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BOSE INSTITUTE
Newsletter
No. 59 November 2024
A NEWSLETTER OF BOSE INSTITUTE

OUR NEW DIRECTOR

Kaustuv Sanyal is a noted biologist and a world's expert in fungal centromeres. Research in his laboratory over two decades helped us understand the fundamental basis of chromosome segregation during cell division. Pioneering findings from his laboratory continue to open unexplored avenues of research of medical importance. Aneuploidy, a cellular state with unnatural number of chromosomes, is a leading cause of many forms of cancer in humans but helps fungal pathogens survive in presence of antifungal drugs. His group, often in collaboration with leading scientists across the globe, uses interdisciplinary, contemporary and cutting-edge ideas and technologies to uncover mechanisms that ensure high-fidelity segregation of chromosomes.

Professor Sanyal joined the faculty of Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore in 2005 and was Chair of the Molecular Biology and Genetics Unit before joining Bose Institute as Director in May 2024. After a BSc (Agriculture) and MSc (Biotechnology) from Bidhan Chandra Krishi Visvavidyalaya and Madurai Kamaraj University respectively, he joined Bose Institute for a PhD degree in yeast genetics. He continued to pursue his passion on chromosome segregation research as a postgraduate researcher at the University of California, Santa Barbara until he joined JNCASR.

The work performed by Professor Sanyal and his colleagues has been widely recognized. He is regularly invited to speak in prestigious meetings and conferences such as Gordon Research Conferences and EMBO meetings. He is an elected fellow of American Academy of Microbiology, Indian National Science Academy, Indian Academy of Sciences, National Academy of Sciences (India). Among the notable awards and fellowships, he received are the GNR Gold Medal for Excellence in Biological Science and Technology by CSIR (2022), Sun Pharma Science Foundation Research Award – Basic Science (2022), the National Bioscience Award – DBT (2012-15), the Tata Innovation Award – DBT (2017 – 20) and JC Bose National Fellowship – SERB/ANRF (2020 – 25). He was a visiting professor at the Institut Pasteur in Paris (2018 – 20), Osaka University, Japan (2020 – 23), a visiting lecturer in the National University of Singapore (2015 – 24) and many other universities across the world. He has received many national, bilateral and international research grants including a recently awarded Discovery grant from the Wellcome Trust, UK. He is on the editorial board of several journals, acted as an adhoc reviewer for journals and grant proposals for funding agencies across the world.

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FROM THE DIRECTOR'S DESK

Bose Institute hosts more than 40 scientists across various disciplines and has the infrastructure and facilities to grow bigger. The depth and breadth of research areas of this century-old institute of higher learning reflect the insightful and forward-thinking vision of the institute's former leaders and scientists. The facilities developed to promote excellent research and valuable products by Bose Institute scientists are fruits of visionary thinking. Of course, in analogy to the famous 'Red Queen Hypothesis,' we must continuously adapt, evolve, and proliferate to survive and cater to the growing needs, unexpected newer challenges, and attain greater heights. Bose Institute fulfilled its promise for over a century and served as a melting pot of ground-breaking ideas and discoveries of great Indian scientists. Bose Institute's contributions to placing India as one of the top countries regarding scientific output are exemplary.

As Director of Bose Institute, I am determined to support and augment ongoing research activities and expand research on major contemporary societal issues by taking new initiatives. In addition to supporting ongoing research in Biological, Chemical, and Physical Sciences, I would like to establish an 'Interdisciplinary Research Centre' to bring together bright minds from areas such as medicine, computer science, and statistics to work on large contemporary problems of global concerns in collaboration with leading universities/ research centres of the world. Steps have been taken to implement projects that benefit from the application of artificial intelligence and machine learning (AI-ML) in areas such as energy, climate change, environment, agriculture, healthcare, drug discovery and even the origin of elements in the universe.

In addition, by combining efforts of the Departments of Biological Sciences and Chemical Sciences, we will identify thrust areas including age-related neurodegenerative diseases, air pollution-related pulmonary diseases, mental disorders, and encourage scientists to work on such areas in national mission-mode projects and international collaborations aligning with the vision of the Government of India. We take advantage of being a part of one of the largest clusters of scientific institutes in the country in Kolkata to share ideas and facilities by setting up collaborative projects with neighbouring institutes of higher learning and major hospitals and diagnostic centres.

A group of scientists from the Department of Physical Sciences are involved in ALICE experiment at CERN. Bose Institute serves as the nodal agency to co-ordinate the Indian participation not only in the construction of

the upcoming multi-million-dollar Facility for Antiproton and Ion Research (FAIR), a multidisciplinary particle accelerator to be used in nuclear structure and reaction, high-energy physics, structure of hadrons, atomic and plasma physics but also in experiments using the machine. Scientists at this Institute are working on characterisation of the new prototype detectors for the Compressed Baryonic Matter (CBM) at FAIR.

Bose Institute has a rich legacy of disseminating knowledge to the nation for more than a century. In addition to the existing PhD programme, I would like to focus on integrated MSc-PhD programmes in Biological, Chemical, and Physical Sciences. Bose Institute scientists will continue to boost outreach activities to remote places, schools and colleges, especially to encourage less-privileged citizens and women to take research as a career and support them.

I envisage working closely with all my colleagues at Bose Institute and the Department of Science and Technology to uplift the institute to a new level. I strongly believe that the new campus, existing state-of-the-art facilities, and academic and administrative prowess have already created the basis, and with strong leadership, this goal could be achieved. Collaboration and open communication are the keys to success in any endeavour. I am also committed to fostering a safe, supportive and inclusive environment where all voices are heard and valued.

Prof. Kaustuv Sanyal
Director

107TH FOUNDATION DAY OF BOSE INSTITUTE

The 107th Foundation Day of Bose Institute was celebrated on November 30, 2023. PROF. DR. PAOLO GIUBELLINO, Scientific Managing Director, Facility for Antiproton and Ion Research in Europe GmbH (FAIR GmbH), GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany, delivered the 84th Acharya J.C. Bose Memorial Lecture on "India and Big Science: A Success Path for the 21st Century". JÖRG BLAUROCK, Technical Managing Director, Facility for Antiproton and Ion Research in Europe GmbH (FAIR GmbH), GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany, presided over the programme.

CURRENT EVENTS

Participation in 47th International Kolkata Book Fair

Bose Institute participated at the 47th International Kolkata Book Fair held from 18 January to 31January 2024. The pavilion displayed all the publications of Bose Institute along with photographs of Acharya Jagadis Chandra Bose and Bose Institute. The publications were kept for sale. The stall was visited by a large number of visitors. The Director, Bose Institute, Dr. Pramod Kumar Shukla, Faculty Members and Staff of Bose Institute were actively involved in the participation.

Bose Institute Colloquium

Dr. Archana Sharma, Principal Staff Scientist at CERN, and recipient of the Pravasi Bhartiya Samman (2023) by the President of India, visited Bose Institute and delivered the Bose Institute Colloquium on "Unlocking secrets of the Universe with Science and Technology, why should you care!" on 29 December 2023.

Special Lecture by Swami Sarvapriyananda

Special Lecture on "The Hard Problem of Consciousness-Perspectives and Insights from Indian Philosophy" by Swami Sarvapriyananda, Minister and spiritual leader of the Vedanta Society of New York, USA at Unified Academic Campus, Bose Institute, was held on 08 January 2024.

Seminar Organised by Bose Institute

A Seminar entitled "Co-targeting fibroblasts and cancer epithelia, a better treatment strategy." by Prof. Neil Bhowmick, Professor, Department of Medicine and Biomedical Sciences of Samuel Oschin Cancer Institute in Cedars-Sinai, Los Angeles, USA was organised on 02 January 2024 at Unified Academic Campus, Bose Institute, Salt Lake, Kolkata.

National Workshop

'National Workshop on Bioinformatics: AI in Healthcare' was organized by the 'Bioinformatics Centre at Bose Institute' – A project Funded by the Department of Biotechnology, Govt. of India on January 16, 2024.

DBS Lecture Series

Dr. Amrita Bhattacharjee, DBT Ramalingaswami Fellow, ICMR National Institute of Cholera and Enteric Diseases delivered lecture on "The TREGerEED gut: A Story of Tregulatory Cells and Enteric Dysfunction" was organized by Department of Biological Sciences, Bose Institute on 22 February 2024 at Unified Academic Campus, Salt Lake, Kolkata.

National Science Day 2024

Bose Institute celebrated National Science Day (28 February 2024) on this year's theme of Indigenous Technologies for Vikshit Bharat. The Institute conducted an open house program from 11 AM - 2 PM as part of the event. In addition, there was a mini-symposium from 3 PM to 5 PM on "Technologies developed in Bose Institute" with distinguished speakers from various branches of science.

'50 years of Indo-German Cooperation in Science and Technology'

Director, Bose Institute with Prof. Paolo Giubellino, Scientific Managing Director of FAIR, Mr. Joerg Blaurock, Technical Managing Director of FAIR and Prof. Catalina Sahlberg, Chair of the FAIR Council during the celebration of the '50 years of Indo-German Cooperation in Science and Technology' held at GSI, Darmstadt, Germany during 21-22 May 2024.

One Day Symposium

One Day Symposium on "Interdisciplinary Approaches to Modern Biology" was organized by the Department of Biological Sciences, Bose Institute, Kolkata, 21 June 2024 at the Unified Academic Campus (UAC) of Bose Institute.

ALICE Run Manager (27 May - 9 June 2024): Sanchari Thakur

Sanchari Thakur, a Post Doctoral Fellow working at Bose Institute, is the current Run Manager for the ALICE Experiment at CERN. She is mostly active in Physics data analysis. In particular, during her PhD at the Variable Energy Cyclotron Centre (VECC, Homi Bhabha National Institute), she investigated two-particle correlations in PbPb collisions. She has studied the nearside jet-like yield with pion and proton-triggered correlation in the intermediate pT range to see the effect of the quark coalescence and radial flow in the particle ratio in heavy ion physics. In Run 2 she was already involved in operations at Point 2 by taking PMD on-call and DQM shifts. This year she has taken central shifts for all the roles (QC, DCS, ECS, and Shift Leader) over the past three months, and she is now fully trained and qualified to start her first Run Manager mandate.

During her mandate, Sanchari will supervise the production of proton-proton physics at 500 kHz, focusing on efficient data taking and the best possible data quality. The second week will be partly devoted to the second LHC machine development period when we will have the opportunity to focus on software deployment and dedicated system tests.

International Yoga Day

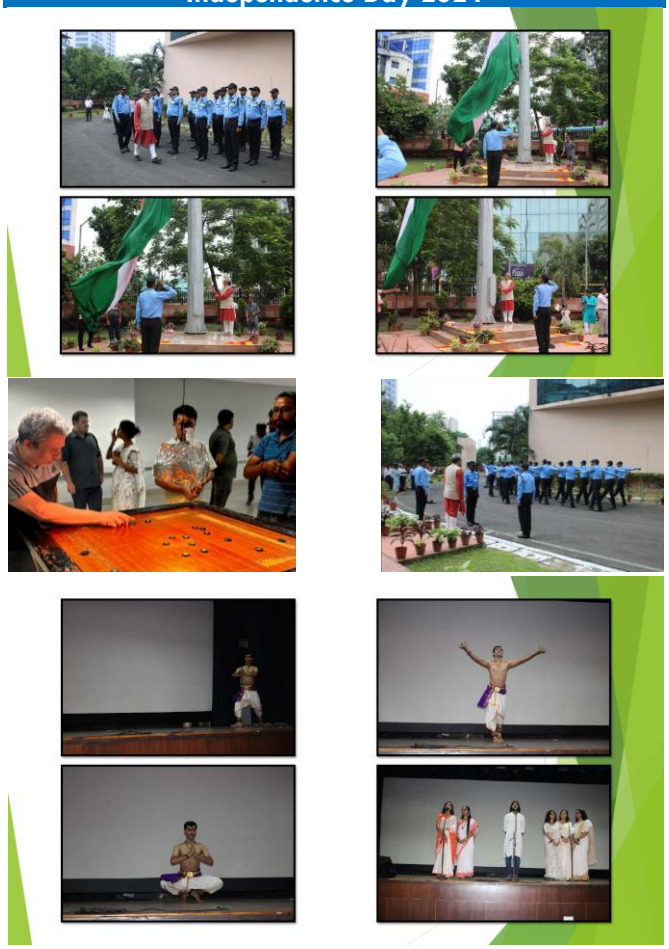
Bose Institute observed International Yoga Day at its Unified Academic Campus on 21 June 2024.

Students Visit

Bose Institute organised an outreach program at UAC, for a group of students and teachers of Calcutta International School on 18 June 2024. Dr. Saikat Biswas, Department of Physical Sciences, delivered a lecture on "Bose Institute's contribution to the European Organisation for Nuclear Research (CERN)".

Students from La Martiniere for Girls (Class-XII Science stream), Kolkata alongwith their teachers visited Acharya J.C. Bose Museum at Bose Institute (Main Campus), Rajabazar on 31 July 2024. Prof. Gaurab Gangopadhyay, Dept. of Biological Sciences, Bose Institute addressed the students in the Lecture Hall. Following a documentary on Acharya J.C. Bose's contribution in the field of Physics and Biological Science, the students were guided around Main Campus, Samadhi of Acharya J.C. Bose and finally the Museum.

Independence Day 2024

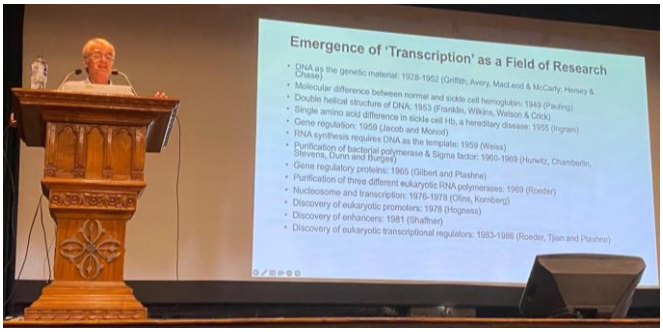


Independence Day was celebrated on 15 August 2024 at all the campuses of Bose Institute. Various programmes were conducted at Unified Academic Campus followed by Cultural Programme by Research Scholars of Bose Institute and Sports Events (Table tennis and Carrom) for its Faculty, Staff members and Scholars.

Celebration of National Space Day

Bose Institute observed National Space Day at Unified Academic Campus on 20 August 2024. The programme was followed by a lecture on "Touching Lives while Touching the Moon: India's Space Saga" delivered by Dr. Debiprosad Duary, Former Director, Research & Academic, M.P. Birla Institute of Fundamental Research, M.P. Birla Planetarium, Kolkata.

Special Lecture



Bose Institute organised a Special Lecture entitled "NF-kappaB-mediated gene regulation: roles of enhancers, promoters, weak kB sites and cofactors in the recruitment of NF-kappaB to DNA" delivered by Prof. Gourishankar Ghosh, Department of Chemistry and Biochemistry, University of California, San Diago, US, on 03 September 2024 at Unified Academic Campus, Bose Institute.

Orientation Programme

Bose Institute extends a warm welcome to the newly admitted Ph.D. Students in the field of Physical, Chemical and Biological Sciences. The Orientation Programme was followed by a illuminating Talk titled "Art in Science" by Prof. Gautam Basu and a presentation with enthralling experience at the Arctic, titled "First Indian Arctic Winter Expedition" presented by Dr. Sanat K. Das.

Vigyan-Jyoti programme of DST

Vigyan Jyoti beneficiaries from Pashchim Medinipur of Navodaya schools (around 43 girls of Class-X-XII) visited Unified Academic Campus, Bose Institute on 18 September 2024.

The objective of the programme was enthusing the students on the basic concepts of Chemistry. Prof. Debaraj Mukherjee, eminent Organic Chemist, interacted with the students and explained them the importance of studying Chemistry and the scope of studying Chemistry in Graduation Level and future prospects. This was followed by a visit to his laboratory where the students were given hands on demonstration on synthesis of various chemicals.

Further, the students interacted with Prof. Shubhra Ghosh Dastidar, Department of Biological Sciences. He demonstrated the use of computer simulation in generating molecules that can be used in wet lab experiments.

The students were thus given exposure to both dry and wet lab experiments of Chemistry. The scientists shared valuable insights on empowering girls in **#STEM** Education. This programme was an initiative to expose the girls to scientific researches of Bose Institute. The students were very inquisitive and had a great interest and eagerness in learning the new scientific concepts and hands-on.

Prof. Gaurab Gangopadhyay, Department of Biological Sciences coordinated and organized the entire programme.

National Workshop

A National Workshop on Microbiome Informatics from 24-25 September 2024 was organized by the 'Bioinformatics Centre at Bose Institute' – A project

Funded by the Department of Biotechnology, Govt. of India.

Hindi Diwas and Hindi Pakhwara 2024

Bose Institute observed Hindi Diwas and Hindi Pakhwada from 13-27 September 2024 in the Unified Academic Campus, Salt Lake, Kolkata. Various activities viz. workshop, popular lecture and cultural programmes were organised for the staff members and scholars of the Institute. Popular lectures were delivered by Dr. Sanat Kumar Das and Dr. Pramod Kumar Shukla on 20 & 24 September 2024.

Dr. Reshmi Panda Mukherjee, Associate Professor, Gokhale Memorial Girls' College delivered a popular Lecture in Hindi. Thereafter, Prof Abhijit Chatterjee also delivered a popular talk on 27 September 2024.

Scientist in Kolkata Doordarshan & All India Radio (Akashvani)

An interview to DD Bangla on Computer, Biotechnology and related subjects for the students by Prof. Shubhra Ghosh Dastidar, Department of Biological Sciences, Bose Institute on 03 October 2024.

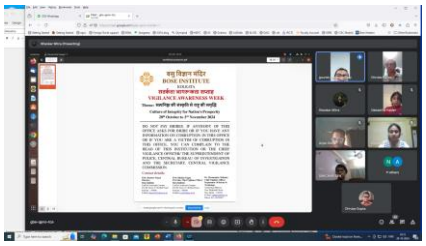
Interview to All India Radio (Akashvani), Kolkata on phage therapy for their science magazine (Anwesha) by Prof. Soumen Roy, Department of Physical Sciences. The programme was first broadcast by AIR on 30 May 2024.

National Unity Day - 2024

Bose Institute observed National Unity Day-2024 at its Unified Academic Campus, Salt Lake, Kolkata on 30 October 2024.

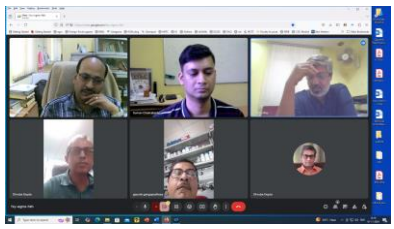
Vigilance Awareness Week (28 October – 03 November 2024)

VAW Pledge taking ceremony, 28 October 2024.



Interaction with a group of college students through online mode, was carried out on 29 October 2024 as part of the activities of the Vigilance Awareness Week.

A panel discussion on vigilance awareness was carried out on 01 November 2024 as part of the activities of the Vigilance Awareness Week.



Present and previous vigilance officers of three institutes Bose Institute, SNBNCBS and IACS, Kolkata participated in the online meeting.

On the occasion of the Vigilance Awareness Week 2024, Prof. Dhruba Gupta, Part-time Chief Vigilance Officer of Bose Institute was invited to attend the program at Vigyan Bhawan, New Delhi on 8 November 2024. The program was graced by the Hon'ble President of India Smt. Droupadi Murmu.

Swachchta Hi SEVA (SHS) 2024

Bose Institute observed Swachhata Hi Sewa (SHS) – 2024 during 17 September to 02 October 2024

140th Birthday of Prof. Debendra Mohan Bose

Bose Institute observed **140th Birthday of Prof. Debendra Mohan Bose** on 26 November 2024. **Prof. Sanghamitra Bandyopadhyay**, Director, Indian Statistical Institute, Kolkata graced the occasion as Guest of Honour and delivered the **D. M. Bose Memorial Lecture 2024** on the topic **"Artificial Intelligence and Life Sciences: A Synergistic Relationship". Prof. Indrani Bose,** Former Professor & Chairman, Department of Physics, Bose Institute, Kolkata, presided over the programme.

Bose Institute Annual Symposium 2024 - BIAS 2024

Bose Institute organised the **"Bose Institute Annual Symposium 2024 (BIAS 2024)"** during 27 – 29 November 2024. About 85 scholars/students participated in the symposium and presented their research work.

Significant Research Findings/Recognition (National or International)

Prof. Anirban Bhunia (Chemical Sciences)

(i) Understanding the structure-function correlation of rationally designed antimicrobial peptide against *Pseudomonas*-associated corneal keratitis.

(ii) Membrane-induced amyloid pathogenicity.

(iii) Molecular mechanism of amyloidosis in the presence of metals and sequence context.

(iv) Introducing SARS CoV E protein peptide derivatives for materials science applications. The viral origin provides inherent bioactivity and self-assembly propensity that could enable smart biomaterials.

(v) The water extract of Lasunadya Ghrita (LG), an Indian traditional medicine, has been repurposed to treat Alzheimer's disease.

Prof. Abhijit Chatterjee (Chemical Sciences) The toxicity standard of atmospheric particulate matter (PM2.5) has been set for Kolkata megacity for the first-time. The major sources of toxic particulate matter have been identified. The required policy interventions for mitigating these sources have been recommended to Govt. of West Bengal including urban Local Bodies.

Dr. Abhrajyoti Ghosh (Biological Sciences) (i) First report of Archaeal Hsp60 as a molecular mosaic of Group I and Group II chaperonins.

(ii) First report of an archaeal type-II toxin-antitoxin system involved in the formation of persister cells under heat stress.

Prof. Achintya Singha (Physical Sciences) Explored the spin-valley physic in engineered 2D quantum materials for applications in valleytronics.

Prof. Atin Kumar Mandal (Biological Sciences) Phosphodiesterase 8A (PDE8A) degrades cAMP and reduces the signaling via protein kinase A (PKA). We find that PDE8A interacts with 14-3-3ξ protein in absence of CRAF kinase, a regulator of MAPK pathway. Interestingly, both PDE8A and 14-3-3ξ interact with CRAF kinase and have an antagonistic relationship on MAPK singling. 14-3-3ξ binds to phosphor-serine 359 residue of PDE8A which is phosphorylated by PKA. Binding of 14-3-3ξ to PDE8A reduces the catalytic (phosphodiesterase) activity of PDE8A therefore sustaining PKA signaling while downregulating MAPK signaling. Therefore, PDE8A acts as a switch in regulating PKA and MAPK signaling. The works is published in J. Biol. Chem. 2024, Feb 5:105725. doi: 10.1016/j.jbc.2024.105725.

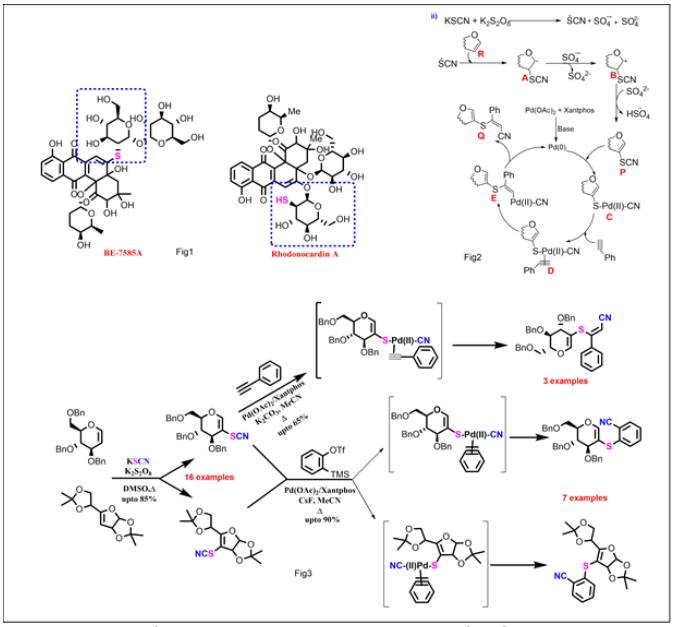
Dr. Basudeb Maji (Biological Sciences) (i) Developed an engineered CRISPR system that can be labeled by a fluorogenic small molecule and quantify Cas9 protein in vitro with high precision and sensitivity. The labeling was used to probe live bacterial protein expression in real time. The system could label other biomolecules like oligonucleotides for their co-delivery with Cas9 for genomic loci-specific DNA repair applications. This work was published in ChemBioChem journal (Chembiochem, 2024, e202400149).

(ii) Developed a novel method and small molecules for targeted degradation of DNA-binding protein. Such small molecules can be applied for genomic loci-specific interactome targeting and mapping. This work was published in Nanoscale journal (Nanoscale, 2024,16, 12502-12509).

(iii) Developed another engineered Cas9 system, which is thermostable and superior to the WT-Cas9 in both gene editing activity and DNA repair efficiency. The engineered Cas9 system can be used in real-time non-invasive theratracking application.

Prof. Debaraj Mukherjee (Chemical Sciences) 1. *Development of novel methods to access medicinally important C-2 Thio branched Sugars via Radical Pathway and Their Late-stage Modifications*

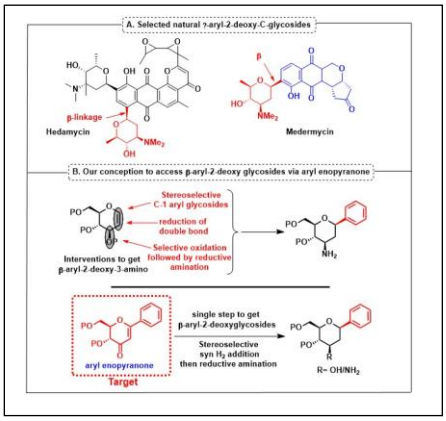
BE-7585A and rhodonocardin-A are naturally occurring polyketides featuring an angucyclic core structure with 2-thio sugars, noted for their potential anticancer properties [fig1]. Both BE-7585A and rhodonocardin-A are believed to exert their anticancer effects through cellular pathways involved in cancer progression, and tumour growth inhibition. Development of strategies to access key intermediate C-2 thio branched sugar is the major challenge. This work by Mukherjee and coworkers showcases a novel C-H activation method for synthesizing 2-thio sugars using a less explored radical mechanism [fig2]. Subsequent late-stage modifications of the resulting product revealed an unexpected rearrangement, the mechanism of which was deciphered in details from the control experiments conducted in our lab [fig3]. This methodology can be applied for the synthesis of thio sugar linked polyketides and investigate their potential as anticancer chemotherapeutics.

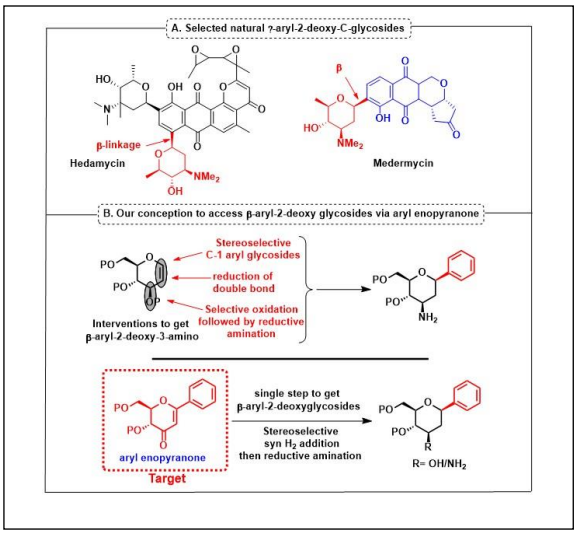


"Peroxodisulfate-assisted synthesis of 2-thiocyanato glycals and their transformation to C-2-thio acrylo/aryl nitrile-substituted glycals" published in RSC 'Nature indexed' journal "Chemical Communications" https://doi.org/10.1039/D4CC02201G.

2. *Development of Novel methods for the Synthesis of Medicinally Important Amino-aryl-C-glyacosides*

A class of naturally occurring molecules having an amino-aryl-C-glycoside moiety such as C-aryl-2-deoxy-3-amino has emerged as antibiotics with promising antitumor activities and is used as drugs for mitigation of leukemia and sarcoma against multi-drug-resistant bacteria (Fig 1A). However, availability and reproducibility limit their biological assay. Synthetic organic chemistry is a powerful tool to access such complex scaffolds and their analogues from easily available raw materials. One of the best precursors one can have for the synthesis of such scaffolds can be sugar enol ether also known as glycals. Here the major synthetic challenge is selective anomeric C-arylation and regio-selectively oxidize C-3 allylic ether to keto which can be easily converted to amines with desired stereochemistry via stereoselective reduction. Hence 3-keto-2-deoxy-C1-aryl glycals was chosen as a target (Fig 1B).





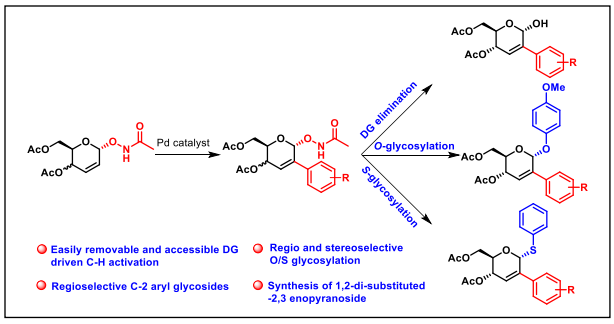
We have established a one-step procedure for the synthesis of C-1 aryl enopyranones directly from commercially available glycals with aryl halides in the absence of strong base via the oxidative Mizoroki–Heck reaction and proposed mechanism (fig 1C). The results are published in Organic Biomolecular Chemistry Journal of Royal Society of Chemistry [Ref]

Reference: Synthesis of aryl enopyranones directly from glycals and aromatic halides to access 2-deoxy-β-C-aryl glycosides; Irshad Ahmad Zargar, Bisma Rasool, S. K. Bappa and Debaraj Mukherjee *,Org. Biomol. Chem., 2024, 22, 6941–6945-6941

3. *New Method Enables Efficient Synthesis of C-2 Aryl Sugars for Advanced Glycosylation Reactions*

A groundbreaking study has introduced a novel palladium-catalyzed coupling technique for the synthesis of C-2 aryl sugars, offering significant advances in carbohydrate chemistry. By leveraging a removable oxyacetamide directing group, the researchers developed an efficient method to couple 2,3-enopyranose with arylboronic acids, resulting in regio- and stereoselective arylation at the C-2 position. This innovative approach addresses a longstanding challenge in glycoscience, where controlled functionalization at the C-2 position of sugar molecules has been difficult to achieve. The newly synthesized C-2 aryl sugars were subsequently utilized as glycosyl donors in both O- and S-glycosylation reactions which enables the precise construction of 1,2-disubstituted branched sugars.

The key to this success lies in the use of a removable directing group, which guides the palladium catalyst to the desired location on the sugar molecule, ensuring selective coupling with arylboronic acids. This method not only expands the toolkit for carbohydrate functionalization but also promises to streamline the creation of intricate glycosidic linkages with high regio- and stereoselectivity. This research represents an important step forward in the development of tools for the synthesis of complex sugar structures, openin up new possibilities for the design of glycosylated compounds with precise structural features.



Anomeric oxyacetamide assisted site-selective C-2 arylation and its application in O/S glycosylation of 2,3 eno-pyranoside. Irshad Ahmad Zargar, Bisma Rasool, SK Bapp, and Debaraj Mukherjee*. Chem. Commun., 2024, 60, 13040-13043.

Prof. Dhruba Gupta (Physical Sciences) The standard big-bang model of the primordial universe is very successful in predicting the abundance of the light elements except lithium, known as the cosmological lithium problem. We explored this problem through several nuclear reactions at CERN-ISOLDE using beams of exotic nuclei and obtained the relevant nuclear reaction rates. We concluded that that our present knowledge of nuclear physics cannot solve it, and it may point towards new fundamental physics. We also carried out improved measurements relevant to the nuclear reaction that is aptly called the "holy grail of nuclear physics", critical for the abundance ratio of carbon to oxygen after the helium-burning cycle. This is a key input for subsequent stellar evolution and is the fundamental basis for all organic chemistry and for the evolution of biological life in our Universe.

Prof. Gaurab Gangopadhyay (Biological Sciences) (i) First report of a metabolomic study of Phytoplasma-infected Sesame plants.

(ii) First report of identification of essential molecular factors and metabolites behind somatic embryogenesis of Darjeeling Tea.

Prof. Pallob Kundu (Biological Sciences) A novel acidic pH-dependent metacaspase governs defense-response against pathogens in tomato. Plant Physiology and Biochemistry, 2024.

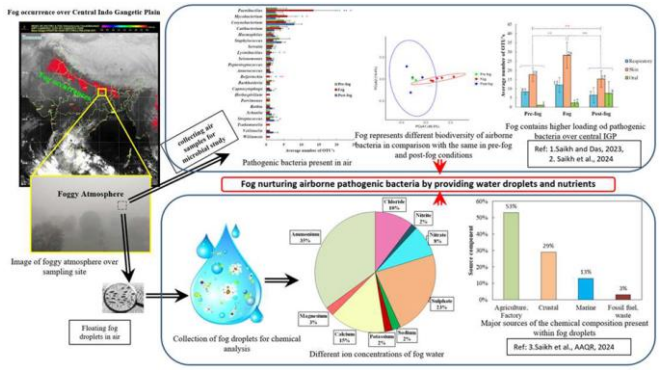
(b) Elucidated the role of miRNAs towards inducing oncogenicity in stem cell derivatives.

(c) Deciphered the role of SNPs present with the lncRNA loci towards cancer risk prediction in case of patients having abnormal breast or ovary conditions that increases the risk of getting breast or ovarian cancer.

Dr. Pramod Kumar Shukla (Physical Sciences) During the last one year, I have been mainly working along two research programs. The first one addresses the issues in constructing realistic global models in the context of string cosmology where we have attempted to find and classify the "suitable" Calabi Yau geometries which are relevant for generating the necessary inflationary potentials in the four-dimensional effective supergravities. For this program we have published 3 papers; one relating to the impact of higher derivative F^4 corrections for inflationary models developed in standard large volume scenarios (LVS), while the other two works are about realizing the Volume modulus inflation and Fibre inflation in

perturbative LVS. The second line of research on uses the non-geometric flux compactifications, and especially deals with the study and reformulation of the effective scalar potentials and the search of de-Sitter as well as Minkowskian vacua in type IIA and type IIB supergravities. This program has led to 3 journal publications and one paper being published in the Proceedings of Science.

Dr. Sanat Kumar Das (Physical Sciences) Research focuses on understanding the interactions among atmospheric non-living (aerosols) and living (microorganisms) particles. Aerosols and airborne microorganisms coming from different non-biological and biological origins demand more attention for atmospheric scientists to explore their types, amount, sources and effects on climate and human health. Recent research works in my lab highlight that fog is a special type of extreme weather conditions nurturing microorganisms in air with a continuous supply of nutrients from aerosols and gathering water from atmospheric moisture in a form of tiny floating water droplet under a protection from harmful solar radiation formed a dense layer near ground. Fog layer is identified by satellite observations retrieved from



Indian satellite; Kalpana, and optical and physical properties of fog layer has been investigated using observational data of MODIS sensor onboard Terra and Aqua satellites, and space-borne lidar on-board CALIPSO satellite. We have identified a variety of atmospheric pollutants in different form of trace metals and major ions from chemical analysis of fog droplets collected from the thick fog layer near ground. Our model simulations suggest these atmospheric pollutants mainly coming from agricultural fields, industries and vehicular emission, and biomass burning over Indo-Gangetic Plain. Plenty of tiny water droplets with dissolved nutrients like sulphate, nitrate, phosphate, iron etc. floating into foggy atmosphere results 40-60% enhancement of airborne pathogenic bacteria loading, which are responsible for different types of respiratory and skin diseases in India.

Dr. Smarajit Polley (Biological Sciences)
(i) Novel mode of phosphotransfer by a eukaryotic protein kinase to maintain signaling fidelity (to be published in eLife)

(ii) Hitherto unreported activation of a p38-MAPK by its downstream kinase by feedback phosphorylation through LLPS (under review).

Prof. Subhrangsu Chatterjee (Biological Sciences)
(i) ALTering Cancer by Triggering Telomere Replication Stress through the Stabilization of Promoter G-Quadruplex in SMARCAL1 (DOI: 10.1021/acschembio.4c00285).

Most of the human cancers are dependent on telomerase to extend the telomeres. But ~10% of all cancers use a telomerase-independent, homologous recombination mediated pathway called alternative lengthening of telomeres (ALT). Due to the poor prognosis, ALT status is not being considered yet in the diagnosis of cancer. No such specific treatment is available to date for ALT positive cancers. ALT positive cancers are dependent on replication stress to deploy DNA repair pathways to the telomeres to execute homologous recombination mediated telomere extension. SMARCAL1 (SWI/SNF related, matrix-associated, actin-dependent regulator of chromatin, subfamily A-like 1) is associated with the ALT telomeres to resolve replication stress thus providing telomere stability. Thus, the dependency on replication stress regulatory factors like SMARCAL1 made it a suitable therapeutic target for the treatment of ALT positive cancers. In this study, we found a significant downregulation of SMARCAL1 expression by stabilizing the G-quadruplex (G4) motif found in the promoter of SMARCAL1 by potent G4 stabilizers, like TMPyP4 and BRACO-19. SMARCAL1 downregulation led toward the increased localization of PML (promyelocytic leukemia) bodies in ALT telomeres and triggered the formation of APBs (ALT-associated promyelocytic leukemia bodies) in ALT positive cell lines, increasing telomere replication stress and DNA damage at a genomic level. Induction of replication stress and hyper-recombinogenic phenotype in ALT positive cells mediated by G4 stabilizing molecules already highlighted their possible application as a new therapeutic window to target ALT positive tumors. In accordance with this, our study will also provide a valuable insight toward the development of G4-based ALT therapeutics targeting SMARCAL1

(ii) Long non-coding intergenic RNA, LINC00273 induces cancer metastasis and stemness via miRNA sponging in triple negative breast cancer (DOI: 10.1016/j.ijbiomac.2024.132730).

LncRNAs and miRNAs, being the master regulators of gene expression, are crucial functional mediators in cancer. Our study unveils the critical regulatory role of the metastatic long non-coding RNA LINC00273 as the master regulator of oncogenes involved in cancer metastasis, stemness, and chemoresistance via its miRNA sponging mechanism. M2 (a salt of bis-Schiff base) mediated G quadruplex (G4) stabilization at the LINC00273 gene promoter remarkably inhibits LINC00273 transcription. Therefore, low-level LINC00273 transcripts are unable to efficiently sponge the miRNAs, which subsequently become available to bind and downregulate their target oncogenes. We have observed significantly different global transcriptomic scenarios in LINC00273 upregulated and downregulated circumstances in MDA-MB-231 triple-negative breast cancer model. Additionally, we have found the G4 sequence in the LINC00273 RNA to play a critical role in miRNA sequestration. miRNAs (miR-6789-5p, miR200b, miR-125b-5p, miR-4268, miR3978) have base pairing complementarity within the G4 region of LINC00273 RNA and the 3′-UTR (untranslated region) of MAPK12, TGF-β1, and SIX-1 transcripts. We have reported TGF-β1, SIX-1, and MAPK12 to be the direct downstream targets of

LINC00273. The correlation between abnormal expression of lncRNA LINC00273 and TNBC aggressiveness strongly evidenced in our study shall accelerate the development of lncRNA-based anti-metastatic therapeutics.
(iii) G-quadruplex structural dynamics at MAPK12 promoter dictates transcriptional switch to determine stemness in breast cancer (DOI: 10.1007/s00018-023-05046-6).
P38γ (MAPK12) is predominantly expressed in triple negative breast cancer cells (TNBC) and induces stem cell (CSC) expansion resulting in decreased survival of the patients due to metastasis. Abundance of G-rich sequences at MAPK12 promoter implied the functional probability to reverse tumorigenesis, though the formation of G-Quadruplex (G4) structures at MAPK12 promoter is elusive. Here, we identified two evolutionary consensus adjacent G4 motifs upstream of the MAPK12 promoter, forming parallel G4 structures. They exist in an equilibria between G4 and duplex, regulated by the binding turnover of Sp1 and Nucleolin that bind to these G4 motifs and regulate MAPK12 transcriptional homeostasis. To underscore the gene-regulatory functions of G4 motifs, we employed CRISPR-Cas9 system to eliminate G4s from TNBC cells and synthesized a naphthalene diimide (NDI) derivative (TGS24) which shows high-affinity binding to MAPK12-G4 and inhibits MAPK12 transcription. Deletion of G4 motifs and NDI compound interfere with the recruitment of the transcription factors, inhibiting MAPK12 expression in cancer cells. The molecular basis of NDI-induced G4 transcriptional regulation was analysed by RNA-seq analyses, which revealed that MAPK12-G4 inhibits oncogenic RAS transformation and trans-activation of NANOG. MAPK12-G4 also reduces CD44High/CD24Low population in TNBC cells and downregulates internal stem cell markers, arresting the stemness properties of cancer cells.

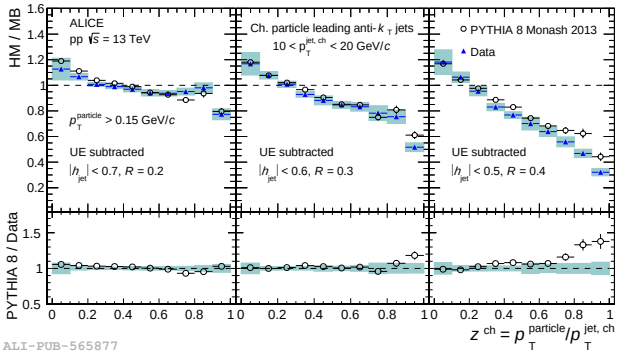
Dr. Sudipto Saha (Biological Sciences) (i) A symptom-based drug prediction web tool for lifestyle-related diseases (LSD) was developed at the Department of Biological Sciences, Bose Institute, using supervised machine learning (ML) techniques. The ML-based prediction can provide a second opinion to clinicians to aid their decision-making for early treatment of LSD patients. The web application of this tool is available at http://bicresources.jcbose.ac.in/ssaha4/sdldpred

(ii) The mitoPADdb is a database of mitochondrial proteins associated with diseases and is a valuable resource for investigating mitochondrial dysfunction-related diseases. It is developed and hosted in the Department of Biological Sciences, Bose Institute, and is freely available for academic use at http://bicresources.jcbose.ac.in/ssaha4/mitopaddb/index.html

Prof. Wriddhiman Ghosh (Biological Sciences) That geothermal spring waters are not habitats reserved exclusively for thermophilic microbes, instead diverse mesophilic bacteria colonize such extreme ecosystems, was unequivocally proved by deep metagenomic analyses.

Prof. Zhumur Ghosh (Biological Sciences) (a) Elucidated the role of parental miRNAs and long noncoding RNAs as regulators during fertilization and early stages of murine development and identifying potential noncodingRNA-mRNA interaction which is having significant role in determining fertility.

Debjani Banerjee, Prottoy Das and Dr. Sidharth K. Prasad (Physical Sciences) Multiplicity/Centrality dependence of charged-particle intra-jet properties in small collision systems: The first measurement of the multiplicity dependence of intra-jet properties of leading charged-particle jets in proton-proton (pp) collisions at 13 TeV and in proton-lead (pPb) collisions at 5.02 TeV is performed using the ALICE experiment. In high-multiplicity/central pp and pPb events, a significant modification of jet fragmentation is observed for the first time at LHC compared to that in minimum bias events for low transverse momentum jets. The observed modification in data is reproduced by theoretical model PYTHIA.



SYMPOSIA/CONFERENCES/COLLOQUIA/ WORKSHOPS/WEBINARS ORGANIZED AND INVITED TALKS DELIVERED

Prof. Abhijit Chatterjee (Chemical Sciences) (i) Delivered a talk in Hindi at the DST's 1st National Scientific & Technical Rajbasha Seminar 2024 at ARCI, Hyderabad during 21-22 March 2024. The title of the talk was. "*Bharat mein vayu ki gunvatta*". (ii) Delivered an invited talk at "National Climate Change Conclave" organized by DST, Govt. of India held at IIT, Delhi on 27 May, 2024. (iii) Delivered an invited talk at Ministry of Environment, Forest and Climate Change, New Delhi on "Air Pollution Mitigation and Policy Interventions over Kolkata" on 05 June, 2024.

Dr. Abhrajyoti Ghosh (Biological Sciences) (i) 24-25 September 2024: Organized two-day "National Workshop on Microbiome Informatics" organized by the DBT-funded Bioinformatics Centre at Bose Institute at the Unified Academic campus of Bose Institute, Kolkata. (ii) 16 January 2024: Organized One Day "National Workshop on Bioinformatics: AI in Healthcare" organized by the DBT-funded Bioinformatics Centre at Bose Institute at the Unified Academic campus of Bose Institute, Kolkata.

Prof. Achintya Singha (Physical Sciences) (i) Delivered an invited talk at 2dMAT: A Discussion Meeting on 2D Materials, held on 18–19 January 2024 at S. N. Bose National Centre for Basic Sciences, Kolkata, India. (ii) Delivered a plenary lecture at the two-day International Conference on Macromolecules,

Supramolecules, and Nanotechnology, held on 23–24 February 2024 at L. J. University, Ahmedabad. (iii) Delivered an invited talk at the SPARC Workshop on 2D Materials, held on 24–25 August 2024 in the Department of Physics, IIT Kharagpur. (iv) Delivered a colloquium at an In-House Meet, held on 24–25 September 2024 in the Department of Physics, Calcutta University. (v) Delivered an invited talk at the International Conference on Advanced Physics (IEMPHYS-24), held on 25-27 October 2024 at the Institute of Engineering and Management, Kolkata. (v) Delivered an invited talk at Frontiers of Material Science and Photonics: Issues and Developments (NCFMSP-2024), held on 13–14 November 2024 at Sidho-Kanho-Birsha University, Purulia.

Prof. Anirban Bhunia (Chemical Sciences) (i) Speaker at International Faculty Development Program-2024, organized by Guru Nanak Institute of Pharmaceutical Science and Technology (GNIPST) Kolkata. (ii) Four students attended the NMRS conference, which was held at CBMR Lucknow during 02-05 February 2024.

Dr. Basudeb Maji (Biological Sciences) (i) Organized the one-day symposium titled Interdisciplinary Approaches to Modern Biology at Bose Institute on 21 June 2024. (ii) Organized a seminar by Dr. Tanmoy Saha from Harvard Medical School and Brigham Women's Hospital, Boston, at Bose Institute on 17 October 2024 with the title: Harnessing cellular communication for introducing next-generation therapeutics. (iii) Organized the students' symposium 2024 at Bose Institute during 27-29 November 2024.

Prof. Debaraj Mukherjee (Chemical Sciences) Vigyan-Jyoti programme of DST, visit of school students from Pashchim Medinipur of Navodaya schools at the Unified Academic Campus, Bose Institute where Prof. Mukherjee interated with the students and explained them the importance of studying Chemistry.

Prof. Dhruba Gupta (Physical Sciences) delivered invited plenary lectures on (i) "Nuclear Astrophysics with Rare Isotope Beams" at the International Conference on Advanced Physics, IEM, Kolkata, 25-27 October 2024; (ii) "Nuclear Astrophysics at Bose Institute" at the Workshop on Ion Beam Experiments using High Current Injector, IUAC, New Delhi, 20-21 August 2024; (iii) "The Nuclear Physics Aspect of the Cosmological Lithium Problem" at the DAE-BRNS Symposium on Nuclear Physics, IIT Indore, India during 9-13 December 2023; (iv) presented online "Transfer reactions with $^{7}Be + ^{12}C$ at 5 MeV/u" at the ISOLDE Workshop and Users Meeting, CERN, Switzerland, 29 November – 1 December 2023.

Prof. Gaurab Gangopadhyay (Biological Sciences) (i) Represented Bose Institute in the "10th Indian National Exhibition cum Fair, 2023" from 06 to 10 December 2023 at Jagannathpur, R K Pally, Kolkata – 700150. (ii) Coordinated the academic visit of the Botany Hons. students of THK Jain College (CU), Kolkata to the UAC, BI on 11 January 2024. (iii) Coordinated the academic visit of the students of M.Sc. (Biotechnology), Guwahati University, Guwahati at the MC and UAC, BI on 25 January 2024. (iv) Coordinated the visit (study tour) of the undergraduate students of the Assam Agricultural University at the UAC, Bose Institute on 12 February 2024. (v) Coordinated the academic visit of the graduate students of the Dhanamanjuri University, Manipur at the UAC, Bose Institute on 14 May 2024. (vi) Coordinated the academic visit of the 6th semester B.Sc. (Biochemistry) students of Gurudas College, Kolkata at the UAC, Bose Institute on 07June 2024. (vii) Coordinated the academic visit of the high school students of Anjuman Islamia Girls' High School at the UAC, Bose Institute on 26June 2024. (viii) Organized the academic visit of the M.Sc. (Botany) students of the Lady Brabourne College for a practical demonstration of the Agrobacterium-mediated plant transformation at the UAC, Bose Institute on 28 June 2024. (ix) Coordinated the filming at MC and UAC by the DD Bangla team concerning the 'QUEST 3' programme on 16 July 2024. (x) Coordinated the academic visit of the students and teachers from La Martiniere for Girls School at the J C Bose Museum, MC, Bose Institute on 31 July 2024. (xi) Organized the National Space Day celebration at the UAC, Bose Institute on 20 August 2024. (xii) Participated the 27th National Science Exhibition at the Science City, Kolkata on behalf of Bose Institute during 11 to 14 September 2024. (xiii) Organized and coordinated the visit of the students of the Jawahar Navodaya Vidyalaya, Paschim Medinipur under the DST "Vigyan Jyoti Scheme" at the UAC, Bose Institute on 18 September 2024.

Prof. Kaushik Biswas (Biological Sciences) (i) 13 May 2024 – Acted as the Host for a seminar titled "Targeting the Epigenetic Machinery to improve responses to Immune checkpoint therapy" by Dr. Sangeeta Goswami, Associate Professor & Clinician Scientist, Dept of Genitourinary Medical Oncology, Div of Cancer Medicine, James P. Allison Institute, MD Anderson Cancer Center, as part of DBS Lecture Series, (ii) Delivered an Invited Lecture titled "De-repression of GM2-synthase Transcription by Sp1-HDAC1 in Cancer" in National Institute of Pharmaceutical Education and Research (NIPER)-Kolkata on 28 February 2024 on the occasion of National Science Day Celebration 2024

(iii) Chaired a scientific session on Cell Signaling in the 2nd International conference titled "Physiology to Pathology: Finding the Therapeutic Roadmap" organized by Amity University, Kolkata during 07-09 March 2024.

Dr. Nirmalya Sen (Biological Sciences) Delivered invited talk on Evolution of chemoresistance in Triple-negative breast cancer. 43rd Annual Conference of The Indian Association for Cancer Research (IACR) at IISER PUNE during 19-22 January 2024.

Dr. Pramod Kumar Shukla (Physical Sciences) (i) Delivered an invited talk titled "A toolkit for global model building in String Phenomenology" in the Indian String Meeting ISM-2023 held at IIT Bombay during

10-16 December 2023. (ii) Delivered a talk titled "On seeing the world through Mathematical Principles" during IISF-Curtain Raiser Event held on 08 November 2024 at Bose Institute.

Dr. Saikat Biswas (Physical Sciences) (i) Presented an invited talk on "Gaseous Detectors from INO to CBM via STAR and ALICE" in "Meeting on the physics of ALICE, CBM and STAR" (MPACS) during 29-30 January 2024 at VECC, Kolkata. (ii) Attended DST's 1st National Scientific & Technical Rajbasha Seminar 2024 at ARCI, Hyderabad during 21-22 March 2024. He delivered an invited talk titled "FAIR: Prayogsh ala me

Brahmaand". (iv) Took part as the Detector Control System expert shifter during the 2024 heavy ion run in the ALICE experiment at CERN LHC. During this time ALICE collected Pb-Pb (heavy-ion) collision data of rate 50 kHz with a readout data rate of about 700 GB/s.

Dr. Sidharth Kumar Prasad (Physical Sciences) delivered invited talk in the Meeting on Physics of ALICE, CBM and STAR (MPACS) at VECC during 29-30 January 2024; Title: "Jets and photons in small systems at LHC".

Prof. Shubhra Ghosh Dastidar (Biological Sciences) Three workshops on Bioinformatics, focusing on the topics Plant Bioinformatics, AI in Healthcare & Microbiome informatics, were held on 7 November 2023, 16 January 2024 and 24-25 September 2024 respectively, were organized by the PIs and CoPIs of the DBT funded bioinformatics Centre Project.

Dr. Smarajit Polley (Biological Sciences) (I) organized lecture on "Restoration Hardware" delivered by Dr. Anindya Ghosh Roy, Professor and Wellcome Trust-DBT India Alliance Senior Fellow, National Brain Research Centre, Gurgaon, on 11 March 2024. (ii) organized lecture on "Synergistic evolution of lipids and proteins towards successful molecular machines" delivered by Dr. Swasti Raychaudhuri, Principal Scientist and Group Leader, CSIR-CCMB, Hyderabad, on 07 October 2024.

Prof. Soumen Roy (Physical Sciences) delivered invited talks at: Stat. Mech. Meet Kolkata held on September 27, 2024 at the SN Bose National Centre for Basic Sciences, Kolkata, and, (ii) Computational systems biology research cooperative: From Cell to Organism (July 12-13, 2024) at IIT Madras.

Prof. Srimonti Sarkar (Biological Sciences) (i) 22 February 2024 – Acted as the Host for a seminar titled "A TREGerEED gut: A story of T-regulatory cells and Enteric Dysfunction" by Dr. Amrita Bhattacharjee, DBT Ramalingaswami Fellow, ICMR-NICER, as part of DBS Lecture Series. (ii) 3 October 2024 – Acted as the Host for a seminar titled "Coordinated degradation of a sirtulin family HDAC upon replication stress: a mechanism to maintain histone acetylation and genome stability" by Dr. Devyani Haldar, Scientist VII, Centre for DNA Fingerprinting and Diagnostics, Hyderabad, as part of DBS Lecture Series. (iii) Delivered lecture as Keynote Speaker in the symposium titled "Bio Nexus: Unveiling the Wonders of Modern Biotechnology 2024", Neotia University on 18 April 2024. (iv) Delivered lecture as resource person in DBT-funded workshop on "Confocal Microscope Technique", Calcutta University on 26 September 2024. (v) Delivered lecture as Resource Person for the Workshop on Research Methodology for PhD Supervisors in Microbiology and Biotechnology, St. Xavier's College, Kolkata on 31 August 2024. (vi) Delivered an invited lecture at PHYSICON 2024, the 35th Annual Conference of the Physiological Society of India, Tripura University, Agartala on 15 November 2024.

Dr. Subhash Halder (Biological Sciences) Delivered a Planary Lecture on 15 March 2024 at the DST-SERB Sponsored Two days National Workshop on "Tips & Tricks in writing Scientific Research Grants" Organized by the Integrative Biochemistry and Immunology Laboratory (IBIL), Dept. of Animal Science, Kazi Nazrul University under the Scientific Social Responsibility (SSR) mandate of DST-SERB-CRG Project (CRG/202/002605) on 14 and 15 March 2024.

Dr. Sudipto Saha (Biological Sciences) Organized a National Workshop on Microbiome Informatics at Bose Institute during 24-25 September 2024. Notable speakers were Prof. Sharmila Mande, Dr. Naweed Naqvi, Prof. Bhabatosh Das, and Dr. Souvik Mukherjee. A half-day hands-on training session was organized on "Analyses of Metagenomics Data Using R."

Prof. Zhumur Ghosh (Biological Sciences) (i) Delivered invited talk on Opportunities and Challenges of Predictive Approaches involving Regulatory Noncoding RNomics - shaping modern day therapeutics at the 92nd Annual Meeting of the Society of Biological Chemists held at BITS Pilani K K Birla Goa Campus from 18-20 December 2023. (ii) Delivered a talk on Predictive Approaches involving Coding and the Noncoding World: Shaping modern day therapeutics, at the workshop entitled "Contemporary perspectives in Computational Biology" from 19-20 February 2024 organised by IMSc, Chennai. (iii) Delivered a talk on Regulatory Noncoding RNomics –Orchestrating the journey across pre- and post- fertilization stages, at the 12th RNA Group Meeting at IIT Guwahati from May 22 to 24 2024. (iv) Delivered a talk on Predictive Approaches involving Noncoding RNomics - orchestrating disease biology, at "BDBio 2024 - Symposium on Big Data Algorithms for Biology" on 31 May and 01 June 2024 at IISc Bangalore and also participated in the panel discussion on "Grand Challenges in Computational Biology". (v) Delivered an online talk on Parental Noncoding RNAs –Orchestrates the pre- and post- fertilization events in the Workshop on "Molecular and Genomic Techniques in Cellular Studies (MAGTICS-2024)" during 02-06 September 2024 organised by Department of Life Science, National Institute of Technology Rourkela, Odisha.

Prottoy Das (Physical Sciences, working under Dr. Sidharth K. Prasad) delivered a multi-experiment talk entitled "Jet fragmentation and hadronchemistry" on behalf of the ALICE, ATLAS, CMS and LHCb collaborations at the LHCP 2024 conference in Boston,US during 03-07 June 2024.

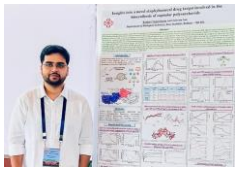
Abhi Modak (Physical Sciences, working under Dr. Sidharth K. Prasad) got Invited talk in the Meeting on Physics of ALICE, CBM and STAR (MPACS) at VECC during 29-30 January 2024; Title: "Inclusive photon production in pp and p-Pb collisions with ALICE PMD".

Subir Mandal, Arindam Sen, Somen Gope, Dr. Saikat Biswas (Physical Sciences) presented poster in the "3rd International Conference on Detector Stability and Aging Phenomena in Gaseous Detectors" during 06-10 November 2023, CERN, Switzerland (online).

Subir Mandal (Physical Sciences) presented poster titled "Behavioural change in performance of GEM detector" in 67th DAE Symposium on Nuclear Physics at IIT Indore, MP, during 09-13 December 2023.

Somen Gope (Physical Sciences) presented poster titled "Performance studies of CBM Time of Flight (TOF) detector and a few aspects of particle production at a FAIR energy" in 67th DAE Symposium on Nuclear Physics at IIT Indore, MP, during 9-13 December 2023.

Monika Aggarwal (Physical Sciences) from the Department of Physics and Astrophysics, Central University of Haryana completed her MSc dissertation project at Bose Institute, Kolkata under the supervision of Dr. saikat Biswas. The title of the thesis was "Performance Study of Bakelite RPC For High-Energy Physics Experiment". The work is highlighted in the prestigious CBM Courier in July 2024 | Issue 2 edition.



Tushar Chakraborty (Biological Sciences, Supervisor: Prof. Subrata Sau) presented a poster, entitled 'Insights into a novel staphylococcal drug target involved in the biosynthesis of capsular polysaccharide', in the meeting of Society of Biological Chemists, held at BITS Pilani, Goa campus during 18-20 December 2023.

Debasmita Sinha (Biological Sciences, Supervisor: Prof. Subrata Sau) presented a poster, entitled 'Mutations affecting the structure, function, and stability of an anti-sigma factor from *Staphylococcus aureus*', in the meeting of Society of Biological Chemists, held at BITS Pilani, Goa campus during 18-20 December 2023.

Dr. Aritreyee Datta (Chemical Sciences, supervisor: Prof. Anirban Bhunia) received best poster award at "Special Symposium on Clinical Application of NMR/MRI & 29th Annual meeting of National Magnetic Resonance Society (NMRS) of India in association with ISWRM, Indian Chapter".

Shahina Raushan Saikh, Md Abu Mushtaque, Antara Pramanick, Sanat Kumar Das (Physical Sciences) delivered on "A Study on the Enhancement of Airborne Bacteria and its Implication on Human Health Due to Fog over Central Indo-Gangetic Plain in India" at 2nd International Multidisciplinary Research Colloquium held on 13-14 July 2024 organized by International Benevolent Research Foundation (IBRF), Kolkata and Confederation of Indian Universities (CIU), New Delhi.

Shahina Raushan Saikh, Md Abu Mushtaque, Antara Pramanick, Sanat Kumar Das (Physical Sciences) delivered on "Structural variation in airborne bacterial communities enriched with pathogens in hazy, cloudy and clear winter days over New Delhi, India" at International Commission on Atmospheric Chemistry and Global Pollution (iCACGP), and International Global Atmospheric Chemistry (IGAC) during 09-13 September 2024 at Kuala Lumpur, Malaysia, fully sponsored by Aakash Project, Research Institute for Humanity and Nature (RIHN), Japan.

Shahina Raushan Saikh, Md Abu Mushtaque, Antara Pramanick, Sanat Kumar Das (Physical Sciences) delivered on "Alteration of urban airborne bacterial communities enriched with pathogens during winter: A study over New Delhi, India"" at the session 'Atmosphere-Biosphere Interactions via Bioaerosols' of 'Annual meeting of American Geophysical Union (AGU)' 2024 at Washington DC, USA

Antara Pramanick (under Dr. Sanat Kumar Das, Physical Sciences) leads an abstract entitled "Long-range transport of dust-associated microbes perturbing biodiversity: A study over Eastern Himalayas, India" at the session 'Atmosphere-Biosphere Interactions via Bioaerosols' of 'Annual meeting of American Geophysical Union (AGU)' 2024 at Washington DC, USA.

VISITS ABROAD

Dr. Anupama Ghosh (Biological Sciences) Three months visit during August to October 2024 to Indiana University, Department of Biology funded by Fulbright Nehru Academic and Professional Excellence Fellowship.

Dr. Pramod Kumar Shukla (Physical Sciences) Participated in "String-Math 2024" conference held during June 10-14, 2024 at the International Centre for Theoretical Physics ICTP, UNESCO, Trieste, Italy.

Dr. Saikat Biswas (Physical Sciences) visited (i) FAIR-GSI, Darmstadt, Germany, 15-20 December 2023 to attend FAIR Council meeting and other FAIR related discussions. (ii) CERN, Geneva, Switzerland during 9 – 26 May 2024 to take DCS data taking shift of ALICE experiment and to take part in discussion on ALICE upgrade. (iii) Attended 41st FAIR Council meeting at FAIR, Germany during 08-11 July 2024 as invitee. He presented a talk to welcome the FAIR Council to Kolkata for the "42nd FAIR Council meeting in Kolkata during 03-04 December 2024". He also presented the status of Indian in-kind contribution to FAIR, Germany in the Bose Institute-FAIR Steering

committee meeting in FAIR, Germany on 09 July 2024. During the visit of FAIR-GSI, he took part in the discussion with Dr. Christian J Schmidt, Head, Detector Laboratory, GSI and Prof. Tetyana Galatyuk, Spokesperson of CBM Experiment at FAIR.

Dr. Sanat Kumar Das (Physical Sciences) Visited Research Institute for Humanity and Nature (RIHN), Kyoto, Japan to deliver an invited talk on "Winter-time airborne bacterial communities enriched with pathogens in Urban Atmosphere: A study over New Delhi, India" in 'Aakash International Meeting 2024' during 26-30 August 2024.

Dr. Sidharth Kumar Prasad (Physical Sciences) visited CERN, Geneva, Switzerland during 06 July to 28 July 2024 for the ALICE experimental work.

Prof. Supriya Das (Physical Sciences) visited

(i) FAIR/GSI, Germany during 15-20 December 2023, to attend 40th. FAIR Council Meeting. (ii) FAIR/GSI, Germany during 20 - 23 May 2024 to attend the event on '50 years of Indo-German Cooperation in Science and Technology'. (iii) FAIR/GSI, Germany during 08 - 11 July 2024 to attend 41st. FAIR Council Meeting.

Dr. Sudipto Saha (Biological Sciences) (i) Presented a poster on "Explainable AI-enabled classification of Asthma and COPD using 16s amplicon sequencing of airway microbiome" at Asia & Pacific Bioinformatics Joint Congress held at Okinawa, Japan, 22-25 October 2024. (ii) Gave an invited talk on "AI-enabled identification of Antibiotic Resistance Bacteria (ARB) and Antibiotic Resistance Genes (ARGs) from the sputum at the genome and metagenome levels" at the Research Institute for Microbial Diseases, Osaka University, Osaka, Japan on 28 October 2024.

Prof. Wriddhiman Ghosh (Biological Sciences) Convened and Co-chaired Session 9g: From extremophiles to biogeochemical cycles: Exploring their implications in Earth's habitability and astrobiology, in the Goldschmidt Conference 2024 held at Chicago, USA, between 18 and 23 August 2024, and also presented the following paper:

Jagannath Sarkar, Sabyasachi Bhattacharya, Aditya Peketi, Ranadhir Chakraborty, Aninda Mazumdar and Wriddhiman Ghosh (2024) Metabolically-active obligate aerobes in the sulfidic sediments of a marine hypoxic zone: sustenance and potential role in Carbon-Sulfur cycling. https://conf.goldschmidt.info/goldschmidt/2024/meetingapp.cgi/Paper/21301.

Goldschmidt is the foremost annual conference on geochemistry and related subjects, organized by the European Association of Geochemistry and the Geochemical Society (USA).

Sanchari Thakur (Physical Sciences, working as a postdoctoral fellow under ALICE-III project) visited CERN, Geneva, Switzerland during 19 March to 14 June 2024 to participate in the ALICE data taking and performing the duties of ALICE Shift Leader and Run Manager.

Prottoy Das (Physical Sciences, working under Dr. Sidharth K. Prasad) visited Boston, US to deliver a multi-experiment talk entitled "Jet fragmentation and hadronchemistry" on behalf of the ALICE, ATLAS, CMS and LHCb collaborations at the LHCP 2024 conference during 03-07 June 2024.

Sonal Sachdev (Biological Sciences) attended ICAR 2024: the 34th International Conference on Arabidopsis Research held during 15 to 19 July 2024 at the University of California, San Diego, USA.

Ritankar Mitra (SRF), working under Prof. Dhruba Gupta, received full financial support from Euroschool to attend "Euroschool on Exotic Beams 2024" at Jyväskylä, Finland during 25 - 31 August 2024. He presented his research work titled "Direct and Sequential Breakup of ^{7}Be on ^{12}C at 5 MeV/u" through oral and poster presentation.

Ritankar Mitra (SRF), working under Prof. Dhruba Gupta, received full financial support from CERN to attend "International School of Trigger and Data Acquisition (ISOTDAQ 2024)" at University of Science and Technology (USTC), Hefei, China during 19 – 28 June 2024.

Physical Sciences Seminar

(i) Delivered by Dr. Sayak Chatterjee, University of Massachusetts, Amherst, on " Precise measurement of the weak mixing angle by the MOLLER experiment at Jefferson Lab" on 14 November 2023.

(ii) Delivered by Dr. Shubhadeep Biswas, SLAC, Stanford University, on "Attosecond Vision and Control of Electron Dynamics in Quantum Systems" on 22 December 2023.

(iii) Delivered by Dr. Jayanta Dutta; HRI, Prayagraj, Allahabad on "Formation and Evolution of the very FIRST STARS (primordial stars) in the Universe" on 15 December 2023.

(iv) Delivered by Dr. Arnab Maity, Technion - Israel Institute of Technology, on "Atomically thin 2D-Field Effect Transistors and Printed Chemi-resistors for Rapid biopsy of Cancer, Chiral Spin Device, and Aquatic Hazards Assessment" on 09 April 2024.

(v) Delivered by Dr. Aishik Ghosh, UC Irvine and Berkeley Lab, on "Performing High-Dimensional Statistical Inference with Artificial Intelligence in Particle and Astrophysics" on 07 June 2024.

(vi) Delivered by Aritra Ghosh, SRF, School of Basic Sciences, IIT-BBS, Bhubaneswar, on "Contact Geometry and Thermodynamics" on 07 August 2024.

(vii) Delivered by Kinjal Roy, SRF, Astronomy & Astrophysics Group, RRI, on "A sharp future of medium-size telescopes in the era of automated adaptive optics" on 08 August 2024.

(viii) Delivered by Dr. Shreyasi Acharya, Postdoc, CERN, on "Recent results on heavy flavours and quarkonia from ALICE focusing on Run-3 data" on 19 August 2024.

(ix) Delivered by Dr. Jhuma Sannigrahi, Ramanujan Fellow, IIT Goa, on "Insights into quantum magnetism: A concise account of my research" on 05 September 2024.

(x) Delivered by Dr. Soumyakanti Bose, Postdoc, Seoul National University, on "Long distance entanglement sharing with optical hybrid states" on 25 October 2024.

RECENT AWARDS/HONOURS/MEMBERSHIP

Prof. Abhijit Chatterjee (Chemical Sciences) (i) Editorial Board Members in the Journal; "Earth and Space Chemistry" of American Chemical Society. (ii) Expert member of "Kolkata Climate Action Plan (KCAP), Govt. of West Bengal".

Prof. Anirban Bhunia (Chemical Sciences) (i) Editorial Board member of Elsevier Journals: Biophysical Chemistry, Journal of Colloid and Interface Sciences and Biochimica et Biophysica Acta (Biomembrane). (ii) Editorial Board member of Springer Journals: Scientific Reports.

Prof. Anup Kumar Misra (Chemical Sciences) Editorial Board Members in Elsevier Journals: Tetrahedron, Tetrahedron Letters and Carbohydrate Research.

Prof. Biswanath Maity (Biological Sciences) Received INSA Associate Fellow, 2024.

Prof. Debaraj Mukherjee (Chemical Sciences) (i) Joined editorial board of the prestigious Journal of Carbohydrate Chemistry (JCC), Taylor & Francis for five years. (ii)Selected and received a certificate for his participation in the Leadership Development Programme in Science and Technology (LEADS) organized by Indian National Science Academy and National Centre for Good Governance at INSA, New Delhi, July, 2024. (iii) Received ACCT(I) Excellence in Carbohydrate Research Award-2024 for outstanding contribution to the area of synthetic carbohydrate chemistry sponsored by PfP, Houston, Texas, USA.

Prof. Gaurab Gangopadhyay (Biological Sciences) (i) Nominated by the Director, Bose Institute to represent BI in the Mega Event of IISF 2023, held at Faridabad from 17 to 20 January 2024. (ii) Nominated by the Director, Bose Institute for a live interview on the National Science Day on February 28 2024 by the Drishtibhongi, a Bengali News Portal. (iii) Invited as a distinguished speaker in the "Hackathon on Geographical Indication and Related Traditional Knowledge and Traditional Cultural Expression from 8 to 12 March 2024 at the WBNUJS (West Bengal National University of Juridical Sciences), Kolkata. (iv) Invited to Chair a session "Women in innovations" in the One day seminar entitled "Women in Science, Technology and Innovations: Challenges and prospects" organised by Kolkata Nivedita Shakti at the Sister Nivedita University, New Town, Kolkata on 27 August 2024. (v) Nominated as the Nodal Officer by the Director, Bose Institute for the Curtain Raiser Event for IISF-2024.

Prof. Kaushik Biswas (Biological Sciences) (i) attended NIPER-K for the 2nd Meeting of the Research Council (RC) of NIPER, Kolkata as a member of the NIPER-K, Research Council, Aug 19-20, 2024. (ii) Member of the Academic Program and Development Committee (APDC) of NIPER, Kolkata.

Dr. Nirmalya Sen (Biological Sciences) Regional Young Investigators' Meetings 2023 Grant received for organizing RYIM Kolkata, 2023 (bit.ly/RYIMKolkata) sponsored by DBT and India Biosciences.

Dr. Sidharth Kumar Prasad (Physical Sciences) (i) serving as one of the conveners of the Physics Analysis Group – Jet Substructure (PAG-JSUB) in the ALICE collaboration at CERN. (ii) serving as the Deputy Spokesperson of the ALICE-India-STAR collaboration. (iii) serving as one of the Internal Review Committee (IRC) members for reviewing the two ALICE experimental papers titled "Groomed and ungroomed jet mass and angularities in pp and PbPb collisions at 5.02 TeV using ALICE" and "Jet substructure correlation of the Soft Drop Rg and Zg in pp and Pb-Pb collisions" in the ALICE Collaboration.

Prof. Soumen Roy (Physical Sciences) (i) Patent awarded as principal inventor: A system and method for analyzing videos of application or function for feature identification of the videos and related application or function [Patent No. 472279 (2023)] Soumen Roy et al. (ii) Member of Editorial board in PLOS ONE, Indian Journal of Physics, Frontiers of Physics (iii) Co-edited a special issue with Prof. Deepak Dhar on "statistical physics and complex systems" in the Indian Journal of Physics (Springer). (iv) Was Guest of Honour at the Institute Innovation Council of the

Heritage Institute of Technology, Kolkata on 30 August 2024. (v)Acted as a Judge for selecting the successful candidate from the West Bengal State Science Seminar who would represent WB at the National Science Seminar to be held in Mumbai.

The event was held at the Birla Industrial and Technological Museum (Ministry of Culture, Govt. of India), Kolkata on 20 September 2024. The participants were winners of the district level competitions held earlier in all districts of West Bengal. It was also covered in the media (viz, The Telegraph on 04 October 2024 — https://www.telegraphindia.com/edugraph/campus/birla-industrial-technological-museums-west-bengal-state-science-seminar-2024-explores-ai-potentials-and-concerns/cid/2053220)

Prof. Subhrangsu Chatterjee (Biological Sciences) Certificate from Elsevier for the publication of open-access articles linked to United Nations Sustainable Development Goals.

Dr. Sudipto Saha (Biological Sciences) Asia & Pacific Bioinformatics Joint Conference 2024 Travel Fellowship Award during 22-25 November, 2024.

Prof. Wriddhiman Ghosh (Biological Sciences) Conferred honorary membership of the European Association of Geochemistry in August 2024.

Prof. Zhumur Ghosh (Biological Sciences) (i) Associate Editor, Molecular Plant-Microbe Interactions (ii) Editor, Current Bioinformatics (iii) Member of the National Academy of Science. (iv) Selected as one of the distinguished Participants for the 2nd batch of the INSA-NCGG Leadership Development in Science & Technology (LEADS) 2024 Programme organized by Indian National Science Academy and National Centre for Good Governance at INSA, from April 1-7, 2024, at INSA, New Delhi.

Abhi Modak (working under Dr. Sidharth K. Prasad) received INFN fellowship.

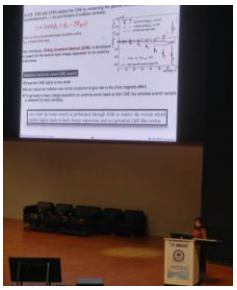
Dr. Amit Kumar Paul (Chemical Sciences) (i) Selected as a member of the editorial board of the International Journal of Chemical Kinetics, Wiley, since June 2023 for 3 years. (ii) PhD student, Manju Siyaram Yadav received best poster award at a conference under Society of Physical Chemistry held at IIT Bombay from 22 – 25 October 2024.

Sonal Sachdev (Biological Sciences) Travel Grant Award on International Travel Scheme by SERB (File Number: ITS/2024/002482) for attending ICAR 2024: the 34th International Conference on Arabidopsis Research held during 15 to 19 July 2024 at the University of California, San Diego, USA and delivered talk and presented poster on Deciphering AtHMGB15, an ARID-HMG Protein in Arabidopsis: Orchestrating the JA Pathway Through MYC2 Regulation in Pollen Development.

Prateeka Borar (Biological Sciences, supervisor: Dr. Smarajit Polley) received SERB-ITS grant to attended an international conference in Dublin, Ireland and presented a poster as well as a flash talk.

Dr. Dipanwita Mukherjee (Biological Sciences) DST-NPDF (supervisor Prof. Kaushik Biswas), received 2nd best oral presentation award for delivering a talk titled "Pro-tumorigenic role of the ganglioside GM2 through modulation of fibroblasts in the tumor micro-environment." In the NIOS conference, organized by Netaji Subhas Chandra Bose Cancer Hospital, during 06-07 January 2024 at Westin Hotel, Newtown, Kolkata, photographs attached.

Trisha Ghosh, SRF (Biological Sciences) received Certificate of Achievement for poster presentation at Recent Trends in Natural Sciences 2023, Bose Institute.



Anjali Sharma (Physical Sciences) received "One of the best Thesis Presentation" award in 67th DAE Symposium on Nuclear Physics at IIT Indore, MP, during 09-13 December 2023. Title of the thesis: Investigation of Elliptic Flow and Chiral Magnetic Effect in Pb-Pb collisions in ALICE at LHC.

Ritankar Mitra (SRF), working under Prof. Dhruba Gupta, received full financial support from Euroschool to attend "Euroschool on Exotic Beams 2024" at Jyväskylä, Finland during 25 - 31 August 2024. He presented his research work titled "Direct and Sequential Breakup of ^{7}Be on ^{12}C at 5 MeV/u" through oral and poster presentation.

Ritankar Mitra (SRF), working under Prof. Dhruba Gupta, received full financial support from CERN to attend "International School of Trigger and Data Acquisition (ISOTDAQ 2024)" at University of Science and Technology (USTC), Hefei, China during 19 - 28 June 2024.

Shahina R. Saikh, SRF (under Dr. Sanat Kumar Das, Physical Sciences) received "Best Oral Presentation" award for presenting "A Study on the Enhancement of Airborne Bacteria and its Implication on Human Health Due to Fog over Central Indo-Gangetic Plain in India" at 2nd International Multidisciplinary Research Colloquium held on 13-14 July 2024 organized by International Benevolent Research Foundation (IBRF), Kolkata and Confederation of Indian Universities (CIU), New Delhi."

Dr. Aritreyee Datta (Chemical Sciences, supervisor: Prof. Anirban Bhunia) received best poster award at — Special Symposium on Clinical Application of NMR/MRI & 29th Annual meeting of National Magnetic Resonance Society (NMRS) of India in association with ISMRM, Indian Chapter‖.

Chumki Nayak (Physical Sciences) working with Prof. Achintya Singha, was awarded the 1st Prize at the 39th Young Physicists' Colloquium (YPC 2024) organized by the Indian Physical Society.

RECENT PH.D. DEGREES AWARDED

Jinia Chakrabarty (CU) Understanding The Role of Trithorax Group of Proteins In Transcriptional Regulation During Abiotic Stress Response In Oryza sativa. Supervisor: Prof. Subho Chaudhuri.

Troyee Das (JU) Genetic Variants within long non coding RNA: Role in Cancer. Supervisor: Prof. Zhumur Ghosh.

Byapti Ghosh (JU) Regulatory Noncoding RNA Mediated Alterations and its Effects in Stem Cell Derivatives. Supervisor: Prof. Zhumur Ghosh.

Soumili Pal (CU) Understanding the Role of Somatic Embryogenesis Receptor Kinase Gene to Combat Fusarium moniliforme Infection in Pineapple. Supervisor: Prof Gaurab Gangopadhyay.

Diptasree Kumar (CU) Transcriptomic Analysis of the Differentially Expressed Genes Behind Salt Tolerance in a Few Rice Genotypes and Molecular Docking Study of the Enzymes of the Selected Genes. Supervisor: Prof. Gaurab Gangopadhyay.

Tuhin Subhra Roy (CU) A Stochastic Study of Signal Transmission in Gene Regulatory Network. Supervisor: Prof. Suman Kumar Banik.

Arghya Bhowmick (CU) Functional Characterization of Type II Toxin-Antitoxin Systems in Thermoacidophilic Crenarchaeon Sulfolobus acidocaldarius. Supervisor: Dr. Abhrajyoti Ghosh.

Koustav Bhakta (CU) Molecular Characterization of Sulfolobus acidocaldarius Hsp60 and its Interaction with Small Heat Shock Proteins (Hsp14 & Hsp20). Supervisor: Dr. Abhrajyoti Ghosh.

Arindam Sen (CU) Development of Resistive Plate Chamber For The CBM Experiment At FAIR And Other Application Of Radiation Detector. Supervisor: Dr. Saikat Biswas.

Monami Dutta (CU) Spatio-Temporal Variability of Aerosols, Trace Gases and its Interaction with Clouds in India. Supervisor: Prof. Abhijit Chatterjee.

Tushar Chakraborty (CU) Studies on a staphylococcal enzyme involved in synthesis of a capsular polysaccharide sugar. Supervisor: Prof. Subrata Sau.

Shruti Mukherjee (CU) Molecular Characterisation of Antimicrobial and Antiviral Agents for the Development of Targeted Therapeutics. Supervisor: Prof. Anirban Bhunia.

Dibakar Sarkar (CU) Investigations on the Structural and Kinetic Features of Amyloid Aggregation. Supervisor: Prof. Anirban Bhunia.

Irshad Ahmad Zargar (AcSIR) Development of Challenging O-/C-/S- Glycosylation Methods and C-H Activation Employing Glycals. Supervisor: Prof. Debaraj Mukherjee (DCS, Bose Institute and Co-supervisor: Dr Naveed Qazi, CSIR-IIIM).

Abhi Modak (CU) Inclusive photon and charged particle production in proton-proton and proton-lead collisions at LHC energies with ALICE. Supervisor: Dr. Sidharth Kumar Prasad.

Debjani Banerjee (CU) Study of Jet Production in Proton-Proton and Nucleus-Nucleus Collisions using the ALICE Experiment. Supervisor: Dr. Sidharth Kumar Prasad.

Prottoy Das (CU) Measurements Of Jet Properties In Small Collision Systems At LHC With ALICE. Supervisor: Dr. Sidharth Kumar Prasad.

Himadri Sekhar Tripathi (CU) Transition Metal Oxide (TMO) Electrode base Supercapacitor for Efficient Energy Storage Applications. Supervisor: Prof. Achintya Singha.

Aroni Mitra (CU) Deciphering the biological function of small heat shock proteins in *Ustilago maydis*. Supervisor: Dr. Anupama Ghosh

Anindya Dutta (JU) Interference of G-Quadruplex Structures in the Metastasis Inducing Oncogenes. Supervisor: Prof. Subhrangsu Chatterjee.

Ananya Roy (JU) Identification and involvement of G quadruplex structure in Cancer Cell Proliferation and Stemness. Supervisor: Prof. Subhrangsu Chatterjee

Abhirupa Ghosh (CU) In-silico Analyses of drug-Resistant Gene-Mutations in *Mycobacterium tuberculosis*, ESKAPE and other Bacterial Species. Supervisor: Dr. Sudipto Saha.

Shreya Chowdhury (CU) Impact of dynamic interaction between miR398 and a Copper/Zinc Superoxide dismutase on stress physiology of tomato plant. Supervisor: Prof. Pallob Kundu.

Shrabani Basak (CU) Biotechnology Department, University of Calcutta, Intracellular interaction dynamics of metacaspases during disease response in Solanum lycopersicum. Supervisor: Prof. Pallob Kundu.

Rohit Das (CU) Mechanistic insights of differential microRNA processing in Solanum lycopersicum under stress conditions. Supervisor: Prof. Pallob Kundu.

Sk Mustak Ali (CU) Study of Nuclear Reactions Related to the Cosmological Lithium Problem. Supervisor: Prof. Dhruba Gupta.

Kabita Kundalia (CU) Study of α-Cluster Transfer Reactions with ^{7}Be. Supervisor: Prof. Dhruba Gupta.

Nibendu Mondal (CU) High Temperature Adaptation by Phylogenetic Relatives of Mesophilic Bacteria. Supervisor: Prof. Wriddhiman Ghosh.

GRANTS RECEIVED

- A proteome centric view of Prajal ubiquitin ligase in proteostasis decline and disease manifestation; SERB; Prof. Atin Kumar Mandal, Department of Biological Sciences; Rs.59,20,992; 3 years.
- Coordinated molecular events in stress sensing, activation, and performance of SINACMTF3 for shaping the stress response in tomato; SERB ; Prof. Pallob Kundu, Department of Biological Sciences; Rs.46,24,992; 3 years.
- FNDC-CaMKII complex facilitate cardiac T-tubule synchronization through mitigating intercommunication of myocyte-endothelia cells in chemo-induced cardiac pathologies; ICMR ; Prof. Biswanath Maity, Department of Biological Sciences; Rs.98,73,084; 3 years.
- Role of NLRP3 mediated inflammosome in chemotherapy drug resistant prostate cancer; SERB; Dr. Subhash Haldar, Department of Biological Sciences; Rs.56,44,000; 3 years.
- Microplastics in ballast water as an emerging vector for bacterial pathogens and Harmful Algal Bloom species: a potential risk to the marine environment and human health; DBT; Dr. Abhrajyoti Ghosh, Department of Biological Sciences; Rs.49,37,278; 3 years.

Short Term Training at Bose Institute

Short term summer training was offered during April to September 2024 at Bose Institute. Outstanding students in Physical Sciences (7), Chemical Sciences (4) and Biological Sciences (9) from all over India successfully carried out projects at Bose Institute (Co-ordinator: Prof. Dhruba Gupta).

STAFF NEWS

Appointments

1. **Dr. Anup Ghosh,** joined as Assistant Professor in the Department of Chemical Sciences w.e.f. 18.03.2024.
2. **Dr. Utpal Nandi,** joined as Associate Professor in the Department of Chemical Sciences w.e.f. 30.04.2024.
3. **Prof. Kaustuv Sanyal,** joined as Director w.e.f. 02.05.2024.
4. **Dr. Amit Kumar Paul,** joined as Associate Professor in the Department of Chemical Sciences w.e.f. 29.05.2024.
5. **Prof. Biswanath Maity,** joined as Professor in the Department of Biological Sciences w.e.f. 04.06.2024.
6. **Mrs. Manisha Chaudhary,** joined as Stenographer in the Administration w.e.f. 10.06.2024.
7. **Mr. Biswajit Chanda,** joined as Accountant in the Administration w.e.f. 04.11.2024.

Retirements on Superannuation

1. **Prof. Uday Bandyopadhyay,** Director, superannuated on 31.01.2024.
2. **Mr. Pulak Kumar Roy,** Madhyamgram Experimental Farm, superannuated on 29.02.2024.
3. **Ms. Chaitali Ray,** Biological Sciences, superannuated on 31.03.2024.
4. **Mr. Purnendu Manna,** Workshop, superannuated on 31.08.2024.
5. **Mrs. Gopa Dasgupta,** Administration, superannuated on 31.10.2024.
6. **Mr. Asoke Kumar Maity,** Chemical Sciences, superannuated on 31.10.2024.
7. **Dr. Debjani Roy,** Biological Sciences, superannuated on 30.11.2024.

85th Acharya J.C. Bose Memorial Lecture will be delivered by Prof. Sankar K. Pal, National Science Chair, GoI, President, Indian Statistical Institute, Distinguished Scientist and Former Director, Indian Statistical Institute, Kolkata

Abstract

Pattern Recognition, Machine Intelligence to Deep Learning and Data Science: Evolution, Challenges and Concerns

The talk describes the development of a discipline over about 50 years starting from pattern recognition and fuzzy sets in 1975 to image processing, expert system and AI, knowledge-based system, neural networks, soft computing, rough technology, machine intelligence, granular data mining, Big data, and deep learning (DL) with applications and challenges involved. New technologies and terms evolved during the process and their relevance are explained. Characteristics of some of the machine learning (ML) tools developed are stated. Modeling uncertainty and rough granular computing concerning data analytics are emphasized.

The second part deals with some granular mining applications such as video tracking in ambiguous situations in the context of both shallow and deep learning. It is shown how the rough lower-upper approximations in temporal domain provide an estimate of object model in unsupervised tracking, even under complete occlusion. This is followed by the new concept of granulated deep learning (GDL). Merits of a G-RCNN (granulated region proposal network) in enhancing the object detection accuracy are featured with applications to real time traffic scenario.

The talk concludes by mentioning some challenging issues and future directions in DL and data science research including certain concerns for beginners.

FORTHCOMING EVENTS

Prof. Abhijit Chatterjee (Chemical Sciences) going to work with India's biggest think tank and policy research institute, "Council of Energy Environment and Water (CEEW)", New Delhi on India's air quality, policy interventions and recommendations. Bose Institute is going to sing a MoU with CEEW in December 2024.

Prof. Anirban Bhunia (Chemical Sciences) Planning to organize a two-day conference at Bose Institute Darjeeling Campus on Nuclear Magnetic Resonance Spectroscopy in October 2025. The conference will be funded by the Velux Stiftung (Switzerland) Project Grant.

Dr. Sudipto Saha (Biological Sciences) The 23rd International Conference on Bioinformatics (InCoB 2025) will be held in September 2025 at the Bose Institute, Kolkata, India.

Dr. Sanat Kumar Das (Physical Sciences) An integrated campaign led by Bose Institute Kolkata collaborated with IIT Delhi and Lovely Professional University Punjab is being carried out since 20 October 2024 and will be continued up to 20 January 2025 to collect simultaneous ambient air samples over source and downwind regions for investigation of optical and physical properties of winter haze over Delhi metropolitan city, and the structural variation of urban airborne bacterial communities in hazy condition occurred due to the transport of stubble burning plume coming over Punjab, and its impact on human health.

The FAIR Council, which is the highest decision making body of the FAIR project has decided to hold it's 42nd meeting at Bose Institute Kolkata during 3-4 December 2024 and that will be the first such meeting outside the FAIR site in Germany.

We condole the passing away of Shri Baidya Nath Murmu on 30.04.2024.