J. Bock, O. Doré, U. Haud, P. M. W. Kalberla, and P. Serra, Modelling and simulation of large-scale polarized dust emission over the southern Galactic cap using the GASS Hi data, A&A, 601, A71, 2017.

76. BICEP2/Keck Array IX. New Bounds on Anisotropies of CMB Polarization Rotation and Implications for Axion-Like Particles and Primordial Magnetic Fields, PRD, 96, 2017.

77. "Magnetic antiskyrmions above room temperature in tetragonal Heusler materials" A. K. Nayak, V. Kumar, T. Ma, P. Werner, E. Pippel, R. Sahoo, F. Damay, U. K. Rößler, C. Felser, S. S. P. Parkin, Nature 548, 561 (2017).

78. "Magnetic compensation-induced sign reversal of exchange bias in a multi-glass perovskite SmFeO3"C. De, A. K. Nayak, M. Nicklas, and A. Sundaresan, Appl. Phys. Lett. 111, 182403 (2017).

79. Mukesh K. Shukla and R. Das, "Tamm-plasmon polaritons in one-dimensional photonic quasi-crystals" Optics Letters, vol. 43, pp. 362-365 (2018).

80. M. Chhabra and R. Das, "Probing students' conceptions at classical - quantum interface," European Journal of Physics, vol. 39, pp. 025710 (2018).

81. M. K Shukla, R. Das, "High-power, single-frequency source in the mid-infrared using a singly-resonant optical parametric oscillator pumped by Yb-fiber laser," Journal of Selected Topics in Quantum Electronics, vol. 24, 5100206 (2018).

82. Partha S. Maji, Mukesh. K. Shukla, R. Das, "Blood component detection based on miniaturized self-referenced hybrid Tamm-plasmon-polariton sensor," Sensors and Actuators B, vol. 255, pp. 729-734 (2018).

83. S. Kumar and R. Das, "On the tunability of quality-factor for optical Tamm plasmon modes," Journal of Optics vol. 19, pp. 095001 (2017).

84. S. Kumar, M. K. Shukla, P. S. Maji and R. Das, "Self-referenced refractive index sensing with hybrid-Tamm-plasmon-polariton modes in sub-wavelength analyte layers," Journal of Physics D: Applied Physics, vol. 50, pp. 375106 (2017).

85. Effect of intense magnetic fields on reduced-MHD evolution in sqrt (sNN) = 200 GeV Au+Au collisions Victor Roy (HBNI, Mumbai), Shi Pu (Tokyo U.), Luciano Rezzolla (Frankfurt U. & Frankfurt U., FIAS), Dirk H. Rischke (Frankfurt U. & Hefei, CUST). Jun 16, 2017. 11 pp. Published in Phys.Rev. C96 (2017) no.5, 054909

86. Dewetting induced Au-Ge composite nanodot evolution in SiO2, Debi P. Datta,

A, Chettah, Vantari Siva, D. Kanjilal, and Pratap K. Sahoo, Applied Surface Science, 428, 676 (2018).

87. Femtosecond laser excited second harmonic and multiphoton absorption induced UV luminescence generation behaviour of ZnOnanofibers,R. Panda, Avanendra Singh, R. Samala, S. Bhattacharya, Pratap K. Sahoo, P. K. Datta, S. K. Das, Optik-Int. J. for Light and Electron Optics, 154, 320 (2018).

88. Growth of significantly low dimensional Zinc Orthotitanate (Zn_2TiO_4) nanoparticles by solid state reaction method, L. Khatua, R. Panda, Avanendra Singh, A. K. Nayak, P. Satapathy, D. radhan, Pratap K. Sahoo, S K S Parashar, S. K. Das, Science of Sintering, 50, 133 (2018).

89. A study of electron and thermal transport in layered Titanium Disulphide single crystals, D. Suri, Vantari Siva, S. Joshi, K. Senapati, Pratap K. Sahoo, S. Varma, and Ram, S. Patel, J of Physics-Consensed Matter, 29, 485708 (2017).

90. Fabrication and characterization of W/B4 lamellar multilayer grating and NbC/Si multilayer phase shift reflector, P. C. Pradhan, S. Bhartiya, A. Singh, A. Majhi, A. Gome, R. Dhawan, M. Nayak, P. K. Sahoo, S. K. Rai, and V. R. Reddy, Advances in X-Ray/EUV Optics and Components, Proc. of SPIE 10386, 1038605, (2017).

91. Effect of magnetic fullerene on magnetization reversal created at the Fe/C60 interface, Srijani Mallik, Stefan Mattauch, Manas Kumar Dalai, Thomas Brueckel, and Subhankar Bedanta, Scientific Reports 8, 5515 (2018)

92. Static and dynamic behavior of domain walls in high Bs soft magnetic ribbons tuned by the annealing temperature, Sougata Mallick, Parmanand Sharma, Kana Takenaka, Akihiro Makino, and Subhankar Bedanta, J. Phys. D : Appl. Phys. 51, 065007 (2018)

93. Effect of sputtered flux direction on damping properties in magnetic bilayers, Sagarika Nayak, Sougata Mallick, Braj Bhusan Singh, and Subhankar Bedanta, J. Phys. D : Appl. Phys. 51, 055008 (2018)

94. Study of anisotropy, magnetization reversal and damping in ultrathin Co films on MgO (001) substrate, Srijani Mallik and Subhankar Bedanta, J. Magn. Magn. Mater. 446, 270 (2018)

95. Study of spin pumping in Co thin film vis-à-vis seed and capping layer using ferromagnetic resonance spectroscopy, Braj Bhusan Singh, Sukanta Kumar Jena, Subhankar Bedanta, J. Phys. D : Appl. Phys. 50, 345001 (2017)

96. A. Paul, A. Mukherjee, I. Dasgupta, A. Paramekanti and T. Saha-Dasgupta "A-site hybridization wave induced Mott transition in ABO_3 perovskites." arXiv:1801.08152

97. N. D. Patel, A. Mukherjee, N. Kaushal, A.

Moreo, and E. Dagotto "Non Fermi liquid behavior and continuously tunable resistivity exponents in the Anderson-Hubbard model at finite temperature." Phys. Rev. Lett. 119, 086601 (2017).

98. Subrata Jana, Abhilash Patra, and Prasanjit Samal. "Efficient lattice constants and energy bandgaps from a meta-GGA level screened range-separated hybrid functional", J. Chem. Phys. 149, 094105 (2018).

99. Subrata Jana, Abhilash Patra, and Prasanjit Samal. "Assessing the performance of the Tao-Mo semilocal density functional in the projector-augmented-wave method", J. Chem. Phys. 149, 044120 (2018).

100. Abhilash Patra, Subrata Jana and Prasanjit Samal. "Inhomogeneity induced and appropriately parameterized semilocal exchange and correlation energy functionals in two-dimensions", J. Chem. Phys. 118, 134117(2018).

101. Abhilash Patra, Subrata Jana and Prasanjit Samal. "A Parameter-Free Semilocal Exchange Energy Functional for Two-Dimensional Quantum Systems", J. Phys. Chem. A 122, 3455(2018)

102. Subrata Jana, Abhilash Patra and Prasanjit Samal. "Gradient approximated exchange energy functionals with improved performances for two-dimensional quantum dot systems", Phys. E 97, 268 (2018).

103. Subrata Jana and Prasanjit Samal. "Exploration of near the origin and the asymptotic behaviors of the Kohn-Sham kinetic energy density for two-dimensional quantum dot systems with parabolic confinement", J. Chem. Phys. 148, 024111 (2018).

104. Subrata Jana and Prasanjit Samal "A meta-GGA level screened range-separated hybrid functional by employing short range Hartree-Fock with a long range semilocal functional ", Phys. Chem. Chem. Phys., 20, 8991-8998 (2018).

105. Bikash Patra, Subrata Jana, and Prasanjit Samal. "Long-range corrected density functional through the density matrix expansion based semilocal exchange hole", Phys. Chem. Chem. Phys., 20, 8991-8998 (2018).

106. D. Kara, A. Bhowmick and A. K. Mohapatra, Rydberg interaction induced enhanced excitation in thermal atomic vapor, Scientific Reports 8, 5256 (2018)

107. S. Bhattacharjee, B. Dey and A. K. Mohapatra, Study of geometric phase using classical coupled oscillators, Eur. J. Phys. 39, 035404 (2018)

108. S. S. Sahoo, A. Bhowmick and A. K. Mohapatra, Polarization rotation of light propagating through a medium with efficient four-wave mixing and cross-phase modulation J. Phys. B: At. Mol. Opt. Phys50, 055501 (2017).

Conference/Workshop proceedings:

1. Talk on "Measurements of spin alignment of vector mesons and global polarization of hyperons with ALICE at the LHC" by Prof. Bedangadas Mohanty (for the ALICE Collaboration) at 17th International Conference on Strangeness in Quark Matter, Utrecht, The Netherlands July 10-15, 2017. Proceedings published in European Physical Journal: Web of Conferences.

2. Talk on "Polarization measurements of **Λ** hyperons and K^{*0} vector mesonswith ALICE at the LHC" by Mr. Sourav Kundu (for the ALICE Collaboration) at Particles and Nuclei International Conference 2017, Bejing, China, September 1-5, 2017.Proceedings to be published in European Physical Journal: Web of Conferences.

3. Talk on "Spin alignment of vector mesons and hyperon polarization in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV" by Dr. Ranbir Singh (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceeding: DAE Symp. on Nucl. Phys. 62 (2017) 828.

4. Talk on "Multiplicity dependence resonance prodiction in pp collisions at $\sqrt{s}$= 13 TeV" by Mr. Sourav Kundu (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceeding: DAE Symp. on Nucl. Phys. 62 (2017) 830.

5. Talk on "Measurement of strange baryonic resonances in pp and p-Pb collisions with ALICE" by Dr. Rama Chandra Baral (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceeding: DAE Symp. on Nucl. Phys. 62 (2017) 816.

6. Talk on "Photoneutron calibration of SuperCDMS detectors" by Mr. Vijay Iyer (for the SuperCDMS collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 682.

7. Poster on "Simulation of energy deposition of lightly ionizing particles in GEANT4" by Mr. Samir Banik (for the SuperCDMS collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 732.

8. Poster on "Study of re-scattering effect on elliptic flow and production of resonances using AMPT" by Mr. Kishora Nayak at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 962.

9. Poster on "Freeze-out Systematics due to the Hadron Spectrum" by Ms. Debadeepti

Mishra at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 920.

10. Poster on "Simulation of neutron background for DINO experiment" by Ms. K K Meghna at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 718.

11. Poster on "System size dependence of hadronic resonances production in pp, p-Pb and Pb-Pb collisions in ALICE at the LHC" by Dr. Ajay Kumar Dash (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 922.

12. Poster on "Study of criticality in Hadron Resonance Gas Model with van der Waals interaction" by Dr. Subhasis Samanta at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017. Proceedings of the DAE Symp. on Nucl. Phys. 62 (2017) 916.

13. Wojciech Florkowski, Bengt Friman, Amaresh Jaiswal and Enrico Speranza,"Relativistic fluid dynamics with spin 1/2" Acta Physica Polonica B Supplements 10 (2018) 1139 [arXiv:1708.04035].

14. Dr. Amaresh Jaiswal, "Quasiparticle viscous hydrodynamics from kinetic theory" Proceedings of the DAE Symposium in Nuclear Physics 62 (2017) 888.

15. Dr. Amaresh Jaiswal, 27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions (Quark Matter 2018), 13-19 May 2018, Venice, Italy.

16. Dr. Amaresh Jaiswal, CNT Workshop on effective field theory of hadrons: from vacuum to medium, 12-17 March 2018, VECC Kolkata, India.

17. Dr. Amaresh Jaiswal, The second Workshop of the Indo-French Network in High Energy Physics, 26-28 February 2018, IISER Pune, India.

18. Dr. Amaresh Jaiswal, Dynamics of Fusion and Fission processes in Hot Nuclei: A discussion meeting, 19-22 February 2018, Tata Institute of Fundamental Research, Mumbai, India.

19. Dr. Amaresh Jaiswal, DAE Symposium on Nuclear Physics, 20-24 December 2017, Thapar university, Patiala, Punjab, India.

20. Dr. Amaresh Jaiswal, Initial Stages, 18-22 September 2017, Polish Academy of Arts and Sciences, Kraków, Poland.

21. Dr. Amaresh Jaiswal's visits to and collaboration with outside institutions:

(a) CERN Geneva, Switzerland, 21 May-10 June 2018.

(b) VECC Kolkata, 24-31 December 2017.

(c) GSI Darmstadt, Germany, 3-19 December 2017.

(d) TIFR Mumbai, 21-24 November 2017.

(e) GSI Darmstadt, Germany, 23-29 September 2017.

(f) TIFR Mumbai, 15-22 July 2017.

(g) IIT Gandhinagar, 12-15 July 2017.

(h) VECC Kolkata, 29-30 May 2017.

22. Dr. Colin Benjamin:- Aspen Summer Program at Aspen center for Physics, Aspen, CO, USA from July 2-July 23, 2017.

23. Dr. Colin Benjamin: International Conference on Condensed Matter Physics during 14-16 November 2017 at Physics and Applied Mathematics Unit, Indian Statistical Institute (ISI), Kolkata, India.

24. Dr.V Ravi Chandra:- Young Investigator Meet On Quantum Condensed Matter Theory, October 2017, SNBNCBS, Kolkata

25. Dr.V Ravi Chandra:- Recent trends in Quantum Matter, December 2017, IIT Bombay

26. Dr.V Ravi Chandra:- APS March Meeting 2018, Los Angeles, USA

27. Mukesh K. Shukla, and R. Das, "High Power, tunable, Mid-IR generation with singly resonant optical parametric oscillator," 2017 Conference on Lasers and Electro-Optics Pacific Rim (CLEO-PR), Singapore, Singapore, pp. 1-2, 2017.

28. Mukesh K. Shukla, P. S. Maji, and R. Das, "Tamm-plasmon-polaritons in photonic quasicrystals," 2017 Conference on Lasers and Electro-Optics Pacific Rim (CLEO-PR), Singapore, Singapore, pp. 1-2, 2017.

29. S. Kumar, Mukesh K. Shukla, P. S. Maji and R. Das, "Refractive index sensor based on hybrid-Tamm plasmon-polariton and cavity mode," 2017 Conference on Lasers and Electro-Optics Pacific Rim (CLEO-PR), Singapore, Singapore, 2017, pp. 1-2.

30. S. Kumar and R. Das, "Refractive Index Sensing With 1D Photonic Crystal," in Frontiers in Optics 2017, OSA Technical Digest (online) (Optical Society of America, 2017), paper LTh2F.

31. S. Kumar, M. K. Shukla, and R. Das, "On the Coupling Efficiency of Tamm Plasmon Polaritons," in Frontiers in Optics 2017, OSA Technical Digest (online) (Optical Society of America, 2017), paper JW3A.99.

32. M. K. Shukla and R. Das, "Tamm plasmon polaritons in aperiodic metal deposited Bragg reflectors," in Frontiers in Optics 2017, OSA Technical Digest (online) (Optical Society of America, 2017), paper JTu3A.115.

33. Enhancement of Elliptic Flow of **π**– under Intense Magnetic Field in $s\sqrt{}$ NN = 200 GeV Au+Au Collisions: A (2 + 1)-Dimensional Reduced-MHD Model Study Victor Roy (HBNI, Mumbai). 2017. Published in Universe 3 (2017) no.4, 82

34. Mini Review on Transport Coefficients of Quark-Gluon Plasma Victor Roy (NISER, Jatni). 2018. 5 pp. Published in Springer Proc.Phys. 203 (2018) 33-37

35. Dr. Pratap K Sahoo, Hybrid nanodot

synthesis by ion beam dewetting for super-hydrophobic applications- Annual condensed Matter Physics Meeting, NISER 26-27th Feb. 2018.

36. Dr. Pratap K Sahoo, Ion beam induced hybrid nanodots synthesis from metal-semiconductor thin films, 4th International conference on Nano Structuring by ion beams (ICNIB-2017) Devi Ahilya University, Indore, 11-13th Oct 2017 (invited talk).

37. Dr. Pratap K Sahoo, Fabrication of light emitting p-n-p junctions in ZnO Nanowires by Oxygen ion implantation, 9th International conference on Materials for Advance Technologies (ICMAT-2017) 18th–23rd June 2017, Suntec Singapore(invited talk).

38. Dr. Pratap K Sahoo, Hybrid Nanodot Evolution by ion irradiation of thin films, International conference on Accelerators in Materials and Medical Sciences (ICAMMS-2017) 5th – 7th June 2017, Amity University Dubai(invited talk).

39. Dr. Pratap K Sahoo, Bilayer thin film to hybrid nano-dots evolution by ion beam induced dewetting, EMSI 2017, 16-19th July 2017, Mahabalipuram, Chennai (invited talk).

40. Dr. Anamitra Mukherjee, Young condensed matter meet SNBCBS, Nov 2017

41. Dr. Anamitra Mukherjee, QMAT, IISER Mohali, July 2018

Conferences / Workshop / Meeting organized:

A: XI SERC school on Experimental High Energy Physics

Prof. Bedangadas Mohanty

The XI SERC School on experimental high energy physics was organized at NISER from 7 November 2017 to 27 November 2017. Around 60 students from across India participated in the school. The school program consisted of

1. Lectures and tutorials from reputed scientists in the field of experimental high energy physics including areas such as Dark Matter.
2. Hands on experimental sessions where students would perform experiments using detectors used in state of the art high energy physics experiments
3. Simulation sessions where students learnt various techniques and tools used in high energy physics experiments
4. Popular lectures aimed for general audience from eminent personalities in the field of high energy physics to fascinate and motivate students for taking up high energy physics and basic science in general as a career option

Excellent feedback was received from students about the school. The students implored to have such schools more often.

B: **Dr. Nishikant Khandai** and **Dr. Tuhin Ghosh**: -Introductory School of Galaxy Formation.

C: **Dr. Ajaya Kumar Nayak** Organized Pedagogy workshop for undergraduate science teachers at NISER, Jatni, Odisha, India, 2017

D: **Dr. Subhankar Bedanta**: Condensed Matter Days held at NISER, Bhubaneswar

E: **Dr. Anamitra Mukherjee**, Annual condensed matter meeting (Jointly organized with IOP Bhubaneswar)

F: **Dr. Pratap Kumar Sahoo**, Organized the workshop on High Resolution TEM Methods: STEM, EELS, and insitu held at NISER

G: **Dr. Pratap Kumar Sahoo**, Joint convener of Electron Microscopy Society of India (EMSI-2018) held at Mayfair, Bhubaneswar.

Projects from non-DAE schemes:

1. Research Project title: "J. C. Bose Fellowship"

PI: Prof. Bedangadas Mohanty

Funding Agency: SERB-Department of Science and Technology, Govt. of India
Sanctioned amount: Rs.75,00,000
Duration: 2017-2022

2. Title:- DST-INSPIRE Faculty Award

PI- Dr. Amaresh Jaiswal

3. PI- Dr. Colin Benjamin,

Funding Agency- DST Nanomission, Project title: Topology, spintronics and quantum computation with Dirac materials, Time: 4 years (Sep. 2013-Sep. 2017), Manpower: One Research Associate and one project fellow, Amount: 27 Lakhs. Host: NISER, Bhubaneswar. Project was graded "Very good" by DST Nanomission expert committee in its March 2017 review.

4. PI- Dr. Colin Benjamin,

ICTP Research stay, June-July 2018 on "Mesoscopic Superconductivity", Host: ICTP, Italy, includes funds for travel and subsistence.

5. DST SERB Project, July 2016-July 2019: "Non-local correlations in mesoscopic superconducting junctions".

PI: Dr. Colin Benjamin, Theoretical project with a budget of around 25 Lakhs which includes funds for recruiting a Research Associate.

6. **Dr. Ajaya Kumar Nayak** Max Planck-India partner group project

Title: Room temperature magnetic skyrmions and the study of their current driven motion for potential applications in racetrack memory devices.

Source of funding: Max Planck Society, Germany

Budget: 20,000 euro per year (Total: 60000 euro in 3 years, 2017-2020).

7. **Ramanujan Fellowship**

PI: - Dr. Ajaya Kumar Nayak

Title: Designing Magnetic Anisotropy for Spintronics

Source of funding: DST/SERB

Budget: Rs. 7 lakhs per year (Total: 35 lakhs in 5 years, 2017- 2022). In addition, overhead of Rs. 3 lakhs in 5 years.

8. Early career research award

PI:- Dr. Ajaya Kumar Nayak

Title: Designing novel magnetic materials for exploring skyrmions at room temperature.

Source of funding: DST

Budget: Rs. 39, 13056/ (2018-2021)

9. DST-Nanomission:

PI:- Dr. Ajaya Kumar Nayak

Title: In-situ low temperature imaging of magnetic nano-structures using Lorentz Transmission Electron Microscopy

Source of funding: DST

Budget: Rs. 86, 55,200/ (2018-2021)

10. Dr. Victor Roy,

Dst Inspire Faculty Research Grant

11. Ferromagnetic-Semiconductor heterostructures for magnetic field sensing and optoelectronic applications (DST-Nanomission)

PI: Dr. S. Bedanta,

Financial Support sanctioned: ~Rs 62 lakhs

12. Engineering magnetic domains in Co antidote arrays (DST- SERB)

PI: Dr. S. Bedanta,

Financial Support sanctioned: ~Rs 49.92 lakhs

(This project is being continues since 2014)

13. Electric field induced spin wave spectra in multiferroic antidot lattice arrays (India-Poland bilateral proposal via DST)

PI: Dr. S. Bedanta,

Financial Support sanctioned: ~Rs 17.2 lakhs

(This project is being continued since 2015)

14. Tuning the interfacial Dzyaloshinskii-Moriya interaction in Ultrathin Magnetic Films: toward the stabilization of skyrmions in spintronics devices

(India-France bilateral project supported by CEFIPRA)

PI: Dr. S. Bedanta,

Financial Support sanctioned: ~Rs 73.82 lakhs

15. Creating magnetic interface in non-magnetics organic thin films for spintronic applications, (DST-Nanomission)

PI: Dr. S. Bedanta,

Financial Support sanctioned: ~Rs 60.75 lakhs

16. Dr. Nishikanta Khandai,

Ramanujan Fellowship - ongoing

Projects from DAE Sources: NIL

Talks (Invited and contributory):

1. "Measurements of spin alignment of vector mesons and global polarization of hyperons with ALICE at the LHC" by Prof. Bedangadas Mohanty (for the ALICE Collaboration) at 17th International Conference on Strangeness in Quark Matter, Utrecht, The Netherlands July 10-15, 2017.
2. "Strangeness enhancement in pp collisions" by Mr. Sourav Kundu (for the ALICE Collaboration) at Flavour Physics conference 2017, Quy Nhon, Vietnam, August 13-19, 2017.
3. "Polarization measurements of **Λ** hyperons and K*0 vector mesonswith ALICE at the LHC" by Mr. Sourav Kundu (for the ALICE Collaboration) at Particles and Nuclei International Conference 2017, Bejing, China, September 1-5, 2017.
4. "Two-particle correlation and flow of identified hadrons in small systems at LHC energies" by Mr. Kishora Nayak (for the ALICE Collaboration) at 9th International Workshop on Multiple Partonic Interactions at the LHC, Hotel Peterhoff, Shimla, India December 11-15, 2017.
5. "System size dependence of particle production in pp, p-Pb and Pb-Pb collisions at 5.02 TeV" by Dr. Ajay Kumar Dash (for the ALICE Collaboration)at 9th International Workshop on Multiple Partonic Interactions at the LHC 11-15 December 2017 Hotel Peterhoff, Shimla, India December 11-15, 2017.
6. "Particle production in heavy-ion collisions at RHIC"by Prof. Bedangadas Mohanty (for the STAR Collaboration) at 9th International Workshop on Multiple Partonic Interactions at the LHC 11-15 December 2017 Hotel Peterhoff, Shimla, India December 11-15, 2017.
7. "Spin alignment of vector mesons and hyperon polarization in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV" by Dr. Ranbir Singh (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017.
8. "Multiplicity dependence resonance prodiction in pp collisions at $\sqrt{s}$ = 13 TeV" by Mr. Sourav Kundu (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017.
9. "Measurement of strange baryonic resonances in pp and p-Pb collisions with ALICE" by Dr. Rama Chandra Baral (for the ALICE Collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017.
10. "Photoneutron calibration of SuperCDMS detectors"by Mr. Vijay Iyer (for the SuperCDMS collaboration) at 62nd DAE symposium of nuclear physics (2017), Patiala, Punjab, India December 20-24, 2017.
11. "Formulation of relativistic dissipative hydrodynamics from microscopic

theories", A symposium on heavy-ion physics at FAIR, RHIC & LHC facilities, June 19, 2018, NISER Jatni, India.

12. "Formulation of relativistic dissipative hydrodynamics from kinetic theory", IOP Seminar, May 1, 2018, IOP Bhubaneswar, India.

13. "Quasiparticle viscous hydrodynamics from kinetic theory", The second Workshop of the Indo-French Network in High Energy Physics, February 28, 2018, IISER Pune, India

14. "Virtual photon polarization and dilepton anisotropy in relativistic heavy ion collisions", Theory group seminar, December 13, 2017, GSI Darmstadt, Germany.

15. "Metric anisotropies and emergent anisotropic hydrodynamics", DNAP Seminar, November 23, 2017, TIFR, Mumbai, India.

16. "Hydrodynamics of vortical and polarized fluids", Initial Stages, September 21, 2017, Polish Academy of Arts and Sciences, Kraków, Poland.

17. "Effect of anisotropic escape mechanism on elliptic flow in relativistic heavy-ion collisions", DNAP Seminar, July 19, 2017, Tata Institute of Fundamental Research, Mumbai, India.

18. "Relativistic dissipative hydrodynamics from kinetic theory", Theory Colloquium, July 13, 2017, Indian Institute of Technology, Gandhinagar, India.

19. "Formulation of relativistic dissipative hydrodynamics from kinetic theory", Theory Group Seminar, May 30, 2017, Variable Energy CyclotronCenter, Kolkata, India.

20. "Relativistic dissipative hydrodynamics from kinetic theory: formulation and application", INSPIRE Faculty Award Seminar, May 22, 2017, Indian National Science Academy (INSA), New Delhi.

21. Invited talk at International Conference on Condensed Matter Physics during 14-16 November 2017 at Physics and Applied Mathematics Unit, Indian Statistical Institute (ISI), Kolkata, India, on "Probing helicity and the topological origins of helicity via HBT correlations".

22. Invited talk on Oct. 13, 2017 at Dept. of Physics, Ravenshaw University, Cuttack, Odisha on Algorithms, games and computation.

23. Talk on "Topology, quantum computation and spintronics in Dirac materials" at DST Nanomission Review meeting in IIT Delhi March 2017.

24. V Ravi Chandra Title : Spin-1/2 Heisenberg antiferromagnet on the pyrochlore lattice: An exact diagonalisation study

Delivered at: SNBNCBS, Kolkata (Invited conference presentation)
IIT Bombay (Invited conference presentation)
APS Meeting, 2018 Los Angeles (Contributed talk)

25. Dr. Tuhin Ghosh, Invited Speaker at Dept of Theoretical Physics TIFR.

26. Dr. Tuhin Ghosh, Invited Speaker at 36th ASI meeting, Osmania University Hyderabad.

27. Dr. Tuhin Ghosh, CMB foregrounds workshop, San Diego, California, USA.

28. Dr. Tuhin Ghosh, Post Planck Cosmology Meeting, IUCAA, Pune.

29. Dr. Tuhin Ghosh, Invited Speaker at Indian Institute of Astrophysics (IIAP) Bangalore.

30. Dr. Tuhin Ghosh, Invited Speaker at ISRO HQ Bangalore.

31. Dr. Tuhin Ghosh, Lecturer at Introductory School of Galaxy Formation NISER.

32. Dr. Ajaya Kumar Nayak Delivered invited talk in SKYMAG conference, Paris, France, 2017

33. Dr. Ajaya Kumar Nayak , Delivered invited talk in Indo-USA Symposium on Magnetism, IIT Bombay, India, 2018

34. Dr. Ajaya Kumar Nayak, Delivered seminar in CMP-Meeting, NISER, Jatni, 2018

35. Dr. Ajaya Kumar Nayak, Delivered invited talk in UGC-DRS meeting, Utkal University, Odisha, India, 2017

36. Dr. Ajaya Kumar Nayak, Delivered invited talk in RECENT DEVELOPMENTS IN CONDENSED MATTER PHYSICS, U. N College, Adaspur, Odisha, India, 2018

37. Dr. Pratap K Sahoo, Hybrid nanodot synthesis by ion beam dewetting for super-hydrophobic applications- Anneal condensed Matter Physics Meeting, NISER 26-27th Feb. 2018

38. Dr. Pratap K Sahoo, Ion beam induced hybrid nanodot synthesis from metal-semiconductor thin films, Department of Kurukhetra University, Kurukhetra, 19th Jan 2018.

39. Dr. Pratap K Sahoo, Lotus leaf effect of artificial quantum dots, Sambalpur University, Burla, Odisha, 24th Feb 2018.

40. Dr. Pratap K Sahoo, Application of Electron Microscopy in Materials Science and Technology, UGC Methodology course, Utkal University, 7th Feb 2018

41. Dr. Pratap K Sahoo, A novel way of synthesizing, TiO2-NiO core-shell nanostructure for dye-sensitized solar cell application, National Seminar on Recent Development in Energy Harvesting and Storage Materials" Govt. (Auto) College, Rourkela, 2nd Sept. 2017.

42. Dr. Pratap K Sahoo, Quantum dots and wires for optoelectronic applications, Silicon Institute of Technology, Bhubaneswar, Odisha, 16th December 2017.

43. Dr. Pratap K Sahoo, Chemically grown ZnONanorods for optoelectronic applications, Department of Physics, National Institute of Technology Durgapur, 8th April 2017.

44. Dr. Subhankar Bedanta, Invited lecture at "Bringing the Nano World Together (BTNT-2017)" held at University of Hyderabad, India in December 2017.

45. Dr. Subhankar Bedanta Invited lecture at "Condensed Matter Days 2018" held at NISER, Bhubaneswar in February 2018.

46. Dr. Subhankar Bedanta Invited lecture at International Conference on Current Trends in Materials Science and Engineering (CTMSE 2018) held at S. N. Bose Center for Basic Sciences, Kolkata, India from 19-20 January 2018. Title "Interface induced magnetism and spin pumping"

47. Dr. Subhankar Bedanta, Invited lecture "Magnetiation reversal in dot and antidot arrays" at the Current trends in condensed matter physics (CTCMP 2018) held atIndian Association of Cultivation of Sciences (IACS), Kolkata during January 2018.

48. Dr. Subhankar Bedanta, Physics colloquium "Exploring Nanomagnetism" at Department of Physics, IIT Guwahati, Guwahati, India in January 2018.

49. Dr. Subhankar Bedanta, Invited lecture "Exploring Nanomagnetism" at Odisha Physical Society (OPS 2018) meeting held at BJB Autonomous College, Odisha.

50. Dr. Subhankar Bedanta, Series of lectures given at the teacher refresher course at Salipur Autonomous College, Odisha. The names of the lectures are – (a) Vacuum technology and Nanotechnology; (b) Survey of various thin film deposition techniques; (c) Surface topography imaging via Scanning probe microscopy (SPM)

51. Dr. Subhankar Bedanta, scanning tunneling microscopy (STM); (d) Excitement in Magnetic thin films and multilayers; and (e) Magnetic nanoparticle- the small ones with big future.

52. Dr. Subhankar Bedanta, Physics colloquium "Exploring Nanomagnetism" at Department of Physics, Sikshya O' Anusandhan University, Bubaneswar, India in October 2018.

53. Dr. Subhankar Bedanta, Two invited lectures "Magnetic thin films and multilayers" and "Magnetic nanoparticle-the small ones with big future" given at the faculty induction program held at Utkal University, Bhubaneswar, India.

54. Dr. Anamitra Mukherjee, QMAT, IISER Mohali, July 2018

55. Dr. Anamitra Mukherjee, Young condensed matter meet SNBCBS, Nov 2017

56. Dr. Anamitra Mukherjee, IACS Kolkata, October 2017

57. Invited talk by Ashok K Mohapatra on Study of Rydberg blockade in Thermal vapour in a conference on "Recent trends in Cold and ultra-cold Matter" (March 27 – 29, 2018 at IIT Guwahati, India)

58. Invited talk by Ashok K Mohapatra on Study of Rydberg blockade in Thermal vapour in a conference on "Giant interactions in Rydberg Systems" (July 4 – 6, 2018, University of Hamburg, Germany)

59. Invited talk by Ashok K Mohapatra on Study of Rydberg blockade in Thermal vapour at Universitaet Stuttgart, Germany on 28th June, 2018

60. Invited talk by Ashok K Mohapatra on Study of Geometric Phase in classical coupled oscillator at Universitaet Stuttgart, Germany on 13th July, 2018

61. 3rd October 2017 - (invited seminar) - IUCAA Pune, Title - Cosmological Hydrodynamical Simulations of Galaxy Formation

62. 11 December 2017 - (invited speaker) - Conference on Universe After The First 200 Million Years, Presidency University, Kolkata Title - Simulations of the Post-EoR HI Signal

63. 14 December 2017 - (contributed talk) - Workshop on Galaxies in Absorption, IUCAA Pune Title - The Large Scale Clustering of the LyÆorest

64. 21 December 2017 - (contributed talk) - Ramanujan Fellows Conclave, SASTRA University, Thanjavur Title - Cosmological Hydrodynamical Simulations of Galaxy Formation

65. 26 February 2018 - (invited seminar) - IISER Mohali, Title - Revisiting The HI Mass Function

66. 14 March 2018 - (workshop speaker/tutor hands-on session) - Introductory School on Galaxy Formation, NISER, Bhubaneswar Title - N-Body Techniques for Self-Gravitating Systems

Recognitions:

1. Prof. Bedangadas Mohanty got elected as a fellow of National Academy of Sciences, Allahabad

2. Prof. Bedangadas Mohanty was awarded the prestigious J C Bose National Fellowship by the Department of Science and Technology, Government of India

3. Prof. Bedangadas Mohanty joined the Editorial Board of International Journal of Modern Physics – E

4. Dr. Tuhin Ghosh –Got elected as Associate of the Indian Academy of Sciences, Bangalore.

5. Dr. Colin Benjamin Awarded ICTP Research stay JUNE-JULY 2018, Host: ICTP, TRIESTE, ITALY.

6. DST Nanomission in its March 2017 review rated the progress in the project DST Nanomission project (PH1304) "Topology, spintronics and quantum computation with Dirac materials" as "Very Good".

7. Dr. Colin Benjamin :- The recent research of J. Rajendran and Colin Benjamin on seeing a genuine Parrondo's paradox

with quantum walks, published in Royal Society Open Science and EPL (Euro Physics Letters) has been featured in Live Science, a website devoted to the science geek, see Weird Paradox Says 2 Losses Equals a Win. And It Could Lead to Fast Quantum Computers by Marcus Woo.

8. (The recent article by J. Rajendran and C. Benjamin on "Playing a true Parrondo's game with a three-state coin on a quantum walk" published in EPL (Europhysics Letters) has been featured in PHYS.ORG, see Parrondo's paradox with a three-sided coin by Lisa Zyga, Phys.org feature.

9. Dr. Pratap K Sahoo-Referee for many International journals: J. Applied Physics, Applied surface Science, Nanoscale Research Letter, Physica B, Radiation defects and effects in Solids, J. of Nanomaterials, Pramana J. Physics. NIMB, RSC Advance, vacuum.

10. Dr. Pratap K Sahoo-Project evaluation committee member: Low energy facility at IUAC New Delhi, and Kuruskhtra University low energy ion beam facility, CSIR projects and IIMT, CSIR project.

11. Dr. Subhankar Bedanta: - Visiting Scientist at Institute of Material Research (IMR) of Tohoku University, Sendai, Japan via the fellowship awarded by International Center for Collaborative Research of IMR (ICC-IMR) in July 2017.

Doctoral degree awarded to Ph.D. Students:

1. Mr. Vantari Siva, Guide:- Dr. Pratap K Sahoo & Dr. Kartikeswar Senapati, Phase synthesis of Ni/Bi system by ion beam mixing

2. Mr. Avanendra Singh, :- Guide:- Dr. Pratap K Sahoo & Dr. Kartikeswar Senapati, Defect assisted phenomena in ZnOnanorods

3. Arjun Mani has submitted his Ph. D thesis on May 28, 2018. He has got post doctoral offers.

Outreach program:

1. Talk by Prof. Bedangadas Mohanty on Recent physics discoveries in high energy physics, at DST Inspire camp scheduled from January 5-9, 2018 in KIIT, University.

2. Dr. Pratap K Sahoo-Energy Conservation and our environment, P. N. High School, Jatni, Khorda; 14th Dec 2017.

3. Dr. Pratap K Sahoo-Lotus leaf effect of artificially synthesized quantum dots, Orissa Physical Society, BJB College Bhubaneswar, 11th Feb 2018.

Major research facilities added in School of Physical Sciences:

1. Physical properties measurement system (PPMS)
2. Arc-melt furnace

3. Dr. Victor Roy added a new elective course on Quark Gluon Plasma along with Prof B Mohanty and Dr. A. Jaiswal.
4. Multipurpose vacuum chamber for sputtering and ion matter interaction study.
5. SQUID magnetometer and ac susceptometer
6. Pulsed laser deposition (PLD)
7. Xanadu Server - Funded by Ramanujan Fellowship - Currently used by students/faculty from NISER, Presidency and visiting project students.

Seminar/Talks Organized at SPS NISER

Period:- October 2017 to March 2018

Date/Time: 3 October 2017, Physics Seminar Tuesday@330PM
Speaker: Dr. Najmul Haque, University of Giessen, Germany
Title: Applications of Thermal Field Theory to Quark-Gluon Plasma

Date/Time: 4 October 2017, Physics Seminar Wednesday@1030AM
Speaker: Dr. Durga Dasari, University of Stuttgart, Germany
Title: QUANTUM STATE ENGINEERING OF ATOM/SPIN ENSEMBLES THROUGH NONUNITARY CONTROL

Date/Time: 25 October 2017, Wednesday, Physics Seminar @1030AM
Speaker: Dr. Santosh Kumar Das, University of Catania
Title: Heavy Quark Dynamics at RHIC and LHC

Date/Time: 30 October 2017, Monday, Physics Seminar @330PM
Speaker: M. Yousuf Jamal, IIT Gandhinagar
Title: Collective Modes of hot QCD/QGP medium

Date/Time: 01 November 2017, Wednesday, Physics Seminar @1030AM
Speaker: Rishi Sharma, TIFR Mumbai
Title: Towards an effective theory for the QCD crossover

Date/Time: 2 November 2017, Physics Seminar Thursday@300PM
Speaker: Dr. Kalon Gopinadhan, University of Manchester
Title: Artificial Å-scale fluidics

Date/Time: 6 November 2017, Monday, Physics Seminar @3.30PM(Skype)
Speaker: Dhiraj Hazra, INFN Bologna
Title: The standard model of cosmology and beyond: constraints and forecasts

Date/Time: 7 November 2017, Tuesday, Physics Seminar @4.00PM(Skype)

r 2017, Tuesday, Physics Seminar @4.00PM(Skype)

Speaker: Udai Raj Singh, University of Hamburg, Germany

Title: Spectroscopic-Imaging and Spin-Polarized STM Study of Superconductivity, Nematicity and Magnetism in 11-Iron Chalcogenide Superconductors

Date/Time: 08 November 2017, Wednesday, Physics Seminar @11.00AM

Speaker: Md. Nasim, UCLA

Title: Probing the QCD phase diagram using heavy-ion collisions at RHIC

Date/Time: 9 November 2017, Thursday, Physics Seminar@5.00PM(Skype)

Speaker: Sujit Manna, MIT

Title: Interface Driven Novel Electronic and Spin States Revealed by Spin-polarized Scanning Tunneling Spectroscopy

Date/Time: 14 November 2017, Tuesday, Physics Seminar @3.30PM

Speaker: Sourav Dutta, RRI Bengaluru

Title: Cooling of trapped ions with a tiny cloud of ultracold atoms: the role of resonant charge exchange

Date/Time: 15 November 2017, Wednesday, Physics Seminar @11.30AM

Speaker: Nishita Desai, LUPM Montpellier, France

Title: Dark Matter searches at the LHC

Date/Time: 16 November 2017, Thursday, Physics Colloquium @11.30AM

Speaker: Nishita Desai, LUPM Montpellier, France

Title: Hunting for New Physics at Colliders

Date/Time: 17 November 2017, Friday, Physics Seminar @3.30PM

Speaker: Sourin Das, IISER Kolkata

Title: Non-local multi-particle geometric phases in electronic intensity interferometry

Date/Time: 24 November 2017, Friday, Physics Seminar @3.00PM

Speaker: Syed Mohd Amir, JCNS, Garching, Germany

Title: Magnetic thin films and multilayers: X-ray and Neutron Reflectometry study

Date/Time: 05 January 2018, SPS Seminar Friday@3.30PM

Speaker: Prof. Saroj Prasad Dash, Chalmers University of Technology, Sweden
Title: Spin on 2D Electronics

Date/Time: 08 January 2018, SPS Colloquium Monday@3.30PM
Speaker: Prof. Dhiman Chakraborty, Northern Illinois University, USA
Title: The Higgs Boson as a Tool for Discoveries

Date/Time: 09 January 2018, SPS Seminar Monday@3.30PM
Speaker: Dr. Swagata Mukherjee, University of Aachen , Germany
Title: Beyond the standard model at the LHC

Date/Time: 10 January 2018, SPS Seminar Wednesday@11.30AM
Speaker: Dr. Mayukh Majumder, University of Augsburg, Germany
Title: In search of Quantum Spin Liquid: A microscopic insight

Date/Time: 24 January 2018, SPS Seminar Wednesday@10.30AM
Speaker: Debabrata Adak, IUCAA Pune
Title: Imprints of Patchy Reionization in CMB Temperature and Polarization

Date/Time: 25 January 2018, SPS Seminar Thursday@11.30AM
Speaker: Dr. Durga Dasari, University of Stuttgart, Germany
Title: The four pillars of Quantum Technologies: Role of solid-state defects

Date/Time: 08 February 2018, Physics Seminar Thursday@11.30AM
Speaker: Prof. T. R. Govindarajan, IMSC Chennai
Designation: Professor
Specialization: High Energy Physics
Title: Quantum blackhole as elementary particle

Date/Time: 13 February 2018, Physics Seminar Tuesday@9.30AM
Speaker: Dr. Hena Das, Cornell University
Designation: Research Scientist
Specialization: Condensed matter physics
Title: Magnetoelectricity in Hexagonal Lattice

Date/Time: 14 February 2018, Physics Seminar Wednesday@10.30AM
Speaker: Dr. Nilay Kundu, YITP Kyoto University
Designation: Research Scientist
Specialization: String theory
Title: Second law of black-hole thermodynamics in higher derivative theories of gravity

Date/Time: 15 February 2018, Physics Seminar Thursday@11.30AM

Speaker: Dr. Sudeshna Sen, Shanghai Jiao Tong University, China

Designation: Research Scientist

Specialization: Condensed matter physics

Title: Understanding the role of disorder in strongly interacting systems using effective medium approaches

Date/Time: 16 February 2018, Physics Seminar Friday@3.30PM

Speaker: Dr. Yalla Ramachandrarao, University of Electro-Communications, Chofu, Tokyo, Japan

Designation: Research Scientist

Specialization: Condensed matter physics

Title: Optical Nanofibers: a versatile platform for Quantum Photonics

Date/Time: 5 March 2018, Physics Colloquium Monday@3.30PM

Speaker: Prof. Nissim Kanekar, NCRA-TIFR

Designation: Associate Professor

Specialization: Astrophysics

Title: Do the Fundamental Constants change with Time?

Lecture series on HEP Statistics: An Introduction to Statistical Analysis in Physics Prof. Harrison B. Prosper, Florida State University, USA

Date, Time & Venue:

Lecture 1 : March 12, 2018, Monday, 08:30 hours, SPS seminar room

Lecture 2 : March 12, 2018, Monday, 15:30 hours, SPS seminar room

Lecture 3 : March 13, 2018, Tuesday, 09:30 hours, SPS seminar room

Date/Time: 20 March 2018, Physics Seminar Tuesday@9.30AM

Speaker: Prof. Sanjeev Srivastava, IIT Kharagpur

Designation: Associate Professor

Specialization: Condensed matter physics

Title: Quantum Phase Transitions in Reduced Dimensions

Date/Time: 20 March 2018, String Group Seminar Tuesday@9.30AM

Speaker: Mr. Abhishek Mohapatra, Ohio State University

Designation: Graduate Student

Specialization: Cosmology and String theory

Title: Nonrelativistic Effective Field Theory of Axion Dark Matter

Date/Time: 21 March 2018, Physics Seminar Wednesday@10.30AM

Speaker: Dr. Shiladitya Sengupta, Tokyo University

Designation: Postdoctoral Fellow

Specialization: Condensed matter physics

Title: Role of mechanical force networks in amorphous solids

Date/Time:	27 March 2018, Physics Seminar Tuesday@3.30PM
Speaker:	Dr. Maheswar Nayak, RRCAT Indore
Designation:	Assistant Professor
Specialization:	Condensed matter physics
Title:	1D Bragg Crystal: Extreme Ultraviolet to Soft Gamma Rays

Date/Time:	28 March 2018, Physics Seminar Wednesday@10.30AM
Speaker:	Dr. Abhishek Atreya, Bose Institute
Designation:	Postdoctoral Fellow Specialization: High energy physics and cosmology
Title:	Can Viscous Dark Matter Cause Cosmic Acceleration?

Poster presentation in conferences/workshop

1. National Laser Symposium (NLS-26) (Dec 20-23, 2017, BARC Mumbai)(Thesis presentation by Arup Bhowmick)
2. National Laser Symposium (NLS-26) (Dec 20-23, 2017, BARC Mumbai)(Poster presentation on Mirrorless Optical Parametric Oscillator in atomic vapor by Sushree S sahoo - Best poster award)
3. Annual Condensed Matter Physics Meet (Feb 26-27, 2018,, NISER Bhubaneswar) (Poster presentation on Mirrorless Optical Parametric Oscillator in atomic vapour by Sushree S sahoo)
4. Recent Trends in Cold and Ultracold Matter (March 27-29, 2018, IIT Guwahati)(Poster presentation on Mirrorless Optical Parametric Oscillator in atomic vapour by Sushree S sahoo - Best Poster award)
5. SERB School on Frontiers in Quantum Optics (Dec 01-19, 2017, IIT Guwahati) Poster Presentation on Rydberg interaction induced enhanced excitation thermal atomic vapour by Dushmanta Kara -Best poster award)
6. National Laser Symposium (NLS-26) (Dec 20-23, 2017, BARC Mumbai, Poster Presentation on Rydberg interaction induced enhanced excitation thermal atomic vapour by Dushmanta Kara)
7. Annual Condensed Matter Physics Meet (Feb 26-27, 2018, NISER Bhubaneswar) Poster Presentation on Study of Rydberg blockade in Thermal Vapor by Dushmanta Kara.
8. Recent Trends in Cold and Ultracold Matter (March 27-29, 2018) Poster Presentation on Rydberg interaction induced enhanced excitation thermal atomic vapour by Dushmanta Kara.

Research and Development Projects: Extraural Funding

Project During The Year-2017-18 (1st April 2017 to 31st March 2018)

Sl No.	Project No.	Name of P.I	Dept	Sponsored by	Title of Project	Total Amount (₹)	Duration From	To	Duration in years
1	CH1701	Dr. Arun Kumar Shil (Under Mentroship of Dr. C Gunanathan)	SCS	SERB	National Post Doctoral fellowship	1,920,000.00	05.05.2017	04.05.2019	2
2	Ch1702	Dr. Subhadip Ghosh	SCS	CSIR	Ultrafast and single molecule spectroscopy study of plymers, organometallic compounds and bio-macromolecular assemblies.	510,000.00	03.05.2017	02.05.2020	3
3	Ph1701	Dr. Partha Sona Maji (Under mentroship of Dr. Ritwick Das)	SPS	SERB	National Post Doctoral fellowship	1,920,000.00	14.06.2017	13.06.2019	2
4	BL1701	Dr. K.C Panigrahi	SBS	DBT	Correlation of PhyB and Auxin Signaling in patterning the root development in Arabidopsis.	7,303,000.00	26.07.2017	25.07.2020	3
5	BL1702	Dr. Pranjal Mahanta (Under mentroship of Dr.Rudresh Acharya)	SBS	SERB	National Post Doctoral Fellowship	1,920,000.00	31.07.2017	30.07.2019	2
6	CH1703	Dr. Sanjib Kar	SCS	SERB	High Valent Metalli-Corroles :Synthesis,Characterization and applications to catalysis	5,409,820.00	07.08.2017	06.08.2020	3
7	CH1704	Dr. Chidambaram Gunanathan	SCS	SERB	Catalytic Activation and Direct Coupling of Ammonia with Arenes and Alkenes by Pincer Complexes	4,989,600.00	08.08.2017	07.08.2020	3
8	BL1703	Dr. Sanjita Banerjee	SBS	SERB	Establishment of Zebrafish- Vibrio angullarum hostpathogen model to analyse the influence of environmental factors on vibriosis	2,013,000.00	21.08.2017	20.08.2020	3

Sl No.	Project No.	Name of P.I	Dept	Sponsored by	Title of Project	Total Amount (₹)	Duration From	To	Duration in years
9	CH1705	Dr. Kanchithalaivan S. (Under mentorship of Dr.S. Peruncheralathan)	SCS	SERB	National Post Doctoral fellowship	1,920,000.00	09.11.2017	08.11.2019	2
10	MT1701	Dr. Arnab Mandal (Under mentorship of Dr.Sutanu Roy)	SMS	SERB	National Post Doctoral fellowship	1,920,000.00	14.011.2017	13.11.2019	2
11	CH1706	Dr. Narasinga Rao Palepu	SCS	SERB	National Post Doctoral fellowship	1,920,000.00	08.11.2017	07.11.2019	2
12	MT1702	Dr. Sriparna Chattopadhyay	SMS	SERB	National Post Doctoral fellowship	1,920,000.00	14.11.2017	13.11.2019	2
13	MT1703	Dr. Md. Ali Zinna	SMS	DST	Inspire Faculty Award (Project modules, complete intersections and orbit spacess of unimodular rows.)	3,500,000.00	09.03.2017	08.03.2020	5
14	PH1702	Dr. Subhankar Bedanta	SPS	CEFIPRA	Breakup of 1st Installment	3,237,713.00	22.12.2017	21.12.2020	3
15	EPS1701	Dr. Urmi Dutta	SEPS	DST	Innovation in Science pursuit for inspired (INSPIRE Faculty Award)	8,300,000.00	13.12.2017	12.12.2021	5
16	PH1703	Dr. Amaresh Jaiswal	SPS	DST	INSPIRE Faculty Award	3,500,000.00	13.12.2017	12.12.2022	5
17	BL1704	Dr. Saumya Bandyopadhyay (Under mentorship of Dr.Subhasis Chattopadhyay)	SBS	SERB	National Post Doctoral fellowship	1,920,000.00	23.01.2018	22.01.2020	2
18	CH1708	Dr. Arkalekha Mandal (NPDF) (Under mentroship of Dr. Prasenjit Mal)	SCS	SERB	National Post Doctoral fellowship	1,920,000.00	06.02.2018	05.02.2020	2

Sl No.	Project No.	Name of P.I	Dept	Sponsored by	Title of Project	Total Amount (₹)	Duration From	To	Duration in years
19	CH1707	Dr. Mullah Muhaiminul Islam (NPDF) (Under Dr. Moloy Sarkar)	SCS	SERB	National Post Doctoral fellowship	1,920,000.00	19.01.2018	18.01.2020	2
20	PH1704	Prof. Bedangadas Mohanty	SPS	SERB	J.C BOSE NATIONAL FELLOWSHIP	9,500,000.00	09.03.2018	08.03.2023	5
21	MT1704	Dr. Sutanu Roy	SMS	SERB	Braided Quantum Groups and Non-Commutative Geometry	1,480,600.00	12.03.2018	11.03.2021	3
22	CH1709	Dr. V.Krishnan	scs	SERB	Imidazole containing polymers for the selective detection of fluoride and synthesis of boron-complexes	5,888,845.00	12.03.2018	11.03.2021	3
23	PH1705	Dr. Ajaya Kumar Nayak	SPS	DST	In-situ low temperature imaging of megnatic nano structures using Lorentz transmission electron microscopy	8,655,200.00	12.03.2018	11.03.2021	3
24	PH1707	Dr. Kartik Senapati	SPS	SERB	Superconductor-exchange Spring-superconductor Junctions for tunable spin-triplet supercurrent devices.	6,295,555.00	17.03.2018	16.03.2021	3
25	PH1706	Dr. Subhankar Bedanta	SPS	SERB	Creating magnetic interface in non-magentic organic thin films for spintronic applications.	6,075,520.00	19.03.2018	18.03.2021	3
26	PH1802	Dr. Karthik Senapati	SPS	CSR	Observation of Triplet Supercurrent using Singlet Superconductor/Ferromagnet hybrid Systems.	45,000.00	31.03.2018	30.03.2019	1
					Total Cost of project	**95,903,853.00**			

List of Administrative Staff

SL.	Name of the Employee	Designation
1	Dr. A. K. Naik	Registrar
2	Shri Deepak Srivastava	SPO
3	Mrs. Shabnam Khanum	APO
4	Shri Dinesh Bahadur Singh	APO
5	Shri Rajeev Kumar Singh	APO
6	Shri Bibhupada Tripathy	Admini. Officer-III
7	Shri Ramakant Kar	Admini. Officer-III
8	Smt. A B Rosy	Office Assistant (MS)
9	Shri D. Lingaraj	Office Assistant (MS)
10	Shri Sujit Kumar Bastia	Office Assistant (MS)
11	Smt.Smruti Kanungo	Office Assistant (MS)
12	Ms. Monalisa Baliarsingh	Office Assistant (MS)
13	Shri Vijay Singh	Office Assistant (MS)
14	Shri Madhusudan Padhy	Office Assistant (MS)
15	Smt. Lipsa Das	Office Assistant (MS)
16	Smt. Lopamudra Sahoo	Office Assistant (MS)
17	Shri Nabin Kumar Sahoo	Office Assistant (MS)
18	Smt. Banita Pradhan	Office Assistant (MS)
19	Smt. Elina Das	Office Assistant (MS)
20	Shri Amarendra Ku. Behera	Office Assistant (MS)
21	Shri Ranjan Kumar Das	Office Assistant (MS)
22	Shri Abhaya Kumar Mohanty	APO
23	Shri Hiralal Das	APO
24	Smt. Apolina Lakra	Office Assistant (MS)
25	Shri Susanta Kumar Sethi	Oper. (Gen. Function)
26	Smt. Sasmita Sahoo	Oper. (Gen. Function)
27	Ms. Sandeepa Sahoo	Oper. (Gen. Function)
28	Shri Subrat Ranjan Hota	Oper. (Gen. Function)
29	Shri Jogendra Jena	Oper. (Gen. Function)
30	Shri Tusar Kanta Sahoo	Oper. (Gen. Function)
31	Shri Pradeep Kumar Mishra	APO
32	Shri Chandra Sekhar Mahapatra	APO
34	Shri Gopal Krishna Rath	APO
34	Shri Purna Chandra Sahu	APO
35	Ms. Bishnupriya Das	Oper. (Gen. Function)
36	Shri Dolananda Pradhan	APO
37	Shri Dhaneswar Nayak	APO
38	Shri Sanjay Kumar Patro	APO
39	Shri Chitta Ranjan Nayak	Clerk - A
40	Ms. Babita Pradhan	Clerk - A
41	Shri M Siba Prasad Rao	Clerk-A
42	Shri Biplab Kanungo	Clerk - A
43	Shri Bijay Kumar Behera	Clerk - A
44	Shri Trailokyanath Sahoo	DCA

Scientific and Technical Staff

1	Shri Ranjan Kumar Rana	SA 'D' Electrical
2	Shri Jitendra Narayan Dash	SA 'D' Library
3	Shri Dipak Kumar Rout	System Administrator
4	Shri Deepankar Dash	System Manager
5	Shri Susanta Kumar Parida	Technician-C
6	Shri Bikash Chandra Behera	Technician-C
7	Shri Ramprasad Panigrahi	Technician-C
8	Dr. Shyamasree Basu	Scientific Officer 'F'

9	SK Safatulla	Technician-B (Library)
10	Dr. Sudakshina Prusty	Scientific Officer 'F'
11	Mrs. Anuradha Das	Technician-C
12	Shri Sanjaya Kumar Mishra	Technician-C
13	Shri Alok Kumar Jena	Technician-C
14	Shri Deepak Kumar Behera	Technician-C
15	Shri Rudranarayan Mohanty	Technician-C
16	Shri Pravakar Mallick	Technician-C
17	Shri V.A. Sakthivel	Technician-C
18	Ms. Suchismita Dash	Technician-D (Library)
19	Shri Rabindra Kumar Maharana	Technician-D (Library)
20	Dr. Gunda Santosh Babu	Scientific Officer 'E'
21	Shri Subhransu Sekhar Panda	Technician-C
22	Shri Mukesh Kumar Meena	Technician-C
23	Dr. Arun Kumar	Scientific Officer 'F'
24	Shri Amit Sankar Sahu	Technician-C
25	Dr. Saurabh Chawla	Scientific Officer 'D'
26	Shri Souvagya Mahapatra	SO 'D' Civil
27	Shri Dilip Jha	SO 'D' Electrical
28	Shri Saikat Hira	Scientific Officer 'E'
29	Shri Amit Kumar Panigrahi	Scientific Assistant 'D'
30	Shri Bhagaban Dhal	Scientific Assistant 'D'
31	Shri Pramod Kumar Nath	Scientific Assistant 'D'
32	Shri Binod Bhagat	Scientific Assistant'C'
33	Dr. Ranbir Singh	Scientific Officer 'D'
34	Shri Sujit Kumar Raut	Scientific Assistant 'B'
35	Shri Ajit Kumar Mohanty	Scientific Assistant 'B'
36	Shri Srikrushna Sahu	Technician –B
37	Shri Debasis Das	Technician –B
38	Ms. V Shiny Jerusha Joseph	Technician –B

39	Mrs. Ashwini Babrubahan Sethi	Technician-B
40	Dr. Saralasrita Mohanty	Scientific Officer 'D'
41	Mr. Prakash Chandra Behera	Technician-B
42	Mr. Prafulla Kumar Sethi	Technician-C
43	Mr. Rakesh Kumar Behera	Technician-B
44	Mr. Kuna Mahara	Technician-B
45	Mr. Sandeep Kumar Behera	Technician-B
46	Mr. Aananda Raman	Scientific Officer 'D'
47	Dr. Priyanka Pandey	Scientific Officer 'C'
48	Mr. Balaji Venkatesan	Technician-C
49	Mr. Mriganka Sadhukhan	Technician-C
50	Dr. Biswajit Mishra	SO 'D' Medical
51	Mr. Bidyut Siba Sankar Mohanty	Scientific Assistant 'B'
52	Mr. Alok Sahoo	Scientific Assistant 'B'
53	Mr. Tapan Kumar Panigrahi	Technician-C
54	Dr. Varchaswi K S Kashyap	Scientific Officer 'D'
55	Dr. Chandramohan Bathrachalam	Scientific Officer 'C'
56	Dr. Bandita Dash	SO 'D' Medical
57	Dr. Haraprasanna Lenka	Scientific Officer 'D'
58	Mr. M Suryanarayan	Scientific Asst. 'C' PET

Employee data on SC, ST, OBC and PWD as on 31.03.2018

Academic

SC	ST	OBC	PWD
1	Nil	1	Nil

Non-Academic

SC	ST	OBC	PWD
11	6	15	Nil

6TH GRADUATION CEREMONY

The 6th graduation ceremony was held on 6th June, 2017. Honourable Chief Guest Prof. D. Balasubramanian, Director (Research), Prof. Brien Holden Eye Research Centre of L. V. Prasad Eye Institute, Hyderabad former President, Indian Academy of Sciences, graced the occasion and awarded the degrees to the Graduated students.









One Ph.D scholar and 57 Integrated M.Sc students graduated in the 6th Graduation Ceremony.

The students who own various awards in the 6th Graduation Ceremony are mentioned below;

Gold Medal for Best All Round Performances

Ms. Rajula Srivastava
School of Mathematical Sciences

Silver Medal for Best Academic Performance in each discipline of the graduating class

Ms. Nibedita Priyadarshini
School of Biological Sciences

Ms. Blessy M Suresh
School of Chemical Sciences

Ms. Rajula Srivastava
School of Mathematical Sciences

Mr. Hardik Routray
School of Physical Sciences

Best M.Sc Thesis Award-2017

Mr. Parameswaran.D Valiathan
School of Biological Sciences

Mr. Sohan Hazra
School of Chemical Sciences

Ms.Rajula Srivastava
School of Mathematical Sciences

Mr. Amit Nanda
School of Physical Sciences

Memorial Awards-2017

1. **Winner of Sarat Chandra Annapurna Award-2017**

   Mr. Hardik Routray
   School of Physical Sciences

2. **Winner of Smt. Jayalaxamma Award-2017**

   Ms. Blessy M Suresh
   School of Chemical Sciences

3. **Winner of Prof. Tribikram Pati Memorial Award-2017**

   Ms.Rajula Srivastava
   School of Mathematical Sciences

4. **Winner of Dr Sumitra Moharana Memorial Award-2017**

   Ms. Nibedita Priyadarshini
   School Biological Sciences

Admission Statistics in the 5yr Integrated M.Sc programme, 2017

Approved intake for 5 year integrated M.Sc programme is 200.

Total admitted into the 5 year integrated M.Sc programme in the year 2017 is 149.

Total students on roll in 5 year integrated M.Sc programme is 129.

INFRASTRUCTURE

NISER Bhubaneswar Project at Jatni was undertaken and completed by M/s L&T under the supervision of Directorate of Construction, Services and Estate Management (DCSEM), Mumbai along with the help of NISER, Institute Works Department (IWD). It covers an area of 300 acres and is located at Jatni along Jatni-Khurda road, Odisha at a distance of about 6 km from NH-5.

Permanent Campus at Jatni

NISER, Jatni Project comprises a total of 127 buildings, having plinth area 175937.92 sqm. The building comprises of various types like Academic buildings, Amenities buildings, Service buildings, Residential, Hostels.

Academic building consists of Schools of Chemical Science, Biological Science, Library, Physical Science, Mathematical Science, Humanities and Social Science, Green House, Animal House, Auditorium, Workshop and Meditation center. Amenities building consist of Health center, bank and Post office, Primary school, Community Centre and shopping complex, Student activity center and Aquatic complex.

Service building consists of AC plant room, Main receiving station (MRS), Local control substations (LCS), Gas bank, water works and gate house. Residential Buildings consist of Flats of A, B, C, D and individual duplex houses like E type, Dean Bungalow and Director Bungalow. Hostels consist of Double Occupancy and single Occupancy.

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. Thousands of saplings have been planted and various other plantation drives are being taken up from time to time with a target to make the campus as one of the greenest campus in India. This was




the pledge taken after the NISER was officially dedicated to Nation by Honorable Prime Minister, Shri Narendra Modi on 7th February 2016. The campus have been shifted to its permanent campus on 1st July, 2015 after which the works department is very much actively participating the needs of its end users i.e. staff, faculties and residents .

Rain water harvesting structures like ground water recharging pits and ponds in the Jatni campus of NISER. The water to the campus is filled in the water tank placed at the hill top from where the water is filled to the respective water tanks at the multi storied buildings through gravity which is economical as far as the expenditure with regards to keeping a pump and its operation and consumption of diesel etc. The Sewage Treatment Plant (STP) is in place. The treated water from the STP can be used for arboriculture and landscaping.

Recently, the thermoplastic marking on road was done within scheduled date and the kerb stone painting and marking done. In order to arrest the soil slipping out during rain, kerb walls in left over portion taken up and completed. This enhances the scenic beauty of the campus also the numbering of all residential quarters done.

Electrical

1. Total power consumption during 2017-2018: 76, 61400/-kwh (Unit).
2. Average power factor during the period 2017-2018: 0.99(lag).
3. Maximum power demand during the period 2017-2018: 2200KVA.
4. 25 Nos of street light pole of 2x250W conventional lamp (HPSV) replaced with 2x90W LED lamp. This initiative has resulted in saving of **1152 Kwh Unit/Day of electricity.**

Some of the salient features of this project are:

Water harvesting is fully ensured by recharging of ponds in the campus by rain water and ground water recharging pits. STP and ETP are provided to make use of waste

water. Separate flushing tank is provided, so that STP treated water can be used in flushing. To ensure minimum water utilisation dual flushing system is provided.

Proper utilisation of day light to conserve electricity by providing glass window and Polycarbonate sheets in the top truss enabling proper lighting. The orientation of building was done in such a way that proper lighting and ventilation is ensured. To ensure heat transfer thermal insulation to the top floor is provided in academic complex.

The water tank catering to the entire campus water demand is placed at the top most location of the campus enabling proper conservation of pumping charges and allied expenses. The water is able to reach the high rise buildings through gravity as a result of this arrangement. A separate irrigation tank is provided for arboriculture.

Smoke proof doors around the corridors to confine the smoke in local area so that rescue can be done. Fire proof doors (2hrs resistivity) at exit point of staircase in every floor during fire emergency.

Source of Electricity and Water in campus

The electricity supply for NISER campus is arranged from Aurugul Grid (5km) near IIT Bhubaneswar which was successfully energized since 28th April 2015.

The shopping complex is also taken over. Various shops have been allotted.

The community centre is already in place which is being regularly used by staff and faculty for family functions and various departmental functions. In construction of various things proper value engineering is taken care and accordingly the scarps taken over from fencing materials are used as guard rails saving huge amount of money etc.

The solid waste disposal is being maintained by Jatni Municipality. Jatni Municipality is picking the solid waste daily and dumping in their designated dump yards.

OUTREACH AND SUMMER PROGRAMMES

NISER has been conscious of its responsibility to reach out to society. As part of our outreach activity we conduct regular workshops and training programmes, particularly in the discipline of mathematics. Our colleagues from this school have been doing a commendable job in this regard catering to students and teachers from Odisha and other parts of the country.

NISER has conducted a highly successful science day celebration which involved lectures and practical demonstrations to school children. We hope to be able to kindle the interest of society in general and young students in particular in science and technology and to be able to attract students to pursue a career in science.

We also accept students from other reputed Institutes of the country such as IISERs, NITs, etc. who express their interest to do summer projects under the supervision of our faculty members. NISER has been more than happy to allow such interested students to leverage its facilities for initiating new or furthering ongoing research activities. Similarly our students also embark for some of the best places during summers to learn new things as well as to expand and fine-tune their existing knowledge.

MISCELLANEOUS

International Day of Yoga

International Day of Yoga was celebrated by the institute on 21.06.2017. NISER conducted various yoga sessions, pranayama etc in which the faculty members, staff and students of the institute participated with all enthusiasm.

Sadbhavana Diwas

The Sadbhavana Diwas was observed 18th August 2017, 20th August, 2017 being a Sunday. All the officers and employees took the Sadbhavana Pledge for maintaining communal harmony.

Rastriya Ekta Diwas (National Unity Day)

The Rastriya Ekta Diwas was observed 31st October, 2017. Director, NISER administered Rastriya Ekta Pledge to all the officers and employees of the institute.

Vigilance Awareness Week

The vigilance awareness week was observed during 30thOctober, 2017- 04thNovember, 2017. All the employees of NISER took the oath of official secrecy and pledged on 3rd November, 2017, for maintenance of honesty and transparency while delivering their work.



Constitution Day observation

The day was observed on 27.11.2016 instead of 26.11.2016 as 26th Nov was a Sunday. The day was marked with address by Director, Registrar and reading of preamble.

3rd Orientation Workshop on Laboratory Animal Sciences (2nd-5th May 2017)

A four day intensive workshop on Laboratory Animal Science was organized by NISER and ILS for research scholars, students and faculty involved in research with animals.

Humane use of animals in research is not only a legal and ethical obligation but is also necessary to do quality science. The objective of this workshop was to prime researchers with basic facts and principles that are essential for the humane use and care of animals. The workshop intended to provide orientation and overview of animal care & use in relation to national and international guidelines. The Workshop involved Research Scholars involved in research with animals (BVSc/ MVSc/ MBBS/ M.Pharma/ MSc./PhD).

All India People's Science Congress

The All India People's Science Congress (AIPSC) is the national event where delegates of the member organizations of the All India People's Science Network (AIPSN) come together to discuss the question of Scientific Rationality and the issue of Social Development and Progress, and to review the working of the science movement and decide the future goals for AIPSN. All India People's Science Network (AIPSN) organized the 16th All India People's Science Congress (AIPSC) at NISER Bhubaneswar from 9-12th February, 2018. The Congress involved participation of 700 delegates from across the country and shall address issues related to science and technology, clustered into different thematic areas. Delegates to the congress represented a spectrum of representation, including scientists, academics, policy makers, activists working at community level for science popularisation, etc. The local organizing committee including Bharat Gyan Vigyan Samiti (BGVS), Odisha, NISER and many more organizations in association with the National Secretariat of AIPSN, currently based in Hyderabad were responsible for organising the Congress.

Smt. Usha Devi, Minister of Planning and Convergence, Skill Development and Technical Education, Govt. of Odisha, inaugurated the congress on 9th February,

2018 and Shri Badrinarayan Patra, Minister, School and Mass Education, Science and Technology, Govt. of Odisha graced the occasion as the Chief Guest for the valediction ceremony on 12th February, 2018.

Implementation of Official Language

Compliance of implementation of official language Hindi in the institute is being done through the Official Language Implementation Committee consisting of all functional section in-charges to encourage and supervise activities pertaining to official language Hindi in the every department of the Institute. The committee regularly meets to monitor and implement the policy level instructions received from DAE as well as Government of India.

Some of the major activities which were conducted during the year 2017-18 are given below:

1. **Hindi fortnight** was observed during September 1st to 15th, 2017. On this occasion following events / activities were conducted:

a) **Hindi Film Quiz Competition:** This event was conducted on September 7, 2017 and coordinated by Dr. Pranay Swain. Amongst the participants, groups of two people were formed. Winner groups of this event were:

i) **First Prize** (Cash award of Rs.2000):
Mr. Vijay Singh & Mr. Sukant Kumar Das

i) **Second Prize** (Cash award of Rs.1500):
Ms. Bishnupriya Das & Ms. Sandipa Sahoo

ii) **Third Prize** (Cash award of Rs.1000):
Ms. Monalisa Baliarsingh & Sri Dillip Swain

b) **Hindi Essay writing competition:** This event was conducted in two categories viz. Students & Employees on September 12, 2017 on the topic of **"Importance of Science in Daily Life"**. Winners of this competition were:

Students Category:

i. **First Prize** (Cash award of Rs.2000):
Mr. Pankaj Kumar

ii. **Second Prize** (Cash award of Rs.1500):
Mr. Deepanshu Kumar

iii. **Third Prize** (Cash award of Rs.1000):
Ms. Rashmita Das





Employees Categories:

i. **First Prize** (Cash award of Rs.2000): **Smt. Smruti Kanungo**

ii. **Second Prize** (Cash award of Rs.1500): **Smt. Apolina Lakra**

iii. **Third Prize** (Cash award of Rs.1000): **Ms. Babita Pradhan**

c. **Short – Lecture in Hindi** organized on HINDI – DIWAS: This event was conducted on the occasion of the Hindi – Diwas (i.e. on September 14, 2017). The winners of this event were:

i) **First Prize** (Cash award of Rs.2000): **Dr. Sourabh Chawla**

ii) **Second Prize** (Cash award of Rs.1500): **Mr. Souvagya Mahapatra**

iii) Third Prize (Cash award of Rs.1000): **Mr. Radha Madhab Pathi**

Some of the Photographs of Hindi-Diwas celebration, & prize distribution to the winners of different events conducted during the Hindi fortnight are depicted at previous page.

1. **Organization of Joint Hindi Workshops:**

a) A Joint Hindi workshop was organized at Heavy Water Plant, Talcher on 23.06.2018 in collaboration with NISER, IOP & HWP.

b) Another Hindi workshop was jointly organized by NISER, IOP & HWB Talcher on December 27, 2017 at Institute of Physics Campus.

2. Since last three years, we are conducting a one day Official Language (Hindi) Seminar in collaboration with NISER, IOP, IMMT, AIIMS, CIFA, CIWA, & ILS in any one of the participating institutions. This year NISER has hoisted it from its Jatni campus. The theme title of the Seminar was "Role of Scientific & Technical Institutions in Skill Development". The Seminar was organized on March 20th, 2018 in collaboration with NISER, IOP, SIFA, ILS, SIWA, and AIIMS Bhubaneswar. There were around 50 participants from NISER and around 15 from each participating institutions. The cost so incurred was equally shared by the all institutions.

Some of the photographs of the Seminar are shown below:

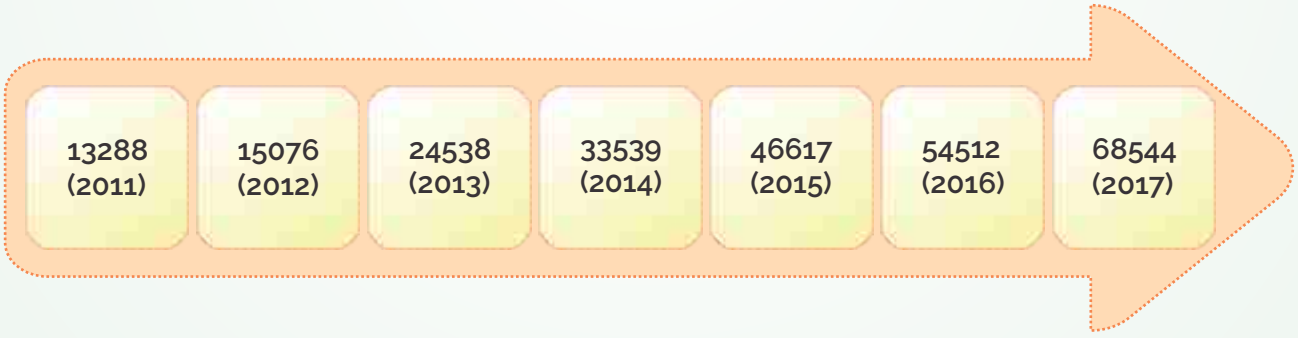
NATIONAL ENTRANCE SCREENING TEST (NEST)

Intake to the Flagship Program – NEST

National Entrance Screening Test (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.NEST is conductedfor admission to National Institute of Science Education and Research (NISER), Bhubaneswar and University of Mumbai - Department of Atomic Energy Centre for Excellence in Basic Sciences (UM-DAE CBS), Mumbai was successfully conducted at 123 venues in 59 cities across the country on 27th May, 2017.For NEST-2017, 21 new venues were added. The response to this year's advertisement was very satisfying.

As against 33503 in 2014, 46617 in 2015 and 54511 in 2016, this time68,544 applications were received. The number reinforces the growing popularity of science education in general and NISER in particular. Out of the 68,544 applied, 46,969 candidates wrote the test.

The results were declared on the NEST website on16th June, 2017 and admission counseling were held on 7th of July. A new batch of 170 students were admitted by 25thJuly 2017 and the classes for the academic session 2017-18 started from that day. In next couple of years, once NISER settles down completely here in the new campus, it will increase the intake to the approved strength of 200. Number of applications received over the years is depicted below.



Brief summary of the gender and category wise applicants is as follows:

Gender	GEN	OBC	SC	ST	PD	Total
Male	20659	11198	3978	1593	234	37428
Female	17941	9322	2773	1080	111	31116
TOTAL						**68544**

The state wise distribution of the applications received is shown in the following table.

State of Domicile	Number	Percentage
Odisha (OD)	16465	24.021
Kerala (KL)	10577	15.431
West Bengal (WB)	5705	8.323
Uttar Pradesh (UP)	5564	8.117
Maharashtra (MH)	3121	4.553
Bihar (BR)	2964	4.324
Andhra Pradesh (AP)	2724	3.974
Rajasthan (RJ)	2494	3.639
Telangana (TS)	2407	3.512
Tamil Nadu (TN)	2265	3.304
Haryana (HR)	1747	2.549
Madhya Pradesh (MP)	1651	2.409
Delhi NCR (DL)	1583	2.309
Himachal Pradesh (HP)	1518	2.215
Jharkhand (JH)	1384	2.019
Chhattisgarh (CG)	1275	1.86
Karnataka (KA)	1052	1.535
Punjab (PB)	874	1.275
Uttarakhand (UK)	723	1.055
Assam (AS)	682	0.995
Gujarat (GJ)	527	0.769
Tripura (TR)	332	0.484
Jammu & Kashmir (JK)	328	0.479
Puducherry (PY)	162	0.236
Chandigarh (CH)	130	0.19
Manipur (MN)	78	0.114
Meghalaya (ML)	62	0.09
Arunachal Pradesh (AR)	52	0.076
Goa (GA)	27	0.039
Sikkim (SK)	21	0.031
Andaman & Nicobar (AN)	20	0.029
Nagaland (NL)	12	0.018
Dadra & Nagar Haveli (DN)	9	0.013
Lakshadweep (LD)	8	0.012
Daman & Diu (DD)	1	0.001
TOTAL	**68544**	**100**

The admissions to the Ph.D programmes were conducted through an even more rigorous process that included short-listing of eligible applicants followed by in-house written tests and interviews.

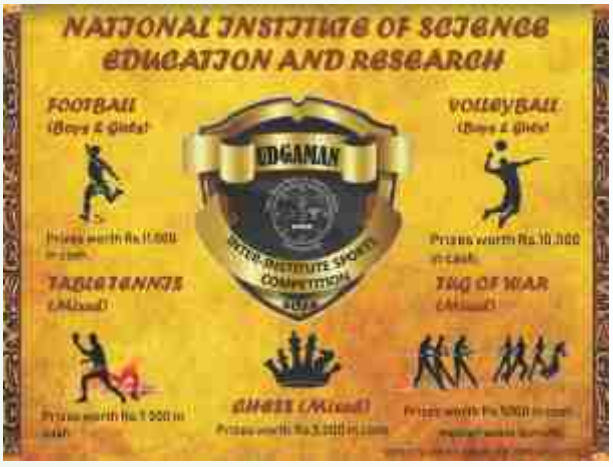
The selection process for the Ph.D programmes in various schools were completed in the month of July 2017 and January 2018. Close to one thousand nine hundred applications were received for the Ph.D programme this time and the school wise break up is as follows:

Physics:	327
Biology:	987
Chemistry:	316
Mathematics:	161
Humanities and Social Sciences:	123

STUDENTS ACTIVITIES

Udgaman:

During March 2018 the students Gymkhana organized the Inter-college Sports and Cultural Meet called "Udgaman". The meet encompassed events like Emblazon, Prelude and Abhivyakti-The Beginning, Football, Volleyball, Table Tennis, Chess, Tug of War.



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, 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. It's primary

objective is to stimulate social responsibility amongst NISER students and promote processes which are sustainable, socially inclusive and gender equitable, enabling marginalized communities to achieve a dignified quality of life. Since its inception, it has taken quite a few initiatives to help underprivileged kids in attaining primary education by providing them financial aid as well as moral support.As a part of fund raiser, they organise food fests for the two children Tehasin and Sukriya that the zariya team has rehabilitaed. The entire NISER family comes together with smiles and a lot of excitement for the cause. They also hold personal reading and story-telling sessions to create a habit of readings among the children in Bhubaneswar slums and villages nearby.

Please join in giving a big round of applause to these initiatives of our students.

The Weekly:

The Quizone Club conducts a weekly e-quiz for the members of our institute. Interesting and intriguing might be the only words which could describe it.

Inter IISER sports meet:

The IISM is the only sporting event in which NISER participates every year along with the other IISER's and a few other national science institutes. Even with a hectic academic schedule our students would find time at some hour of the day and practice for the meet. And it paid off in the form of three silver medals (Chess, Cricket and Athletics) and two bronze medals (Athlectis).

Science Activities Club:

The SAC is actively engaged in conducting various types of sessions for the science

enthusiasts. Seminars, Skype sessions (Webinar) with experts from various fields of science and observation sessions are some of the activities of the Science Activities Club. They have had various Astronomy sessions, telescope handling sessions and LIGO webinars.

Cleanliness Drive:

The youngest members of our NISER family, the first-year Integrated MSc. Students, have continuously made efforts towards keeping our campus clean. In order to create awareness amongst the students they even performed a street play (Nukkad). And after that we all wore safety gloves and cleaned our hostel premises. The first years continue to pursue their goal till date. They have taken the initiative to put up dustbins on the sidewalks leading to our hostels.

SPICMACAY NISER

Chapter hosted a mesmerizing concert of qawaali by Warsi Brothers (Nazeer Ahmed Khan Warsi and Naseer Ahmed Khan Warsi) on 5th November 2017. Few more events of Spicmacay are in the pipeline in coming months.

International Yoga Day was celebrated on 21 June 2017 with enthused participation from NISER family members. I am told this year it has been planned on a grander scale. I appeal to all of you to make Yoga an invariable part of your daily life for an allround development of your body and mind.

Drama and Music Club

Our students have a very vibrant drama and music club. The students showcase their

artistic creativity through activities on various festive occasions. To name a few, they put up cultural activities during Holi, Diwali, Eid, Chirstmas. Koffee with Kishore is another event that the students organize every year on a grand scale to commemorate the birthday of the legendary singer Kishore Kumar.

Placement

Talking of placement, the 6th batch of Integrated M. Sc graduating students graduated in June 2017, have bagged offers for Ph.D. positions from various universities in India and abroad. In India, they have secured positions at TIFR, NCBS and IITs. From abroad, students have received offers from various universities including 13 universities under top 50 global rankings in respective subjects, some of them are University of Oxford, ETH Zürich, University of Illinois at Urbana-Champaign, University of Wisconsin-Madison, Texas A&M University, University of Michigan, RWTH Aachen University, University of British Columbia, Rice University.

Sports

Sports and games constitute a major part of campus life for our students. 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.






Outstanding Performers Award

Our Administrative and Technical staff play an invaluable role in ensuring the smooth functioning of all Institute activities. This year (2018) on Republic Day the Institute acknowledged the contributions made by them and felicitated several members of the NISER family for their devotion to duty. The Institute has also decided to make the excellence awards an annual component of our Republic Day celebrations.

Dr. Sudakshina Prusty, Scientific Officer-F

Shri Rajeev Kumar Singh, APO

Shri Deepankar Dash, Scientific Asst.-C

Sk Safatulla, Technician-B (Library)

Mrs. Elina Das, Office Assistant (MS)

Audited Statement of Accounts
&
Statutory Auditor's Report
Financial Year 2017-18

National Institute of Science Education and Research
Bhubaneswar

Auditor

P K NAYAK & CO.

CHARTERED ACCCOUNTANTS
446, Sahid Nagar, Bhubaneswar-751007, Odisha
Tel.: 0674-2547560, Email: pknayakco@yahoo.com

P K NAYAK & CO.
Chartered Accountants

446 – SAHID NAGAR, Bhubaneswar-751007
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Email: pknayakco@yahoo.com

INDEPENDENT AUDITORS' REPORT

TO
THE MEMBERS
National Institute of Science Education and Research ,
P.O:Jatni,Dist:Khurda,Odisha
PIN-752050

We have audited the accompanying financial statements of National Institute of Science Education and Research ('The Institute'), which comprise the Balance Sheet as at 31 March 2018, the Income and Expenditure account and the cash Receipt & Payment account for the year ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Standalone Financial Statements

The management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance of the Institute in accordance with the accounting principles generally accepted in India. This responsibility also includes maintenance of adequate accounting records for safeguarding the assets of the Institute and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We have taken into account the accounting and auditing standards generally accepted in India.

We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and the disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal financial control relevant to the Institute's preparation of the financial statements that give a true and fair view in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on whether the Institute has in place an adequate internal financial controls system over financial reporting and the operating effectiveness of such controls. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of the accounting estimates made by the Institute as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the standalone financial statements.

Contd...P/2

P. K. NAYAK & CO.

Opinion

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information required by the Act in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India,

Further to our observations annexed hereto, we report as follows:

1. We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit.

2. In our opinion proper books of accounts have been kept by the Institute so far as appears from our examination of those books.

3. The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of accounts maintained by the Institute.

4. In our opinion and to the best of our information and according to explanations given to us the said accounts give a true and fair view:

   (i) In the case of the Balance Sheet, of the state of affairs of the Institute as at 31st March, 2018.

   AND

   (ii) In the case of Income and Expenditure Account of the excess of income over expenditure for the year ended on that date.

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

Sucanta Kumar Sahoo

(CA. S.K.SAHOO)
Partner
M. No. 060588

Place: Bhubaneswar
Date: 05.09.2018

ANNUAL ACCOUNTS 2017-18

BALANCE SHEET AS AT 31ST MARCH, 2018

Amount In Rs.

Particulars	Schedule	As at 31st March, 2018	As at 31st March, 2017
CORPUS/CAPITAL FUND AND LIABILITIES			
CORPUS/CAPITAL FUND	1	8,54,65,88,872	7,96,43,15,009
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	12,26,16,187	9,14,01,538
TOTAL Rs.		**8,66,92,05,059**	**8,05,57,16,547**
ASSETS			
FIXED ASSETS	8	1,77,72,99,641	1,37,34,95,978
INVESTMENTS- FROM EARMARKED/ENDOWMENT FUNDS	9	-	-
INVESTMENTS-OTHERS	10	6,29,72,523	14,24,04,232
CURRENT ASSETS, LOANS, ADVANCES ETC.	11	6,82,89,32,895	6,53,98,16,338
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)		-	-
TOTAL Rs.		**8,66,92,05,059**	**8,05,57,16,547**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTIGENT LIABILITIES AND NOTES ON ACCOUNTS	25		

As per our report of even date attached

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

Date: 05.09.2018
Place: Bhubaneswar

APC (F&A)

Officer on Special Duty
Finance

Director

ANNUAL ACCOUNTS 2017 - 18

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2018

Amount in Rs.

Particulars	Schedule	For the Year Ended 31st March, 2018	For the Year Ended 31st March, 2017
INCOME			
Income from Sales/ Services	12	-	-
Grant / Subsidies	13	99,15,91,348	90,55,89,923
Fees / Subscriptions	14	1,50,67,261	1,18,73,514
Income from Investment	15	-	-
Income from Royalty, Publication etc.	16	-	-
Interest Earned	17	2,25,38,958	2,74,07,176
Other Income	18	-	-
Increase/(decrease) in stock of Finished goods and work-in-progress	19	-	-
TOTAL(A)		**1,02,91,97,567**	**94,48,70,613**
EXPENDITURE			
Establishment Expenses	20	48,36,56,200	34,51,88,163
Other Administrative Expenses etc.	21	26,14,84,671	20,51,97,058
Expenditure on Grants, Subsidies etc	22	-	-
Interest	23	-	-
Depreciation(Net total at the year-end-corresponding to Schedule 8)		14,39,69,349	17,76,08,403
TOTAL(B)		**88,91,10,220**	**72,79,93,625**
Balance being excess of Income over Expenditure(A-B)		14,00,87,347	21,68,76,988
Add: Depreciation Adjustment		-	-
Less: Prior Period Expenditure		26,22,136	1,83,000
Add: Prior Period Income		-	83,994
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**13,74,65,211**	**21,67,97,982**
SIGNIFICANT ACCOUNTING POLICIES	24		
CONTIGENT LIABILITES AND NOTES ON ACCOUNTS	25		

As per our report of even date attached

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

Date 05.09.2018
Place: Bhubaneswar

APO (F&A)

Officer on Special Duty
Finance

FO

Director

ANNUAL ACCOUNTS 2017-18

RECEIPTS AND PAYMENTS ACCOUNT FOR THE PERIOD FROM 1ST APRIL,2017 TO 31ST MARCH, 2018

Amount in Rs.

RECEIPTS	For the Year Ended 31st March, 2018	For the Year Ended 31st March, 2017	PAYMENTS	For the Year Ended 31st March, 2018	For the Year Ended 31st March, 2017
I.Opening Balances			**I. Expenses**		
			a) Establishment Expenses		
a) Cash in Hand	27	32,375	**(corresponding to Schedule 20)**		
b) Bank Balances:			i. Pay and Allowances	33,12,66,425	28,64,93,416
i) In current accounts	61,70,63,290	34,49,16,783	i. Manpower (Outsourced)		
ii) In deposit accounts	-	-	ii. Staff Welfare Expenses		
ii) In Savings accounts	33,85,24,600	8,59,88,234	iv. Other Expenditure		
			v. New Pension Contribution		
			b) Administrative Expenses		
II. Grants Received			**(corresponding to Schedule 21)**		
a) From Government of India	1,43,64,00,000	1,85,63,33,000	i. Laboratory Consumable		
b) From State Government	-	-	ii.Computer Consumables		
c) From other sources	-	-	ii. Rent, Rates & Taxes		
			iv. Duties & Taxes		
III. Income on Investments	-	-	v. Other Expenditure	28,32,49,383	14,58,78,237
			vi. Prior Period Expenses	72,000	
IV. Interest Received			vi. Niser XII plan	5,41,15,912	1,85,16,421
On Bank Deposits	4,99,37,791	2,69,97,066			
			II. Payments made against funds for various projects		
V. Other Income					
a) Registration Fee (Msc & Phd)	10,58,545	84,13,508	**III. Investments and deposits made**		
b) Job Application Fee	63,000	1,52,000			
c) Summer course fee	84,500	28,000	**IV. Expenditure on Fixed Assets & Capital Work- in- progress**		
d) Application fees	-	1,500	a) Purchase of Fixed Assets	54,46,48,918	41,96,91,376
e) Receipts of CIF, SCS	-	-	b) Expenditure on Capital WIP	1,86,12,208	1,01,21,507
f) RTI Application Fees	490	638			
g) Sale of Tender paper	3,14,350	4,66,925			
h) Guest House Rent	6,21,910	3,91,399	**V. Refund of Surplus money/loans**		
i) License Fees	11,38,175	6,88,410			
j) Misc. Receipt	5,000	6,153	**VI.Finance Charges(Interest)**	2,74,09,939	-
k) Transcript Fees	28,600	31,400			
l) Identity Card/Health Card(Duplicate) Fee	3,000	1,525	**VII. Other Payments**		
m) Lease Rent	1,45,378	-	a) Sundry Creditors	-	1,61,061
			b) Smart City Fund	9,676	-
			c) Alumni Association Subscription	200	-
			d)License Fees	404	-
			e) Tender Paper Cost	10,000	-
VI. Amount Borrowed			f) NISER R&D	10,324	3,22,759
			g) IOAA - 2018	7,44,304	2,24,41,578
VII. Any other receipts (Loans, Advances & Expenses Recovered)			h) DCSEM-Medical Expenses	-	43,143
a) Security Deposit	24,85,496	15,67,448	i) Fright & Forwarding Expenses	-	12,31,882
b) E.M.D	7,45,997	5,83,680	j) Deposit (Asset) (LC)	20,90,05,775	22,48,03,043
c) IOAA - 2018		2,68,78,792	k) Deans Allowance Receivable	88,000	52,200
d) Fixed Assets	1,96,13,515	6,60,282	l) Prepaid Expenses	-	84,84,700
e) Other Expences	-	2,57,694	m) Newspaper & Magazine	-	58,938
f) Prior Period Income	-	69,669	n)Security Deposit (Refundable)	22,80,469	7,60,032
g) Duties & Taxes	4,65,11,901	2,71,26,570	o) Duties & Taxes	4,70,80,178	2,67,05,824
h) CSR FUND	4,18,720	-	p) EMD	19,54,142	26,11,759
i) DST INSPIRE Payable	1,680		q) prior period expenses		53,000
j) Statutory Recoveries	2,47,16,177	1,60,91,395	r) Scholarship Ashutosh Payable	-	2,63,060
k) Student Dues	1,32,63,085	32,91,334	s) Statutory Recoveries	2,46,49,128	1,55,92,015
l) Scholarship Ashutosh Payable	-	2,87,120	t) Student Dues	13,41,618	11,52,595
m) Hindi Sangoshthi	1,50,000	-	u) Registration Fee (Msc & Phd)	1,29,060	6,93,974
n) Odisha State Fund	43,805	-	v) Loans & Advance (Asset)	1,53,17,476	40,81,07,646
o) Smart City Fund	20,000	-	w) Abhash Jha NBHM TA Claim	-	39,786
p) Scholarship Receivable		3,23,97,276	x) Mr. Vanatr Siva TA Bill (SERB)	-	1,36,604
q) NISER XIITH Plan (Asset)	-	1,15,944	y) Liabilities for Expenses	6,15,79,745	2,59,52,312
r) Deposit (Asset) (LC)	28,64,42,631	18,95,07,382	z) Scholarship Receivable	2,04,85,082	86,82,539
s) Loans & Advance (Asset)	1,02,24,932	55,83,514	aa) Guest House Rent	-	17,862
t) Mr. Vanatri Siva TA Bill (SERB)	-	1,36,604			
u) Scholarship Payable	1,73,96,191	-			
v) Sundry Creditors	-	1,61,061	**VIII. Closing Balances**		
w) DAE Fund	-	6,28,000	a) Cash in hand	-	27
x) NISER R& D Receivable	13,62,797	575	b) Bank Balances:		
xi) shop rent	-	7,76,062	i) In current accounts	90,02,80,727	61,78,53,298
xi) Ashash Jha NBHM TA Claim	-	1,60,420	ii) In deposit accounts	-	-
xii) Water Charges	-	1,15,332	iii) In savings accounts	34,62,15,500	33,85,24,800
xiv) Electricity Charges	-	5,38,119			
xv) Travelling & Conveyance	-	6,37,532			
xvi) Supplies & Materials	-	5,43,513			
		-			
TOTAL Rs.	**2,86,95,27,389**	**2,61,55,40,101**	**TOTAL Rs.**	**2,86,95,27,389**	**2,61,55,40,101**

For P. K. NAYAK & CO.
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

Date:05.09.2018
Place: Bhubaneswar

P.K.NAYAK & CO. BHUBANESWAR CHARTERED ACCOUNTANTS

APO (F&A) | Officer on Special Duty Finance | FO | Director

ANNUAL ACCOUNTS 2017-18

Schedule -1 : Corpus / Capital Fund
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount In Rs.

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
Balance as at the beginning of the year	8,01,07,00,000		7,55,07,00,000	
Add: Contribution towards Corpus/Capital Fund	20,00,00,000		46,00,00,000	
Add: XII Plan New Project	**1,32,83,46,000**		**1,02,83,46,000**	
Advance Materials for Different applications Grant	14,30,00,000		14,30,00,000	
Basic Research in Cellular and Molecular Grant	14,75,00,000		11,75,00,000	
Centre for Fundamental Studies Grant	3,72,96,000		3,52,96,000	
Centre for inter Disciplinary Sciences Grant	28,63,00,000		16,09,00,000	
Experimental Condensed Matter Ultra Cold Atom Grant	28,05,00,000		25,05,00,000	
Experimental High Energy Physics Programme Grant	3,42,00,000		3,12,00,000	
Microbes Immunity and Disease Biology Grant	14,19,00,000		11,19,00,000	
Novel Organic Compounds for Boimedical Grant	14,52,00,000		13,67,00,000	
Outreach Programmes in Maths and Systems Biology Grant	34,50,000		24,50,000	
Research in Basic Sciences Grant	5,00,00,000		-	
Theoretical High Energy and Condensed Matter Grant	5,89,00,000		3,83,00,000	
Less: Grant Transferred to Revenue	17,61,97,309		12,10,05,961	
		9,36,28,48,691		8,91,80,40,039
Add/(Deduct): Balance of net income/ (expenditure) transferred from the Income and Expenditure Account		(81,62,59,819)	-	(95,37,25,030)
Balance as at the year end Total Rs.		**8,54,65,88,872**		**7,96,43,15,009**

Schedule -2 : Reserves & Surplus
(Schedule forming part of Balance Sheet as at 31.03.2018)

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
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 Rs.		-		-

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E
S Sahoo
(CA. S.K.Sahoo)
Partner
M. No. 060588

P.K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

APO (P&A) | Officer on Special Duty Finance | Director

Schedule -3 : Earmarked/Endowment Fund

(Schedule forming part of Balance Sheet as at 31.03.2018)

Particulars	Fund-wise break up								Totals			
	Fund WW		Fund XX		Fund YY		Fund ZZ		Current Year(2017-18)		Previous Year(2016-17)	
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 adcitions	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL Rs. (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 Rs. (c)		-		-		-		-		-		-
Net Balance at the year end (a+b-c)		-		-		-		-		-		-

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

Sukanta Kumar Sahoo
(CA. S.K.Sahoo)
Partner
M. No. 060588

P. K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

APO (F&A)

Officer on Special Duty
Finance

FO

Director

ANNUAL ACCOUNTS 2017- 18

Schedule -4 : Secured Loans and Borrowings

(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
1. Central Government		-		-
2. State Government (Specify)		-		-
3. Financial Institutions				
a) Term Loans	-		-	
b) Interest accured and due	-	-	-	-
4. Banks:				
a) Term Loans	-		-	
Interest accured and due	-		-	
b) Other Loans (specify)	-		-	
Interest accured and due	-	-	-	-
5. Other Institutions and Agencies		-		-
6. Debenture and Bonds		-		-
7. Others(specify)		-		-
TOTAL Rs.		-		-

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

APO (F&A)

Officer on Special Duty
Finance

Director

ANNUAL ACCOUNTS 2017-18

Schedule -5 : Unsecured Loans and Borrowings
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
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 Rs.		-		-

Schedule -6 : Deferred Credit Liabilities
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
a) Acceptances secured by hypothecation of capital equipment and other assets	-	-
b) Others	-	-
TOTAL Rs.	-	-

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

APO (F&A)

Officer on Special Duty
Finance

Director
FO

ANNUAL ACCOUNTS 2017-18

Schedule -7 : Current Liabilities and Provisions
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount In Rs.

S.No.	Particulars	Current Year(2017-18)		Previous Year(2016-17)	
A.	CURRENT LIABILITIES				
1.	Acceptances		-		-
2.	Sundry Creditors:				
	a) For Goods	2,87,653		2,87,653	
	b) Others - EMD	59,52,400		47,39,297	
			62,40,053		50,26,950
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				
	TDS (Non Salary)	96,446		6,00,701	
	TDS (Salary)	(10,202)		5,046	
	Work Contract Tax	-		53,175	
	c) Other Recoveries s				
	Statutory Deposit	-		-	
			86,244		6,58,922
6.	Other Current Liabilities				
a)	Student Dues				
	Internal amenitie S.D.	1,86,000		1,92,000	
	Excess Prog. Regd. Fees	12,667		52,589	
	Caution Money (Labrotary)	13,000		13,000	
	Caution Money (Library)	14,12,000		12,41,000	
	Caution Money (Institute)	24,15,250		21,54,150	
	CSIR FUND	4,18,720		-	
	Smart City Fund	10,324		-	
	Hindi Sangoshthi	1,50,000			
	DST INSPIRE	1,580		-	
	Odisha State Fund	43,805		-	
	Alumni Association Subscription	47,000		-	
	DAE Fund	-		6,28,000	
	Programme Registration	2,77,050		76,550	
	Student Welfare Fund	2,01,840		1,61,640	
	IOAA -2016	64,17,811		71,62,115	
	TA Claim (Abhash jha)	-		1,20,654	
	Scholarship (Asutosh)	-		2,90,000	
	Earned Leave	-		12,713	
			1,16,07,047		1,21,04,411
b)	Security Deposit				
	Thames Consultant Pvt. Ltd.	22,722		22,722	
	Jena Travels	1,01,000		1,01,000	
	Airway Bhubaneswar	28,000		28,000	
	Ashok Kumar Nayak	5,000		5,000	
	Aniruddha Mohapatra	65,147		4,864	
	Amarendra Ojha	61,188		31,385	
	4S Interiors	25,39,832		25,39,832	
	Bigyan Kumar Pradhan	1,29,782		24,369	
	Bijay Kumar Behera	1,26,313		32,500	
	Bhagarathi Sahoo	1,22,193		30,553	
	B K Giri	18,133		13,133	
	CEETAK	-		70,794	
	Clean "N" Clean	-		9,60,320	
	Damodar Engineers Pvt. Ltd.	-		76,947	
	Deepak Kumar Mishra	51,841		51,841	

ANNUAL ACCOUNTS 2017-18

Schedule -7 : Current Liabilities and Provisions

(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

S.No.	Particulars	Current Year(2017-18)		Previous Year(2016-17)	
	Geeken Seating Collection Pvt. Ltd.	55,36,542		55,36,542	
	Orissa Engineering Udyog Pvt. Ltd.	-		30,020	
	HAK Electrical & Engineering Works	76,693		50,018	
	H Electrical Engg. Works	16,439		16,439	
	Jagannath Refrigeration Services	3,200		3,200	
	Shri Rabindra Kumar Mallick	93,670		2,14,006	
	Subhashree Engineering	4,890		4,890	
	Pest Control India Pvt. Ltd.	360		360	
	Biswajit Mishra	1,26,694		1,26,694	
	Nirmal Chandra Sar	2,97,451		3,34,046	
	Numeric Power Systems Ltd.	14,343		14,343	
	Deepak Kumar Das	1,00,739		1,04,345	
	Laser Science Services (I) Pvt Ltd	4,50,900		4,50,900	
	Laxman Senapati	1,26,231		81,631	
	Maa Dakhinachandi Catering Services	1,00,000		1,00,000	
	Barnali Bera	34,317		-	
	Bichitrananda Samantaray	30,600		-	
	Bikramajit Singh	5,000		-	
	Chandan Electrical	10,000		-	
	Debasis Pattanaik	1,62,000		-	
	Dwarika Nath Samal	3,02,571		-	
	Ensure Supoort Services India Ltd	5,000		-	
	Everest Computers	5,000		-	
	IN2IT Technology Pvt. Ltd	5,000		-	
	J N Sharma	1,00,000		-	
	JOHNSON	1,30,504		-	
	Kumar Electricals	5,000		-	
	Manor Computers	5,000		-	
	Maxim Systems	5,000		-	
	Nablok Das	60,909		-	
	Ray Electricals	19,015		-	
	Santosh Kumar Paikaray	5,000		-	
	S P Power System	13,975		-	
	Suvidha Engineers Pvt. Ltd	1,15,644		-	
	Vedica Resources	25,107		-	
	Wizertech informatices Pvt. Ltc	5,000		-	
	Nihar Ranjan Parida	-		1,96,981	
	Sai Aircon	9,509		9,509	
	Sanjeeb Kumar Das	5,000		5,000	
	Sridhar Routray	5,000		5,000	
	Sritam Computers	2,16,597		1,05,836	
	Sujit Kumar Nahak	44,579		33,394	
	Tathagata Engineering	2,48,536		1,40,267	
			1,17,98,156		1,15,56,681
c)	Other s				
	Court Case ofSouvagya Mahapatra	13,000			
	CPF/ GPF/ PRMS (Deputation V. Chandrasekhar)	(150)			
	NPS Recovery	74,519		21,595	
	Professional Tax	815		540	
			88,184		22,135
	TOTAL Rs. (A)		**2,98,19,694**		**2,93,69,099**

ANNUAL ACCOUNTS 2017-18

Schedule -7 : Current Liabilities and Provisions
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount In Rs.

S.No.	Particulars	Current Year(2017-18)		Previous Year(2016-17)	
B.	**PROVISIONS**				
	For Taxation	-		-	
	Gratuity	-		-	
	Superannuation / Pension	-		-	
	Accumulated Leave Encashment	-		-	
	Trade Warranties / Claims	-		-	
	For Expenses Payable	-		-	
	Audit Fees	50,740		50,740	
	Fellowship	63,78,709		81,92,165	
	Hire Charges Vehicle	4,58,649		10,57,288	
	Stipend to Trainee	60,000		59,080	
	Fuel Charges	2,11,898		20,657	
	House Keeping Expenses	90,000		-	
	Honorarim/Remuneration	1,82,500		1,74,537	
	Outsourced Manpower	1,13,90,273		28,70,253	
	Outsourced Security	-		20,00,162	
	Medical Expenses	76,652		4,13,586	
	Advertisement Charges	7,189			
	Electricity Charges	75,741		-	
	Children Educational Allowance	18,41,097		-	
	Contingency Expenditure	5,69,463		-	
	Hospitality Expenses	2,25,678		-	
	Lab Consumable	26,02,544		-	
	Leave Travel Concession	1,93,743		-	
	Meeting Expenses	5,11,489		-	
	Newspaper & Magazine Expenses	1,814		-	
	Printing & Stationary Expenses	77,670		-	
	Postage & telegram	19,275		-	
	Pension Contribution	5,16,852			
	Leave Salary Contribution	2,75,403			
	Purchase of Consumable	11,67,340		-	
	Rent , Rate & Taxes	5,296		-	
	Sports & Internal Activity Expenses	24,256		-	
	Supplies & Materials	8,71,300		-	
	TA on Tranfer	18,867		-	
	Travelling & Conveyance	4,75,160		-	
	Work In Progress	41,00,970		-	
	Repair & Maintainance Expenses	13,60,550		19,750	
	Professional Update Allowance	49,19,064		29,80,000	
	Pay and Allowances	1,88,35,057		1,75,25,066	
	Telephone & Telex	1,26,082		1,34,217	
	PRIS	3,32,10,225		2,66,85,421	
	Water Charges	6,540		17,796	
	NPS Employees Subscription	16,56,487		14,93,998	
	Ghuru Murughan Ganeshan	-		94,390	
	LSPC of Prof.T.K.Chandrasekhar	-		2,41,413	
	NPS-Receive SERB Delhi	1,920		1,920	
	Sub-total Rs. (B)		**9,27,96,493**		**6,20,32,439**
	Total Rs. (A+B)		**12,26,16,187**		**9,14,01,538**

For P. K. NAYAK & CO.
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 050588

APO (F&A)

Officer on Special Duty
Finance

FO

Director

Schedule -8 : Fixed Assets
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

Sl. No.	Particular of Assets	Rate	GROSS BLOCK					DEPRECIATION			NET BLOCK	
			WDV as on 01.04.2017	Addition during the year		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 on 31.03.2018	As at the Previous year-end on 31.03.2017
				more than 180 days	less than 180 days							
1	Land	-	2,76,17,405	-	-	-	2,76,17,405	-	-	-	2,76,17,405	2,76,17,405
2	Furniture & Fixtures	10%	30,73,94,163	24,69,953	87,76,268	-	31,86,40,404	3,13,25,226		3,13,25,226	28,53,15,179	30,73,94,163
3	Computers	40%	42,93,960	13,800	1,17,50,297	-	1,60,58,056	40,73,167	-	40,73,167	1,19,84,900	42,93,960
4	Software	40%	1,87,319	5,26,240	-	-	7,13,559	2,85,424	-	2,85,424	4,28,135	1,87,319
5	Lab Equipments	15%	29,01,45,324	10,22,75,478	13,57,47,421	47,07,516	52,34,60,705	6,83,38,049	-	6,83,38,049	45,51,22,656	29,01,45,324
6	Tools Equipments	15%	1,26,680	-	-	-	1,26,680	19,002	-	19,002	1,07,678	1,26,680
7	Books	40%	50,74,756	31,49,940	3,20,042	53,161	84,91,557	33,32,614	-	33,32,614	51,58,943	50,74,756
8	Journals	40%	2,58,56,335	2,54,63,253	-	7,810	5,13,12,579	2,05,25,032	-	2,05,25,032	3,07,87,547	2,58,56,335
9	Air Conditioners	15%	16,02,851	-	-	-	19,02,851	2,85,429	-	2,85,429	16,17,423	19,02,851
10	Vehicles	15%	4,07,136	-	-	-	4,07,136	61,070	-	61,070	3,46,066	4,07,136
11	Bicycle	15%	3,079	-	-	-	3,079	462	-	462	2,617	3,079
12	Machinery & Equipments	15%	8,20,76,181	1,21,21,986	1,22,61,805	-	10,64,59,972	1,50,49,345	-	1,50,49,345	9,14,10,527	8,20,76,181
13	EPABX	15%	9,632	-	-	-	9,632	1,445	-	1,445	8,187	9,632
14	Kitchen Equipments	15%	44,85,343	-	-	4,761	44,81,082	6,72,162	-	6,72,162	38,08,920	44,85,343
15	Telephones	10%	7,475	-	3,514	-	10,989	923	-	923	10,066	7,475
16	Capital Assets(WIP)	-	21,78,55,260	1,02,21,832	1,24,91,348	1,90,12,158	22,15,56,280	-	-	-	22,15,56,280	21,78,55,260
17	NISER XII Plan Asset	-	40,60,52,591	12,97,36,776	14,86,67,291	4,23,42,541	84,20,17,117	-	-	-	84,20,17,116	40,60,52,591
	TOTAL Rs.		1,37,34,95,978	28,59,82,155	32,79,18,004	6,61,27,147	1,92,12,68,993	14,39,69,349	-	14,39,69,349	1,77,72,99,641	1,37,34,95,980

For P. K. NAYAK & CO.
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 050588

P. K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

APO (F&A)

Officer on Special Duty
Finance

FO

Director

ANNUAL ACCOUNTS 2017-18

Schedule -9 : Investments from Earmarked/Endowment Funds
(Schedule forming part of Balance Sheet as at 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and Joint Ventures	-	-
6. FD against LC's	6,29,72,523	14,24,04,232
TOTAL Rs.	**6,29,72,523**	**14,24,04,232**

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

AO (F&A)

Officer on Special Duty
Finance

FO

Director

ANNUAL ACCOUNTS 2017 - 18

Schedule -11 : Current Assets, Loans, Advances etc.
(Schedule forming part of Balance Sheet as at 31.03.2018)

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
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	-	-	-	27
4. Bank Balances				
a) SBI A/C 30755200010	90,32,80,727		61,76,53,298	
b) UBI A/C - 450502060000215	-		1,76,52,381	
c) ICB A/C - 373701000000007	34,17,94,815		28,47,75,055	
d) IOB A/C -373701000000098	40,52,566		38,94,453	
e) IOB A/C -147601000015510	3,69,117	1,24,64,37,227	3,22,02,701	95,63,77,895
5. Post office Savings Accounts	-	-	-	-
Total(A)		1,24,64,37,227		95,63,77,925
B. LOANS, ADVANCES AND OTHER ASSETS:				
1. a) Staffs:				
Abhay Kumar Mohanty	-		2,000	
Amarendra Kumar Behera	-		167	
Awanendra Singh,Ph.D. Student , SPS	16,300		16,200	
A V Anil Kumar (SPS)	-		62,282	
Bhagaban Dhal			3,711	
Binod Bhagat	-		2,662	
Brundaban Sahu	-		70,000	
Chandra Shekar Purohit	-		23,000	
Debasish Mallick	1,25,352		2,94,210	
Jaban Meher	70,233		70,233	
Jogendra Jena	-		212	
Pradeep Kumar Mishra	17,404		17,404	
Prasenjit Sarkar	20,325		20,325	
Pratap Kumar Mal	28,445		1,50,000	
Ranbir Singh	-		5,05,260	
Sandeep Bhowmik	-		5,00,000	
Sanjay Kumar Patra	-		5,220	
Subhransu Sekhar Panda	-		311	
Deepak Srivastav	3,389		3,389	
Vijay Singh	10,000		28,000	
Vipul Kharatmal	-		2,94,210	
Saurabh Chawla	74,800		51,283	
Subashis Basak	-		90,000	
Shabnam Khanum	-		10,000	
Sourav Kundu SPS			3,55,140	
Pranaya Ku Swain	4,780		4,780	
Abhay Kumar Naik	1,500		-	
Amarendra Das	88,081		-	
Debadipti Mishra	1,25,352		-	
Debasmita P A lane	1,00,000		-	
G. Santosh Babu	8,075		-	
Kartik Senapati	2,70,000		-	
Kishore C S Panigrahi	3		-	
KVS Baidyanath	607		-	
Manjusha Dixit	8,182		-	
Mr Dilip Jha	6,615		-	
Mr Ramanujam Srinivasan	2,153		-	
Mr. Trailokyanath Sahoo	84,104		-	
M Suryanarayan [PET, NISER]	1,54,500		-	
Nirupama Dutta	15,000		-	
Nishikanta Khandai	20,000		-	
Pelvic Alex	2,00,000		-	
Subhankar Bedanta	1,40,000		-	
U Lourdoraj , Reader	64,242		-	
V A Sakthivel	665		-	
V Ravi Chandra , Reader	99,000		-	
Abhaya Kumar Mohanty (Imprest)	20,000		-	
Sanjay Tanti (Imprest)	9,466		-	
Arun Kumar , Chemistry (Imprest)	9,000		-	
Ashok Mohapatara (Imprest)	3,074		-	
Biswajit Mishra (Imprest)	9,542		-	
Deepak Kumar Dalai (Imprest)	10,000		-	
Deepak Srivastav (Imprest)	10,000		-	
Dewan Bahadur Singh(Imprest)	4,992		-	
Kishore CS Panigrahi (Imprest)	10,000		-	
P C Ravi Kumar (Imprest)	5,146		-	
Prakul Singru (Imprest)	6,000		1,000	
Purna Chadra Sahu (Imprest)	5,000		-	
Dr Ranjit Mathew (Imprest)	3,500		15,000	
Saikat Hira SO (Imprest)	10,000		-	
Subhankar Bedanta (Imprest)	14,925		-	
Sudhakshina Frusty (Imprest)	10,000		-	
Sumedha Warden (Imprest)	2,507		-	
Shabnam Khanum(Imprest)	10,000		20,000	
Hanis Das(Imprest)			1,545	
Purak Aich (Imprest)	-		6,986	
Ritik Das (mprest)	-		10,000	
Festival Advance to Staff	3,800		54,500	
		13,77,908		27,00,[illegible]

ANNUAL ACCOUNTS 2017 - 18

Schedule -11 : Current Assets, Loans, Advances etc.
(Schedule forming part of Balance Sheet as at 31.03.2018)

Particulars	Current Year(2017-18)		Previous Year(2016-17)	
b) Other Entities engaged in activities similar to that		-		-
c) Others				
NBHM Support DHA	1,67,174		1,67,174	
Deans Allowance Receivable	1,72,200		1,80,199	
Advances to Suppliers :				
Exim Logistics Pvt Ltd	25,00,000		-	
DSS Imagetech Pvt. Ltd.	23,04,540			
MTI Corporation USA	-		1,430	
Pravartaka Infotech LLP, Bangalore	27,000		27,000	
Siero Medicare, Coimbator	-		36,397	
M/s A One Hospitality & cattering	72,228		96,603	
Scholarship -ICMR	50,345		50,345	
Scholarship -UGC	64,60,307		35,68,332	
Scholarship-INSPIRE	(15,74,493)		15,11,425	
Scholarship- DBT	1,00,000		-	
DCS & EM,Mumbai	5,30,00,00,000		5,30,00,00,000	
Scholarship -CSIR	1,56,83,356		1,34,77,830	
IGCAR	30,402		30,402	
Inspire Scholore (MSC)	7,10,288		-	
NEST -2016	-		28,620	
DCS & M,VECC,Kolkata	24,62,10,423		24,62,10,423	
		5,57,29,13,770		5,56,53,06,180
Security Deposit		63,17,910		63,17,910
2. Advances and other amounts recoverable in cash or in kind or for value to be received:				
a) on Capital Account		-		-
b) Prepayments		-		-
c) Others				
JEST-2010	-		-	
DCSEM-Medical Expenses Receivable	12,17,090		2,50,666	
R&D Receivable	8,990		3,78,937	
ICMA - 2016	-		-	
KYPY 2013	-		-	
Prepaid Expenses	-		84,84,700	
		12,26,080		91,14,303
3. Income Accured:				
a) On Investments from Earmarked/Endowment Fund	-		-	
b) On Investment-Others	-		-	
c) On Loans and Advances	-		-	
d) Others	-	-	-	-
4. Claims Receivables		-		-
Total (B)		**5,58,24,35,668**		**5,58,34,38,413**
TOTAL Rs.(A+B)		**6,82,89,32,895**		**6,53,88,16,338**

For P. K. NAYAK & CO.
Chartered Accountants
FRN - 318155E
(CA. S.K.Sahoo)
Partner
M. No. 060588

P.K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

APO (F&A) | Office on Special Duty Finance | FO | Director

ANNUAL ACCOUNTS 2017 - 18

Schedule -12 : Income from Sales/Services

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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 Rs.	-	-

Schedule -13 : Grants/Subsidies

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
(Irrevocable Grants & Subsidies Received)		
1) Central Government		
I) Non plan (Revenue)	93,64,00,000	85,63,33,000
i) Plan (Capital)	5,51,91,348	4,92,56,923
2) State Government(s)	-	
3) Government Agencies	-	-
4) Institutions/Welfare Bodies	-	-
5) International Organisations	-	-
6) Others (Specify)	-	-
TOTAL Rs.	**99,15,91,348**	**90,55,89,923**

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

P.K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

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ANNUAL ACCOUNTS 2017 - 18

Schedule -14 : Fees/Subscriptions

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
1. Registration Fees (Msc & Phd)	1,24,58,238	94,72,934
2. Application Fees		1,500
3. License Fees	11,20,771	5,32,716
4. Sale of Tender Paper	3,04,350	4,36,925
5. RTI Application Fees	490	636
6.Transcript Fees	26,500	31,400
7.Identity card/Health Card fee	3,000	1,525
8.Summer course fees	64,500	28,000
9. Miscellaneous Receipts	-	6,267
10. Guest House Rent	6,21,910	3,73,547
11. Job Application Fees	63,000	1,52,000
12. Rent for shop	-	7,76,062
13. Other Income (LSPC TKC & EL BKS)	2,59,126	
14. Lease Rent	1,45,376	-
TOTAL Rs.	1,50,67,261	1,18,73,514

Schedule -15 : Income from Investments

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount In Rs.

Particulars	Investment from Earmark Fund		Investment Others	
	Current Year(2017-18)	Previous Year(2016-17)	Current Year(2017-18)	Previous Year(2016-17)
(Income on Invest. From Earmarked/Encowment 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 P. K. NAYAK & CO.
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

APO (F&A)

Officer on Special Duty
Finance

Director

ANNUAL ACCOUNTS 2017-18

Schedule -16 : Income from Royalty, Publication etc.
(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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	2,25,38,958	2,74,07,176
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 Rs.	**2,25,38,958**	**2,74,07,176**

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 3060588

P.K. NAYAK & CO. CHARTERED ACCOUNTANTS BHUBANESWAR

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ANNUAL ACCOUNTS 2017 - 18

Schedule -18 : Other Income

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
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 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
a) Pay and Allowances	24,81,46,972	16,74,80,426
b) Manpower (Outsourced)	8,44,36,409	4,13,32,566
c) Stipend to Trainee	5,25,917	5,30,561
d) Contribution to NPS	2,21,04,479	1,47,36,116
e) Leave Travel Concession	35,07,262	31,45,902
f) Fellowship to Phd Scholars	5,80,45,080	5,80,14,745
g) Fellowship to Post Doctoral Scholars	71,26,809	52,21,223
h) Contigency to PHD Students	55,88,065	33,92,951
i) Honorarium & Scholarship	45,32,538	56,84,033
j) PRIS	3,33,21,056	3,72,45,523
k) Medical Expenses	17,47,908	34,30,362
l)Children Education Allowance	20,52,229	12,05,327
m) Leave Encashment	15,97,335	5,18,164
n) Leave Salary Contribution	5,28,191	1,14,400
o) Professional Update Allowance	49,19,064	28,99,654
p) Pension Contribution	7,90,561	2,36,210
q)Contingency Expenses PDF	4,77,189	-
r) Msc Scholarship (DISHA)	61,86,734	-
s) Summaer course fellowship -student	20,322	
	48,36,56,200	**34,51,88,163**

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA.S.K.Sahoo)
Partner
M. No. 060588

FO (F&A)

Officer on Special Duty
Finance

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Director

ANNUAL ACCOUNTS 2017 - 18

Schedule -21 : Other Administrative Expenses
(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year(2017-18)	Previous Year(2016-17)
Graduation Ceremony Expenses	4,74,704	2,55,910
Freight & Forwarding Expenses	1,46,358	12,36,732
Foundation Day Expenses	1,000	83,800
Purchases (Consumables)	6,49,86,723	3,19,04,297
Office Maintenance	-	13,884
Repair & Maintenance	1,60,17,143	87,69,337
Electrical Maintenance	68,275	29,14,031
Civil Maintenance	12,36,055	56,45,016
Advertisement	12,30,786	13,59,999
Audit Fees	50,740	50,740
Bank Charges & Commission	83,660	58,675
CRA Service Charges	36,134	46,546
Electricity Charges	5,27,34,079	4,64,84,454
Fuel for DG set	2,41,417	64,290
Hospitality Expenses	24,71,816	22,25,627
Housekeeping Expenses	12,19,791	88,24,053
Legal Fees	2,17,505	1,69,535
Meeting Expenses	27,78,700	9,60,333
News Papers and Periodicals	71,842	65,522
Membership fee	4,200	-
Postage & Courier	4,78,311	5,06,469
Printing & Stationery	7,97,599	10,96,240
Rent, Rates & Taxes	5,25,587	10,28,506
Seminar/Workshop Expenses	41,52,573	16,02,211
Telephone & Internet charges	1,95,66,615	83,13,976
Travelling & Conveyance - Domestic	88,89,876	87,35,971
Travelling & Conveyance - Foreign	89,92,057	93,32,713
Vehicle Maintenance Expenses	90,77,399	1,40,87,473
Water Charges	30,49,686	1,03,796
Professional Charges	8,260	-
Publicion Charges	1,54,916	
Subscription Expenses	65,29,514	-
NISER XII PLAN	-	
	-	-
Domestic Travel	7,61,982	4,32,846
Fellowships	17,88,666	14,05,455
Foreign Travels	37,78,580	22,55,654
Office Expenses	81,599	33,46,989
Other Expense	24,56,095	4,71,086
Supplies & Materials	4,63,24,427	1,13,18,893
Honorarium	-	26,000
TOTAL Rs.	**26,14,84,671**	**20,51,97,058**

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo) (F&A)
Partner
M. No. 060588

Officer on Special Duty
Finance

Director

ANNUAL ACCOUNTS 2017-18

Schedule -22 : Expenditure on Grants, Subsidies etc.

(Schedule forming part of Income & Expenditure for the year ended on 31.03.2018)

Amount in Rs.

Particulars	Current Year (2017-18)	Previous Year (2016-17)
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 31.03.2018)

Amount in Rs.

Particulars	Current Year (2017-18)	Previous Year (2016-17)
a) On Fixed Loans	-	-
b) On Other Loans (including Bank Charges)	-	-
c) Others (specify)	-	-
TOTAL	-	-

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo)
Partner
M. No. 060588

APO (F&A)

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Finance

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Director

ANNUAL ACCOUNTS 2017 - 18

SCHEDULE 24 – SIGNIFICANT ACCOUNTING POLICIES

(Schedule forming part of the accounts for the period ended on 31.03.2018)

About the organisation :

The National Institute of Science Education and Research (NISER) set up at Bhubaneswar by the Department of Atomic Energy was registered as a Society with the Registrar of Societies, Cuttack, Orissa vide registration no:22426/16 dt. 10.07.2007 with a capital outlay of Rs 857.27 crores .

NISER conducts the following programmes in science education for bright and meritorious students who are selected through National Entrance Screening Test (NEST) conducted on all India basis.

a) An integrated 5 year M.SC programme in the core and emerging branches of basic sciences to students after 10+2 higer secondary schooling.
b) Integrated M.SC +PHD programmes after 10+2 from other universities.
c) PHD programme after MSC from other Universities.
d) Computer Science and Earth& Planetary Science

Presently NISER has 579 students admitted in 5 year M.SC programme in the various streams of Basic Sciences .

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 General Accepted Accounting Principles In India (Indian GAAP) except otherwise stated elsewhere.

The accounting policies adopted in the preparation of financial statements are consistent with those of previous year.

2. Fixed Assets

Fixed assets are stated at cost of acquisition inclusive of inward freight, duties & taxes and incidental & direct expenses related to acquisition.

ANNUAL ACCOUNTS 2017 - 18

3. Depreciation

Depreciation has been provided on written down value method as per rate prescribed in the income Tax Act, 1961.

4. Capital Assets(WIP)

The institute is at project stage. Hence Capital Expenditure incurred on construction activities including Electrical Furnishing, Electrical installation, Electrical Transformer & Office Automation etc are being shown as capital work in progress in the FY 2017-18.

5. Recognition of income & Expenditure

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

Lab consumables and stores consumables purchased during 2017-18 is treated as recurring expenditure and the consumables are transferred to respective schools of study. Necessary records are maintained at the school concerned.

6. Foreign Exchange Transactions

Transactions involving foreign currency are accounted at the exchange rate prevailing on the date of the transaction.

7. Accounting for Registration Fees

Registration fee of students are being accounted for on receipt basis.

8. Accounting of interest earned on FD

Interest earned against lien of FD are being accounted for on cash basis.

9. 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) Government grants/ subsidy is accounted on realisation basis.

10. Lease

Lease rentals are expensed with reference to lease terms.

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ANNUAL ACCOUNTS 2017 - 18

11. Retirement Benefits

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

12. TAXATION

Since the Institute is a research oriented organization wholly funded by Government of India, Department of Atomic Energy there being no taxable income under Income-tax Act 1961, no provision for Income tax has been made during the year.

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.SAHOO)
Partner
M. No. 060588

APO (F&A)

Officer on Special Duty

FO

Director

ANNUAL ACCOUNTS 2017-18

Schedule -25: Contingent liabilities & Notes on Accounts

(Schedule forming part of the accounts for the period ended on 31.03.2018)

Amounts in Rs.

A) CONTINTENT LIABILITIES

1.	Claims against the entity not acknowledge as debts	NIL
2.	Liability for partly –paid investments	NA
3.	Liabilities on account of outstanding forward exchange contracts	NA
4.	Guarantee & 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 expenditure**
   a) Rs.26,22,136 /- Paid / adjusted to Students caution money , mess dues against payment of their mess bill. and reversal of forfeited EMD

2. **Lien against FD**
   Lien against FD shown in Receipt & payment s account relates to items under import & the same is in order.
3. Corresponding figures for the previous year have been regrouped/ arranged, where ever necessary.
4. Schedules 1 to 25 are annexed to and form an integral part of the Balance Sheet as at 31st March, 2018 and the Income & Expenditure Account for the year ended on that date.

For **P. K. NAYAK & CO.**
Chartered Accountants
FRN - 318155E

(CA. S.K.Sahoo
Partner
M. No. 060588

APO(F&A)

Officer on Special Duty(Finance)

FO

Director

NOTES