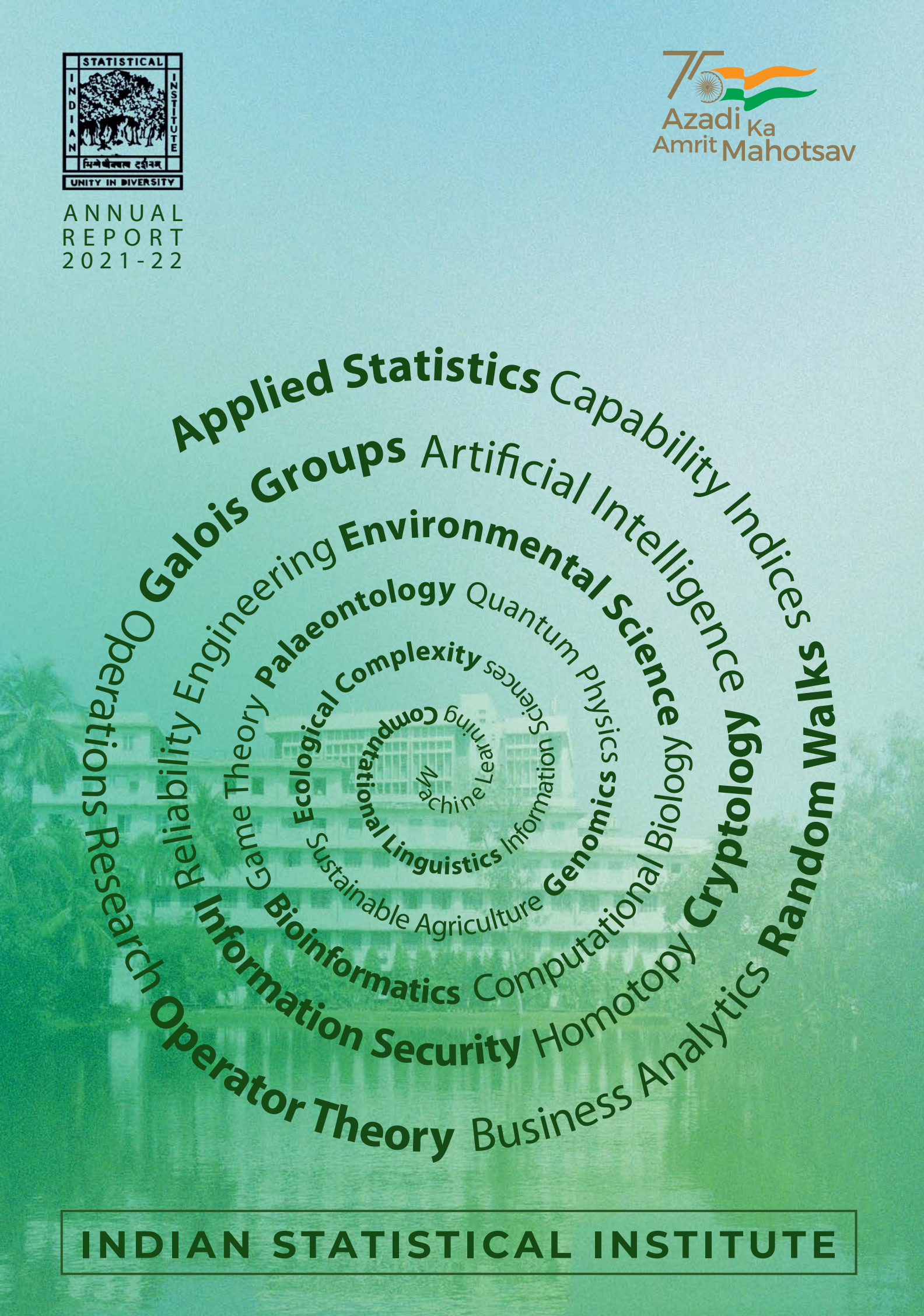
ANNUAL
REPORT
2021-22

Azadi Ka Amrit Mahotsav



INDIAN STATISTICAL INSTITUTE

90th

Annual Report
2021-22

Indian Statistical Institute

203, Barrackpore Trunk Road, Kolkata - 700108
http://www.isical.ac.in

CONTENTS

PREFACE

The Annual Report 2021-22 attempts to summarize the salient research, teaching, training and consultancy activities which the ISI faculty members carried out during the period under review. The early part of this period is synonymous with the deadly second wave of the COVID-19 Coronavirus pandemic. Building upon our experience during the first wave of the pandemic, we tried to be more responsible. Nevertheless it did affect our activities and we can only hope that it is behind us. With the gradual easing of restrictions, we slowly limped back to normalcy. The usual in-person workshops, conferences, symposia and regular teaching in our degree programs started taking place and these are appropriately reported.

The compilation of this report would not have been possible without the support and co-operation of all concerned. They are gratefully acknowledged. Special thanks are due to our colleagues at the Public Relations Unit for tirelessly burning the mid-night oil for its completion. The use of OR techniques will streamline the Annual Report compilation process and will be attempted in future. Inadvertent errors and/or omissions is regretted.

The Editorial Board

From the Director's Desk

It is my honour to present before you the Annual Report 2021-22 of the Indian Statistical Institute. From humble beginnings in a room in Presidency College in 1931 to the beautiful campus of the Headquarters in Baranagar, Kolkata and centres in multiple cities across India, the journey has been eventful and fulfilling. The Institute scientists and students continue to make theoretical and methodological developments in statistics and allied areas, and use these in practical applications with reference to problems of planning for national development and social welfare. Unity in Diversity remains the guiding vision of the Institute. Responding to the demands of the current times, multidisciplinary research in data driven science is being conducted in various domains like health care, environmental science, agriculture, ecology, financial analysis, social networks, policy design, economic planning, video analytics, to name just a few.

The year 2021-22 saw the Institute continue to flourish under the able leadership and guidance of Shri Bibek Debroy, the President of the Institute, and Dr. Ashok Kumar Lahiri, the Chairman of the ISI Council. The Institute conducted its 56th Convocation on 02nd March 2022. Prof. Gagandeep Kang, FRS, a leading virologist, was the Chief Guest at the event. The 91st Foundation Day was celebrated in December 2021.

The Institute faculty and students continue to bring recognition to the Institute through their scientific endeavors. I mention some of these here. Neena Gupta of the Theoretical Statistics & Mathematics Unit, Kolkata has been awarded the DST-ICTP-IMU Ramanujan Prize for Young Mathematicians from Developing Countries and the Nari Shakti Puraskar from the Government of India. She is also an invited speaker at ICM 2022, a rare honor for a mathematician. Ritabrata Munshi of Theoretical Statistics

> Responding to the demands of the current times, multidisciplinary research in data driven science is being conducted in various domains like health care, environmental science, agriculture, ecology, financial analysis, social networks, policy design, economic planning, video analytics, to name just a few.

& Mathematics Unit of ISI Kolkata has been awarded the prestigious J.C. Bose Fellowship. The J.C. Bose Fellowship of Debashish Goswami of Theoretical Statistics & Mathematics Unit, Kolkata is extended for another five years. B.S. Daya Sagar of Systems Science and Informatics Unit (SSIU), Bangalore has been elected Fellow of the Indian Academy of Sciences. Siva Athreya of Theoretical Statistics & Mathematics Unit, Bangalore is elected a Fellow of INSA. Tridib Kumar Mondal of Geological Studies Unit is awarded the INSA Young Scientist Medal. Arup Bose of Theoretical Statistics & Mathematics Unit, Kolkata is awarded INSA Prasanta Chandra Mahalanobis Medal. Susmita Sur-Kolay of Advanced Computing and Microelectronic Unit is elected a Fellow of Indian National Academy of Engineering. Parthanil Roy of Theoretical Statistics & Mathematics Unit, Bangalore has received the 2021 Young Statistical Scientist Award (in the 'Theory and Methods' category) from International Indian Statistical Association. Ashis Kumar Chakraborty of Statistical Quality Control & Operations Research (SQC & OR) Unit, Kolkata has received the 2021 Distinguished Educator Award in the field of Mathematics, Statistics and Other Science Disciplines from the Operational Research Society of India. Saurabh Ghosh of Human Genetics Unit has been elected as Fellow of Indian Society for Medical Statistics. The Indian Society for Probability and Statistics has awarded Prof CR Rao Gold Medal to Sudheesh Kumar Kattumannil. Sanghamitra Bandyopadhyay was conferred the Padma Shri award by the Government of India. Partha P. Majumder, Emeritus Professor of the Institute, is awarded CSIR Gold Medal for Excellence in Biological Sciences and Technology. Our students also did well in the Simon Marais competition with eight students placed in the top quartile of whom Arghya Sarkar won the Stonehage-Fleming Prize.

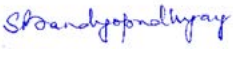
The country as well as the Institute is recovering from the COVID-19 pandemic. Nevertheless, the Institute has hosted several conferences and workshops during this period in hybrid mode, which is now the new normal. Seminar on Social Costs of Keystone Species Collapse: Evidence from the Decline of Vultures in India was organized by Center for Research on the Economics of Climate, Food, Energy and Environment (CECFEE), Indian Statistical Institute, Delhi. CECFEE, Delhi also organized a seminar on Does Traffic Congestion Pose Health Hazards? Evidence from a Highly Congested and Polluted City, and co-organised the BRICS NU Conference on Growth and Development in the BRICS Economies. The 15th Environment for Development Initiatives (EfD) – Annual Conference and a seminar on Wildfires, smoky days, and labor supply were also organized by CECFEE, ISI Delhi. Workshop on The Mahalanobis Growth Model was conducted by EPU at ISI, Delhi. The unit with CECFEE at ISI, Delhi organized the 16th Annual Conference on Economic Growth and Development. A workshop on Spatial Data Sciences was organized by the SSIU at ISI, Bangalore in collaboration with IEEE Bangalore Section GRSS Chapter, and the Technology Innovation Hub called IDEAS Foundation established as a Section 8 company in the Institute. A national workshop on Psychotherapeutic Approaches, Cognitive Behaviour Therapy: Principles and Applications was conducted by Psychology Research Unit at ISI, Kolkata. The unit also organized workshops on In Search of Consciousness & Healthy Living in collaboration with Rishi Aurobindo Institute of Teachers Education and on Neuroplasticity and Music Therapy in collaboration with Lalbaba College. The 6th Conference and Workshop on Statistical Methods in Finance was conducted by the Applied Statistics Unit at ISI, Bengaluru in association with Chennai Mathematical Institute. The SQC & OR Unit at ISI, Mumbai organized a workshop on Statistical Techniques in Research Methodology. The 9th International Conference on Pattern Recognition and Machine Intelligence was organized by Machine Intelligence Unit at ISI Kolkata. The unit also organized a Workshop on Machine Intelligence and Applications. ECSU, ISI Kolkata organized a workshop titled PIXELS AND PATTERNS. A workshop on Research Methodology and Statistical Package on Social Science was organized by Biological Anthropology Unit at ISI, Kolkata. Theoretical Statistics and Mathematics Unit at ISI, Bangalore organized the 42nd International Conference on Quantum Probability, and Infinite Dimensional Analysis (QP-42). Physics and Applied Mathematics Unit at ISI, Kolkata in collaboration with University of Calcutta, S. N.

Bose National Centre for Basic Sciences and Bose Institute, Kolkata, India organized an International Conference on Quantum Information and Foundations. A workshop on Computational Statistics and Data Analytics was conducted by Interdisciplinary Statistical Research Unit at ISI Kolkata. Many such activities were conducted all through the year.

The gradual shift from online to hybrid to in person classes in our regular programs happened over the year as the country slowly regained control over the sars-cov-2 virus and its mutants. The Institute is gearing up to launch its first fully online Diploma in Applied Statistics Program. The first batch of the newly launched post graduate program on Agricultural and Rural Management with Statistical Methods and Analytics in Giridih graduated in 2021.

The Cell for Collaboration with Academia, Industry and R&D labs has been active in handling the externally funded projects and consultancy activities in the Institute. MoUs have been signed/extended/continue between ISI and several other organizations from the government, industry and academia. Some of the collaborating organizations are Quality Council of India; Defense Research and Development Organization (DRDO); National Technical Research Organization (NTRO); Geological Survey of India, Ministry of Mines; CSIR National Metallurgical Laboratory; CSIRO Health and Biosecurity, ICSSR; Ministry of Earth Sciences; Indian Council of Medical Research; Ministry of Electronics & Information Technology; DST; DBT; SERB; Ministry of Finance; Directorate of Census Operations, Government of West Bengal; Airport Authority of India; NTPC Ltd.; National Highway Authority of India; State Bank of India; Bokaro Naval Armament Inspectorate; Tata Memorial Centre; Ramakrishna Mission Vivekananda Educational and Research Institute; CESC Limited; Tata Consultancy Services; Springer Nature Pvt. Ltd., Singapore; ABB Power Technology Services Private Limited; Tata Steel; Larsen & Toubro Infotech Limited; Cognizant Technology Solutions India Pvt. Ltd.; Credit - Suisse (CS); Ericsson India Pvt. Ltd; Vedanta group; SEG Automotive India Private Limited; Google, Indo French Centre for the Promotion of Advanced Research (CEFIPRA), Bharat Electronics Limited, FIAT India Automobiles Pvt. Ltd., Qglobal Management Consultants pvt Ltd; Catterpillar India Private Ltd; BRICS STI Framework Programme; UltraTech Cements; Intas Pharmaceuticals Ltd, Biopharma Division; Altigreen Propulsion Labs Private Limited, Bangalore; ISI-IEG Research project under EfD Agreement; All India Institute of Hygiene & Public Health; Tata Institute of Fundamental Research; Institute of Statistical Mathematics; Institute of Economic Growth; Ramakrishna Mission Vidyamandira; Kidney Care Society; University of Technology, Sydney; Pt. B. D. Sharma University of Health Sciences, Rohtak; Universita Degli Studi Di Trieste, Italy; Università degli Studi di Cagliari; Università Degli Studi Di Genova; International Centre for Integrated Mountain Development (ICIMOD); HAL Management Academy; Delhi Judicial Academy; Moscow State University; Coursera; University of Hyderabad; London School of Economics; University of Gothenberg; University of Groningen; University of Reading; Technical University of Košice, Slovakia; Basque Centre for Applied Mathematics (BCAM), Spain; The University of Auckland, New Zealand; Dauphine Université Paris, France; School of Electrical Engineering, Kyungpook National University, South Korea; Szechenyi Istvan University, Hungary; State University of New York, USA; University of Warwick, UK; The Instituto Technologico Autonomo De Mexico - ITAM; National University of Singapore; Østfold University College, Norway, and many others. Apart from these, the Institute is working closely with the Government of India and various state governments for solving social problems and for improvement of services being offered by the government, in addition to conducting a large number of training programs for government officials. The different Units of the SQC&OR division continue offering their expertise for training personnel from the industry towards developing up-to-date quality management systems and helping solve critical problems of quality, reliability and productivity.

I remain grateful to the President of the Institute, Shri Bibek Debroy, Chairman, Economic Advisory Council to the Prime Minister and to Dr. Ashok Kumar Lahiri, Chairman of Council whose able leadership and guidance have helped ISI in all its activities. I am thankful to the Secretary, Ministry of Statistics and Programme Implementation and all other officials of the Ministry of Statistics and Programme Implementation, Government of India. I also gratefully acknowledge the help and support provided by a large number of academic colleagues and officials who serve on the Council and on various other committees. I thank all the scientific and non-scientific workers, students and well-wishers of the Institute for extending their cooperation for the all-round development of the Institute.

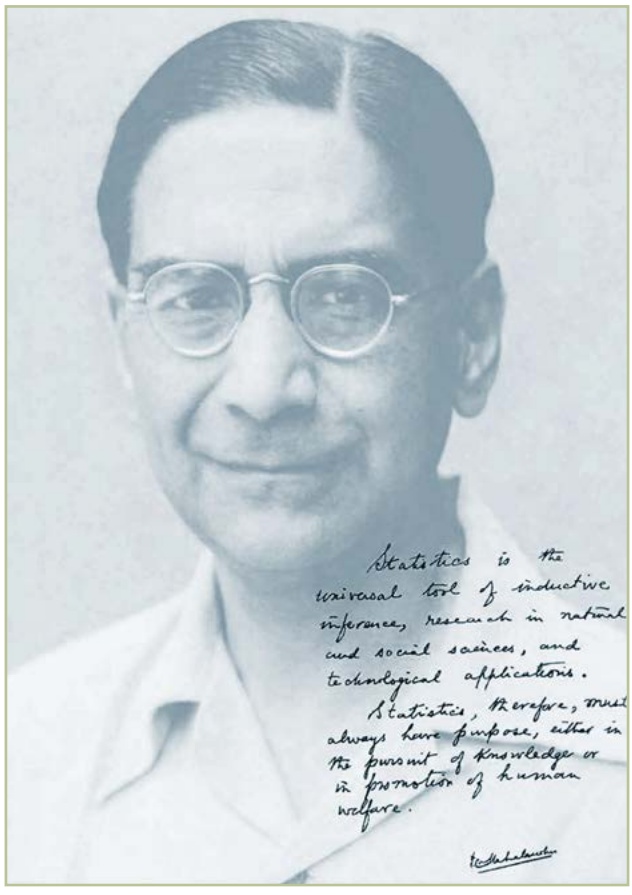


Sanghamitra Bandyopadhyay
March 31, 2022

Chapter - 1

About The Institute

The Indian Statistical Institute, an Institute of National Importance, is a premier and internationally acclaimed research, teaching and training institute.



Founder
Professor Prasanta Chandra Mahalanobis

Our Vision:

To nurture Statistics as a unifying force across disciplines; encompass emerging areas of research in all our scientific divisions and strive towards advancing data driven strategies for national development and social welfare.

Our Mission:

- To promote the study and dissemination of knowledge of Statistics, to develop statistical theory and methods, and their use in research and practical applications generally, with special reference to problems of planning for national development and social welfare;
- To undertake research in various fields of natural and social sciences with a view to the mutual development of Statistics and these sciences;
- To provide for, and undertake, the collection of information, investigations, projects, and operational research for purposes of planning and the improvement of efficiency of management and production; and
- To undertake any other ancillary activities in fulfillment of the objectives stated above.

1.1 LOCATIONS

Campus Locations and Outlying SQC&OR Units

The Indian Statistical Institute was formally established in 1932. The Institute has its headquarters in Baranagar, Kolkata. It has four other centres at Delhi, Bangalore, Chennai and Tezpur, and a branch at Giridih. The R.C. Bose Centre for Cryptology and Security was created in 2014 and is also located in Kolkata. The various locations are shown on a map of India along with a separate list of units at each campus.

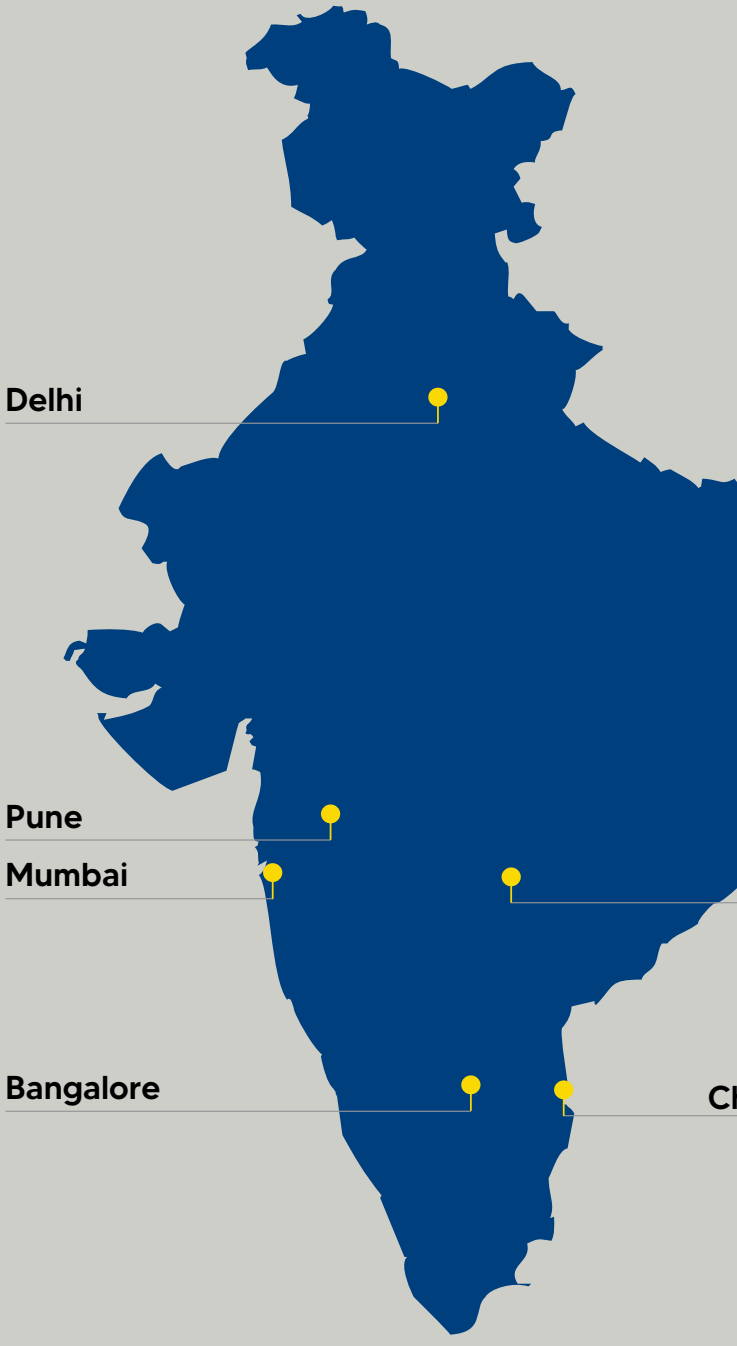
At Kolkata, West Bengal

I) The Headquarters of ISI

The headquarters of the Institute, which shifted to its present campus in 1953, has a lush green sprawling campus in the northern fringe of the Kolkata metropolis. It has 19 academic units, a large and vibrant library, a computer and statistical service centre, two museums, two centres of excellence and a Technology Hub. They are listed below:-

1. Advanced Computing and Microelectronics Unit (ACMU)
2. Agricultural and Ecological Research Unit (AERU)
3. Applied Statistics Unit (ASU)
4. Biological Anthropology Unit (BAU)
5. Computer Vision and Pattern Recognition Unit (CVPRU)
6. Economic Research Unit (ERU)
7. Electronics and Communication Sciences Unit (ECSU)
8. Geological Studies Unit (GSU) and the Geology Museum
9. Human Genetics Unit (HGU)
10. Interdisciplinary Statistical Research Unit (ISRU)
11. Linguistic Research Unit (LRU)
12. Machine Intelligence Unit (MIU)
13. Physics and Applied Mathematics Unit (PAMU)
14. Population Studies Unit (PSU)
15. Psychology Research Unit (PRU)
16. Sampling and Official Statistics Unit (SOSU)
17. Sociological Research Unit (SRU)
18. Statistical Quality Control & Operations Research Unit (SQC&ORU)
19. Stat-Math Unit (SMU)
20. Library and the PCM Memorial Museum and Archives (PCMMMA)
21. Center for Soft Computing Research (CSCR): A National Facility
22. Centre for Artificial Intelligence and Machine Learning (CAIML)
23. Computer and Statistical Service Centre (CSSC)
24. Technology Innovation Hub (TIH)

    This centre was established on March 16, 2021 pursuant to the decision of the ISI Council in its meeting held on December 22, 2020



II) The RC Bose Centre

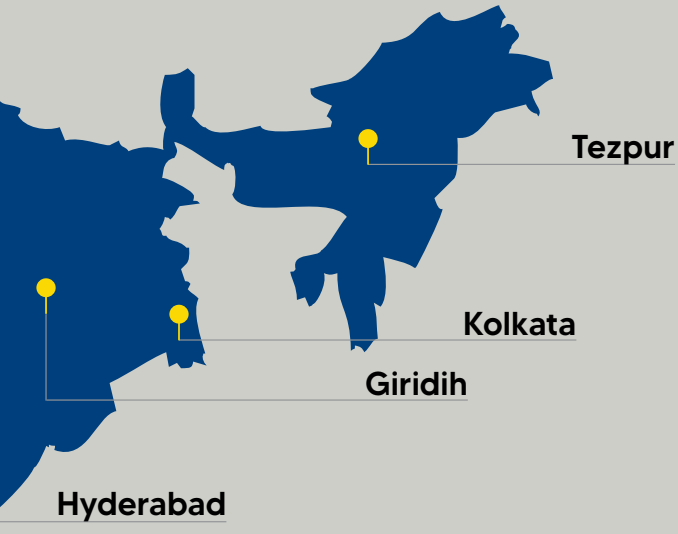
The R.C. Bose Centre for Cryptology and Security at Kolkata was created in 2014 as a national hub for cryptographic requirements. This Centre has only one Unit at present.

- Cryptology and Security Research Unit (CSRU)

The Bangalore Centre, Karnataka

The Bangalore Centre was conceived by Professor P.C. Mahalanobis during the 1960s. The Statistical Quality Control Unit had been functioning in Bangalore since 1956 and the Documentation Research and Training Centre was set up in 1962. The activities of the Bangalore Centre started in September 1978 in a rented building and the various units moved to the present campus in May 1985. The Bangalore Centre was formally declared as a Centre of ISI in September 1996. The present campus, full of eucalyptus trees, is located on Mysore Road on the outskirts of the city and is close to the Bangalore University campus. The Centre has six units and a library, namely –

- Applied Statistics Unit (ASU)
- Documentation Research and Training Centre (DRTC)
- Economic Analysis Unit (EAU)
- Statistical Quality Control & Operations Research Unit (SQC&ORU)
- Stat-Math Unit (SMU)
- Systems Science and Informatics Unit (SSIU)
- Library



The Delhi Centre, Delhi

The Delhi Centre was established in 1974 within the Planning Commission premises. It shifted to its present campus in 1975. It is located in a part of South Delhi known as the Qutub Institutional Area. The Centre is composed of the following:

- Economics and Planning Unit (EPU)
- Stat-Math Unit (SMU)
- Statistical Quality Control & Operations Research Unit (SQC&ORU)
- Library
- Centre for research on the Economics of Climate, Food, Energy and Environment (CECFEE)

This centre was established on July 24, 2020 pursuant to the decision of the ISI Council in its meeting held on June 09, 2020.

The Chennai Centre, Tamil Nadu

The Chennai Centre came into existence in 2008 and is presently located at 37, Nelson Manickam Road (First Floor), Aminjikarai, Chennai. The Centre has three units and a library, namely -

- Applied Statistics Unit (ASU)
- Computer Science Unit (CSU)
- Statistical Quality Control & Operations Research Unit (SQC&ORU)
- Library

The North-East Centre at Tezpur, Assam

The North-East Centre at Tezpur was established in 2011 and is presently located at Punioni, Solmara which is north of Tezpur and is close to Tezpur University, the Defence Research Laboratory (DRL) and the Defence Research & Development Organization (DRDO). The Centre has the following three units and a library-

- Applied and Official Statistics Unit (AOSU)
- Socio-Economic Research Unit (SERU)
- Theoretical and Applied Sciences Unit (TASU)
- Library

The Giridih Branch, Jharkhand

The Giridih branch was started in 1931 and is situated at the heart of Giridih town. The sprawling campus of the Giridih branch includes three land parcels. Besides the office buildings, Giridih has two large agricultural farms adjacent to the river Ushri. The farms with different land situations (high, mid and low) are ideal for conducting agricultural experiments and have well-equipped laboratories as well. The Giridih branch has two operational units functioning under the respective units in Kolkata-

- Agricultural & Ecological Research Unit (AERU)
- Sociological Research Unit (SRU)

The Statistical Quality Control & Operations Research (SQC & OR) Units

The Institute has a network of seven Statistical Quality Control & Operations Research (SQC&OR) units spread across the country. In addition to the units functioning from its headquarters at Kolkata and from other centres in Delhi, Bengaluru and Chennai, the other three units are located in-

- Hyderabad, Telangana
- Mumbai, Maharashtra
- Pune, Maharashtra

1.2 ORGANIZATIONAL CHART

Academic Divisions

1. Applied Statistics Division (ASD)

- Applied and Official Statistics Unit (AOSU), North-East Centre, Tezpur
- Applied Statistics Unit (ASU), Bangalore
- Applied Statistics Unit (ASU), Chennai
- Applied Statistics Unit (ASU), Kolkata
- Interdisciplinary Statistical Research Unit (ISRU), Kolkata

2. Biological Sciences Division (BSD)

- Agricultural & Ecological Research Unit (AERU), Kolkata & Giridih
- Biological Anthropology Unit (BAU), Kolkata
- Human Genetics Unit (HGU), Kolkata

3. Computer and Communications Sciences Division (CCSD)

- Advanced Computing and Microelectronics Unit (ACMU), Kolkata
- Computer Science Unit (CSU), Chennai
- Computer Vision and Pattern Recognition Unit (CVPRU), Kolkata
- Cryptology and Security Research Unit (CSRU), Kolkata
- Documentation Research and Training Centre (DRTC), Bangalore
- Electronics and Communication Sciences Unit (ECSU), Kolkata
- Machine Intelligence Unit (MIU), Kolkata
- Systems Science and Informatics Unit (SSIU), Bangalore

4. Library, Documentation and Information Sciences Division (LDISD)

- Library, Bangalore
- Library, Chennai
- Library, Delhi
- Library, Kolkata
- Prasanta Chandra Mahalanobis Memorial Museum & Archives
- Library, North-East Centre, Tezpur

5. Physics and Earth Sciences Division (PESD)

- Geological Studies Unit (GSU), Kolkata
- Geological Museum
- Physics and Applied Mathematics Unit (PAMU), Kolkata
- Theoretical and Applied Sciences Unit (TASU), North-East Centre, Tezpur

6. Social Sciences Division (SSD)

- Economic Analysis Unit (EAU), Bangalore
- Economics and Planning Unit (EPU), Delhi
- Economic Research Unit (ERU), Kolkata
- Linguistic Research Unit (LRU), Kolkata
- Population Studies Unit (PSU), Kolkata
- Psychology Research Unit (PRU), Kolkata
- Sampling and Official Statistics Unit (SOSU), Kolkata
- Socio-Economic Research Unit (SERU), North-East Centre, Tezpur
- Sociological Research Unit (SRU), Kolkata & Giridih

7. Statistical Quality Control and Operations Research Division (SQCOR)

- SQC & OR Unit, Bangalore
- SQC & OR Unit, Chennai
- SQC & OR Unit, Delhi
- SQC & OR Unit, Hyderabad
- SQC & OR Unit, Kolkata
- SQC & OR Unit, Mumbai
- SQC & OR Unit, Pune

8. Theoretical Statistics and Mathematics Division (TSMD)

- Theoretical Statistics and Mathematics Unit (SMU), Bangalore
- Theoretical Statistics and Mathematics Unit (SMU), Delhi
- Theoretical Statistics and Mathematics Unit (SMU), Kolkata

Teaching and Training

1. Dean's Office
2. Placement Cell

Associate Institutions

1. Center for Soft Computing Research (CSCR): A National Facility, Kolkata
2. International Statistical Education Centre (ISEC), Kolkata

Centres of Excellence

1. Centre for Artificial Intelligence and Machine Learning (CAIML)
2. Centre for Research on the Economics of Climate, Food, Energy and Environment (CECFEE)

Technology Innovations Hub (TIH)

Computer and Statistical Service Centre (CSSC), Kolkata

Administrative Services Division

1. Director's Office
   - » Cell for Co-operation with Academia, Industry & Research labs (CCAIR)
   - » Faculty Recruitment Cell
   - » PhD/ DSc Cell
   - » ST/SC/OBC Liaison Cell
   - » House Building Advance Cell
   - » Internal Audit Cell
   - » Legal Cell
   - » Official Language Cell
   - » Retirement Benefit Cell
   - » RTI, Grievance, Complain Cell
   - » Import/ Travel Cell
2. CE (A&F)'s Office
   - » Accounts Section
   - » Audio Visual Unit
   - » Canteen
   - » Cash Unit
   - » Central Stores
   - » Council Section
   - » Despatch Unit
   - » Electrical Maintenance Unit
   - » Engineering Unit
   - » Estate Office
   - » Guest House
   - » Hostels
   - » Human Resource Development Unit
   - » Medical Expenses Reimbursement Unit
   - » Medical Welfare Unit
   - » Personnel Unit
   - » Provident Fund Unit
   - » Public Relations Unit
   - » Printing and Publication Unit
   - » Security Unit
   - » Telephone Unit
   - » Transport Unit

1.3 Journey of the Indian Statistical Institute

Snapshots!

1931-1980

- PC Mahalanobis establishes ISI in 1931
- First international journal of Statistics in India, Sankhya, foreword by Rabindranath Tagore in 1933
- Path-breaking discoveries by ISI scientists:
  - Mahalanobis distance, large scale sample survey method - PC Mahalanobis
  - Cramer-Rao Bound, Rao-Blackwell Theorem - CR Rao
  - BCH Error-correcting codes - RC Bose
  - Theory of large deviations - SRS Varadhan
  - Bahadur Efficiency and Basu's Theorem in Statistics
- National Sample Survey (NSS) was conceived for the collection of socio-economic data in 1950
- UNESCO empowers ISI to train statisticians of developing countries – International Statistical Education Centre (ISEC) established in 1950
- Second Five-Year Plan drafted in 1954
- ISI designs the first analog computer in India in 1954
- ISI imports and installs the first digital computer in India, HEC-2M, in 1955
- Dinosaur fossil, Barapasaurus tagorei, discovered by ISI geologists
- ISI recognized as an institute of national importance by a Central Act in 1959
- First digital computer (ISI-JU-1) built and commissioned (1961-1966)
- Delhi Centre of ISI established in 1974
- Bangalore Centre of ISI established in 1978

1981 – 2004

- M. Tech Program in Computer Science [M.Tech (CS)] started in 1981.
- Nodal Centre for a 5th Generation Knowledge-Based Computer Systems (FGCS/ KBCS) in the fields of Pattern Recognition, Computer Vision, Image Processing and Artificial Intelligence established in 1987
- M. Tech Program in Quality, Reliability & Operations Research [M.Tech (QROR)] started in 1989.
- M. S. Program in Quantitative Economics [MS (QE)] started in 1996.
- Computer-based dictionary in the Indian Language (Bangla) developed for use by blind persons in 1996
- Bachelor's Program in Mathematics [B.Math] started in 2000.
- Master's Program in Mathematics [M.Math] started in 2003.

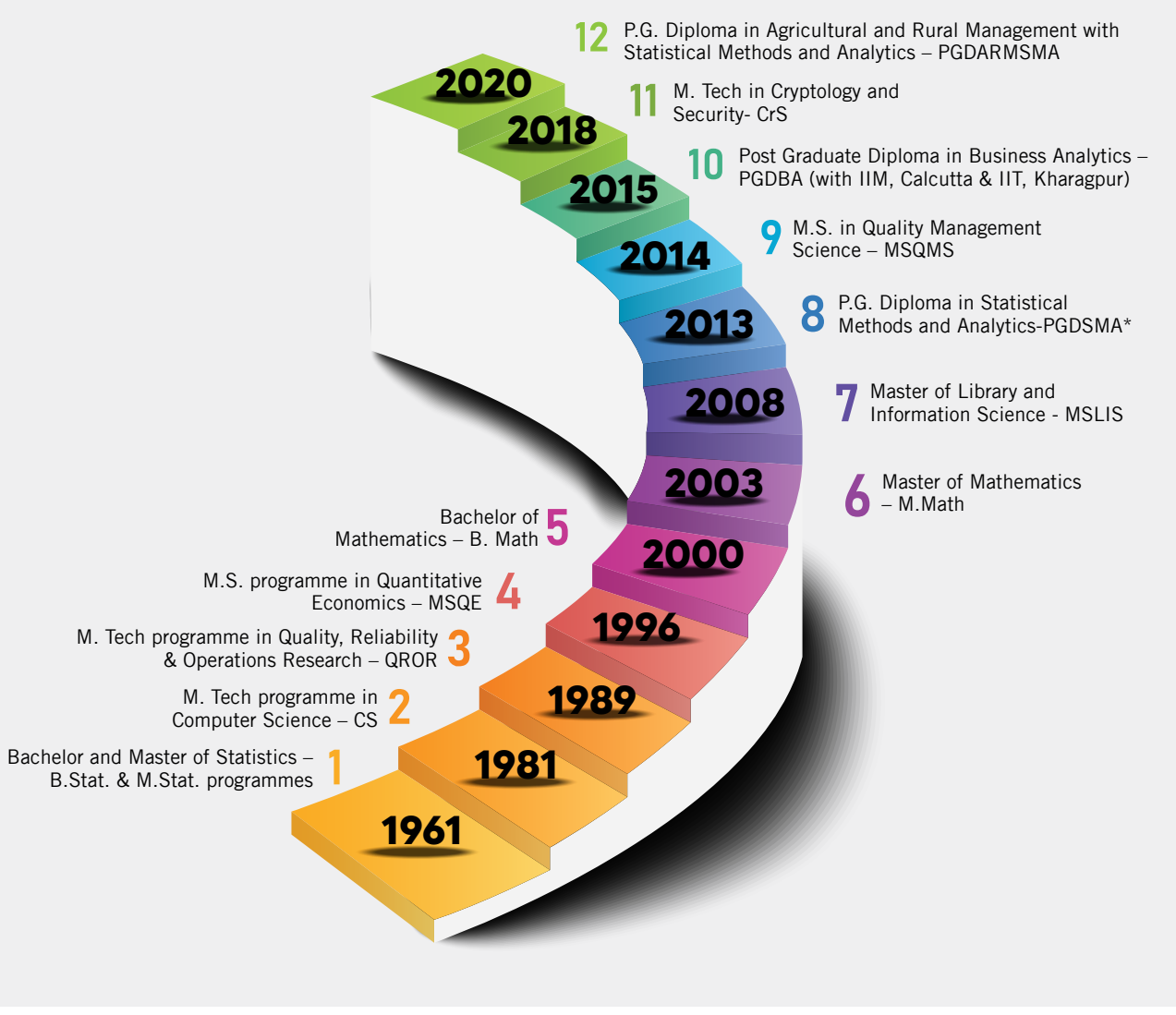
2005 – till date

- Introduction of Soft Computing in India and establishment of the first Centre for Soft Computing Research in Asia in 2005
- Outreach program: North-East in 2005
- 29th June declared as the National Statistics Day during the Platinum Jubilee celebrations at ISI by the then Prime Minister, Dr. Manmohan Singh in 2006
- Chennai Centre of ISI established in 2008
- M. S. Program in Library & Information Science [MS (LIS)] started in 2008.
- Pioneering work in Artificial Intelligence and Machine Learning, Bioinformatics, Computational Genetics, Cryptology, Indian Language Technologies, Population Genomics, Soft Computing Technology
- North-east Centre of ISI established for the development of the region in 2011
- M. S. Program in Quality Management Science [MS (QMS)] started in 2014.
- RC Bose Centre for Cryptology and Security established in 2014
- Teaching and training in Official Statistics & Policy Research initiated
- Seminal contributions in Game theory, Algebraic Geometry, Poverty and Inequality Measures, Disease Genetics, Granular Computing
- A tri-institute Post-Graduate Program in Business Analytics [PGDBA] started in 2015.
- Discovery of Shringasaurus indicus in 2017
- M. Tech Program in Crytpology & Secruity [M.Tech (CrS)] started in 2018.
- Centre for Artificial Intelligence and Machine Learning established in 2019
- Computational and experimental biology research; cancer, auto-immune and neuro-degenerative diseases
- Centre for Research on the Economics of Climate, Food, Energy and Environment, Delhi
- Technology Innovation Hub established in 2020
- Coal Index developed and adopted by Coal Ministry.
- Development of an Integrated Solution for Automatic Assessment of Autism using visual attention, facial expression and vocal emoton cues.
- Development of a computer vision based vehicle type and vehicle number detection system.
- Development of National Mineral Index.

Thinking ahead of times!

Academic programmes introduced in ISI

- The Institute began offering its internationally-acclaimed UG and PG programmes in Statistics, (B.Stat. and M.Stat.) in 1961, empowered by The Indian Statistical Institute Act of 1959 to award degrees.
- This Act was amended by the Parliament of India in 1995 to empower the Institute to award Degrees/Diplomas not only in Statistics but also in Mathematics, Quantitative Economics, Computer Science and other subjects related to Statistics as may be determined by the Institute from time to time.
- ISI also started awarding Ph.D. degrees in the areas of Mathematics, Quantitative Economics, Computer Science as well as Quality, Reliability and Operations Research, in addition to the original discipline, namely, Statistics.
- Several degree/diploma programmes have been introduced subsequently. A timeline of the innovative programmes introduced in ISI are as follows –



**The PGDSMA was initially introduced in 2011-12 as PG Diploma in Statistical Methods with Applications at the North-East Centre and later renamed in 2013. The programme has been running successfully at Tezpur, with 50% of its seats reserved for candidates domiciled in the Northeast region. Since 2019, this programme is also being offered simultaneously at the Chennai centre for candidates from all over India.*

1.4 A Brief History of the Institute

In the 1920's, Prasanta Chandra Mahalanobis, then a Professor of Physics at Presidency College, Calcutta conducted several studies employing statistical methods with results that vindicated his ideas about the efficacy and possibilities of the emerging science of Statistics.

The Indian Statistical Institute (ISI) was formally established on 17 December 1931 in a meeting presided by Sir R.N. Mukherjee, the first President of the Institute, and Prasanta Chandra Mahalanobis was appointed as the Honorary Secretary.

On April 28 1932 the Indian Statistical Institute was registered as a non-government and non-profit distributing learned society under the Societies Registration Act No. XXI of 1860. The Institute is now registered under the West Bengal Societies Registration Act XXVI of 1961, as amended in 1964.

The Institute started functioning initially from a room of the then Presidency College (now Presidency University) with enduring support from several distinguished personalities and devoted scholars in Calcutta. Over the first two decades, which turned out to be a glorious chapter in the annals of Indian science and institution building, the ISI embarked upon a series of pioneering programmes involving the application of Statistics in search of solution to the urgent and live problems of the country. Such programmes included innovative projects on sample surveys of yield and land utilization of crops, socio-economic after-effects of the Bengal famine and problems of flood research. These innovations and methodological research have since become classics in Statistics. At the same time, the training of scientific personnel began to grow. This also encouraged high-level research and brought into focus the need for publication of the research results, for which Sankhya, the first international journal of Statistics in the country came into being in 1933.

When India became independent, the Institute played a pivotal role in the task of nation-building through the brilliant choice of the area of surveys, which were socially and nationally relevant. The patronage and invaluable contribution of Sir Ronald A. Fisher played an important role. Led by Professor Mahalanobis and a very capable group of younger statisticians including R.C. Bose, S.N. Roy and C.R. Rao, the Institute was poised to take on the larger role. In 1954 Pandit Jawaharlal Nehru, the then Prime

Minister of India, entrusted Professor Mahalanobis and ISI with the responsibility of preparing the draft Second Five-Year Plan for the country. The draft submitted by Professor Mahalanobis and the planning models formulated by him and his colleagues have since been regarded as major contributions to economic planning in India. The formal recognition came in December 1959, when the then Prime Minister, Pandit Jawaharlal Nehru himself piloted the enactment of the Indian Statistical Institute Act of 1959 in the Parliament. This Act designated ISI as an 'Institution of National Importance'. The activities of ISI steadily grew, existing interests became more broad-based and a number of science units were created in the interest of live interaction between Statistics and Natural and Social Sciences. Empowered by the Act to award degrees, the Institute started the B. Stat. and M. Stat. programs. An excellent library was established at Kolkata and the Documentation Research and Training Centre began functioning in Bangalore. Other developments in infrastructure also began.

The Indian Statistical Institute Act of 1959 was amended by the Parliament in 1995 to empower the Institute to award Degrees/Diplomas not only in Statistics, but also in Mathematics, Quantitative Economics, Computer Science and such other subjects related to Statistics as may be determined by the Institute from time to time. Several degree/diploma programmes have been introduced subsequently. The detailed list is given on Page 33.

On December 24, 2006, during the inauguration of the Platinum Jubilee celebrations of the Institute (2006-07), Dr. Manmohan Singh, the then Prime Minister of India declared the birth anniversary (29th June) of Prof. P.C. Mahalanobis as National Statistics Day.

Visitors:

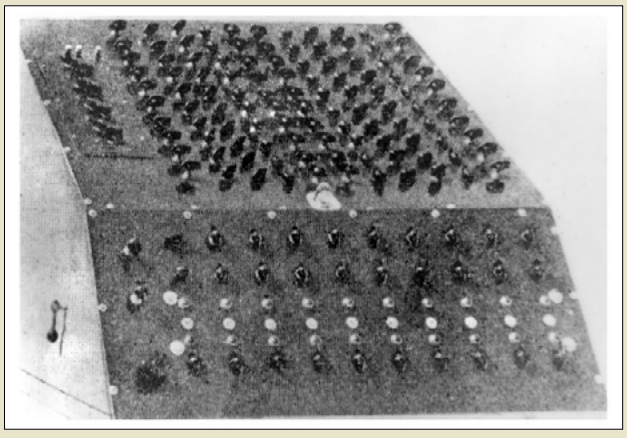
The Institute, since its formative period till present times, has had many eminent visitors, some of whom were Nobel Laureates. Besides Ronald A. Fisher, J.B.S. Haldane and Walter A. Shewhart, the luminaries included Frederic and Irene Curie, Neils Bohr, A.N. Kolmogorov, P.M.S. Blackett, J.D. Bernal, Joan Robinson, Genichi Taguchi and George Akerlof (Nobel prize in economics, 2001). Incidentally, George Akerlof was a visiting professor at ISI during 1967-68. During recent times, the visit of Amartya K. Sen, Robert Aumann, Lotfi A. Zadeh, Roger Penrose, Joseph E. Stiglitz, Sir James A. Mirrlees, Eric Maskin, Ei-ichi Negishi, Ada Yonath, David Jonathan Gross and S.R.S. Varadhan (Abel Prize, 2007 for his contributions to probability theory and an alumnus of the institute) may be specially mentioned. The Institute is proud to have the legendary statistician C. R. Rao in its list of illustrious alumni.

1.5 ISI and the first computers in India

The outbreak of the COVID-19 pandemic had created the largest disruption of education systems in human mankind. It has completely changed the higher education delivery system, and has brought the focus on the role of computer / IT in the teaching-learning process. Hence, it is interesting to know how ISI played a major role in the journey of developing computing facilities in India.

This timeline recapitulates the advent of the first computers in ISI by Prof. Mahalanobis and highlights some of the notable accomplishments, until the turn of this century, using computer-related technology by the faculty of this Institute. During 1943, while conducting estimates of the yield of paddy crop in Bengal after the famine at the request of the Government of Bengal, Prof. Mahalanobis first felt the need for computing machines and introduced the mechanical desk calculators for the first time. Thereafter,

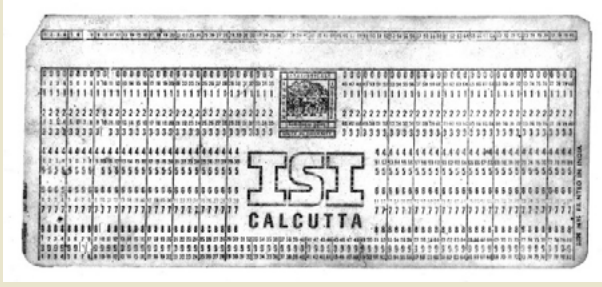
- **In 1943**, the Indian Calculating Machine and Scientific Instrument Research Society was set up to explore the fabrication of such devices locally.
- **In 1950**, the Institute set up an Electronic Computer Laboratory to look into the needs of high-speed computations. The first mechanical hand computing machine, the first Analog computer, the first Punch Card storing machines and the first Solid State Computer in India- were all developed here.
- **In 1953**, India's first indigenous electronic analog computer for solving linear equations with 10 variables and related problems was developed by ISI (Design: Samerendra Kumar Mitra).



The first Electronic Analogue Computer constructed by ISI in 1953.

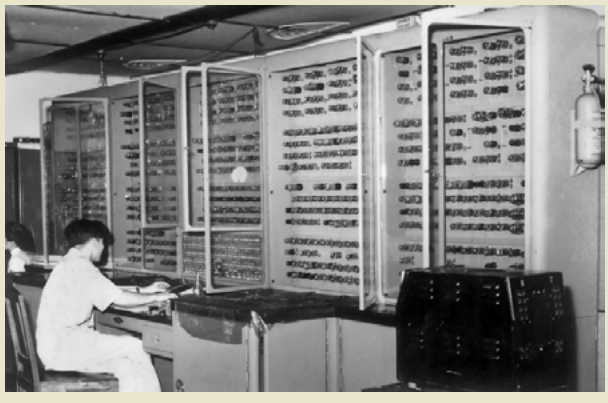
» **In 1956**, the first electronic digital computer, HEC-2M (Hollerith Electronic Digital Computer-2M) produced by the British Tabulating Machines Works, Letchworth was installed in ISI. This was the first electronic computer to be installed in India and the ISI was the first to turn out trained programmers.

HEC-2M Hollerith Electronic Digital Computer, 1956



Punch cards used at ISI

» **In 1958**, a big electronic digital computer called URAL, offered by the USSR Government through the UNTAA (United Nations Technical Aid Administration), was installed in the institute for processing statistical data.



Soviet Electronic computer, URAL (front view), installed in 1958 Neils Bohr, Mrs. Bohr, PC Mahalanobis and Rani Mahalanobis at the URAL computer floor of ISI, 1960

» **In 1961**, ISI in collaboration with Jadavpur University undertook the design, development and fabrication of a fully transistorized digital computer, called ISI-JU-1, which was commissioned in 1966 by Shri M.C. Chagla, the then Union Minister of Education. This was the first solid state computer built in India.

The ISI-Jadavpur University (ISI-JU) computer commissioned at Jadavpur University in 1966

» In 1962, an Evening Course on Punched Card Systems for imparting training in programming and operation of tabulating and computing machines was organized. This course was renamed Course on Operation of Automatic Data Processing Equipment in 1980.

» In 1979, a new third generation computer, EC-1033, from USSR was installed. It had a 256 KB memory with multi-programming facility and two card-readers, four tape-drivers, four disk drivers, two high-speed printers and four terminals as the supporting peripherals.

» In 1987, a Nodal Centre for a Fifth Generation Knowledge-Based Computer Systems (FGCS/KBCS) in the fields of Pattern Recognition, Computer Vision, Image Processing and Artificial Intelligence was established.

» In 1988, the Computer and Statistical Service Centre (CSSC), equipped with a VAX 8650 system of Digital Equipment Corporation, USA, was set up.

» In 1991, computer based Natural Language processing was initiated and the first speech synthesis system for Bengali language, named Bangabani, was developed. A related achievement was a system, called Surobitan, for automatic musical transcription for vocal songs.

» In 1996, a landmark development was a computer-based dictionary in the Indian Language (Bangla) that could be used by blind persons as well.

» In 1998, the Bangla Script Optical Character Recognition (OCR) systems was built which could read Bangla books published by publishing houses. The development of Devnagari (Hindi) OCR system, Artificial Neural Models and Image Compression Techniques, Remote Sensing and Data Analysis in Atmospheric Science need mention here.

» In 2003, the work in the areas of bioengineering, bioinformatics and computational biology, particularly modeling metabolic networks, was initiated. The activitiy spans from analyzing structure/function of genes/proteins to modeling biochemical pathways, with an aim to provide engineering solution towards controling living systems.

» In 2005, the Center for Soft Computing Research: a National Facility was formally inaugurated.

» In 2015, several scientists in the division started research in deep learning. Since then very impressive results are reported every year at the top tier AI journals and conferences. Several AI-based tools are developed by the researchers in the areas of image processing, video analytics, signal processing and language engineering. Technology development in Indian languages received a special emphasis.

» In 2019, the Centre for Artificial Intelligence and Machine Learning (CAIML) was established to leverage the multi-disciplinary nature of research and teaching at the Indian Statistical Institute (ISI) in establishing a world class pan India center of excellence for research, development, teaching, and training in Artificial Intelligence (AI), Data Science (DS), and related areas.

» In 2020, the Dept. of Science and Technology funded a Technology Innvovation Hub (TIH) in the Institute. The Hub received more than 100 crores for five years (2020-2025) for conducting translational research and innovation in the areas of Data Science, Big Data Analytics, and Data Curation.

1.6 Distinguished scientists and statesmen who have served the Institute since inception

Presidents

1	Sir Rajendra Nath Mookerjee	1932-35
2	Shri E.C. Benthall	1936-37
3	Shri James Reid-Kay	1938
4	Shri Badridas Goenka	1939-41
5	Dr. Nalini Ranjan Sarkar	1942-43
6	Dr. Chintaman D. Deshmukh	1944-63
7	Shri Y.B. Chavan	1964-66
8	Prof. Satyendra Nath Bose	1967-75
9	Shri Subimal Dutt	1976-89
10	Prof. M.G.K. Menon	1990-2012
11	Dr. C. Rangarajan	2012-16
12	Dr. Vijay Kelkar	2016-18
13	Shri Bibek Debroy	2018-till date

Chairmen

1	Shri B. Rama Rao	1954
2	Shri D.N. Mitra	1955-63
3	Shri K.P.S. Menon	1964-70
4	Shri S.C. Roy	1971
5	Dr. Atma Ram	1972
6	Shri P.N. Haksar	1973-97
7	Dr. Bimal Jalan	1998-2001
8	Dr. N.R. Madhava Menon	2002-03
9	Shri Pranab Mukherjee	2004-12
10	Shri A.K. Antony	2012-14
11	Dr. Arun Shourie	2014-16
12	Prof. Goverdhan Mehta	2016- 20
13	Dr. Ashok Kumar Lahiri	2020-till date

Directors

1	Prof. P.C. Mahalanobis	Dec	1931	-	June	1972
2	Prof. C.R. Rao	July	1972	-	June	1976
3	Prof. G. Kallianpur	July	1976	-	Sept	1978
4	Prof. B.P. Adhikari	Aug	1979	-	Oct	1983
5	Prof. Ashok Maitra	Apri	1984	-	Jan	1987
6	Prof. J.K. Ghosh	Jan	1987	-	Jan	1992
7	Prof. B.L.S. Prakasa Rao	Jun	1992	-	Feb	1995
8	Prof. S.B. Rao	July	1995	-	July	2000
9	Prof. K.B. Sinha	Aug	2000	-	July	2005
10	Prof. S.K. Pal	Aug	2005	-	July	2010
11	Prof. Bimal K. Roy	Aug	2010	-	July	2015
12	Prof. Sanghamitra Bandyopadhyay	Aug	2015	-	till date	

D.Sc. (Honoris Causa) awardees

Feb 1962	Prof. Satyendra Nath Bose, Prof. Ronald A. Fisher, Pandit Jawaharlal Nehru, Dr. Walter A. Shewhart
Apr 1962	Prof. A.N. Kolmogorov
May 1965	Dr. Chintaman Dwarkanath Deshmukh
Dec 1974	Prof. Raj Chandra Bose, Dr. M.V. Keldysh, Prof. Jerzy Neyman
Feb 1977	Prof. Harald Cramer
Feb 1978	Shri Morarji Desai, Prof. L.V. Kantorovich
Dec 1989	Prof. C.R. Rao
Jan 2001	Prof. Gopinath Kallianpur
Feb 2004	Prof. S.R. Srinivasa Varadhan
Mar 2006	Prof. L.A. Zadeh
Dec 2006	Dr. Manmohan Singh
Feb 2011	Dr. Subhas Mukherjee (Posthumously)
Jan 2013	Prof. K.R. Parthasarathy, Prof. Jayanta Kr. Ghosh, Prof. Pranab Bardhan

1.7 The Council & Key Committees

Council

President

Shri Bibek Debroy,
Chairman, Economic Advisory Council to the Prime Minister (EAC-PM)

Chairman

Dr. Ashok Kumar Lahiri,
Member, 15th Finance Commission, Finance Commission of India

Director

Prof. Sanghamitra Bandyopadhyay

Representatives of the Government of India

<table>
<tr><th>From 1st April 2021 – 13th April 2021</th><th>From 14th April 2021 – 23rd August 2021</th><th>From 24th August 2021 – 31st March 2022</th></tr>
<tr><td colspan="2">Smt. Sibani Swain
Additional Secretary & Financial Advisor, Government of India, Ministry of Statistics and Programme Implementation, New Delhi</td><td>Shri Jayant Sinha
Additional Secretary & Financial Advisor Government of India, Ministry of Statistics and Programme Implementation, New Delhi</td></tr>
<tr><td colspan="2">Smt. Mamta Saxena
DG (Co-ordination and Administration), Government of India, Ministry of Statistics and Programme Implementation, New Delhi</td><td>Shri Shankar Lal Menariya
Director General (Statistics), Government of India, Ministry of Statistics and Programme Implementation, New Delhi</td></tr>
<tr><td></td><td colspan="2">Shri Prakash Lakhchaura
Dy. Director General (DDG) Staff Inspection Unit, Government of India, Ministry of Finance</td></tr>
<tr><td>Dr. Rajiv Kumar Tayal
Scientist-G, Government of India, Ministry of Science and Technology, New Delhi</td><td></td><td>Shri Sunil Kumar
JS & Head, AI Division
Ministry of Science and Technology, New Delhi</td></tr>
<tr><td colspan="3">Dr. O.P. Mall
Executive Director, Reserve Bank of India, Mumbai</td></tr>
<tr><td>Shri Madan Mohan
ADG (HE), Government of India, Ministry of Human Resource Development, New Delhi</td><td></td><td>Shri R. Rajesh
Deputy Director General (DDG)
Ministry of Education,
New Delhi</td></tr>
</table>

Representative of the ICSSR

Prof. V.K. Malhotra
Member-Secretary, Indian Council of Social Science Research, New Delhi

Representatives of the INSA

Prof. Manindra Agrawal
N Rama Rao Chair Professor,
Department of Computer Science,
Indian Institute of Technology, Kanpur

Prof. Shahid Jameel, Ph.D
Chief Executive Officer,
The Wellcome Trust/DBT India, Alliance,
New Delhi

Prof. Rohini M. Godbole, FNA
Centre for High Energy Physics,
Indian Institute of Science, Bengaluru

Prof. Rahul Mukherjee, FNA
National Science Chair,
Indian Institute of Management , Calcutta

Representative of the NITI Aayog

Ms. Anna Roy
Adviser (DM&A), Government of India, NITI Aayog, New Delhi

Representative of the University Grants Commission

Prof. Umesh Singh
Department of Statistics, Institute of Science, Banaras Hindu University, Varanasi

Scientists co-opted by the Council

Prof. Usha Vijayraghavan
Dean, Microbiology and Cell Biology,
Indian Institute of Science, Bengaluru

Prof. Dipendra Prasad
Indian Institute of Technology,
Bombay

Elected representatives of the Institute members not employed in the Institute

Shri Rabindra Narayan Das
Kolkata

Dr. T.S.S.R.K. Rao
Bengaluru

Dr. Sashi Mohan Srivastava
Kolkata

Elected representatives of the employees of the Institute

Dr. Partha Pratim Mohanta
Representative of the Scientific Workers

Shri Swarup Ghara
Representative of the Non-Scientific Workers

Officers of the Institute

Prof. Antar Bandyopadhyay
Professor-in-Charge,
Theoretical Statistics and Mathematics Division

Prof. Mridul Nandi
Professor-in-Charge,
Applied Statistics Division

Dr. Raghunath Chatterjee
Professor-in-Charge,
Biological Sciences Division

Prof. Manipushpak Mitra
Professor-in-Charge,
Social Sciences Division

Prof. Krishnendu Mukhopadhyaya
Professor-in-Charge,
Computer and Communication Sciences Division

Prof. Preeti Parashar
Professor-in-Charge,
Physics and Earth Sciences Division

Dr. Arup Ranjan Mukhopadhyay
Head, SQC & OR Division

Prof. S.K. Neogy
Head, Delhi Centre

Prof. C.R.E. Raja
Head, Bengaluru Centre

Dr. D. Sampangi Raman
Acting Head, Chennai Centre

Prof. Debasis Sengupta
Dean of Studies

Non-Member Secretary

Brigadier Jagdish Narayan Pandey (Retd)
Chief Executive (Administration & Finance)

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Sanghamitra Bandyopadhyay
Director (Chairperson)

Debasis Sengupta
Dean of Studies (Convener)

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- Bimal Kr. Roy
- Debapriya Sengupta
- Debasis Sengupta
- Kishan Chand Gupta
- Mausumi Bose
- Mridul Nandi
- Palash Sarkar
- Rita Saha Ray
- Rituparna Sen
- Smarajit Bose
- Subhamoy Maitra
- Subir Kumar Bhandari
- Sudheesh Kumar Kattumannil
- Sumitra Purkayastha
- Sushama M. Bendre
- Tapas Samanta

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- Anjana Dewanji
- Arunava Goswami
- Indranil Mukhopadhyay
- Joydev Chattopadhyay
- Pabitra Banik
- Rabi Ranjan Chattopadhyay
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- Sabyasachi Bhattacharya
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- Subrata Kr. Roy
- Susmita Mukhopadhyay

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- Arijit Bishnu
- Ashish Ghosh
- Ayineedi Venkateswarlu
- B.S. Daya Sagar
- Devika P. Madalli
- Dipti Prasad Mukherjee
- Kausik Kumar Majumdar
- Krishnendu Mukhopadhyaya
- Mandar Mitra
- Nabanita Das
- Nikhil Ranjan Pal
- Pradipta Maji
- Rajat Kumar De
- Sandip Das
- Sanghamitra Bandyopadhyay
- Sasthi Charan Ghosh
- Srimanta Pal
- Subhas Chandra Nandy
- Sushmita Mitra
- Susmita Sur-Kolay
- Umapada Pal
- Utpal Garain

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- B. Ramakrishnan
- Dhurjati Prasad Sengupta
- Guruprasad Kar
- Partha Sarathi Ghosh
- Preeti Parashar
- Sarbani Patranabis Deb
- Santanu Kumar Maity
- Shiladri Shekhar Das
- Subir Ghosh

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- Arunava Sen
- Chetan Ghate
- Debasis Mishra
- Diganta Mukherjee
- E. Somanathan
- Farzana Afridi
- Indraneel Dasgupta
- Madhura Swaminathan
- Manash Ranjan Gupta
- Manipushpak Mitra
- Molly Chattopadhyay
- Monisankar Bishnu
- Niladri Sekhar Dash
- Prabal Roy Chowdhury
- Samarjit Das
- Souvik Roy
- Tarun Kabiraj
- Tridip Ray

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- Amitava Bandyopadhyay
- Arup Kumar Das
- Arup Ranjan Mukhopadhyay
- Ashis Kr. Chakraborty
- Ashok Sarkar
- Biswabrata Pradhan
- Boby John
- Dipak Kr. Manna
- E.V. Gijo
- G. Murali Rao
- G. Ravindran
- G.S.R. Murthy
- Md. Zafar Anis
- Nandini Das
- Prasun Das
- Ranjan Sett
- Sagar Sikder
- Samir Kr. Neogy
- Sanjit Ray
- Surajit Pal
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- U. Haridas Acharya

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- Debashish Goswami
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- Goutam Mukherjee
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- Mohana Delampady
- Mrinal Kanti Das
- Paramita Das
- Partha Sarathi Chakraborty
- Parthanil Roy
- Pradipta Bandyopadhyay
- Probal Chaudhuri
- Rahul Roy
- Ritabrata Munshi
- Rudra Pada Sarkar
- Shanta Laishram
- Siva Athreya
- Swagata Nandi
- Swagato Kumar Ray

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Member-Secretary, International Statistical Education Center

- Amita Pal

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- Government Representative (Ministry of Finance)
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- Ayanendranath Basu, ISI, Kolkata
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- Kaushik Majumdar, ISI, Bangalore
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- Head, Bangalore Centre
- Head, Chennai Centre
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- Shri Gour Krishna Pattanyak, Finance Officer, Jadavpur University (External Expert)
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- Head, SSIU, ISI, Bangalore or his/her nominee
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- Mr. R. Upadhyay, Executive Engineer (Civil), Shri Lal Bahadur National Sanskrit Univ. Expert (Civil)
- Mr. Madhav Naik (Architect)
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- Prof. Anish Sarkar, ISI Delhi
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- Dr. Bhaskar Sengupta [Expert (Civil)]
- Professor Siddhartha Datta [Expert (Architecture)]
- Shri Asim Sinha [Expert (Electrical)]
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- Anup Dewanji
- Sumitra Purakayastha
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- Krishanu Maulik
- Tapas Samanta
- Anish Sarkar
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- Director, ISI (Vice-Chairperson)
- Director General, CSO
- Financial Advisor, MOS & PI
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- Professor Partha P. Majumder, National Science Chair, NIBMG
- Professor Rahul Mukherjee, IIM Kolkata
- Dr. Manju Sharma, Former Secretary, DBT, Govt. of India
- Professor Malabika Pramanik, Dept. of Mathematics, Univ., of British Columbia, Canada, Director, Banff International Research Station
- Professor Ritabrata Munshi, ISI, Kolkata
- Professor E. Somanathan, ISI Delhi
- Professor Dipti P. Mukherjee, Dy. Director, ISI (Member-Convener)

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- Professor Debasis Kundu, Department of Mathematics and Statistics, IIT, Kanpur
- Professor R.L. Karandikar, Director, Chennai Mathematical Institute, Chennai
- Professor Veni Madhavan, Dept. of Computer Science and Automation, IISc, Bangalore
- Professor-in-Charge, Applied Statistics Division (Convener)

Biological Sciences Division

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- Dr. Anurag Agrawal, Director, CSIR-IGIB, Mall Road, New Delhi
- Dr. A.R. Sharma, Director Research, Rani Lakshmi Bai Central Agricultural University Jhansi, UP
- Professor Gaurangadeb Chattopadhyay, Department of Statistics University of Calcutta, Kolkata
- Dr. Giriraj Ratan Chandak, CSIR- Centre for Cellular and Molecular Biology (CCMB), Hyderabad
- Dr. H. Pathak, Director, ICAR-National Institute of Abiotic Stress Management, Baramati, Pune
- Professor M.P. Sachdeva Department of Anthropology, University of Delhi, Delhi
- Professor-in-Charge, Biological Sciences Division (Convener)

Computer and Communication Sciences Division

- Director, ISI (Chairperson)
- Professor P. Nagabhushan, Director, IIIT, Allahabad
- Professor Santanu Chaudhury, Director, IIT, Jodhpur
- Professor Partha P. Chakrabarti, Department of Computer Science & Engineering, IIT, Kharagpur
- Dr. Pijushkanti Panigrahi, Professor & Dean, Department of Library & Information Science, University of Calcutta
- Professor Pallab Dasgupta, Department of Computer Science & Engineering, IIT, Kharagpur

- Professor Jaikumar Radhakrishnan, School of Technology and Computer Science, TIFR, Mumbai
- Professor Chiranjib Bhattacharyya, Department of Computer Science & Automation, IISc, Bangalore
- Professor-in-Charge Computer & Communication Sciences Division (Convener)

Library, Documentation and Information Sciences Division

- Director, ISI (Chairperson)
- Dr. Anand T. Byrappa, Librarian & Head, J.R.D. Tata Memorial Library, IISc, Bengaluru
- Dr. K. Rama Patnaik, Librarian, IIM, Bengaluru
- Dr. Sujit Bhattacharya, Professor, Academy of Scientific & Innovative Research, Chief Scientist (CSIR-NISTADS), Pusa Campus, New Delhi
- Dr. Venkat Srinivasan, Archivist, Archives, NCBS, TIFR, Bangalore
- Dr. Kishor Chandra Satpathy, Chief Librarian (Convener)

Physics and Earth Sciences Division

- Director, ISI (Chairperson)
- Professor Santanu Banerjee, Department of Earth Sciences, IIT, Bombay, Mumbai
- Professor Suman Chakraborty, Mechanical Engineering Department, IIT, Kharagpur
- Professor Archan S. Majumdar, S.N. Bose National Centre for Basic Sciences, Salt Lake, Kolkata
- Professor Manju Mohan, Centre for Atmospheric Sciences, IIT, New Delhi
- Professor N.V. Chalapathi Rao, Center for Advanced Study in Geology, BHU, Varanasi
- Professor Ashok Sahni, Emeritus Professor, Punjab University
- Professor-in-Charge, Physics & Earth Sciences Division (Convener)

Social Sciences Division

- Director, ISI (Chairperson)
- Professor Jyotsna Jalan, Center for Studies in Social Sciences, Kolkata
- Professor Sugata Marjit, Distinguished Professor, Indian Institute of Foreign Trade, Kolkata (and Former VC of Calcutta University)
- Professor Arvind Pandey, Ex- Advisor, ICMR-NIMS & Ex-Director, National Institute of Medical Statistics, ICMR, New Delhi
- Professor K.S. James, Director and Sr. Professor, International Institute of Population Sciences, Mumbai
- Professor Rajni Palriwala (Retired), Department of Sociology, Delhi University, Delhi
- Professor Girish Nath Jha, Professor of Computational Linguistics, School for Sanskrit and Indic Studies, Jawaharlal Nehru University, New Delhi
- Professor-in-Charge Social Sciences Division (Convener)

Statistical Quality Control and Operations Research Division

- Director, ISI (Chairperson)
- Professor Debasis Kundu, IIT, Kanpur
- Professor Saibal Chattopadhyay, IIM, Calcutta
- Mr. Rajaram Majali, Director, Demand Planning Customer Support, Supply Chain HP India Sales Pvt. Ltd., Chennai
- Dr. Surinder Singh, Vice-Chancellor, JSS Academy of Higher Education & Research
- Head, SQC & OR Division (Convener)

Theoretical Statistics and Mathematics Division

- Director, ISI (Chairperson)
- Professor Tathagata Bandyopadhyay IIM, Ahmedabad
- Professor V.S. Borkar IIT, Mumbai
- Professor Saibal Chattopadhyay IIM, Calcutta
- Professor Srikanth K. Iyer, Indian Institute of Science, Bangalore
- Professor Mahan Mj., TIFR, Mumbai
- Professor Kapil Hari Paranjape IISER, Mohali
- Professor-in-Charge, Statistics & Mathematics Division (Convener)

1.8 Funding:

The Ministry of Statistics & Programme Implementation, Government of India, provides full funding to the Institute. Their support and constant encouragement are among the major factors that help the Institute to sustain its academic growth and excellence.

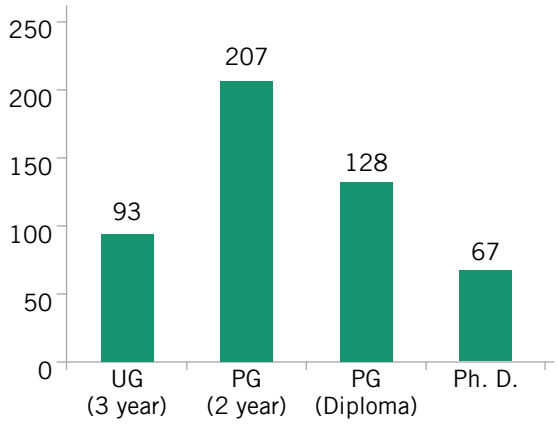
Chapter - 2

Teaching and TRAINING

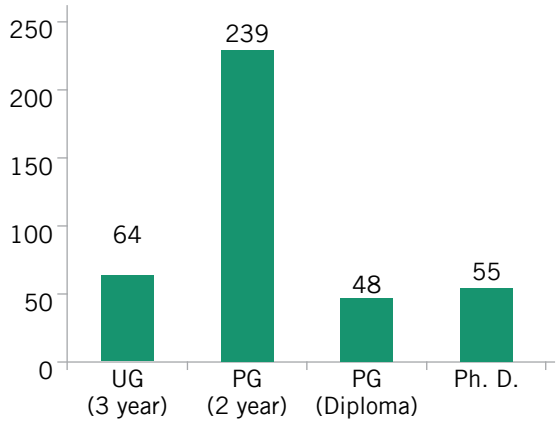
Dean of Studies: Prof. Debasis Sengupta, ASU Kolkata
Office: 5th floor, S.N. Bose Bhawan, ISI, Kolkata-700 108

No of Scientific Staff: Two (2)
No of non-scientific staff: Twelve (12)

Admission across programmes



Human Resources Generated



2.1 Programmes Offered

ISI, a premier institute in India, is renowned for its first internationally acclaimed under graduate and post graduate degree programmes in Statistics introduced by its founder, Prof. P.C. Mahalanobis in 1961.

The following academic programmes were offered during the academic session 2021-22:

Name of Programme	Centre(s) at which offered
Undergraduate Programmes (three-year)	
Bachelor of Statistics - B. Stat. (Hons.)	Kolkata
Bachelor of Mathematics - B. Math. (Hons.)	Bengaluru
Postgraduate Programmes (two-year)	
Master of Statistics - M. Stat.	Delhi - Kolkata
Master of Mathematics - M. Math.	Bengaluru
Master of Science (M.S.) in Quantitative Economics - MSQE	Delhi & Kolkata
Master of Science (M.S.) in Quality Management Science - MSQMS	Bengaluru - Hyderabad
Master of Science (M.S.) in Library and Information Science – MSLIS	Bengaluru
M. Tech. in Computer Science (CS)	Kolkata
M. Tech. in Cryptology and Security (CrS)	Kolkata
M. Tech. in Quality, Reliability and Operations Research (QROR)	Kolkata
Postgraduate Diploma Programmes (two-year)	
Post Graduate Diploma in Business Analytics (PGDBA) Jointly conducted by IIM Kolkata, IIT Kharagpur and ISI Kolkata	Kolkata
Postgraduate Diploma Programmes (one-year)	
Post Graduate Diploma in Statistical Methods and Analytics (PGDSMA)	North-East Centre, Tezpur and Chennai
Post Graduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics (PGDARSMA)	Giridih
Doctoral Programmes	
Research Fellowships and degrees awarded by ISI in Statistics, Mathematics, Quantitative Economics, Computer Science, Quality, Reliability and Operations Research	Bengaluru, Chennai, Delhi, Giridih & Kolkata
Research Fellowships awarded by ISI and degrees awarded by other academic bodies in areas including, Physics and Applied Mathematics, Geology, Biological Science (Agricultural and Ecological Research), Library & Information Science.	
Research Fellowships awarded by government bodies (e.g. CSIR, DST, INSPIRE, NBHM, UGC) and degrees awarded by ISI/other academic bodies.	
Short-term Training Programmes (4 weeks-6 months)	
This training is provided to UG/PG students from other reputed Universities/ Institutions as part of their curriculum requirements/ for enhancement of knowledge and application skills, under the guidance of faculty members of the Institute.	

2.2 Admissions

Degree, Diploma and Ph.D. programmes:

An all-India entrance examination is conducted annually by the Dean's Office for all programmes (except PG Diploma courses).

The two-year Post Graduate Diploma in Business Analytics (PGDBA) programme, jointly offered with IIM Calcutta and IIT Kharagpur aims to deliver a cutting-edge interdisciplinary educational experience to graduates aspiring to build a career in the rapidly expanding field of business analytics. The first semester of this programme is conducted every year in ISI. The selection and admission process for the programme is carried out by the three institutes on a rotation basis. ISI, Kolkata conducted the Admission test in 2021-2022.

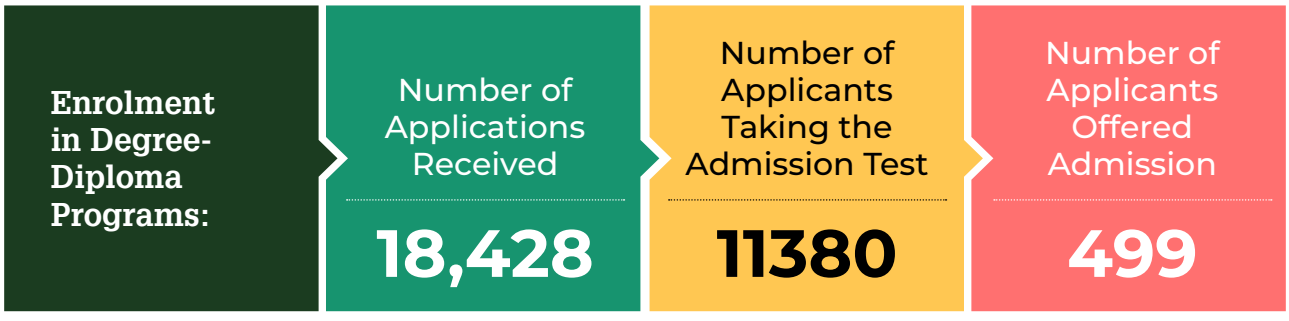
Date of ISI Admission test (only for JRF in Statistics) : **25.07.2021**

Date of PGDBA Admission test : **07.08.2021**

Date of ISI Admission test (All other programmes) : **18.07.2021**

Programmes	Number of Applications Received	Number of Applicants Taking the Admission Test	Number of Applicants Offered Admission
Bachelor of Statistics - B. Stat. (Hons.)	3666	2527	50
Bachelor of Mathematics - B. Math. (Hons.)	2998	2040	49
Master of Statistics - M. Stat.	1202	756	30
Master of Mathematics - M. Math.	845	527	19
Master of Science (M.S.) in Quantitative Economics - MSQE	1968	1367	46
Master of Science (M.S.) in Quality Management Science - MSQMS	407	286	14
Master of Science (M.S.) in Library and Information Science – MSLIS	127	78	12
M. Tech. in Computer Science (CS)	945	436	41
M. Tech. in Cryptology and Security (CrS)	273	170	22
M. Tech. in Quality, Reliability and Operations Research (QROR)	621	308	23
Post Graduate Diploma in Business Analytics (PGDBA)	3762	1936 (*645)	63
Post Graduate Diploma in Statistical Methods and Analytics (PGDSMA)	259	173	57
Post Graduate Diploma in Computer Applications (PGDARSMA)	53	32	14
Junior Research Fellowship	1302	744 (*126)	59

(*) Number of Applicants Shortlisted for Interview, which were conducted only for the PGDBA and the Junior Research Fellowship programmes.



Enrolment in Degree-Diploma Programs:

PROGRAMME		Number Enrolled
Undergraduate Programmes (three-year)		93
Postgraduate Programmes (two-year)		207
Postgraduate Diploma Programmes (two-year)		60
Postgraduate Diploma Programmes (one-year)		68
JRF Programmes		
ISI – funded	(53)	67
Externally-funded	(14)	

Short-term Training Programmes:

Division	Number of Trainees
Biological Sciences Division	14
Computer & Communication Sc. Div	13
Physical & Earth Sciences Division	11
Social Sciences Division	1
TOTAL	**39**

2.3 Graduating Students

The number of students graduating, under the different programmes, are as follows-

Programme	Number Graduating	Programme Total
Undergraduate Programmes (three-year)		**64**
Bachelor of Statistics - B. Stat. (Hons.)	34	
Bachelor of Mathematics - B. Math. (Hons.)	30	
Postgraduate Programmes (two-year)		**239**
Master of Statistics - M. Stat.	69	
Master of Mathematics - M. Math.	39	
Master of Science (M.S.) in Quantitative Economics - MSQE	37	
Master of Science (M.S.) in Quality Management Science - MSQMS	15	
Master of Science (M.S.) in Library and Information Science - MSLIS	08	
M. Tech. in Computer Science (CS)	34	
M. Tech. in Cryptology and Security (CrS)	15	
M. Tech. in Quality, Reliability and Operations Research (QROR)	22	
Postgraduate Diploma Programmes (one-year)		**48**
Post Graduate Diploma in Statistical Methods and Analytics (PGDSMA)	33	
Post Graduate Diploma in Agricultural and Rural Management with Statistical Methods and Analytics (PGDARSMA)	15	
Ph.D. Degrees		**38**
Mathematics	04	
Statistics	02	
Computer Science	24	
Quantitative Economics	08	
Externally-funded Ph.D. Degrees		**17**
Physics	01	
Geology	01	
Psychology	02	
Zoology	01	
Applied Mathematics	07	
Development Studies	03	
Science	01	
Engineering	01	

Recipients of Prizes

During the 56th Convocation of the Indian Statistical Institute held on 2nd March 2022, students were felicitated with prestigious medals and prizes in recognition of their outstanding performance for the session ending 2021, under the following programmes

	Degree Programme	Name of the Medal/Award/Prize	Name of Recipient
UNDERGRADUATE	B.Stat	ISIAA – Mrs. M. R. Iyer Memorial Gold Medal for outstanding overall performance	Manit Paul
		D. Basu Memorial Gold Medal for outstanding performance	Sayak Chatterjee
		Nikhilesh Bhattacharya Memorial Gold Medal for best performance in Statistics	Manit Paul
		Mukul Chaudhuri Cash Award for the best female student in the first year	Aytijhya Saha
		Usri Gangopadhyay Memorial Medal for the best female student	Aadrita Laha
	B.Math	S. H. Aravind Gold Medal for outstanding performance	Balarka Sen
POSTGRADUATE	M.Stat.	ISIAA – J. K. Ghosh Memorial Gold Medal for outstanding performance	Subhrajyoty Roy
		P. C. Mahalanobis Memorial Gold Medal for outstanding performance	Tamojit Sadhukhan
		Sabyasachi Roy Memorial Gold Medals for doing the best project work in second year	Ayoushman Bhattacharya
	M.Math	ISIAA – P. C. Panesar Memorial Gold Medal for outstanding overall performance	Supravat Sarkar
	MS (QE)	Dr. N. S. Iyenger Award for best student of Econometrics	Aditya Vikram Sett
		Sanghamitra Das Memorial Gold Medal for outstanding overall performance	Rajib Oraon
	M.Tech. (CS)	ISIAA – Rashi Ray Memorial Medal for outstanding overall performance	Rishi Dey
		Sunity Kumar Pal Memorial Gold Medal for best dissertation	Chandra Sekhar Mukherjee
	M.Tech. (QROR)	ISIAA – Mrs. M. R. Iyer Memorial Gold Medal for outstanding overall performance	Chandresh Gupta

PhD Degrees Awarded by ISI

The following students were conferred PhD degrees after having successfully completed their requirements for the award of PhD degree –

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	Subject area
1.	Kaustav Nandy	Dr. Deepayan Sarkar, SMU, ISI, Delhi	Locally Dependent Natural Image Priors for Non-blind and Blind Image Deconvolution	Statistics
2.	Pronoy Kanti Mondal	Prof. Indranil Mukhopadhyay, HGU, ISI, Kolkata	On some statistical problems in single-cell transcriptome data analysis	Statistics
3.	Hemant Kumar Mishra	Dr. Tanvi Jain, SMU, ISI,Delhi	Differential and Subdifferential properties of symplectic eigenvalues	Mathematics
4.	Sugato Mukhopadhyay	Dr. Jyotishman Bhowmick, SMU, ISI, Kolkata	Levi-Civita connections in noncommutative geometry	Mathematics
5.	Manish Kumar	Prof. B. V. Rajarama Bhat, SMU, ISI, Bangalore	C*-extreme maps and nest algebras	Mathematics
6.	Jayanta Sarkar	Prof. Swagato K. Ray, TSMU, ISI, Kolkata	Around Fatou Theorem and Its Converse on Certain Lie Groups	Mathematics
7.	Dhritiman Gupta	Prof. Prabal Roy Chowdhury, EPU, ISI, Delhi	Essays on Collective Contests and Bargaining	Quantitative Economics
8.	Swati Sharma	Prof. Farzana Afridi, EPU, ISI, Delhi	Essays on social networks, workplace ties and labor productivity	Quantitative Economics
9.	Kolagani Paramahamsa	Prof. Debasis Mishra, EPU, ISI, Delhi	Essays in Multidimensional Mechanism Design	Quantitative Economics
10.	Komal Sahai	Prof. Tridip Ray, EPU, ISI, Delhi	Interplay between Education and Identity: Inter Caste Marriages, Gendered Stream Choice and Caste Peer Effects	Quantitative Economics
11.	Sugat Chaturvedi	Prof. Tridip Ray, EPU, ISI, Delhi	Representation in Politics and Labor Markets	Quantitative Economics
12.	Ranajoy Guha Neogi	Prof. Indraneel Dasgupta, ERU, ISI, Kolkata	Essays on the Economics of Conflict	Quantitative Economics
13.	Komal Malik	Prof. Debasis Mishra, EPU, ISI, Delhi	Essays in Auctions and Robust Bilateral Trading	Quantitative Economics
14.	Pinaki Mandal	Dr. Souvik Roy, ERU, ISI, Kolkata	Stability and (Obviously) Strategy-proofness in Matching Theory	Quantitative Economics
15.	Shion Samadder Chaudhury	Prof. Bimal Kr. Roy, ASU, ISI, Kolkata	Secret Sharing and its variants, Matroids, Combinatorics	Computer Science
16.	Somnath Panja	Prof. Bimal Kr. Roy, ASU, ISI, Kolkata	Zero-Knowledge proof, Deniability and Their Applications in Blockchain, E-Voting and Deniable Secret Handshake Protocols	Computer Science
17.	Satyabrata Jana	Dr. Sasanka Roy, ACMU, ISI, Kolkata	Computing Well-Structured Subgraphs in Geometric Intersection Graphs	Computer Science
18.	Sebati Ghosh	Prof. Palash Sarkar, ASU, ISI, Kolkata	Constructions and Analyses of Efficient Symmetric-Key Primitives for Authentication and Encryption	Computer Science

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	Subject area
19.	Ranjan Mondal	Prof. Bhabatosh Chanda, ECSU, ISI, Kolkata	Morphological Network: Network With Morphological Neurons	Computer Science
20.	Madhurima Mukhopadhyay	Prof. Palash Sarkar, ASU, ISI, Kolkata	Aspects of Index Calculus Algorithms for Discrete Logarithm and Class Group Computations	Computer Science
21.	Atanu Acharyya	Dr. Goutam Kumar Paul, CSRU, ISI, Kolkata	Optimal Eavesdropping in Quantum Cryptography	Computer Science
22.	Shankar Kumar Ghosh	Prof. Sasthi Charan Ghosh, ACMU, ISI, Kolkata	Efficient Handover Mechanisms for Heterogeneous Networks	Computer Science
23.	Kaushik Nath	Prof. Palash Sarkar, ASU, ISI, Kolkata	Secure and Efficient Computation of the Diffie-Hellman Protocol using Montgomery Curves over Prime Order Fields	Computer Science
24.	Aparajita Khan	Prof. Pradipta Maji, MIU, ISI, Kolkata	Integrative Clustering of Multi-View Data: Subspace Clustering , Graph Approximation to Manifold Learning	Computer Science
25.	Avisek Gupta	Dr. Swagatam Das, ECSU, ISI, Kolkata	On Efficient Center-based Clustering: From Unsupervised Learning to Clustering under Weak Supervision	Computer Science
26.	Akshay Chaturvedi	Prof. Utpal Garain, CVPRU, ISI, Kolkata	On Adversarial Robustness of Deep Learning Systems	Computer Science
27.	Bikash Santra	Prof. Dipti Prasad Mukherjee, ECSU, ISI, Kolkata	On Automatic Identification of Retail Products in Images of Racks in the Supermarkets	Computer Science
28.	Ashish Bakshi	Dr. Kuntal Ghosh, MIU, ISI, Kolkata	Some Perspectives on Brightness Perception Models through the Study of Brightness Illusions	Computer Science
29.	Laltu Sardar	Prof. Bimal Kr. Roy, ASU, ISI, Kolkata and Dr. Sushmita Ruj, UNSW, Sydney	Queryable Encryption for Outsourced Dynamic Data	Computer Science
30.	Gopinath Mishra	Prof. Arijit Bishnu, ACMU, ISI, Kolkata And Dr. Arijit Ghosh, ACMU, ISI, Kolkata	On Some Estimation Problems through the Sub-linear Lens	Computer Science
31.	Durgesh Singh	Prof. Sasthi Charan Ghosh, ACMU, ISI, Kolkata	Efficient Relay Selection Techniques for D2D Communication under User Mobility and Presence of Obstacles	Computer Science
32.	Subhankar Ghosal	Prof. Sasthi Charan Ghosh, ACMU, ISI, Kolkata	Randomized Algorithms for Resource Allocation in Device-to-Device Communication	Computer Science
33.	Mostafizar Rahman	Dr. Goutam Kumar Paul, CSRU, ISI, Kolkata	Cryptanalysis of Symmetric Key Schemes using Classical and Quantum Techniques	Computer Science
34.	Pritam Chattopadhyay	Dr. Goutam Kumar Paul, CSRU, ISI, Kolkata	Studies on Space Structure, Quantum Thermodynamic Systems and Computation	Computer Science
35.	Harmender Gahlawat	Prof. Sandip Das, ACMU, ISI, Kolkata	The Cops and Robber game on some graph classes	Computer Science

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	Subject area
36.	Manaswi Paraashar	Dr. Sourav Chakraborty, ACMU, ISI, Kolkata	Quantum query complexity through the lens of communication complexity and exact learning	Computer Science
37.	Kaustabha Ray	Dr. Ansuman Banerjee, ACMU, ISI, Kolkata	Policy Design and Verification for Multi-Access Edge Computing: A Formal Methods Perspective	Computer Science
38.	Uma kant Sahoo	Prof. Sandip Das, ACMU, ISI, Kolkata	Arrangement Graphs and Intersection Graphs of Curves	Computer Science

PhD Degrees Awarded by Other Academic bodies

A. Research Fellows (with ISI-fellowships) who have been awarded Ph. D degree by Academic Bodies other than ISI for work done in ISI.

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	University
1.	Suparna Goswami	Prof. Parthasarathi Ghosh, GSU, ISI, Kolkata	Sedimentology Of The Limestone Interval And Its Underlying Siliciclastic Succession Of The Kota Formation, Pranhita-Godavari Gondwana Basin, India	University of Calcutta
2.	Sumona Datta	Dr. Debdulal Dutta Roy, PRU, ISI, Kolkata	A Study on Visuospatial Reasoning Ability and Working Memory across ages	University of Calcutta
3.	Ghosh Sravanti Amiyakanti Swapna	Dr. Debdulal Dutta Roy, PRU, ISI, Kolkata	A study on Self care Efficacy in Diabetes Mellitus	University of Calcutta
4.	Deepak Johnson	Prof. Madhura Swaminathan, EAU, ISI,Bangalore	Rice Incomes and Farm Policy: Case Studies from Kerala and Vietnam	Tata Institute of Social Sciences
5.	Kaushik Bora	Prof. Madhura Swaminathan, EAU, ISI,Bangalore	A Study of Climatic Factors and Fertilizer Use in Indian Agriculture	Tata Institute of Social Sciences
6.	Niyati S.	Prof. Madhura Swaminathan, EAU, ISI,Bangalore	Women's Labour in Rice Cultivation	Tata Institute of Social Sciences

B. Research Fellows (with other fellowships)/Personnel who have been awarded Ph. D degree by Academic Bodies other than ISI for work done in ISI.

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	University
1.	Sandip Paul	Dr. Diganta Saha, Professor, Dept. of CSE, Jadavpur University and Dr. Kumar Sankar Ray, Retired Professor, ECSU, ISI, Kolkata	Fuzzy Answer Set Programming Using Interval-Valued Fuzzy Sets	Jadavpur University
2.	Indrajit Ghosh	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata	Mathematical Modeling Of Some Emerging and Re-Emerging Epidemics: Transmission Routes And Controls	University of Calcutta

Serial No.	Name of the Scholar	Name(s) of the Supervisor(s)	Title of the Thesis	University
3.	Sk Shahid Nadim	Prof. Sabyasachi Bhattacharya, AERU, ISI, Kolkata and Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata	Dynamics And Control Of Diseases With Multiple Transmission Routes: Implications From Mathematical Modeling	University of Calcutta
4.	Pijush Panday	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata	Mathematical Models On Ecosystem Conservation With Special Emphasis On Fear Factors Of Prey Or Predator Species	University of Calcutta
5.	Abhishek Senapati	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata	The Spread And Control Of Some Infectious Diseases In Patchy Environment-Model Based Studies	University of Calcutta
6.	Swarnendu Banerjee	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata And Dr. Ram Rup Sarkar, Principal Scientist, Chemical Engineering and Process Development, CSIR-National Chemical Laboratory, Pune	Mathematical Modeling To Study Problems Related To Plankton Ecology Ranging From Intracellular To Large Scale	University of Calcutta
7.	Biman Chakraborty	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata and Prof. Sabyasachi Bhattacharya, AERU, ISI, Kolkata	On extended Gompertz family and its applications: Deterministic and Stochastic approach	University of Calcutta
8.	Amar Sha	Prof. Joydev Chattopadhyay, AERU, ISI, Kolkata	Mathematical modelling of Predator-Prey Interactions under the influence of symbiotic relationship, psychological fear and disease induced factors	University of Calcutta
9.	Durba Banerjee	Prof. Sagartirtha Sarkar, Department of Zoology, University of Calcutta and Dr. Raghunath Chatterjee, HGU, ISI, Kolkata	Tracking Intracellular Trails in Hypertrophied Cardiomyocytes by Tissue Targeted Modulation of C/EBPβ During Pathological Hypertrophy in Rat Model	University of Calcutta
10.	Praloy Das	Prof. Subir Ghosh, PAMU, ISI, Kolkata	Aspects of Constraints and Noncommutative Geometry in Physics	University of Calcutta
11.	Ananya Mondal	Dr. Pradip Bhattacharyya, AERU, ISI, Giridih and Dr. Satya Sundar Bhattacharya, Environmental Science Department, Tezpur University, Assam	Characterization, risk evaluation and utilization of brick kiln coal ash (BKCA) in agriculture through vemicomposting	Jadavpur University

2.4 PLACEMENT

As in the past, Indian Statistical Institute had offered during 2021-22 a number of degree and diploma programs in Statistics, Mathematics, Computer Science, Quantitative Economics, and Quality, Reliability and Operations Research as well as various PhD programs. In particular, its flagship programs in statistics, both at the undergraduate and post-graduate levels, are unmatched at the national level and well-recognized internationally. After completion of post-graduate programs successfully, some students opt for higher education and enrol at the PhD programs themselves in home and abroad. The remaining others opt for jobs in the industry or corporate sector. Overall placement of the students passing out of the ISI courses or programs is 100%. Some information of placement in the corporate sector are furnished below based on the data available in the ISI Placement Brochure 2022-23. The following Table includes some course-wise information about placements and corresponding salary offered.

Course-wise Recruitment Details

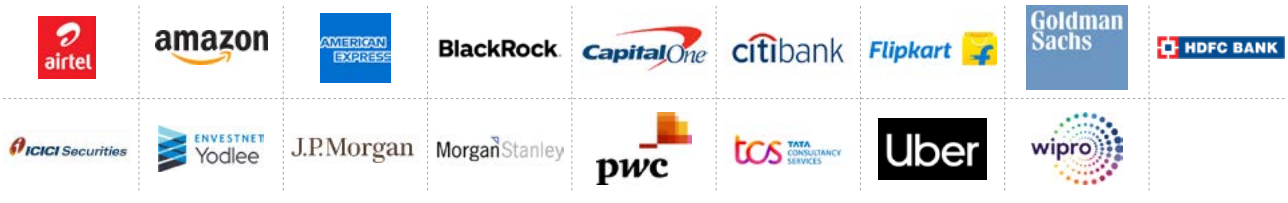
Name of Program	Batch Size	No. of Job Market Candidates	Highest Salary Offered (in LPA)	Median salary Offered (In LPA)	Name of some companies who recruited
M Tech (CS) Kolkata	34	29	89	22	Amazon, American Express, Comcast, Dream 11, EA Games, HDFC Bank, ICICI Bank, ICICI Securities, InfoEdge, Nference, Tata Digital, Tata Steel, UBS, Walmart, Wells Fargo, Zee Entertainment, Zendrive
M Stat (Kolkata)	44	31	44	28.7	Bank of America, Capital One, DMI Finance, Dream11, Fullerton India, Goldman Sachs, HDFC Bank, ICICI Bank, JP Morgan & Chase, Morgan Stanley, PWC, Reliance, Tata AIG, UBS, Walmart, Wells Fargo, ZS Associate
MS(QE) Kolkata	15	14	51	26	Amazon, American Express, JP Morgan & Chase, Protiviti, Tata AIG, UBS, Wells Fargo
M Tech (CrS) Kolkata	15	8	58.7	20	HDFC Bank, ICICI Prudential, Standard Chartered Bank, TCS Research and Innovation, Ugam Solutions, Zee Entertainment
M Tech QROR Kolkata	22	21	34	18	AbinBev, Accenture, Accenture, Edelweiss, Fullerton India, HDFC Bank, ICICI Bank, JP Morgan & Chase, KPMG, Lowes India, MBB Labs, PwC, Tata Digital, UBS, ZEE Entertainment
M Math (Bangalore)	39	4	24.5	12	ICICI Bank, Tata Steel, Virtusa, Zendrive

Course-wise 2-Month Internship

Batch	Highest Salary	Average Salary
M Tech (CS)	1.6 L	80 K
M Stat	1.65 L	1.1 L
MS (QE)	1.5 L	1.0 L
M Tech QROR	1.5 L	90 K
M Tech (CrS)	85 K	67 K

A number of students from M. Tech (QROR) and M. Tech (CrS) had also been recruited for 6-month Internship programs, with a highest salary ranging from 1.1 L to 3.0 L

Top Recruitment companies in internship were



2.5 International Training Programme

International Statistical Education Centre (ISEC)

Member Secretary : Prof. Amita Pal, ISRU Kolkata

Office : C.D. Deshmukh Bhawan, 202, B.T. Road, ISI, Kolkata

No of Scientific Staff: One (1)

No of non-scientific staff: Five (5)

The International Statistical Education Centre (ISEC) was founded in 1950 at Kolkata through the initiative of Professor P.C. Mahalanobis, based on an agreement between the International Statistical Institute and the Indian Statistical Institute (ISI). It is an Associate Institution of ISI as per Regulation no. 14 of the Institute. It functions under a Board of Directors, which has members from ISI, MoSPI and the Ministry of External Affairs (MEA), and whose current Chairman is Professor S. P. Mukherjee. The centre aims to provide training in theoretical and applied statistics at various levels to selected participants from countries of the Middle East, the Far East, South and South-East Asia, as well as the Commonwealth countries of Africa. The primary training programme is a 10-month regular course in Statistics (titled **Statistical Theory and Applications**) leading to a Diploma. In addition, special courses on different topics of varying duration are also organized for international participants.

Regular Course

In the current academic year (2021-22), it has not been possible to conduct the 74th term of the regular 10-month course on Statistical Theory and Applications due to the COVID-19 pandemic and the ensuing restrictions on international air travel and other related constraints.

Special Course

In 2021-22, ISEC conducted two editions (one of which only partially overlapped with the period under review) of a four-week specialized online training course on Big Data Analytics for Policy Planners, under the e-ITEC scheme of the Indian Technical and Economic Co-operation (ITEC) Programme of the Ministry of External Affairs (MEA), Government of India. The objective of the course was to introduce policy planners working in various areas of Government and industry to methodologies that are useful for analysis of Big Data, with the ultimate objective of being able to make more informed decisions leading to better policy-planning. Four ninety-minute lecture-cum-R programming sessions were conducted online every day (from Monday to Friday) on a number of topics ranging from linear and generalized regression models, resampling methods, classification methods, tree-based methods, dimension reduction techniques, support vector machines, cross-validation and time series modelling to predictive analytics and MCDM methods. These sessions were supplemented with quizzes/assignments/projects so that the participants could get a better understanding of the topics. An assessment was made on the basis of the performance of the participants on these components. The lectures were recorded and made available to the participants.

- In the 1st edition of this course, conducted from March 11, 2021 to April 07, 2021, there were 31 participants from 7 countries, namely, Armenia, Cambodia, Fiji, Kenya, Palestine, Thailand and Vietnam.
- In the 2nd edition of this course, conducted from August 30, 2021 to September 24, 2021, there were 18 participants from 9 countries, namely, from Algeria, Azerbaijan, Bangladesh, Cambodia, Kenya, Nigeria, Seychelles, Somalia and Sudan.

During March 7-30, 2022, an e-course on **Sampling Methodologies for Conducting Household Surveys** was conducted with the objective of providing participants with an overview of available sampling methodologies for conducting household surveys. In all, 182-hour lectures and 32-hour practical sessions were delivered/ conducted by the ISEC Chairman Prof. S. P. Mukherjee, faculty members of ISI and University of Calcutta as well as senior and recently retired officers of the Government of India, on topics like Sampling Units and Sampling Frame, Definition of Operational Terms, Overview of Sampling Methods, Sampling and Non-sampling Errors, Estimation of population mean and proportion, relative standard error and confidence interval, Sampling Design and Determination of Sample Size, Problems in Stratified Sampling, Development of Questionnaires / Schedules, Development of Instruction

Manual, Pilot Testing of Schedules and Training of Investigators, Surveys on Consumer Expenditure, Health and Family Welfare, Employment Situation, Education, Data Errors, Manual/ Computer Scrutiny and Validation, Preparation of Tables and Drafting of Report. Twenty officers from the Uganda Bureau of Statistics participated in this self-funded online programme.

Special Courses

Serial no.	Name of Special Course	Duration	No. of Participants
1	Big Data Analytics for Policy Planners	March 11 - April 07, 2021	31
2	Big Data Analytics for Policy Planners	August 30 - September 24, 2021	18
3	Sampling Methodologies for Conducting Household Surveys	March 7 - March 30, 2022	20

Chapter - 3

Research Activities

73 **No. of Internal Projects**

25 New	31 Ongoing	17 Completed

140 **No. of External Projects**

27 New	53 Ongoing	60 Completed

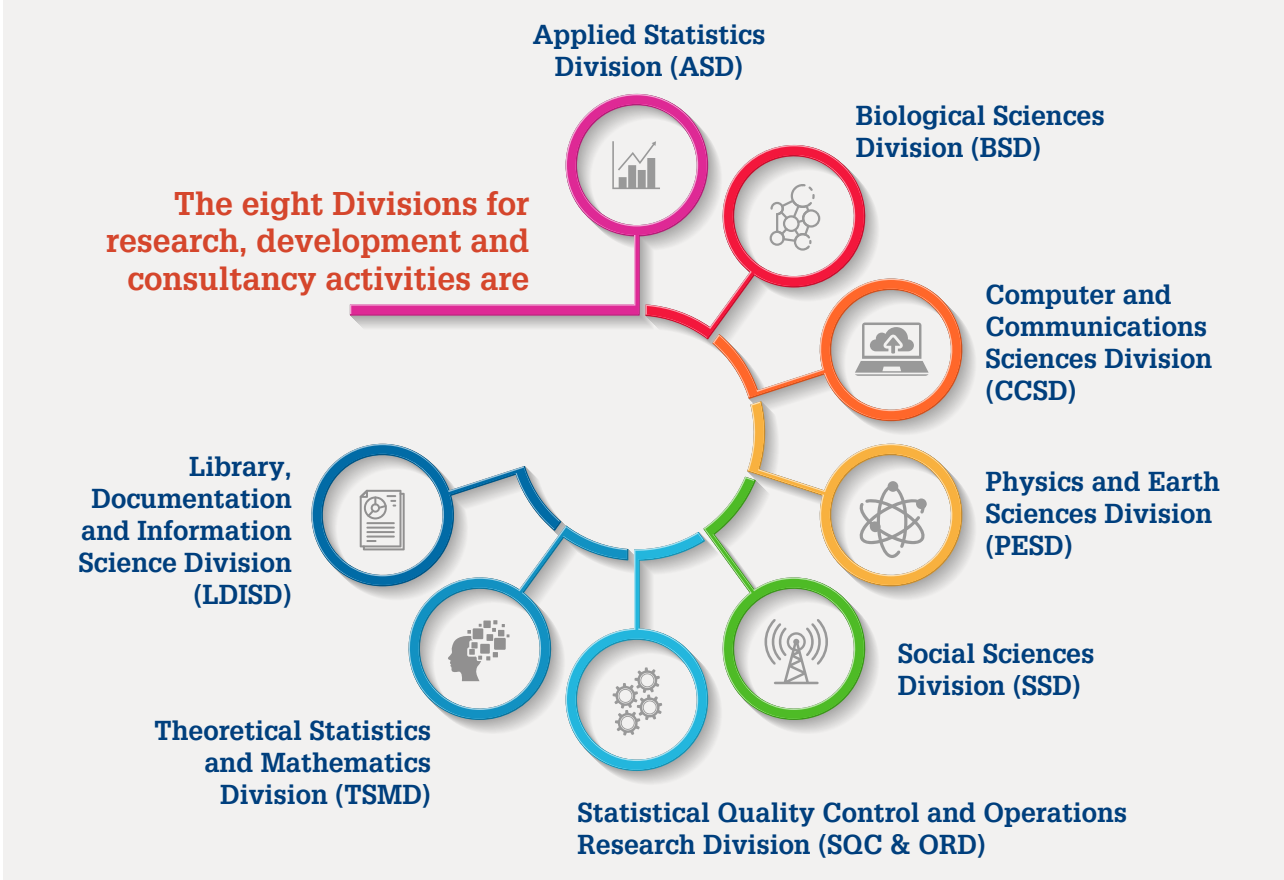
20 **No. of Government Projects**

06 New	10 Ongoing	04 Completed

Research Activities

The major thrust of the Institute is on research in various disciplines and the activities of the Institute are organized into Divisions. These Divisions have multi-locational units (vide the Locations page, Chapter 1). Scientists of the Institute carry out independent research in their own basic discipline and also undertake interdisciplinary research in collaboration with other units within the Institute and also with other organizations. The Institute also takes up various internally and externally funded projects in diverse fields on challenging problems of national and international importance. As a part of research activities, the scientists of the Institute are also involved in consultancy work. The Institute has a network of units under the Statistical Quality Control and Operations Research Division which, in addition to research and training activities, also specialize in providing technical consultancy to a wide range of public and private organizations for developing quality management systems and in solving critical problems of quality, reliability and productivity.

This chapter provides the principal areas of work and the projects undertaken by the faculty, of the different Divisions, during 2021-2022.



One Centre providing services -

Computer and Statistical Services Centre (CSSC), Kolkata

Additionally, there are five national facilities –

- The Centre for Artificial Intelligence and Machine Learning (CAIML), Kolkata
- The Centre for research on the Economics of Climate, Food, Energy and Environment (CECFEE), Delhi
- The Centre for Soft Computing Research (CSCR), Kolkata
- The R C Bose Centre for Cryptology and Security (RCBCCS), Kolkata
- Technology Innovations Hub, Kolkata

3.1 APPLIED STATISTICS DIVISION (ASD)

Professor In-Charge: MRIDUL NANDI, ASU Kolkata

Office: 8th floor, S.N. Bose Bhawan, ISI, Kolkata-700 108

1

Applied and Official Statistics Unit (AOSU), North-East Centre, Tezpur

- **Head of Unit:** BALAKRISHNAN RAMAKRISHNAN
- **Number of Faculties:** One (1)
- **Office:** Punioni, Solmara, Tezpur, Assam – 784501

2

Applied Statistics Unit (ASU), Bangalore

- **Head of Unit:** C.R.E. RAJA
- **Number of Faculties:** One (1)
- **Number of Scientific Workers:** One (1)
- **Office:** 8th Mile, Mysore Road, ISI, Bangalore – 560059

3

Applied Statistics Unit (ASU), Chennai

- **Head of Unit:** D. SAMPANGIRAMAN
- **Number of Faculties:** Two (2)
- **Office:** 110, Nelson Manickam Road, Aminjikarai, Chennai - 600029

4

Applied Statistics Unit (ASU), Kolkata

- **Head of Unit:** SUBHAMOY MAITRA
- **Number of Faculties:** Sixteen (16)
- **Number of Non-Scientific Workers:** Seven (7)
- **Number of Research Scholars:** Thirty-six (36)
- **Number of Visiting Scientists:** One (1)
- **Office:** 203, B.T. Road, 8th Floor, S.N. Bose Bhavan, Kolkata-700108

5

Interdisciplinary Statistical Research Unit (ISRU), Kolkata

- **Head of Unit:** RITA SAHARAY (April 1, 2021 to December 12, 2021) AMITA PAL (December 13, 2021 to March 31, 2022)
- **Number of Faculties:** Nine (9)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** Two (2)
- **Number of Research Scholars:** Ten (10)
- **Number of Visiting Scientists:** One (1)
- **Office:** 4th floor, R.A. Fisher Bhavan, ISI, Kolkata 700108

1. Applied and Official Statistics Unit (AOSU), North-East Centre, Tezpur

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Holendro Singh Chungkham	Psychosocial work characteristics and health (mainly depression and work stress)	
	Applications of advanced statistical methods (e.g., mixed models, structural equation models, autoregressive models, multilevel models)	

2. Applied Statistics Unit (ASU), Bangalore

Research

The Applied Statistics Unit at ISI Bangalore was created in 2019 with one faculty member. The unit participates in teaching for the B. Math and M. Math programs of the centre in addition to research activities.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Rituparna Sen	Statistical Network Analysis, Risk Measurement, Stylized facts of financial markets	S. Basu, S. Biswas, S. Krishna Kumar

Projects

Externally-funded Projects

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Functional Time Series	E-517	February 23, 2021	3 years	Rituparna Sen	SERB	6,60,000/-
2	Estimation of Risk Measures	E-515	December 22, 2020	3 years	Suparna Biswas	DST	28,24,416/-

3. APPLIED STATISTICS UNIT (ASU), CHENNAI

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Sudheesh K.K.	Entropy	N. Balakrishnan
	Cure Rate Model	P.G. Sankaran and Sreedevi E.P.
	Linear Transformation Model and Measurement Error	Min Xie and Deemat C.M.
	Censored Regression	Hira L. Koul

Projects

Internally-funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	End date	Principal Investigator(s)
1	Semiparametric Analysis of Transformation Model with Measurement Error in Covariates	December 2, 2019	March 31, 2022	Sudheesh K.K.

4. APPLIED STATISTICS UNIT (ASU), KOLKATA

Research

Scientists of the Applied Statistics Unit (ASU) are involved in various teaching, training, research and development activities. The unit regularly conducts research in various areas of statistics, mathematics and computer science with special emphasis on applications, sometimes in collaboration with scientists of other units of ISI and /or other organisations. This unit also conducts Statistical traineeship programme, scientific oriented lectures, UGC sponsored refresher courses and workshops (and winter/summer schools, North-East training which are presently stopped due to non-availability of fund and covid scenario).

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Anup Dewanji	Reliability	T.S. Vignesh, Dhrubasish Bhattacharya
	Survival Analysis	Biswadeep Ghosh, Sudipta Das, G. Asha, C.S. Soorya
Arijit Chakrabarti	High-Dimensional Statistics, Model selection, Multiple hypothesis testing.	Soumendu Sundar Mukherjee, Sayantan Pal, Tapas Samanta
Arnab Chakraborty	Applied Statistics, Pattern Recognition, E M Algorithm	Atanu Ghosh (Presidency College)
Atanu Biswas	Problems related to discrete-valued time series, sequential analysis and clinical trials, among others	
Bimal Kumar Roy	Combinatorics, Design of Experiments, Optimization, Cryptology, Data obfuscation, Design of secure Electronic voting machine	
Debapriya Sengupta	Multivariate Analysis, Inference, Bio-Statistics, Signal Processing, Big Data Analysis, Regression and Data Science	
Debasis Sengupta	Developing statistical models and methods for various types of real data, Reliability, Survival Analysis	
Kishan Chand Gupta	Cryptology, Boolean Functions, Maximum Distance Separable (MDS) Matrix	
Mausumi Bose	Combinatorial Designs (for obtaining efficient designs for determining the best treatment for total effects)	
	Operations Research (for obtaining shorter prediction intervals for anonymous individual assessments in group decision making) Sampling	
Mridul Nandi	Symmetric Key Design, Provable Security, Cryptanalysis and Implementation, Hash Function, Authenticated Encryption and its Applications, Quantum Symmetric Key	
Palash Sarkar	Cryptology, Combinatorics, Theoretical Computer Science, Discrete Logarithm Problem, Computation using Kummer Line, Lattice based cryptography, Symmetric Key cryptography	
Shyamal Krishna De	High dimensional Inference	Biplab Paul, Anil K. Ghosh
	Change-point detection in random networks	Soumendu Sundar Mukherjee, Sharmodeep Bhattacharya, Shirshendu Chatterjee
	Large-scale multiple testing for sequential data	Rahul Roy
Souvik Roy	Game Theory	Ratul Lahkar (Ashoka University), Andrés Perea (Maastricht University, Netherlands), Anish Sarkar, Arunava Sen, Debasis Mishra, Hans Peters (Maastricht University, Netherlands), Ravindra B. Bapat, Y. Narahari (Indian Institute of Science)

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Subhamoy Maitra	Cryptology and Security, Digital Watermarking, Sensor Networks, Quantum Information	
Sumitra Purkayastha	Copula based methods and inference, with focus on Multivariate longitudinal models	
Tapas Samanta	Asymptotic Theory, Bayesian Analysis, Model Selection	

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Social Choice under Ambiguity	April, 2021	3 years	Souvik Roy

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Mechanism Design with Interdependent Preferences	April, 2020	3 years	Souvik Roy

Projects done for Govt. of India/State Govts

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Research & Development of stream encryption Algorithm	E-176	March 17, 2021	3 Years	M. Nandi	DST, GoI	15,21,816/-

COMPLETED PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Design of a PQC Algorithm Solution	I-065	July 29, 2020	October 18, 2021	S. Maitra	NAVY, GoI	14,20,170/-

5. INTERDISCIPLINARY STATISTICAL RESEARCH UNIT (ISRU), KOLKATA

Research

Scientists of the Interdisciplinary Statistical Research Unit (ISRU) are actively involved in research related to diverse areas of Applied and Interdisciplinary Statistics. The primary research areas are Robust Statistical Inference, Statistical Machine Learning, Image Processing, Bayesian Modeling and Inference, Spatiotemporal Data Analysis, Multivariate Analysis, Biostatistics, Statistical Process Control, Applications of Nonparametric Regression, Design of Experiments, Probability Inequalities, Multiple Hypothesis Testing, Statistical Inference, to name a few. They are regularly involved in interdisciplinary projects, internally or externally funded, sometimes in collaboration with scientists of other units of ISI and/or other organisations. They are also involved in teaching and training activities. Apart from participating actively in the teaching of courses under the regular academic programmes of the Institute, they also conduct and/or teach in winter/ summer schools, refresher courses and workshops.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Abhik Ghosh	Robust Statistical Inference for various Applications	Ayanendranath Basu, Leandro Pardo (UCM, Madrid, Spain)
	Robust Inference for High and Ultra-high dimensional Data	Leandro Pardo (UCM, Madrid, Spain), Magne Thoresen (UiO, Oslo, Norway)
	Entropy, divergences, their generalization and applications in Statistical infernece	Ayanendranath Basu
	Applications of Statistics within Econophysics & Socio-economic Applications	Banasri Basu
	Rainfall Modelling	Arnab Hazra (IIT Kanpur, India)
	Robust Inference for Stochastic Processes	
	Robust Methods in Bioinformatics	
Amita Pal	Robust Support Vector Machines	
Ayanendranath Basu	Robust singular value decomposition with applications	Subhrajyoty Roy and Abhik Ghosh
	Robust principal component analysis	
	Robust clustering in mixture normal models	Soumya Chakraborty and Abhik Ghosh
	Sequential and robust estimation of a multivariate scatter matrix	
	Robust estimation based on the extended Bregman divergence	Sancharee Basak
	Robust estimation under linear mixed models	Giovanni Saraceno and Claudio Agostinelli (University of Trento, Italy) and Abhik Ghosh
	Robust and efficient estimation based on ordinal response models	Arijit Pyne and Abhik Ghosh
	Robust inference based on the exponentially weighted divergence	Soumik Purkayastha (University of Michigan)
	Characterizing the functional density power divergence	Souvik Roy (Stanford University), Subrata Pal (Iowa State University), Sumit Kumar Kar (University of North Carolina, Chapel Hill)

Research Activities

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Kiranmoy Das	Bayesian Joint Modeling of Longitudinal and Survival Data	Damitri Kundu
	Bayesian Model Selection for Interval Data	Shubhajit Sen
	Variable Selection for Categorical Outcomes	Sweata Sen
	Dose-Response Modeling for Leukemia Patients in India	Vaskar Saha, Shekhar Krishnan
	Multivariate Quantile Regression	Jayabrata Biswas
	Automated Patient Monitoring using Sensor Networks	Aditi Chatterjee
Partha Sarathi Mukherjee	Image denoising using jump regression analysis and machine learning techniques	Subhasis Basak, Somenath Mandal
	Image deblurring using jump regression analysis and machine learning techniques	Yicheng Kang
	Image registration	Sujay Das
	Statistical Process Control	
	Control Charts for Image monitoring	Anik Roy
	Applications of statistical tools in various scientific research	Dr. Lilian Calderon-Garciduenas
Rita SahaRay	Robust Generalised Quadratic Discriminant Analysis	Abhik Ghosh, Sayan Chakraborty (University of Illinois at Urbana-Champaign, USA), Sayan Bhadra (Florida State University, USA)
	Classification under the Generalised Additive Model	Anil Ghosh, Manit Paul, Nirmalya Mandal, Abir Sarkar
Smarajit Bose	Content Based Image Retrieval	Subhadip Maji
	Ensemble methods for learning	
Sourabh Bhattacharya	Bayesian Statistics	
	Bayesian Computation	
	Stochastic Processes	
Subir Kumar Bhandari	Multiple Hypotheses Testing	Shyamal Krishna De, Nabaneet Das, Rahul Roy, Monitirtha Dey

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Outlier-Robust Methods in Biostatistics and Bioinformatics using Density Power Divergence	April 1, 2020	3 years	Abhik Ghosh

Externally-funded Projects

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Robust minimum divergence inferences for Non-Standard data problems: Emphasis on Censored, Longitudinal & High-dimensional data and Machine Learning & Multisample set-ups	E054	November 2, 2016	6 years	Abhik Ghosh	DST, Govt. of India	35,00,000/-
2	Robust Statistical Learning for High-dimensional Biomedical and Omics data	E152	December 4, 2020	2 years	Abhik Ghosh	SERB, Govt. of India	15,32,916/-
3	Applied Statistical Problems for Dependent Incomplete Multivariate Data (Indo-Uzbek joint project)	E159	February 15, 2021	3 years	Ayanendranath Basu	IBCD,DST, Govt. of India	15,85,800/-

3.2 BIOLOGICAL SCIENCES DIVISION (BSD)

Professor In-Charge: RAGHUNATH CHATTERJEE, HGU, Kolkata

Office: 2nd floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

1

Agricultural & Ecological Research Unit (AERU), Giridih & Kolkata

- **Head of Unit:** RABI RANJAN CHATTOPADHYAY
- **Number of Faculties:** Eight (8)
- **Number of Scientific Workers:** Five (5)
- **Number of Non-Scientific Workers:** Six (6)
- **Giridih Office:** Rose Villa, New Barganda, ISI, Giridih, Jharkhand - 815301
- **Kolkata Office:** 2nd floor, R. A. Fisher Bhavan, ISI, Kolkata – 700108

2

Biological Anthropology Unit (BAU), Kolkata

- **Head of Unit:** S.K. RAY
- **Number of Faculties:** Two (2)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** Two (2)
- **Number of Research Scholars:** Four (4)
- **Office:** 3rd floor, R.A. Fisher Bhavan, ISI, Kolkata-700 108

3

Human Genetics Unit (HGU), Kolkata

- **Head of Unit:** INDRANIL MUKHOPADHYAY & SAURABH GHOSH
- **Number of Faculties:** Three (3)
- **Number of Non-Scientific Workers:** Three (3)
- **Number of Research Scholars:** Nine (9)
- **Office:** 2nd floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

1. Agricultural & Ecological Research Unit (AERU), Giridih & Kolkata

Research

The Agricultural and Ecological Research Unit (AERU) is based in Kolkata and has its branch at Giridih. The unit is comprised of nine faculty members. The Scientific workers of the Unit are engaged in various research and academic activities on Agriculture and Ecology. During the period under consideration, the scientific workers of the Unit have undertaken research on various ecological aspects as invasive plants, zoopankton-phytoplankton interaction, plant - nematode interaction etc. and also in Agriculture and social aspects as technology adoption by farmers, use of nanotechnology in Agriculture and other various topics. In addition to these, the faculty members of the Unit are also engaged in regular teaching in B. Stat. and M. Stat. courses in ISI and also in various departments of other Universities. AERU faculties have launched a Post Graduate Diploma in Agricultural & Rural Management with Statistical Methods and Analytics in the Giridih Branch.

Current Areas of Research

Faculty name	Research topic(s)	Collaborator(s)
Abhishek Mukherjee	Plant – Nematode interaction	Prof. Matiyar R. Khan (Principal Scientist, Division of Nematology, ICAR- Indian Agricultural Research Unit, New Delhi), Dr. Dipankar Chakraborti (Head, Department of Genetics, University of Calcutta)
	Applications of nanotechnology in agriculture	Dr. Chandan Ghosh (Department of Material Science and Technology, School of Materials Science & Nanotechnology, Jadavpur University)
	Biocontrol of pest and diseases	Prof. Birendra Nath Panja (Prof. and HoD, Dept. of Plant Pathology, Bidhan Chandra Krishi Viswavidyalaya)
	Invasive weed ecology and management	Dr. Achyut Banerjee (School of Life Sciences, Sun Yat-sen University, China), Dr. Raghu Sathyamurthy (Biosecurity Flagship, CSIRO, Brisbane, Australia)
Arunava Goswami	Nanobiotechnology	
Joydev Chattopadhyay	Disease modelling including COVID-19 Ecological predator prey based model with fear and vigilance impact	
Pabitra Banik	Climate change and Socioeconomic situation of the Sundarban	Prof. Christopher Edmonds (Associate Professor, Tokyo International University, Japan), Prof. Ilan Noy (Victoria University of Wellington, New Zealand)
	Ecological aspect of the Sundarban area	Dr. K. C. Rath (Dept. of Geography, Utkal University)
	Technology adoption by the farmers	Prof. Christipher Edmonds (Tokyo International University, Japan)
Pradip Bhattacharyya	Waste Management, Phytoremediation, Metal-microbe relationship, Soil and water pollution and remediation	
Rabi Ranjan Chattopadhyay	Bioactive natural products	Prof. Smarajit Bose
Sabyasachi Bhattacharya	Migratory pattern and cooperative breeding of Blue-tailed bee-eater	Prof. Santanu Ray, (Ex-Professor, Department of Zoology, Visva-Bharati, Santiniketan), Dr. Fahad Al Basir (Assistant Professor, Asansol Girls College, Asansol)
	Growth dynamics of zooplankton-phytoplankton system	Prof. Santanu Ray (Ex-Professor, Department of Zoology, Visva-Bharati, Santiniketan), Dr. Bratati Chakraborty (Assistant Professor, Lady Brabourne College, Kolkata)

Faculty name	Research topic(s)	Collaborator(s)
Sabyasachi Bhattacharya	Cell proliferation and growth dynamics in bio assays and in vitro culture under noisy environment	Dr. Bapi Saha (Assistant Professor, Government College of Engineering & Textile Technology, Berhampore)
	Extinction risk assessment and growth dynamics of Herring fish population	Dr. Bapi Saha (Assistant Professor, Department of Mathematics, Government College Of Engineering & Textile Technology, Berhampore)
	Conservation status assessment of species under noisy environment	Dr. Nabakumar Ghosh (Assistant Professor, Department of Mathematics, Acharya Jagadish Chandra Bose College, Kolkata)
Suparna Mandal Biswas	Potent nutraceuticals having antioxidant, DNA damage protecting potential and anti-cancer properties from the leaves of some tropical plant species.	Prof. Thomas A Hughes and Dr. Arindam Pramanik (School of Medicine, St James's University Hospital, University of Leeds, UK)
	Mitigating waste lands by phytoremediation potentialities of some weed species.	Prof. Prasanta C. Bhowmik (University of Massachusetts Amherst, Department of Plant and Soil Sciences, Amherst, USA)
	Exploring the vegan sources of squalene and its implication in pharmacological sciences	Prof. Panchanan Pramanik, (Former Professor of IIT, Kharagpur)
	Evaluating the potential role of plant derived natural products in urease inhibition and nitrogen utilization for enhancing soil health - A rhizosphere manipulation strategy	Prof. Panchanan Pramanik, (Former Professor of IIT, Kharagpur)
	Plant polyphenols and assessing their role as nutraceuticals, food additives and for health care.	Prof. Parimal Karmakar (Department of Life Science and Biotechnology, Jadavpur University)
	Characterization of fungal metabolites and bioactivity screening to assess its potentialities as raw material for development of dying agents and pharmaceutical products.	Dr. Lalit Kumar (ICAR- Indian Institute of Farming Systems Research, Modipuram Meerut)

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Vetiver based phytoremediation of metal contaminated chromium asbestos mines of Jharkhand: A cradle to grave approach through vermitechnology	April, 2021	March, 2024	Pradip Bhattacharyya
2	Designing strategies for the enhanced production of cosmetic antiaging "squalene" from the shedded leaves of Moraceae and exploring its novel sources based on molecular cues.	April, 2021	March, 2024	Suparna Mandal Biswas
3	Strategies for improvement of livelihood security of the farming community in the Indian Sundarbans under present scenario of climate change	April, 2021	March, 2024	Pabitra Banik

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
4	Green synthesis of nanoparticle in plant ethanol extracts and application in various experimental and field model systems	April, 2021	March, 2024	Arunava Goswami

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	End date	Principal Investigator(s)
1	A search for novel natural alternative to synthetic food preservatives from plant essential oils and their components	April, 2019	March, 2022	Rabi Ranjan Chattopadhyay
2	Understanding electrical signals in Alternanthera philoxeroides - physiological and ecological aspects	April, 2020	March, 2022	Anjana Dewanji, Kuntal Ghosh

Externally-funded Projects

NEW PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Conducting surveys in India to identify biocontrol agent for Nymphoides cristata	F591	July, 2021	July, 2024	Abhishek Mukherjee	CSIRO, Australia	14,62,000/-
2	A study on chemical constituents of rice root modulating herbivory by the rice root knot nematode Meloidogyne graminicola: a chemical ecology perspective	E158	April, 2021	April, 2024	Abhishek Mukherjee	SERB, DST	21,52,683/-

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Characterization and hazard prediction of tannery waste sludge in West Bengal and resource recovery through vermiremediation	E115	August 2019	July 2022	Pradip Bhattacharyya (PI) and Sabyasachi Bhattachryya (Co-PI)	Department of Science and Technology & Biotechnology, Govt. of West Bengal	15,00,000/-
2	Delaying programme cell death of beneficial in gut bacteria using oxide and complex nanoparticles	E126	2019	2022	Arunava Goswami	ISRO	34,63,000/-
3	Climate change and livelihoods in disaster-prone coastal areas of Bay of Bengal	F010	2019	2022	Pabitra Banik	Tokyo International University	2,47,280/-

COMPLETED PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Antidotes against dsDNA adenovirus induced kerato conjunctivitis ex vivo platform for nanoformulation development	E130	2019	2022	Arunava Goswami	DBT, GOI	34,29,264/-

2. BIOLOGICAL ANTHROPOLOGY UNIT (BAU), KOLKATA

Research

Primarily bio-anthropological researches are being done with emphasis on health status of population studied. Faculty members are also engaged in teaching anthropology (elective) at B. Stat. level and Ph. D. Course work in anthropology.

Current Areas of Research

Faculty name	Research topic(s)	Collaborator(s)
Subrata Roy	Health and Coping Strategy of the Labourers of Closed and Running Tea Gardens of Alipurduar District of West Bengal: A Comparative Study	Akash Mallick
	Health related Pain cognition and threshold of the Urban and Rural Santals	Arpita Santra (UGC Research fellow)
Susmita Mukhopadhyay	Health related quality of life among rural elderly in relation to socio-cultural factors	Samarpita Debnath (UGC fellow)

3. HUMAN GENETICS UNIT (HGU), KOLKATA

Research

1. Genetic and epigenetic association in Human Health and Diseases
2. To identify the role of genetic and epigenetic alterations in epidermal keratinocytes in the pathogenesis of Psoriasis
3. Spike protein mutations and its impact on SARS-CoV-2 transmission and vaccine efficiency
4. Genomic data integration
5. Development of single-cell data analysis methods
6. Genetic Association Mapping Of Comorbid Phenotypes
7. Combining Family-based Controls with Unrelated Cases In Genetic Mapping

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Raghunath Chatterjee	Genetics, genomics and epigenetics basis of Human health and diseases	Gobinda Chatterjee (IPGMER), Sujoy Ghosh (IPGMER), Soma Sarkar (NRS), Saibal Mukherjee (NRS), Soma Banerjee (IPGMER)
Saurabh Ghosh	Genetic Association Mapping of Comorbid Phenotypes, Combining Population level and Family Level Tests for Association, Integrating Genomic Data For Predicting Disease Risk	Sanjeev Jain (NIMHANS), Radha V (MDRF), Deepayan Sarkar, Sanjit Dey (CU)

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No.	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	The synergistic effect of microRNAs on target genes in Oral Squamous Cell Carcinoma	1 April, 2020	3 years	Raghunath Chatterjee
2	Some Statistical Issues In Simultaneous Genetic Analyses Of Multiple Phenotypes	1 April, 2020	3 years	Saurabh Ghosh

COMPLETED PROJECTS

Sl. No.	Name of the project	Starting Date	End date	Principal Investigator(s)
1	Modelling Transcriptional ... Gene Expression Data	1 April, 2019	31 March, 2022	Indranil Mukhopadhyay

Externally-funded Projects

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	To identify the role of genetic and epigenetic alterations in epidermal keratinocytes in the pathogenesis of Psoriasis	E157	18 March, 2021	3 years	Raghunath Chatterjee	SERB, Govt. of India	66,75,400/-

3.3 Computer and Communication Sciences Division (CCSD)

Professor In-Charge: KRISHNENDU MUKHOPADHYAYA, ACMU, Kolkata

Office: 5th floor, Platinum Jubilee Building, ISI, Kolkata-700 108

1

Advanced Computing and Microelectronics Unit (ACMU), Kolkata

- **Head of Unit:** SUSMITA SUR-KOLAY & SANDIP DAS
- **Number of Faculties:** Eleven (11)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** Five (5)
- **Number of Research Scholars:** Twenty Six (26)
- **Office:** 5th floor, Platinum Jubilee Building, ISI, Kolkata-700 108

2

Computer Science Unit (CSU), Chennai

- **Head of Unit:** SUJATA GHOSH & T. KARTHICK
- **Number of Faculties:** Four (4)
- **Number of Research Scholars:** Two (2)
- **Office:** 37 Nelson Manickam Road, Aminjikarai, ISI, Chennai-600 029

3

Computer Vision and Pattern Recognition Unit (CVPRU), Kolkata

- **Head of Unit:** SARBANI PALIT
- **Number of Faculties:** Seven (7)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Twenty-one (21)
- **Office:** 8th floor, S.N. Bose Bhavan, ISI, Kolkata-700 108

4

Cryptology and Security Research Unit (CSRU), Kolkata

- **Head of Unit:** GOUTAM KUMAR PAUL
- **Number of Faculties:** Four (4)
- **Number of Non-scientific Workers:** Three (3)
- **Number of Research Scholars:** Eight (8)
- **Number of Visiting Scientist:** Three (3)
- **Office:** 3rd floor, C.D. Deshmukh Bhavan, ISI, Kolkata-700 108

5

Documentation Research and Training Centre (DRTC), Bengaluru

- **Head of Unit:** M KRISHNAMURTHY
- **Number of Faculties:** Three (3)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Eleven (11)
- **Office:** 8th Mile, Mysore Road, ISI, Bengaluru- 560 059

6

Electronics and Communication Sciences Unit (ECSU), Kolkata

- **Head of Unit:** SWAGATAM DAS
- **Number of Faculties:** Eight (8)
- **Number of Scientific Workers:** Two (2)
- **Number of Non-Scientific Workers:** Six (6)
- **Number of Research Scholars:** Seventeen (17)
- **Office:** 9th floor, S.N. Bose Bhavan, ISI, Kolkata-700 108

7

Machine Intelligence Unit (MIU), Kolkata

- **Head of Unit:** PRADIPTA MAJI
- **Number of Faculties:** 10 (Ten)
- **Number of Non-Scientific Workers:** Two (2)
- **Number of Research Scholars:** Thirty-Five (35)
- **Number of Visiting Scientist:** Two (2)
- **Office:** 4th floor, Platinum Jubilee Building, ISI, Kolkata-700 108

8

Systems Science and Informatics Unit (SSIU), Bengaluru

- **Head of Unit:** SAROJ K. MEHER
- **Number of Faculties:** Four (4)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Two (2)
- **Office:** 8th Mile, Mysore Road, ISI, Bengaluru-560 059

1. ADVANCED COMPUTING AND MICROELECTRONICS UNIT (ACMU), KOLKATA

Research

The focus of the faculty members of the ACM Unit (ACMU) is in the core areas of Computer Science and Engineering, broadly spanning topics in Theoretical Computer Science and High Performance Computing Systems.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Ansuman Banerjee	Formal Methods Edge Computing	Dr. Swarup K. Mohalik, Ericsson Research Dr. N. C. Narendra Ericsson Research
Arijit Bishnu	Theoretical Computer Science	Manaswi Paraashar; Sayantan Sen; Gopinath Mishra, Warwick; Arijit Ghosh; Kunal Dutta, Univ. Warsaw; Subhas C. Nandy;
Arijit Ghosh	Theoretical Computer Science	Manaswi Paraashar; Sayantan Sen; Gopinath Mishra, Warwick; Sourav Chakraborty; Arijit Bishnu; Kunal Dutta, Univ. Warsaw; Nabal Hasan Mustafa, EISEE Paris; Jean-Daniel Boissonnat, INRIA; Siddharth Pritam, Shiv Nader Univ
Nabanita Das	Cognitive Radio Networks Parallel Computing Wireless Sensor and UAV Networks	Dr.SubhankarDhar, SJSU, USA Dr.Abhirup Das Barman, CU Dr. AnanthKalyanraman, WSU, Pullman, US
Sandip Das	Graph theory and Graph Algorithms Discrete and Computational Geometry Optimization	Binay Bhattacharya, SFU, Canada Sergio Cabello, University of Ljubljana, Slovenia Anil Maheshwari, Carleton University, Canada Swami Sarvattomananda, RKM University Yan Gerard, Université d'Auvergne, France Sagnik Sen, IITDh, Aritra Banik, NISER
Sasthi C. Ghosh	Wireless Networks Mobile Computing Device to device communications 5G cellular networks Wireless local area networks Network Planning and Optimization Hand-off management in heterogeneous networks	Arpan Chhattopadhyay, IIT Delhi
Sourav Chakraborty	Property Testing Probabilistic Verification Complexity Theory Streaming Algorithms Fourier Analysis Quantum Computation	Kuldeep Meel, NUS, Singapore; N.V. Vinodchandran, University of Nebraska; Ronald d'Wolf, CWI, Amsterdam; Arkadev Chattopadhyay, TIFR; Peter Hoyer, University of Calgary; Nikhil Mande, CWI; Rajat Mittal, IIT Kanpur; Swagato Sanyal, IIT Kgp; Manaswi Paraashar; Arijit Ghosh; Sayantan Sen; MIkhal Kouchy, Charles University, Prague; Gopinath Mishra, Warwick; Nitin Saurabh, IIT Hyd; Srinivasan Arunachalam, MIT; Troy Lee, University of Technology, Sydney

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Susmita Sur-Kolay	Algorithms for Physical Design Automation Hardware IP Security Quantum Computing In-memory Computation 3D Image Processing	Dr. Pritha Banerjee, CSE, CU; Dr. Debris Saha, AKCSIT, CU; Dr. S. Raghunathan, Dr. D. Vinayagamurthy, IBM; Prof. Amlan Chakrabarti, AKCSIT, CU; Dr. Debajyoti Bhattacharjee, IMEC Belgium

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	On the Interplay of Machine Models and Algorithms	2022	2025	Arijit Bishnu
2	Network selection in 5G and beyond: an AI perspective	2022	2025	Sasthi C. Ghosh
3	Verifying the Equivalence of Probabilistic Programs	2022	2025	Sourav Chakraborty

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Minimum Discriminating Codes in Geometric Setup	2020	2023	Subhas C. Nandy
2	Machine Learning Based Physical Design Automation for Next Generation ICs	2020	2023	Susmita Sur-Kolay
3	Center Location Problems on Graphs and Plane	2020	2023	Sandip Das
4	Distributed Algorithms for Fat Robots	2020	2023	Krishnendu Mukhopadhyaya
5	Geometric Shortest Path Problems with Violations	2020	2023	Sasanka Roy
6	Computational Topology and its Applications in Topological Data Analysis	2020	2023	Arijit Ghosh
7	Modeling, Verification and Synthesis for Multi-Access Edge Computing (MVSMEC)	2021	2024	Ansuman Banerjee
8	Co-operative Channel Sharing in Cognitive Radio Ad Hoc Networks- Phase II (CRAN2)	2021	2023	Nabanita Das

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Model Centric Algorithms for Graph Theoretic, Clustering and Geometric Problems	2019	2022	Arijit Bishnu
2	Relay Selection in 5G Device to Device Communications under Uncontrolled Interference	2019	2022	Sasthi C. Ghosh
3	Testers for Checking Correctness of Samplers	2019	2022	Sourav Chakraborty

Externally-funded Projects

NEW PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Towards Fourier Entropy Influence	E182	2022	2025	Sourav Chakraborty	SERB	6,60,000/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Design for Manufacturability aware Global Routing	251A	2010	Ongoing	Susmita Sur-Kolay	IBM, USA	5,96,649/-
2	United Software Defined Architecture for Industrial Internet-of-Things	E133	2019	September, 2022	Susmita Sur-Kolay	SERB	26,68,820/-
3	An Efficient Framework for Ensuring Security of FPGA-Based Environment	E122	2019	June, 2022	Susmita Sur-Kolay	SERB New Delhi	26,36,205/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Automated Methods for Implementing Robust and Bio-chemical Assays with Micro-fluidic Lab-on-Chips	E095	July 6, 2018	July 5, 2021	Ansuman Banerjee	SERB, Govt. of India	18,44,000/-

2. COMPUTER SCIENCE UNIT (CSU), CHENNAI

Research

During this pandemic time, Faculty of CSU actively assisted in teaching courses through online mode. They are also part of several conferences/workshops, and other academic activities, and served as invited speakers, Thesis examiners, Doctoral Committee members and Program committee members. Faculty of CSU are also actively involved in externally funded projects to support themselves and the institute. Faculties of CSU have published high quality papers in reputed Journals and Conferences in their area of research, and striving hard to do more in the near future.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Ayineedi Venkateswarlu	Construction of efficient MDS matrices	Sumanta Sarkar, Abhishek Kesarwani, Santanu Sarkar
Mathew C. Francis	Variants of the Gyarfas-Sumner Conjecture p-centered colourings of graphs Intersection dimensions of graphs Covering points in the plane using curves	Manu Basavaraju, L. Sunil Chandran, Rogers Mathew, Arijit Bishnu, Dalu Jacob, Drimit Pattanayak
Sujata Ghosh	Logic	Shreyas Gupta, Lei Li, Dazhu Li, Fenrong Liu, R. Ramanujam, Katsuhiko Sano, Yaxin Tu,
	Building agents for game playing	Harmen de Weerd
	On reasoning tasks performed by individuals with Autism Spectrum Disorder	Torben Braüner, Aishwarya Ghosh
T. Karthick	Coloring of some special classes of graphs	Maria Chudnovsky Shenwei Huang Jenny K. Kauffman Arnab Char

Projects

Externally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Strategizing with partial information – From game theory, logic and automata theory to experiments and computational models	E801	26 February, 2021	3 years	Sujata Ghosh	DST-CSRI	35,75,460/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Coloring of some special classes of graphs	N809	8 March, 2019	11 March, 2022	T. Karthick	DST- SERB-MATRICS	6,60,000/-

3. COMPUTER VISION AND PATTERN RECOGNITION UNIT (CVPRU), KOLKATA

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Debapriyo Majumdar	Profanity detection in online gaming	Bala Venkat, Ankit Gupta
	Automated answer validation for question answering	Arkadeep Baksi
	Semantic Search with noisy user feedback data under Multitask learning setup	Surender Kumar, Suraj Yadav
Mandar Mitra	Explainability of document ranking by neural models	Sourav Saha, Debapriyo Majumdar
	Implementing a Bibliographic Recommender System	Dipasree Pal, Dwaipayan Roy, Debanjan Dutta, P. Omkar Ashrit
	Query performance prediction	Debasis Ganguly, Suchana Datta
Sarbani Palit	Estimation of air pollution (particulate matter of size 2.5 /10 microns)	Harsh Bhandari, Soumajit Chowdhury
	Cyclicity detection in stratigraphic records	Sarbani Patrnabis-Deb, Soumajit Chowdhury, Ayoti Bannerjee
	Analysis and prediction of glacial lakes outburst flood (GLOF)	Subhranil Mustafi, Ayoti Bannerjee, Paramita Adhikari
Ujjwal Bhattacharya	Adaptive E-learning	Nushrat Hussain, Arpan Mukherjee
	Machine Learning Based Shipping Market Forecasting	
	Deep Learning for Identification of Motifs in Artifacts of Indus Valley Civilization	Debasis Mitra, Ananyapam De
	Machine Recognition of Indus Valley Script	Debasis Mitra, Shubham Basak, Nushrat Hussain, Arpan Mukherjee
	Deep Learning for Degraded Document Analysis	Ahana Kundu, Ayan Chaudhury, Partha Sarathi Mukherjee, Sudip Das, Chandan Biswas
	Deep Architecture for Video Summarization	Sanjoy Chowdhury, Aditya P. Patra, Subhrajyoti Dasgupta, Sudip Das, Atanu Santra

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Ujjwal Bhattacharya	Deep Network based Localization of Audio Source in Video Frames	Sanjoy Chowdhury, , Sudip Das , Subhrajyoti Dasgupta
	Multimodal Pedestrian Detection for Autonomous Driving	Kinjal Dasgupta, Arindam Das, Sudip Das, Ujjwal Bhattacharya and Senthil Yogamani
	Privacy Preserving Machine Learning	Chandan Biswas, Debasis Ganguly
	MLCC: Machine Learning for Cardiac Care	Shubham Basak
Umapada Pal	Handwritten Multilingual handwritten city Name Recognition	Kaushik Roy
	Classification of Personality Traits	Palaiahnakote Shivakumara Tapabrata Chakraborti, Tong Lu
	Self-supervised representation learning for detection of ACL tear injury	Saumik Bhattacharya
	Occluded text detection in natural scene images	Palaiahnakote Shivakumara, Tong Lu, Michael Blumenstein
	Biomedical Image Segmentation.	Debesh Jha, Sukalpa Chanda, Umapada Pal, Håvard D. Johansen, Dag Johansen, Michael A. Riegler, Sharib Ali, Pål Halvorsen
	Automatic Handwriting Answer-Script Evaluation	Tamaltaru Pal, Palaiahnakote Shivakumara
	Text based Pose Estimation	Saumik Bhattacharya, Michael Blumenstein
	Image Colorization	Saumik Bhattacharya, Michael Blumenstein
Utpal Garain	Design of robust AI systems for language and vision tasks	Akshay Chaturvedi, Omid Mohamad Nezami, Mark Dras, Abhisek Chakrabarty, Masao Utiyama, Eiichiro Sumita, Nicholas Asher, and Soumadeep Saha
	Deep Learning for Analysis of Psoriatic Skin	Anabik Pal, Akshay Chaturvedi, Aditi Chandra, Raghunath Chatterjee, Swapan Senapati and Alejandro F. Frangi
	Domain Knowledge Augmented ECG Analytics	Soumadeep Saha, Arijit Ukil, and Arpan Pal
	Machine learning for analysis of Peripheral Blood Smear Cells	Aditya Shankar Pal, Debasis Banerjee

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	DAMP: Deep Analysis for Pain Management	April 1, 2020	3 years	Utpal Garain
2	DADDI: Deep Analysis of Degraded Document	April 1, 2020	3 years	Ujjwal Bhattacharya
3	Air writing Recognition	April 1, 2020	3 years	Umapada Pal
4	Recommender System for Citations and Illustrations	April 1, 2020	3 years	Mandar Mitra
5	Image based estimation of air quality	April 1, 2021	3 years	Sarbani Palit

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	TrustED: Evaluating Trustworthiness of Deep Learning Systems	E-161	April 5, 2021	3 years	Utpal Garain	SERB-DST	58,62,142/-
2	Mentoring/Guiding the MOLIT on ML/AI Issues towards Achievement of Improved Results in Their AI/ML Based Projects Improved Results in Their AI/ML Based Projects	E-163	July 1, 2021	1 Year	Ujjwal Bhattacharya	MOL Information Technology India Pvt. Ltd.	14,00,000/- + GST

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Multi-Modal Learning in Limited Data Scenario	F011	August, 2020	2 years	Umapada Pal	Østfold University College, Norway.	10,47,550/-
2	Remote Intelligent Baby Monitoring	F013	September, 2020	2 years	Umapada Pal	BabySensor Company, Norway	20,15,250/-

4. CRYPTOLOGY AND SECURITY RESEARCH UNIT (CSRU), KOLKATA

Research

CSRU is a part of the Computer and Communication Sciences Division (CCSD) of Indian Statistical Institute, Kolkata. It is an integral component of R C Bose Centre for Cryptology and Security, a national hub for cryptographic requirements, cutting-edge research activities and indigenous capacity building in all relevant fields of study. The Unit aims at the promotion of interdisciplinary research in Mathematics, Computer Science and Statistics towards furtherance of teaching, research as well as training and development in Cryptology and Cyber Security.

Major activities of CSRU include teaching, training and research in Cryptology and Security. The Unit promotes sustained collaboration in focused research areas, and serves as a meeting point for eminent scholars. It also conducts internship and training programs targeted to produce a critical mass of experts to cater to the national and international requirements in this niche area.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Anisur Rahaman Molla	Security in Distributed Computing/ Byzantine Computation	Manish Kumar, John Augustine, Yadu Vasudev (IIT Madras), Gopal Pandurangan (UoH, Texas, USA), Ajay D. Kshemkalyani (UI, Chicago, USA), Gokarna Sharma (KSU, USA)
	Mobile Agents/ Robotics	Sumathi Sivasubramaniam, Prabhat Kumar Chand, Kaushik Mondal (IIT Ropar), Subhrangsu Mandal (IIIT Guwahati), William K. Moses Jr. (UoH, Texas,USA)
	Distributed graph algorithms	Sumathi Sivasubramaniam, Manish Kumar, Prabhat Kumar Chand

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Debrup Chakraborty	Symmetric Key Cryptography	Palash Sarkar, Cuauhtemoc Mancillas Lopez, Sebati Ghosh, Avisekh Mazumder, Samir Kundu
Goutam Paul	Quantum Information / Computing / Cryptography	Anindya Banerji (CQT, Singapur), Ritabrata Sengupta (IISER, Behrampur)
	Symmetric Cryptanalysis	Mostafizar Rahman, Amit Jana, Dhiman Saha(IIT Bhilai)
Sabyasachi Karati	Elliptic-Curve Crypto	
	Hash-based Crypto	Prof. Rei. Safavi-Naini
	Isogeny-based Crypto	

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Scalable and Secure Byzantine Algorithms in Distributed Networks	April 1, 2020	3 years	Anisur Rahaman Molla

Externally-funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Cryptanalysis of Symmetric Cipher Algorithms	E053	January 4, 2017	March 31, 2022	Goutam Paul	BARC, DAE, India	18,06,000/-
2	Exploration of Suitable Metric for TRNG	E128	April 18, 2019	March 31, 2022	Goutam Paul	DRDO, INDIA	20,60,000/-

Projects done for Govt. of India

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Distributed Computation in Dynamic Networks	E055	October, 2016	6 years (extended for 1 year)	Anisur Rahaman Molla	DST, Govt. of India	19,00,000/-

5. DOCUMENTATION RESEARCH AND TRAINING CENTRE (DRTC), BENGALURU

Research

The Documentation Research and Training Centre (DRTC) was established as an integral part of the Indian Statistical Institute in 1962. The primary objectives of DRTC are to promote research and training, in the area of Library Science, Documentation and Information Science.

Activities:

To achieve the objectives as mentioned above, the activities of DRTC have been grouped into:

a) Research Programme;

b) Educational and Training programme;

c) Continuing Education etc.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Biswanath Dutta	Knowledge Graph	Michael DeBellis, USA
	Ontology, Semantic techniques	Dr. Animesh Dutta, NIT, Durgapur
	Metadata	Dr. Clement Jonquet, INRAE (MISTEA) & University of Montpellier (LIRMM), France; Dr. Yann Le Franc, e-Science Data Factory, France
	Data Science	
	Electronic Health Information System	
Devika P. Madalli	Research Data Management, Open Access, Knowledge Organization, Semantic Web	
M. Krishnamurthy	Information seeking behavior, social media, information service and systems Knowledge representation	Prof A. Y. Asundi; Dr Subhash Reddy

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Integrated and Unified Data Model for Publication and Sharing of prolonged pandemic data as FAIR Semantic Data: COVID-19 as a case study	April, 2021	3 years	Biswanath Dutta
2	Ontology Information Systems for Knowledge Representation	July, 2021	3 years	M. Krishnamurthy

Externally-funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Online training on semantic web & classification & indexing systems	I322	24 th September, 2021	2nd October, 2021	Biswanath Dutta	Informatics Publishing Limited	1,00,000/-

6. ELECTRONICS AND COMMUNICATION SCIENCES UNIT (ECSU), KOLKATA

Research

Electronics and Communication Sciences Unit (ECSU) is the oldest unit under the Computer and Communication Sciences Division (CCSD) of Indian Statistical Institute, Kolkata. The unit actively engages in the pursuit of state-of-the-art research encompassing areas like computer vision, statistical machine learning, image processing, computational intelligence, information theory, and atmospheric science. The faculties take part in various Governmental and Industrial projects and consultancies focusing on real-life problems of national importance. The unit regularly organizes international conferences and workshops involving world-renowned researchers. Faculties of the Unit have received many national and international awards/honours in recognition of their research achievements. They also take part in dissemination knowledge in the form of teaching, training, and research guidance. Apart from the eminent faculties, the unit boasts of a vibrant team of junior and senior research fellows, project linked personnel, scientific and non-scientific workers whose contributions greatly enrich the achievements of the unit.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Dipti Prasad Mukherjee	Image and Video Processing Computer Vision Machine Learning	
Naqueeb Ahmad Warsi	Quantum bit commitment capacity	Masahito Hayashi; Nagoya University; Japan
Nikhil R. Pal	Machine Learning, Neuro-Fuzzy Control, Brain-Computer Interface	H. Zhang, J. Wang, K. Zhang; T. Huang; C. T. Lin, Y. K. Wang
Partha Pratim Mohanta	Machine/Deep Learning, Neural Networks, Artificial Intelligence, Image and Video Processing, Computer Vision	Sayed Umer, Aliah University; Sanjoy Kumar Saha, Jadavpur University; Mrinmoy Ghorai, IIIT, Sri City
Srimanta Pal	Neural networks, Fuzzy logic, Atmospheric science in soft computing paradigm, Econophysics, Currency crisis model, Numerical methods, Mathematical modelling	(1) Dr. T. K. Mandal, NPL, New Delhi; (2) Dr. S. K. Sharma, NPL, New Delhi; (3) Dr. Sanjoy Sharma, Kohima Science College, Kohima, Nagaland; (4) Prof. Saibal Kar, CSSSC, Jadavpur University, Kolkata
Sumana Ghosh	Verification of Neural Networked-Controlled Cyber-Physical Systems, Efficient Design of Wireless Cyber-Physical Systems, Real-Time Scheduling for Heterogeneous Embedded Platforms, Design of Secure Cyber-Physical Systems, Edge Computing for Autonomous Vehicles	Dr. Ansuman Banerjee; Dr. Samarjit Chakraborty, UNC Chappel Hill; Dr. Soumyajit Dey, IIT, Kharagpur
Swagatam Das	Deep Generative Models Data Clustering Class Imbalanced Learning Non-convex Optimization	1) Prof. Salvador Garcia, Univ. of Granada, Spai; 2) Dr. Jason Xu, Duke University, USA; 3) Prof. Vaclav Snasel, TU Ostrava, Czech Republic; 4) Dr. Rammohan Mallipeddi, KNU, Korea

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Investigating Multiple Kernel Approaches for Efficient and Effective Multi-View Clustering	April, 2020	3 years	Swagatam Das

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Peak demand forecasting for next 10 years with advanced machine learning models	I-076	February, 2022	1 Year	Swagatam Das	CESC, Kolkata Limited	5,15,660/-

Research Activities

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Digital Restoration and Reconstruction of Indian Heritage Artefacts with Focus on Murals, Manuscript, and Sculptures using Big Data Technology	E - 118	May, 2019	3 years	Swagatam Das	DST-SERB	48,400/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1.	Development of Advanced Machine Learning Tools for Multi-modal Image Assisted Diagnostics of Infectious Respiratory Diseases	E-148	December, 2020	March, 2022	Swagatam Das	DST-SERB	10,00,000/-
2.	Automated Coal Petrography	I-61	July, 2020	March, 2022	Dipti Prasad Mukherjee	Tata Steel	16,89,000/-

7. MACHINE INTELLIGENCE UNIT (MIU), KOLKATA

Research

The objective of the unit is to carry out fundamental research concerning certain aspects of machine intelligence. Machine intelligence signifies the work associated with attempting to make a machine behave like a human being, and conveys the core concept of pattern recognition and machine learning with the advanced technologies like fuzzy logic, artificial neural networks, evolutionary computing, granular computing and rough sets. These tools provide efficient theories of flexible information processing, can tackle real-life ambiguous situations in an efficient manner like human beings, and therefore form the basis of future generation computing systems. The faculty members of the unit have also started working in the area of deep learning, both from the perspectives of theory and applications. Applications include bioinformatics, personalized medicine, computer vision, medical image processing and network analysis, while theoretical study deals with developing novel deep models with optimized architecture and appropriate learning algorithms for solving certain problems.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Ashish Ghosh	Machine learning, bioinformatics	Dr. Jonathan H. Chan, Associate Professor, King Mongkut's University of Technology Thonburi, Thailand
	Image processing	Dr. T. Veerakumar, Assistant Professor, NIT, Goa
	Video analysis	Dr. B. N. Subudhi, Assistant Professor, IIT, Jammu
	Evolutionary computation	Dr. S. Dehuri, Professor, F. M. University, Balasore, Odisha
	Soft computing	Dr. S.B. Cho, Professor, Yonsei University, South Korea
Bulusu Uma Shankar	Machine Learning based Global Terrestrial Gross Primary Productivity (GPP) Model Development using Satellite Driven Observation and Eddy Flux Covariance Data.	Dr. Bikash Ranjan Parida, Assistant Professor, Department of Geoinformatics, School of Natural Resource and Management, Central University of Jharkhand; Ashish Ghosh
	Artificial Intelligence for Affordable Screening and Prediction of Diabetic Retinopathy in the Framework of Big Data	Sushmita Mitra
Deba Prasad Mandal	Community Question Answering Services	Dipankar Kundu & Rajat Kumar Pal
	Graph Neural Network Model	Dinabandhu Bhandari & Pabitra Mitra
Kuntal Ghosh	Computer Vision	Rajdeep Das; Ashish Bakshi, Ajoy Mandal; Srutiparna Neogi; Sanjit Maitra
	Complex Network	Swarup Chattopadhyay; Gautam Das
Malay Bhattacharyya	Crowdsourcing, Big Data Analysis, Computational Biology	Christopher E. Mason; Niranjan Nagarajan; Emmanuel Dias-Neto; Eran Elhaik; Christelle Desnues; Michael Poulsen; E.E. Afshin; David Danko
Rajat K. De	Computational Biology, Machine Learning, Big Data Analytics	Sushil K. Mahata, University of California, San Diego, USA; Abhijit Dasgupta, St. Jude Children's Research Hospital, Memphis, USA; Vivek Das, Novo Nordisk A/S, Denmark
Pradipta Maji	Machine Learning, Computer Vision and Image Understanding, Multiview Learning, Manifold Learning, Deep Learning, Medical Image Analysis, Bioinformatics	Dr. Archya Dasgupta, ACTREC, Tata Memorial Centre, Mumbai; Dr. Sudipto Saha, Bose Institute, Kolkata; Dr. Ratan K. Saha, IIIT Allahabad; Dr. Abhirup Banerjee, Oxford University, UK; Dr. Shaswati Roy, RCCIIT, Kolkata
Shubhra Sankar Ray	Bioinformatics, Computational Biology, Neural Networks, Soft Computing	Joginder Singh; Sukriti Roy; Sudip Ghosh; Jayanta K. Pal; Sampa Misra

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Sushmita Mitra	Deep learning, Data science, Medical image analytics	Dr. A. Dhara & Dr. T. K. Bera, NIT Durgapur; B. Uma Shankar; Dr. R. Raman, Sankara Nethralaya; Dr. I. Mullick & Dr. P. Roy, TMC Kolkata; Prof. P. Shenoy, UMass, USA; Dr. S. Chatterjee, Park Clinic

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Brain network analysis of neurological disorders like stroke, epilepsy, and dementia	April, 2021	3 years	Kuntal Ghosh
2	Anomaly Detection in Streaming Environment for IoT and Sensor Data	April, 2021	3 years	Ashish Ghosh

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Habitat imaging for survival prediction in radiogenomics	1st April, 2020	3 years	Susmita Mitra
2	Three Timescale Modeling of Biochemical Pathways: Integration of Signaling, Gene Regulatory and Metabolic Pathways	1st April, 2019	3 years	Rajat K. De
3	Multi-Omics Data Integration for Cancer Subtype Discovery	1st April, 2020	3 years	Pradipta Maji
4	Judgment Analysis on Multi-dimensional Crowd Opinions	1st April, 2020	3 years	Malay Bhattacharyya
5	Machine Learning based Global Terrestrial Gross Primary Productivity (GPP) Model Development using Satellite Driven Observation and Eddy Flux Covariance Data.	April, 2020	3 years	B. Uma Shankar

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	End date	Principal Investigator(s)
1	Identifying various stages of cancer using miRNA Expressions	April 2019	March 2022	Shubhra Sankar Ray
2	Understanding the mechanisms of perceptual filling-in and attention in low-level vision	April 2018	March 2022 (Extended for one year)	Kuntal Ghosh

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No. (mandatory)	Starting Date	Duration	Principal Investigator(s)	Funding agency (mandatory)	Sanctioned amount (₹)
1	J. C. Bose National Fellowship	E 156	April 2021	5 years	Susmita Mitra	DST, SERB	95,00,000/-
2	Artificial Intelligence for Affordable Screening and Prediction of Diabetic Retinopathy in the Framework of Big Data	E 173	December 2021	3 years	Susmita Mitra	DBT	33,94,696/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No. (mandatory)	Starting Date	Duration	Principal Investigator(s)	Funding agency (mandatory)	Sanctioned amount (₹)
1	Deep learning for handling imbalance in Diabetic Retinopathy	F 008	December 2018	4 years	Susmita Mitra	Intel, USA	8070 USD
2	Technology Innovation Hub on Data Science, Big Data Analytics and Data Curation	E 151	August, 2020	5 years	Ashish Ghosh	DST	100,00,00,000/-
3	Distributed cognitive system for healthcare	E 143	April 2020	3 years	Ashish Ghosh	MEITY, New Delhi	1,32,55,000/-
4	Hardware Trojan detection in PCBs using X-ray images		October 1, 2019	December 2022	Ashish Ghosh	DRDO	63,38,000/-
5	Center for distributed deep learning framework for classification		Sept 2019	Sept 2022	Ashish Ghosh	Indo-US Science and Technology Forum	32.870,00,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No. (mandatory)	Starting Date	End date	Principal Investigator(s)	Funding agency (mandatory)	Sanctioned amount (₹)
1	Understanding the Efficacy of Existing Drug Molecules on COVID-19 and Interactive Pathways: A Deep Learning Model	E146	July,2020	July, 2021	Rajat K. De	SERB	4,30,000/-
2	Development of Computational Techniques to Integrate Multimodal, Multiscale Omics and Imaging Data for Cancer Diagnosis and Prognosis	E036	May, 2016	April, 2021	Pradipta Maji	Ministry of Electronics and Information Technology, Government of India	37,00,000/-
3	Network Based Prediction of COVID-19 Spread in India under Migration	E147	July, 2020	June, 2021	Malay Bhattacharyya	SERB, Department of Science and Technology, Government of India	5,50,000/-

8. SYSTEMS SCIENCE AND INFORMATICS UNIT (SSIU), BANGALORE

Research

SSIU is a multidisciplinary unit for scientific computation specializing in Informatics and Machine Learning. Currently, our research areas include; Mathematical Morphology, Mathematical Earth Sciences, Spatial Data Science, Neuro-informatics, Computational Neuroscience, Machine Learning, Granular Computing, Domain adaptation, Quantum condensed matter theory, quantum computation, quantum information, Graphene physics. We have plans to offer postgraduate-level courses in Informatics and Machine Learning. We want to consolidate our current areas of research with internal (within ISI) and external collaboration. We brought quite a good amount of external funding and looking forward to getting more. Our research publications are on par with any top notch University across the globe. We are also looking forward to industry collaboration. ISI has eight master's and two bachelor's programs. SSIU faculties have taught or are still teaching in five master's and one bachelor's programs. SIU faculties also guided the dissertation of MSLIS, M. Tech.(CS), MSQMS, M. Math. and B. Math.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
B. S. Daya Sagar	Watershed Arcs in Image Segmentation	Sampriti Soor
	Mathematical Morphology in Digital Elevation Models (DEMs)	K. Nagajothi, ISRO
	Hyperspectral Image Classification via Mathematical Morphology	Geetika Barman
Kaushik Majumdar	Fundamental laws of network synchronization	
Prabuddha Chakraborty	Quantum Monte Carlo simulations of interacting and disordered bosons in an optical lattice.	Krishnendu Sengupta, Indian Association for the Cultivation of Sciences
	Quantum Monte Carlo simulations of gauge fields and interacting fermions on the lattice.	Vijay Shenoy, IISc, Bangalore
	Interplay of topological phases and superconducting order in Dirac fermions.	Pallab Goswami, Northwestern University, USA
Saroj K. Meher	Semisupervised learning based classification	Neeta Kothari
	Domain Adaptation	Neeta Kothari, Sankar K. Pal
	Granular deep learning	Sankar K. Pal and D. Arun
	Adversarial Machine Learning	

Projects

Externally funded project

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Analysis of Optical and Radar Remote Sensing Images for Dynamic Earth Process Monitoring	E511	April, 2019	3 Years	B. S. Daya Sagar; Subhasish Chaudhuri, IIT, Bombay; Arundhati Mishra-Ray, SAC-ISRO; Lorenzo Bruzzone, University Trento, Italy	DST (DST-ITPAR-IV: Govt. of India)	1,36,00,000/-
2	An efficient measure of network synchronizability with applications	E514	20th February, 2020	3 years	Kaushik Majumdar	SERB, DST	7,20,000/-

3.4 PHYSICS AND EARTH SCIENCES DIVISION (PESD)

Professor In-Charge: PREETI PARASHAR, PAMU, Kolkata

Office: 7th floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

1

Geological Studies Unit (GSU), Kolkata

- **Head of Unit:** SARBANI PATRANABIS DEB and SHILADRI SEKHAR DAS (ACTING)
- **Number of Faculties:** Seven (7)
- **Number of Scientific Workers:** One (1) (RA)
- **Number of Non-Scientific Workers:** Five (5)
- **Number of Research Scholars:** Fourteen (14)
- **Number of Visiting Scientists:** One (1)
- **Office:** 2nd floor, Platinum Jubilee Building, ISI, Kolkata-700 108

2

Physics and Applied Mathematics Unit (PAMU), Kolkata

- **Head of Unit:** GURUPRASAD KAR (April 1, 2021 to June 30, 2021) and SUPRATIK PAL (July 1, 2021 to March 31, 2022)
- **Number of Faculties:** Ten (10) + Four (4) (Inspire Faculty)
- **Number of Non-Scientific Workers:** Two (2)
- **Number of Research Scholars:** Twenty-Nine (29)
- **Number of Visiting Scientists:** Four (4)
- **Office:** 7th floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

3

Theoretical and Applied Sciences Unit (TASU), North-East Centre, Tezpur

- **Head of Unit:** KUNTAL GHOSH
- **Number of Faculties:** Four (4)
- **Number of Scientific Workers:** Two (2) (RA)
- **Office:** Punioni, Solmara, ISI, Tezpur, Assam-784501

1. GEOLOGICAL STUDIES UNIT (GSU), KOLKATA

Research

Understanding the dynamics of the Earth and Environment systems through time by pursuing integrated research projects constitutes the essence of the activities of Geological Studies Unit (GSU), Indian Statistical Institute, Kolkata. We try to develop statistical, analogue and numerical models by studying structures and tectonics, sedimentology, palaeontology, geochemistry, geo-hydrology, biodiversity and biotic evolution through geological ages, starting from the Precambrian through the Phanerozoic period. Research students working for their PhD dissertation are the main strength of GSU. Students are also trained to carry out extensive geological field work and techniques of data collection. At the same time, computational techniques are also used for geological modelling by numerical simulation and development of software to suit specific needs of the unit. GSU also offers an elective course along with field study to the B.Stat students, which encompasses basic ideas of Earth System Science. Present projects cover.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Dhurjati Prasad Sengupta	Evolution, diversity and taphonomy of Triassic Gondwana Vertebrates, Morphometry, Gondwana stratigraphy (Triassic)	1. Saswati Bandyopadhyay. 2. Susmita Sur-Kolay 3. Somobali Ghoshal Calcutta University. 4. Sanjukta Chakravorti, JIS University. Kolkata. 5. Saradee Sengupta, Durgapur Govt. College. 6. Geologists of Paleontology Division, CHQ, Geological Survey of India. 7. Dorota Konietzko-Meier, Depatment of Biosystematics, University Opole, Poland 8. Elzbieta Teshner, Opole, Poland. 9. Pravat Munshi, Kanpur IIT (retired). 10. S. Sarkar, IIT Kanpur. 11. Martin EzcuraMuseo Argentino de Ciencias Naturales
	Taphonomy of Eocene larger benthic foraminifera and coeval macrofauna of Kutch Basin	1. Parthasarathi Ghosh, 2. Sreemoyee Chakravorti
Parthasarathi Ghosh	Sedimentology and Paleoclimatology	1. S. Dutta, 2. A. Choudhury, 3. P. Sanyal (IISER, Kolkata)
	Geo-Spatial Data Analysis	
	Terrestrial Surface Dynamics	
Sarbani Patranabis-Deb	Sedimentology and Stratigraphy	1. Amlan Banerjee 2. Dilip Saha 3. Sarbani Palit 4. Michiel Olivier De Kock (University of Johannesburg, SA)
Shiladri Shekhar Das	Whale (Delphinidae) fall fauna from the lower Miocene of Kutch, India	1. P. Goswami 2. S. Panja
	Taxonomy and Paleobiogeographic implications of two new species of Talantodiscus (Gastropoda, Pleurotomariidae) from the Jurassic of western India.	1. S. Saha, 2. S. Mondal 3. K. Bose

Name of the DCSW Member	Research topic(s)	Collaborator(s)
	Evolution and extinction of Chartronella (Gastropoda): A study from the uppermost Jurassic of Kutch, India.	1. S. Bardhan, 2. S. Saha 3. S. Paul
	Global paleobiogeographic distributions and migration patterns of the Cenozoic pleurotomariid gastropods (Family: Pleurotomariidae Swaison, 1840)	1. K. Bose 2. S. Mondal
	An assemblage of stromboid gastropods (Superfamily Stromboidea Rafinesque, 1815) from the Miocene of Dwarka Basin, western India and, their paleobiogeographic implications.	1. K. Bose 2. S. Saha
	Ichnology and paleoecology of a Middle Eocene assemblage from Fulra Formation, Matanomadh, Kutch, Gujarat	1. A Chakraborty, 2. S. Mondal 3. U. Sarkar
	Naticid gastropod predation on bivalve assemblages across the K-Pg mass extinction boundary in Rajahmundry, India	1. S. Bardhan 2. S. Mallick
Amlan Banerjee	Geochemical modeling & water–rock interaction; Dolomite formation and dolomitization; Talc mineralization and geochemical model; Oxygenation of the Proterozoic Ocean and atmosphere; Oxygenation of the Proterozoic Ocean and atmosphere; Granite and greenstone belts	1. Sarbani Patrnabis Deb 2. Dilip Saha, 3. Mirosław Słowakiewicz
Tridib Kumar Mondal	Structural Geology and Tectonics	1. Amlan Banerjee 2. Manish Mamtani 3. Thirukumaran V 4. Sakhawat Hossain 5. Arnab Sain 6. Sourav Mondal 7. Susanta Samanta 8. Soumendu Sundar Mukherjee
	Fabric analysis	
	Paleostress analysis Structural control on mineralization	
	Vein emplacement and upper crustal fluid flow	
	Mechanical characterization of apparently massive and foliated rocks	
Debarati Mukherjee	Ichnological model, palaeoenvironment and palaeoclimate of the Upper Triassic continental red bed from India: implications for palaeoenvironment and palaeoclimate	1. Suchana Taral, Pondichery University; 2. Sanghamitra Ray, IIT Kharagpur
	Quantitative approach to understand the evolutionary trends of the Mesozoic archosauromorph claws	1. Nibedita Rakshit, IIT Bombay
	Mesozoic Gondwana Vertebrates of India	1. Sunil Bajpai, IIT Roorkee
	Bone histology and functional attributes of premaxillae of Hyperodapedon tikiensis from the Upper Triassic Tiki Formation of India	1. Sanghamitra Ray, IIT Kharagpur
	Signature of diagenetic alteration of dicynodont bones from coeveal Permian-Triassic horizons of South Africa and India: palaeoenvironmental implications	1. Anusuya Chinsamy-Turan, University of Cape Town, South Africa
	Revision of the basal Archosauromorhs from South Africa	1. C. Browning, Curator, Karoo Palaeontology, Iziko Museum, Cape Town, South Africa

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	To understand oxygenation of Indian Mesoproterozoic basins using geochemical proxies of sedimentary records	1st April 2021	3 years	Amlan Banerjee
2	Taphonomic significance of two discrete biotic elements, a new remingtonoce whale and larger benthic foraminifera from the Eocene Kutch basin	1st April 2021	3 years	Dhurjati Prasad Sengupta
3	Life dynamics of sympatric sauropod dinosaurs: a case study from the continental Jurassic of India	22nd October 2021	1 year	Debarati Mukherjee
4	Understanding the mechanism of tensile fractures and estimation of paleostress in mechanically rigid layers	April 1, 2021	1 year	Tridib Kumar Mondal

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1.	Micro- and mega- vertebrate and Palynological studies of Panchet formation, Damodar valley basin, India.	24th October 2019	3 years	1. Dhurjati Prasad Sengupta 2. Pummy Roy (Geological Survey of India)

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	End date	Principal Investigator(s)
1.	Neoproterozoic cratonic basins in southern India: Palaeoclimatic, palaeoenvironmental and palaeotectonic implications	April 1, 2019	March 31, 2022	Patranabis-Deb Sarbani

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Museum on the wheels	F 014	October 2021	1 year	Sanjukta Chakravorti	Palaeontological Association, London	7000 GDP ~Rs. 7,00,000/-
2	Spatial Modelling of Arsenic Contamination data from West Bengal and Bangladesh	D001 (9443)	October, 2021	1 year	Amlan Banerjee & Soumendu Sundar Mukherjee (ISRU, ISI)	Corporate Social Responsibility (CSR)	2,75,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1.	Systematics, Palaeobiogeography and change in diversity of Tertiary Gastropoda of Kutch, Gujarat.	E108	October 12, 2018	March 31, 2022	Shiladri Shekhar Das	SERB, DST, Govt. of India	41,40,640/-

2. PHYSICS AND APPLIED MATHEMATICS UNIT (PAMU), KOLKATA

Research

The major areas of research in Physics and Applied Mathematics Unit are different leading branches of Theoretical Physics and Applied Mathematics. Additionally, some experimental works are also being done in the Fluvial Mechanics Laboratory of this Unit. The areas of Physics in which work has been going on are Cosmology and Astroparticle Physics and related Data Science, High Energy Physics, Condensed Matter Physics, Mesoscopic Physics and Nano-electronics, Physics of Complex Phenomena, Quantum Field Theory, Quantum Information Theory, Foundation of Quantum Mechanics and Quantum Thermodynamics. Research activities in the areas of Applied Mathematics mostly deal with Nonlinear Dynamical Systems, Temporal Networks, Synchronization, Clustering and Death in Networks of Complex Systems, Quantum Coherence as Resource Theory, Study of Quantum Channel and Quantum Cryptography. At present, the areas in which experiments in Fluvial Mechanics Laboratory are performed are the following: Sediment-Fluid Interactions, Flow Visualization and Turbulent Flow in Open Channel.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Banasri Basu	Physics of Quantum Materials	Anirudha Menon
	Physics of Socio-economic phenomena	Abhik Ghosh, Aniirudha Menon
Dibakar Ghosh	1. Temporal complex network 2. Eco-evolutionary game theory 3. Extreme events and Statistics	Stefano Boccaletti, Italy; Matjaz Perc, Slovenia; Syamal K Dana (NIT Durgapur) and Gopal K Basak
Guruprasad Kar	Quantum Foundation and Quantum Information	Manik Banik, IISER TVM, Sibasish Ghosh, IMSC, Chennai, Alok Pan, NIT, Patna
Preeti Parashar	Quantum Information Theory, Quantum Thermodynamics	Anandamay Das Bhowmik, Manik Banik (IISER TVM)
Ramij Rahaman	Quantum Cryptography, Quantum Information Processing	Guruprasad Kar and Sibasish Ghosh, IMSc., Chennai
Sankar Sarkar	Degraded bed hydrodynamics	Partha P. Gopmandal
Santanu K. Maiti	1. Nanoscale thermoelectricity 2. Spintronics 3. Magnetic field and bias driven circular currents 4. Localization phenomena 5. Driven quantum systems 6. Many-body theory 7. Phononic system	S. Chakraborty, S. Roy, J. Majhi, S. Sarkar, A. Koley, D. Das Gupta, R. Bhattacharya, M. Patra (Kwansei Gakuin University, Japan), M. Dey (Adamas University), S. Sil (Visva-Bharati University), J. Silva (Universidad Pedagogica, Colombia), D. Laroze (Universidad de Tarapaca, Chile)
Supratik Pal	Cosmology and Astroparticle Physics	Anish Ghoshal (Warsaw), Gaitano Lambiase (INFN Salerno), Soumitra SenGupta and Sumanta Chakraborty (IACS), Soumendra Kishore Roy (SUNY, Stony Brook), Pratyusava Baral (Wisconsin, Milwaukee), Arindam Chatterjee (SNU)
	Data Science	
Subir Ghosh	Effect of time crystal condensate on cosmology	Raj K. Das
	Cosmological modelling for HO tension	S. Pan (Presidency Univ) and Raj K. Das
	Anomalies in classical fluid	A. K. Mitra (HRI)
	Anyonic uncertainty principle	Joydeep Majhi
	Chaotic dynamics near black hole horizon	E. Vagenas (Kuwait Univ.)
Swapan Rana	Quantum Resource Theory, Quantum Operations, Coherence, Entanglement	Alexander Streltsov (CeNT, Poland)

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No.	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Resource theory of coherence and its interplay with entanglement	August 18, 2021	1 year	Swapan Rana
2	Self-testing of multipartite entanglement and its applications in secure communication	August 18, 2021	1 year	Ramij Rahaman

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Three-dimensional turbulence characteristics over a bimodal water-worked gravel-bed	April 1, 2019	3 years	Sankar Sarkar

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	SERB-CRG project	E-181	February 21, 2022	3 years	Dibakar Ghosh	DST-SERB	21,74,546/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Unravelling the interdisciplinary facets of physics and data sciences in socio-economic challenges	E-135	December 26, 2019	3 years	Banasri Basu	DST-SERB	21,19,546/-
2	Indo-Russian joint project	E-139	January 21, 2020	2 years and 6 months	Dibakar Ghosh	DST	16,34,200/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Quantum transport in mesoscale and nanoscale systems: Open problems and challenges	E-103	September 14, 2018	3 years	Santanu K. Maiti	DST-SERB	18,60,980/-

3. THEORETICAL AND APPLIED SCIENCES UNIT (TASU), NORTH-EAST CENTRE, TEZPUR

Research

The Theoretical and Applied Sciences Unit (TASU) was established in August 2018. The goal of the Unit is to pursue research in (a) basic theoretical sciences and (b) emerging interdisciplinary and multidisciplinary applied sciences. The Unit is currently involved in: i) Research work related to finding formulas for the number of representations of squares by certain diagonal quadratic forms of odd number of variables using the theory of modular forms of half-integral weight has been studied. An extension of the Ramanujan-Serre derivative map is obtained and evaluation of several types of convolution sums of the divisor functions have been derived as a consequence. ii) Bankline detection and monitoring techniques near Kaziranga National Park; Crop health monitoring; Impact of Amphan and Yash cyclones during COVID-19 lockdown in Sundarban adjacent gangetic West Bengal. iii) Air quality, Atmospheric sciences, and Climate change. The Unit aims to complement research and development on Sustainable Development Goals, in line with the ongoing work of MoSPI towards monitoring progress on the environmental indicators.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
B. Ramakrishnan	Representations of squares by certain diagonal quadratic forms in an odd number of variables	Brundaban Sahu and Anup Kumar Singh (NISER, Bhubaneswar)
	A simple extension of Ramanujan-Serre derivative map and some applications	
Darpa Saurav Jyethi	Air quality, Climate change	
Sanjit Maitra	Bankline detection and monitoring technique near Kaziranga National Park	Tapan Chakraborty, Kuntal Ghosh, Aniruddha Dey (MAKAUT), Srutiparna Neogi (IIIT Kalyani), Geetanjali Aich, Suchismita Bhattacharya
	Crop Health Monitoring	Rituraj Gogoi
	Impact of Amphan and Yash cyclones during COVID-19 lockdown in Sundarban adjacent gangetic West Bengal	Hari Charan Behera, Tarun Kabiraj, Kuntal Ghosh, Darpa Saurav Jyethi, Partha De, Rabindranath Jana

Projects

Internally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Atmospheric Particulate Matter (PM2.5) associated Elemental Carbon, Organic Carbon and Water-Soluble Organic Carbon at Tezpur, a site in the North Bank Plain Region of Brahmaputra Valley	April 1, 2020	3 years	Darpa Saurav Jyethi
2	Modeling crop growth and detection of stress regions during the growing season in Sonitpur district, Assam	June 5, 2020	3 years	Sanjit Maitra

3.5 SOCIAL SCIENCES DIVISION (SSD)

Professor In-Charge: MANIPUSHPAK MITRA, ERU Kolkata

Office: 6th floor, S.N. Bose Bhavan, ISI, Kolkata-700 108

1

Economic Analysis Unit (EAU), Bangalore

- **Head of Unit:** MADHURA SWAMINATHAN
- **Number of Faculties:** Two (2)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Six (6)
- **Number of Visiting Scientists:** One (1)
- **Office:** 8th Mile, Mysore Road, ISI, Bengaluru-560 059

2

Economics and Planning Unit (EPU), Delhi

- **Head of Unit:** DEBASIS MISHRA
- **Number of Faculties:** Eleven (11)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Twenty-seven (27)
- **Number of Visiting Scientists:** Eleven (11)
- **Office:** 7, S.J.S. Sansanwal Marg, ISI, New Delhi-110 016

3

Economic Research Unit (ERU), Kolkata

- **Head of Unit:** TARUN KABIRAJ
- **Number of Faculties:** Nine (9) [including one contractual faculty member]
- **Number of Scientific Workers:** Two (2)
- **Number of Non-Scientific Workers:** Four (4) and one-part time
- **Number of Research Scholars:** Eleven (11)
- **Number of Visiting Scientists:** Five (5)
- **Office:** 6th floor, S.N. Bose Bhavan, ISI, Kolkata-700 108

4

Linguistic Research Unit (LRU), Kolkata

- **Head of Unit:** NILADRI SEKHAR DASH
- **Number of Faculties:** One (1)
- **Number of Non-Scientific Workers:** Three (3)
- **Number of Visiting Scientists:** Nine (9)
- **Office:** Ground floor, R. A. Fisher Bhavan, ISI, Kolkata-700 108

5

Population Studies Unit (PSU), Kolkata

- **Head of Unit:** PRASANTA PATHAK (retired on August, 2021), MANIPUSPAK MITRA (September, 2021 31st March, 2022)
- **Number of Faculties:** One (1) (up to August, 2021)
- **Number of Scientific Workers:** Two (2)
- **Number of Non-Scientific Workers:** Two (2) and one-part time
- **Number of Visiting Scientists:** One (1)
- **Office:** 5th floor, R. A. Fisher Bhavan, ISI, Kolkata-700 108

6

Psychology Research Unit (PRU), Kolkata

- **Head of Unit:** DEBDULAL DUTTA ROY
- **Number of Faculties:** Two (2)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** Three (3)
- **Number of Research Fellows:** Two (2)
- **Number of Visiting Scientists:** Five (5)
- **Office:** 7th floor, Platinum Jubilee Building, ISI, Kolkata-700 108

7

Sampling and Official Statistics Unit (SOSU)

- **Head of Unit:** NACHIKETA CHATTOPADHYAY
- **Number of Faculties:** Four (4)
- **Number of Non-Scientific Workers:** Three (3) and two-part time
- **Number of Visiting Scientists:** One (1)
- **Office:** 3rd floor, C.D. Deshmukh Bhavan, ISI, Kolkata-700 108

8

Socio-Economic Research Unit (SERU), North-East Centre, Tezpur

- **Head of Unit:** GOUTAM MUKHERJEE
- **Number of Faculties:** Two (2)
- **Office:** Punioni, Solmara, ISI, Tezpur, Assam- 784501

9

Sociological Research Unit (SRU), Giridih & Kolkata

- **Head of Unit:** TARUN KABIRAJ
- **Number of Faculties:** One (1)
- **Number of Scientific Workers:** Two (2)
- **Number of Non-Scientific Workers:** One (1) and one-part time
- **Number of Research Scholars:** One (1)
- **Giridih Office:** New Barganda, ISI, Giridih, Jharkhand- 815 301
- **Kolkata Office:** 5th floor, R. A. Fisher Bhavan, ISI, Kolkata-700 108

1. ECONOMIC ANALYSIS UNIT (EAU), BANGALORE

Research

Research students and faculty of EAU continue to work on contemporary problems of development, especially pertaining to the rural economy. Using secondary and primary data, we have examined issues of women's work in agriculture, impact of climate change on agricultural yields and input use, problems of incomes from rice cultivation in India and Vietnam, features of Scheduled Caste majority villages, access to rural energy and understanding tenancy. Our concerns are with understanding the overarching problems of poverty, inequality and food insecurity in the context of the pandemic and identifying suitable policy approaches.

Current Areas of Research

Name of the DCSW Member	Research topic(s)
Madhura Swaminathan	Rural women workers: evidence from time use surveys in Indian villages
	COVID-19 and Food Security
	Rural household incomes, poverty and inequality and caste discrimination
	Changing structure of rural credit market
Molly Chattopadhyay	Research on Official Statistics regarding Women's Labour in India

2. ECONOMICS AND PLANNING UNIT (EPU), DELHI

Research

Economics and Planning Unit at Delhi comes under the Social Sciences Division of ISI. We carry out research in the areas of economic theory, applied economics and econometrics, macroeconomics, growth theory, econometric methods, time series analysis and economic statistics. Some specific areas are: welfare economics, industrial economics, game theory and applications, international economics, public economics, financial economics, agricultural economics, development economics, environmental economics, issues on living standards, gender studies and labour economics. While the quantitative and applied work involves extensive application of existing statistical and mathematical tools, substantial contribution is being made in econometric and time series methods in the areas of macro-econometrics, micro-econometrics and financial econometrics.

Economics and Planning Unit has a doctoral program in Economics and a Master's program called Masters in Science in Quantitative Economics (MSQE). We offer courses in Microeconomics, Macroeconomics, Statistics and Econometrics, Mathematics for Economists, Economic Development, Game Theory, Macro Dynamics, International Economics, Finance, Industrial Organization, Dynamic Programming, Applied Econometrics, Time Series Econometrics, Social Choice and Political Economy, Public Economics, Intertemporal Economics, and Environmental Economics, and many more. Details about courses and our Masters and doctoral program can be found under the Academics link.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Abhiroop Mukhopadhyay	Education, STEM gender gap, Social Capital, Human Capital, Teacher Transfer, Ageing, Political Economy	Aparajita Dasgupta (Ashoka Univ), Nishith Prakash (u Conn), Amparo Costello Climent (U Valencia)
Arunava Sen	Mechanism design, Matching and Axiomatic allocation theory	Ankit Singh, Souvik Roy, Ujjwal Kumar, Huaxia, Zeng, Sonal Yadav, Debasis Mishra, Rajiv, Vohra
Chetan Ghate	Monetary Economics, Macroeconomics, Growth and Development	Piyali Das, Debdulal Mallick, Parantap Basu
Debasis Mishra	Multidimensional mechanism design	Sushil Bikhchandani, UCLA
	Stable dissolution of partnership	Arunava Sen, ISI Delhi and Rajiv Vohra, Brown University
	Reduced-form voting	Xu Lang, Southwestern University of Finance and Economics

Name of the DCSW Member	Research topic(s)	Collaborator(s)
E. Somanathan	Electric Stoves as a Solution to Household Air Pollution: Evidence from India	Eshita Gupta, Marc Jeuland, Rachit Kamdar, Utkarsh Kumar, T. V. Ninan, Vidisha Chowdhury, Suvir Chandna, Michael H. Bergin, Karoline Barkjohn, Christina Norris, T. Robert Fetter, and Subhrendu K. Pattanayak
	A platform for linking community reforestation efforts with global actors and resources	R. Prabhakar and Ruchinilo Kemp
	Effects of heat on the incomes of workers in the informal sector	Saudamini Das
	Impact of COVID lockdown and post lockdown recovery of urban informal sector	Saudamini Das, Abhiroop Mukhopadhyay
	Drilling in the drought? The industrial organization of groundwater	Ujjayant Chakravorty
	Coal plants and Air Pollution	Kanishka Kacker and Rishabh Choudhary
	The effect of free power for farmers on groundwater	Praveen Kumar and Eshita Gupta
	Drivers of mortality from human-elephant conflict	Nitin Sekar, Meghna Aggarwal, Athisii, Arpit Deomurari, Tanay Raj Bhatt, and Hiten Baishya
	The primary drivers of human-elephant conflict in Assam, India, and the effect of anti-depredation squads in resolving these conflicts	Nitin Sekar, Poonam Kumari, Hiten Baishya, David Smith, and Athisii
	There is no economic case for coal plants in India	Shoibal Chakravarty
	Human Casualties and Wildlife Conservation in India	Cole Burton, Krithi Karanth, Nitin Sekar, Robin Naidoo, Theresa (Terre) Satterfield, Sumeet Gulati
Farzana Afridi	Time for Clean Energy? Cleaner Fuels and Women's Time in Home Production	Sisir Debnath, Taryn Dinkelman and Komal Sareen
	The Gendered Effects of Droughts: Production Shocks and Labor Response	Kanika Mahajan and Nikita Sangwan
	Measuring Performance: Ranking State Success over Two Decades in India	Amrita Dhillon, Arka Roy Chaudhuri and Saattvic
	The Gendered Crisis: Livelihoods and Mental Well-being in India During Covid-19	Amrita Dhillon and Sanchari Roy
	The Ties that Bind Us: Social Networks and Productivity in the Factory	Amrita Dhillon and Swati Sharma
	What Determines Women's Labor Supply? The Role of Home Productivity and Social Norms	Monisankar Bishnu and Kanika Mahajan
	Electoral Competition, Accountability and Corruption: Theory and Evidence from India under review	Sourav Bhattacharya, Amrita Dhillon and Eilon Solan
	Hunger and Performance in the Classroom	Bidisha Barooah and Rohini Somanathan
	On the Design of Subsidy Programs: Access to Clean Energy and Liquidity Constraints	Prabhat Barnwal and Shreya Sarkar
	Job Search Technology, Social Networks and Gender: Experimental Evidence from Urban India	Amrita Dhillon, Sanchari Roy and Nikita Sangwan
	Beliefs, Information and Anti-corruption Activism: Experimental Evidence from India	Ahana Basistha, Amrita Dhillon and Danila Serra
	Do Crises Affect Citizen Activism? Evidence from a Pandemic	Ahana Basistha, Amrita Dhillon and Danila Serra
	Women's Work, Social Norms and the Marriage Market	Abhishek Arora, Diva Dhar and Kanika Mahajan

Research Activities

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Kanishka Kacker	Energy/Environment Economics	E. Somanathan, R. Gupta, S. Ali, R. Kumar
Monisankar Bishnu	Pension, Intergenerational transfers, taxes, time inconsistencies, fertility, labor force participation, resource economics	Farzana Afridi , Amol Amol, J Bhattacharya , S Garg, T Garg , CS Kumru , K Mahajan , Tridip Ray
Mudit Kapoor	Health economics (Prevalence of low birth weight in India, Seasonality in nutritional outcomes)	UNICEF
	Decomposition of neonatal mortality between the rich and poor	UNICEF
	Prediction of early neonatal sepsis	AIIMS
	The association between exposure to open biomass burning and hypertension prevalence in North India	AIIMS
Prabal Roy Chowdhury	Honesty or Talent in Project Implementation	Parimal Bag, National University of Singapore
	Activists and Politicians	Mayank Mundhra and Jaideep Roy
Tridip Ray	Public, Private, or a bit of both (Mixed)?	Arghya Ghosh (University of New South Wales)
	Congested Markets: Public vs Private Provision, Inequality and Competition	
	Pension under Endogenous Fertility	Monisankar Bishnu
	Intergenerational Transfers: Public Education and Pensions with Endogenous Fertility	
	Changing Structure of the Labour Market in India: Job Polarization and Informalization	Arka Roy Chaudhuri (Shiv Nadar University)
	Contract Hiring and Computer Investment: Evidence from Rainfall Shocks	
	Temperature and exam scores in India	
	Caste Peer Effects on Student Performance: Evidence from Indian Schools	
	Gendered Stream Choice in India	

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Public Debt in India: A Neoclassical Approach (PPRU)	1 April, 2021	02 Years	Chetan Ghate
2	Project Implementation: Honesty or Talent?	2021	2 years	Prabal Roy Chowdhury
3	Caste Peer Effects on Student Performance: Evidence from Indian schools	April, 2021	2 years	Tridip Ray

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Analyzing Bid Trends in Solar Auctions in India	10 July, 2019	3 & half years	Kanishka Kacker

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Teacher Rationalization Policies: How do they affect Aggregate Human Capital	1 April, 2021	31 March, 2022	Abhiroop Mukhopadhyay
2	Mahalanobis Redux (PPRU)	1 April, 2021	31 March, 2022	Chetan Ghate

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Electricity reliability and electric cooking: What can we learn from cross-national comparisons?	633D	1 January, 2022	2 Years	E. Somanathan	Environment for Development Initiatives (EfD), Sweden	59,00,431/-
2	Optimal emissions pricing in LMICs accounting for household emissions from traditional cooking	633D	1 January, 2022	2 years	E. Somanathan	Environment for Development Initiatives (EfD), Sweden	67,73,500/-
3	Designing Subsidies to Reach the Poor	Outside ISI Project	March, 2022	1 year	Prabhat Barnwal	Weiss Fund	35 lakhs

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Emissions Pricing for Development Program (EPDP)	633D	1 January, 2021	4 years	E. Somanathan	Environment for Development Initiatives (EfD), Sweden	1,17,89,520/- (2021) 83,11,577/-(2022)
2	Human Casualties and Wildlife Conservation in India	Partnership Development Grant	22 March, 2020	21 March, 2023	E. Somanathan (Co-Investigator)	University of British Columbia	$166,000

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Researching Refills: Resources and relationships required for sustaining LPG access in rural India	F-701	1 June, 2019	31 December, 2021	E. Somanathan & Deepti Chatti (Humboldt State University)	Environment for Development Initiatives (EfD), Sweden	14,95,795/-
2	IWWAGE	E-706	May, 2018	3 years	Farzana Afridi	BMGF	4,30,00,000/-
3	The Causes and Consequences of Traffic Congestion in India	MS-578	15 July, 2020	31st December, 2021	Kanishka Kacker	Environment for Development	29,00,000/-

Projects done for Govt. of India/State Govt.

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Controlling ext.reme content in social media: Net neutrality and regulation	N 729	15 February, 2020	3 Years	Prabal Roy Chowdhury	SERB MATRICS	6,60,000/-

3. ECONOMIC RESEARCH UNIT (ERU), KOLKATA

Research

As in other years, ERU is actively involved in teaching, research and other academic activities. The scientists of the Unit participate in various teaching programs like B. Stat., M. Stat., MS(QE), ISEC and Post-Graduate Diploma programs over the year. They also teach PhD courses and supervise the PhD scholars. They publish their research works in various internationally acclaimed journals, conference proceedings and as book chapters. Some scientists also publish books. Their present research areas are: Applied Econometrics, Financial Econometrics, Mechanism Design under Incomplete Information, Lexicographic Preferences, Inequality Measures, R& amp; D and Technology Transfer, Economics of Terrorism, Political Economy, Economics of Conflict, Gender Studies, Women Empowerment, Child Labor, Healthcare, Econophysics, General Equilibrium Theory, Public Economics, etc. The scientists also engage in internally and externally funded projects. However, due to Covid and lockdown, only a few lectures and seminars were organized during 2021-22.

Current Areas of Research

Faculty name	Research topic(s)	Collaborator(s)
Anuj Bhowmik	Social Economics	Arijit Sen
	General Equilibrium and Development	Biung-Ghi Ju and Manipushpak Mitra
	General Equilibrium Theory	Maria Gabriella Graziano, G V A Dharanan, Sandipan Saha, Japneet Kaur, S. Tikader
	Matching Theory	Pramit Dutta
	Reputational Cheap Talk	Saptarshi P. Ghosh
	Games with Discontinuous Payoff	Nicholas C. Yannelis
Brati Sankar Chakraborty	Trade in Intermediate Goods and Unemployment in a Model with Firm Productivity Differential	
Chaiti Sharma Biswas	Women empowerment, gender violence, quality of life of women, women and nutrition, gender inequality in higher education	Prof. Ishita Mukhopadhyay, Dr. Snigdha Chakraborty, Prof. Manoranjan Pal, Prof. Premananda Bharati, Prof. Anjali Ghosh, Dr. Chaitali Sinha Roy
Indraneel Dasgupta	Ethnic Conflict	Sarmistha Pal (University of Surrey, UK), Dripto Bakshi (IIT Kharagpur)
Manipushpak Mitra	Econophysics, Game Theory, Social Choice Theory, Mechanism Design under incomplete information and Industrial Organization	Suchismita Banerjee, Bikas K. Chakrabarti, Satya R. Chakravarty, Youngsub Chun, Suresh Mutuswami, Rupayan Pal, Arindam Paul and P. M. Saradha,
Priyodorshi Banerjee	Communication and Information	Sanmitra Ghosh
	Expertise and Prediction	Sanchaita Hazra
Raju Maiti	Change point analysis of time series data	Palash Ghosh, Abhigayan Adhikary
	Multi-category classification	Bibhas Chakraborty, Jialiang Li
	Health Economics	Nocholas Graves
	Intervention analysis in longitudunal data models	Inbal Nahum-Shani, Jamie Yap, Bibhas Chakraborty
	Time Series analysis of count and categorical data	Atanu Biswas, Samarjit Das, Subhankar Chattopadhyay
Saswati Das	MGNREGA impact on livelihood security across different regions: A study based on national sample survey data	
	Multidimensional deprivation from children's perspectives: A cross-national comparative analysis	D. Mukherjee
	South Asian research on childhood and youth studies	H. Goswami and others

Faculty name	Research topic(s)	Collaborator(s)
	Impact of COVID 19 on food consumption: A comparative analysis between rural-urban situation	A. Biswas
Samarjit Das	Econometrics, Time Series Analysis	Atanu Biswas
Soumyanetra Munshi	Analysis of third party intervention in conflict	
	Analysis of conflict during a pandemic	
	Clientelism or Public Goods: Dilemma in a 'Divided' Democracy	
Tarun Kabiraj	Incomplete Information and R&D Incentives	Rittwik Chattopadhyay and Srobonti Chatterjee
	Technology Transfer in an Asymmetric Duopoly	--

Projects

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Impact of Amphan and Yash Cyclones that struck during the Covid-19 and its lockdown periods on life and livelihood in the Sundarban adjacent Gangetic West Bengal	D001 (9426)	January, 2022	One year	Dr Hari Charan Behera (SRU) (Co-PI – Tarun Kabiraj, ERU)	CSR	3,00,000/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Man-Met South Asian Research Network for Childhood and Youth Studies	F012	1 Feruary, 2019	4 Years (Extended)	Saswati Das	Manchester Metropolitan University, UK	1,88,879/-

4. LINGUISTIC RESEARCH UNIT (LRU), KOLKATA

Research

During last few years, LRU is working in Corpus Linguistics, Language Technology, Computational Lexicography, Language Documentation & Digitization, Language Teaching, Digital Humanities, Cognitive Linguistics, Clinical Linguistics, and Descriptive Linguistics. During this academic year (2021-2022), LRU has published 1 book, 7 journal papers, 1 book chapter, 7 conference papers. It has also delivered 2 keynote speech and 18 plenary talks across the country and abroad. Also, it has collaborated with at least 4 institutions across the world for joint collaborative research and publication. It has trained 6 research interns in various areas of corpus linguistics, language technology, language documentation, computational lexicography and clinical neurolinguistics. More than 10 scholars from India and abroad visited LRU during this academic year.

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Niladri Sekhar Dash	Sound Imitative Words in World Languages-Bengali	Prof. Livia Kortvelyessy (Department of British and American Studies, Faculty of Arts, P.J. Šafárik University, Kosice, Slovakia)
	Corpus of Indian Newspaper English from 12 Indian English Newspapers published from 12 different cities of India	
	Code-switching in bilingual aphasia-going beyond established language combinations and challenging existing assumptions	Dr. Julia Hofweber (Psychology and Human Development, Institute of Education, University College London, UK)
	Nature of Bilingual Dementia of Patients with Broca's Aphasia	Dr. Arpita Bose (School of Psychology & Clinical Language Sciences, University of Reading, UK)
	Characterizing phonological properties of nasality in Bengali words through experimental study	Prof. Adti Lahiri (Language and Brain lab, Oxford University, UK)

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Bengali WordNet Augmentation & Upgradation	1 April, 2021	3 Years	Niladri Sekhar Dash

5. POPULATION STUDIES UNIT (PSU), KOLKATA

Research

Population Studies Unit is extensively involved in various researches, teaching and training activities. The unit is also participating in teaching in ISEC Courses in regular as well as specialization in Demography. The members of the unit publish papers in journals and books, and also participate as a speaker or resource person in various national and international seminars, conferences and workshops. The scientific staff of the Unit undertake research projects (both internally and externally funded) on various themes related with population studies. The following are the list of topics of major research being carried out by the unit: fertility, mortality, migration including indirect estimation of illegal migrants, population dynamism, ageing, population projection, survival analysis in health care perspective, economic efficiency in provision of health care, inequality in health, actuarial statistics & health insurance and epidemiological studies.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Partha De	Inequality in immunization of children in selected states of India.	
	Status of virulence of COVID-19 in urban population of Eastern India.	Kuntal Ghosh, Ayanendranath Basu, Arup Ranjan Mukhopadhyay, Biswabrata Pradhan, Sandip Mitra, Rabindranath Jana, I Saha, M. K. Gumta, P K Das, G Das.
	Unearthing the heterogeneity in virulence using both ICMR COVID-19 testing data and other primary data: Exploratory study from West Bengal	Kuntal Ghosh,Shubhra Sankar Ray, Ayanendranath Basu, Arup Ranjan Mukhopadhyay, Biswabrata Pradhan, Sandip Mitra, Rabindranath Jana, I Saha, M. K. Gumta, G Das, Prabir Kr. Chatterjee, Satabdi Ghosh, Chandra Das, and Partha P Majumdar.
	Impact of Amphan and Yaas Cyclones on life and livelihood in the Sundarban adjacent Gangetic West Bengal	Hari Charan Behera, Tarun Kabiraj, Kuntal Ghosh, Sanjit Matra, Rabindranath Jana. Sambit Mallick, Rupak Goswami, Abarna Mukherjee.
	Developmental problems of disable children in India.	

6. PSYCHOLOGY RESEARCH UNIT (PRU), KOLKATA

Research

Faculty members and research fellows of the Psychology Research Unit are engaged in teaching, research, training and consultancy. 2 research fellows have successfully completed Ph.D. Viva and received provisional certificates. 16 students are regularly trained by the unit for research internship. Unit faculty trains students of other Universities and Engineering Institutes on Exploratory data analysis, Data Discretization, Categorical data structuring, Psychometric counselling through short term courses. Besides, the unit has organized a Research internship in order to overcome covid-19 stress. Focused areas of research in research internship are Hierarchical clustering in dimension reduction and farmer self-efficacy data analysis.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Debdulal Dutta Roy	Hierarchical Cluster Analysis of Pro-Environmental Attitude Questionnaire, Item Clustering of Pro-Environmental Attitude Questionnaire, Exploratory Data Analysis of Pro-Environmental Attitude Questionnaire, Item Reduction using Multiple correlation in Pro-Environmental Attitude Questionnaire, Internal Consistency of Pro Environmental Attitude questionnaire.	Priti Rekha Das, Baby Ziliya N. A., Arunima Ticku

Projects

Internally-funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Pro Environmental attitude survey	2020	2022	Dr. Debdulal Dutta Roy

7. SAMPLING AND OFFICIAL STATISTICS UNIT (SOSU)

Research

Emphasis on interdisciplinary collaboration in Research Projects and Training programs: Statisticians, Economists, Computer Scientists, Official Statisticians from the Govt are involved. Research Projects and Training Programs are Demand Driven. Research projects, being demand driven, involve real-life problems involving statistical challenges in addressing them. Individual research works undertaken in diverse fields with international collaborators in spite of undertaking so many projects and training programs with a small manpower. Futuristic vision in development of courses in digital mode, research based training. Aspiration to involve official statisticians in research and development in Indian official statistical system, with support from the administration. Development of online Post Graduate Diploma programme in Applied Statistics.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Diganta Mukherjee	Mathematical Finance	
	Demand Analysis	
Kajal Dihidar	Bayesian Estimation of sensitivity level and sensitive population proportion in a Modified Randomized Response Technique (RRT) Model.	
Nachiketa Chattopadhyay	Socio economic Indicators, Medical Statistics	RKMVERI

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Sandip Mitra	Distributive Impact of Microcredit intervention, Decentralized Targeting of Agricultural Credit Programs, Work-Life Balance, SHG and Aspiration.	Dilip Mookherjee (Boston University), Sujata Visaria (Hong Kong University of Science and Technology, Pushkar Maitra(Monash University), Anandi Mani(University of Oxford), Sayantan Ghoshal(University of Glasgow),Sanchari Roy(King's College),

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Development of an E-Learning Portal on Official Statistics and Allied Topics	01 April 2021	2 Years	Kajal Dihidar

Projects done for Govt. of India

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Social Audit Applying Survey Sampling and Analytics	E 169	22 November, 2021	10.04.2022 (Might be extended upto 31.07.2022)	Nachiketa Chattopadhyay	NITI Aayog (Governance & Research Vertical), Government of India	24,94,000/-

COMPLETED PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Hand Holding with CCO for NCI	I 077	1 December, 2020	30 November, 2021	Nachiketa Chattopadhyay	Ministry of Coal	2,36,000/-

8. SOCIO-ECONOMIC RESEARCH UNIT (SERU), NORTH-EAST CENTRE, TEZPUR

Research

Currently the research areas of the socio-economic research unit are microeconomic theory and applied macroeconomics. Faculty members of the unit participate in the teaching activities at the centre by offering various core courses to students enrolled in PGDSMA. Also the faculty members of the unit have been actively involved in organizing various training programs and workshops.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Kushal Banik Chowdhury	Oil price and exchange rate	Bhavesh Garg (IIT Ropar)
	Renewable energy consumption and its impact on current account deficit	
	Sectoral stock return and oil price uncertainty	Ranajoy Guha Neogi (RBI)
	Realized volatility of exchange rate and its impact on macroeconomic variables	Srikanta Kundu (CDS), Kaustav K Sarkar (RBI)
	Structural stability and macroeconomic uncertainty	Gogol Mitra Thakur (CDS)
	Trend analysis of Particulate Matter (PM) during COVID-19 period	Darpa Saurav Jyethi
Mridu Prabal Goswami	Intelligent Machines and Shapely Values	Surajit Borkotokey and Sujata Goala (Dibrugarh University)
	Fair Consumption with Negative Externality	Manipushpak Mitra and Soumendu Sarkar (University of Delhi)
	Learning From The Past Experiments on the Dictator Game	Sanmitra Ghosh (Jadavpur University) and Shubhro Sarkar (IGIDR).

9. SOCIOLOGICAL RESEARCH UNIT (SRU), GIRIDIH & KOLKATA

Research

The faculty and other scientific staff of the Unit are involved in teaching; supervising Ph.D. students; undertaking research projects (both internally and externally funded) on various sociological emerging research themes, like, survival strategies and resilience during Covid-19, Social network pattern and its role during Covid-19, virulence of Covid-19 across several socio-economic sectors, pattern of land leasing and so on; and rendering services to various activities of academic administration. The scientific staff of the Unit also continue to perform several academic activities of other institutes/universities (both national and international level).

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Hari Charan Behera	Land leasing arrangements in eastern India.	
	Impact of Amphan and Yash Cyclones on life and livelihood in the Sundarban adjacent Gangetic West Bengal	Tarun Kabiraj, Kuntal Ghosh, Sanjit Matra, Partha De, Rabindranath Jana, Sambit Mallick (Guwahati IIT, Guwahati), Rupak Goswami Gosami (Ramkrishna Vivekananda University, Narendrapur), Abarna Mukherjee(Ranaghat College, West Bengal)

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Rabindranath Jana	Status of virulence of COVID-19 in urban population of Eastern India	Kuntal Ghosh, Ayanendranath Basu, Arup Ranjan Mukhopadhyay, Biswabrata Pradhan, Sandip Mitra, Partha De, I. Saha Saha (Indian Council of Medical Research, Kolkata), M. K. Gumta (College of Medicine and Sagar Dutta Hospital, Kolkta), P. K. Das (Pvt. Practitioner doctor), G. Das (Institute of Post-Graduate Medical Education and Research Kolkata)
	Unearthing the heterogeneity in virulence using both ICMR COVID-19 testing data and other primary data: Exploratory study from West Bengal	Kuntal Ghosh, Shubhra Sankar Ray, Ayanendranath Basu, Arup Ranjan Mukhopadhyay, Biswabrata Pradhan, Sandip Mitra, Rabindranath Jana, Partha De, I. Saha Saha (Indian Council of Medical Research, Kolkata), M. K. Gumta (College of Medicine and Sagar Dutta Hospital, Kolkta), G. Das (Institute of Post-Graduate Medical Education and Research Kolkata), Prabir Kr. Chatterjee, Satabdi Ghosh, Chandra Das and Partha P. Majumdar

Projects

Internally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Impact of Amphan and Yash Cyclones that struck during the COVID-19 and its lockdown period on life and livelihood in the Sundarban adjacent Gangetic West Bengal	2022	One year	H.C. Behera

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Land leasing arrangements and functions in eastern India.	2020	Two years	H.C. Behera

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Strengthening livelihood opportunities for the forest dwellers in Jharkhand and Odisha	2018	2022	H.C. Behera
2	Contract farming: participation, partnership and socio-economic development in eastern India	2018	2021	H.C. Behera

Externally funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Impact of Amphan and Yash Cyclones that struck during the COVID-19 and its lockdown period on life and livelihood in the Sundarban adjacent Gangetic West Bengal	D001(9426)	January, 2022	One year	Hari Charan Behera	CSR funded	3,00,000/-

3.6 STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH DIVISION (SQC & OR)

Head: ARUP RANJAN MUKHOPADHYAY, SQC & OR Kolkata

Office: 7th floor, Platinum Jubilee Building, ISI, Kolkata-700 108

1

Statistical Quality Control & Operations Research Unit (SQC&OR), Bangalore

- **Head of Unit:** BOBY JOHN
- **Number of Faculties:** Five (5)
- **Number of Non-scientific Workers:** Two (2)
- **Number of Research Fellows:** One (1)
- **Office:** 8th Mile, Mysore Road, ISI, Bengaluru-560 059

2

Statistical Quality Control & Operations Research Unit (SQC&OR), Chennai

- **Head of Unit:** G. RAVINDRAN
- **Number of Faculties:** Four (4)
- **Number of Research Fellows:** One (1)
- **Office:** 111, Nelson Manickam Road, ISI, Chennai-600 029

3

Statistical Quality Control & Operations Research Unit (SQC&OR), Delhi

- **Head of Unit:** RINA CHAKRAVORTY
- **Number of Faculties:** Two (2)
- **Number of Non-scientific Workers:** One (1)
- **Number of Research Fellows:** One (1)
- **Office:** 7, S.J.S. Sansanwal Marg, New Delhi -110016

4

Statistical Quality Control & Operations Research Unit (SQC&OR), Hyderabad

- **Head of Unit:** S. M. SUBHANI
- **Number of Faculties:** Four (4)
- **Number of Non-scientific Workers:** Three (3)
- **Office:** Street Number 8, Habsiguda, Hyderabad - 500007

5

Statistical Quality Control & Operations Research Unit (SQC&OR), Kolkata

- **Head of Unit:** NANDINI DAS
- **Number of Faculties:** Fourteen (14)
- **Number of Non-scientific Workers:** 2 full time + 2 part-time
- **Number of Research Fellows:** Eight (8)
- **Office:** 6th floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

6

Statistical Quality Control & Operations Research Unit (SQC&OR), Mumbai

- **Head of Unit:** SAGAR SIKDER
- **Number of Faculties:** Two (2)
- **Number of Non-scientific Workers:** One (1)
- **Office:** 3rd Floor, Pratistha Bhavan (Old CGO Building), 101, Maharshi Karve Road, Mumbai - 400 020

7

Statistical Quality Control & Operations Research Unit (SQC&OR), Pune

- **Head of Unit:** SUBRATA RATH
- **Number of Faculties:** One (1)
- **Number of Non-scientific Workers:** Two (2)
- **Office:** B-Wing, 3rd Floor, B-9, Anandvan Co-op. Housing Society, Near Gandhi Bhavan, Survey No 36, Kothrud, ISI, Pune - 411 038

1. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, BANGALORE

Research

The major activities of the unit are the academic programs, research, industrial training & consultancy services and organizing short-term training programs. Currently, the unit is handling two academic courses namely Master of Science in Quality Management Sciences (MS-QMS) and Part-Time Certificate Course in Statistical Quality Control. As part of research activities, the faculties have published 8 papers in international journals and one paper in IEEE conference proceedings during 2021-22. The unit has undertaken 16 consultancy and training assignments and generated more than Rs.81 lakhs as training and consultancy fee during 2021-22. The unit also organized the "Ishteaqul Islam Memorial Lecture" on 23 October 2021, a webinar series titled "Industry Connect through ISI Alumni" from November 2021 to February 2022 and an outreach program titled "Data Processing using Python" for college students, research scholars and faculties from 29 December 2021 to 14 January 2022.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Boby John	Minimizing the dry content variation in the pulp drying process using Six Sigma methodology	
	Development of control chart pattern recognition methodology for ITeS customer complaint monitoring	
	Development of a fuzzy quantitative model for assessing the performance of pharmaceutical supply chain under uncertainty	Firoz Ahmad
	Development of multiobjective optimization problem solution using hesitant fuzzy aggregation operator	Firoz Ahmad
	Modeling and optimization of multiobjective programming problems in neutrosophic hesitant fuzzy environment	Firoz Ahmad
E V Gijo	Reliability estimation of censoring scheme	
	Process capability evaluation of life data	
	Assessing the impact of DFSS on Sustainable Performance for the Product/Service Industry.	J. Antony, S. Bhat
	Entropy and its applications in reliability theory	Sarat Sindhu Mukhopadhyay

Projects

Externally funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Online six sigma black belt certification program	I 332	1 March, 2022	6 months	E V Gijo & Somnath Ray	Jubilant Ingrevia Limited, Noida, UP.	6,00,000/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Machine learning using python course (ML-03)	I 330	21 Feb, 2022	2 months	Boby John	External Participants	6,30,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Six Sigma training for DFSS, DMAIC Software and Business analytics	I 320	June, 2021	March, 2022	U H Acharya & Boby John	Bharat Electronics, Bangalore	16,24,000/-
2	Six sigma training & project guidance	I 327	September, 2021	March, 2022	U H Acharya	Fiat, Pune	4,06,000/-
3	Certification program on six sigma green belt (GB-55)	I 318	12 July, 2021	17 July, 2021	Somnath Ray	External Participants	6,00,000/-
4	Certification program on six sigma master black belt (MBB-33)	I 319	25 July, 2021	14 August, 2021	Somnath Ray & U H Acharya	External Participants	5,40,000/-
5	Six sigma green belt certification program	I 333	16 September, 2021	30 March, 2022	Somnath Ray	HAL Management Academy	3,00,000/-
6	Certification program on six sigma green belt (GB-56)	I 323	25 October, 2021	30 October, 2021	Somnath Ray	External Participants	3,80,000/-
7	Certification program on six sigma green belt (GB-57)	I 329	21 January, 2022	30 January, 2022	Somnath Ray	External Participants	3,20,000/-
8	Certification program on six sigma master black belt (MBB-34)	I 331	14 February, 2022	13 March, 2022	Somnath Ray & U H Acharya	External Participants	3,00,000/-
9	Online six sigma black belt certification	I 326	1 July, 2021	31 December, 2021	E V Gijo	SEG Automotive India, Bangalore	6,00,000/-
10	Online certification program on six sigma black belt (BB-34)	I 317	14 June, 2021	15 September, 2021	E V Gijo & Sanjit Ray	External Participants	6,00,000/-
11	Online certification program on six sigma black belt (BB-35)	I 325	15 November, 2021	31 March, 2022	E V Gijo & Sanjit Ray	External Participants	2,50,000/-
12	Online certification program on six sigma black belt (BB-36)	I 328	21 February, 2022	31 March, 2022	E V Gijo & Sanjit Ray	External Participants	4,50,000/-
13	Business analytics using R course (BA-09)	I 321	10 August, 2021	31 March, 2022	Boby John	External Participants	6,24,000/-
14	Predictive modelling and its applications using python	I 324	15 August, 2021	31 March, 2022	Boby John	Caterpillar India	4,00,000/-

2. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, CHENNAI

Research

We have one JRF who is working for his PhD under the supervision of Prof G. Ravindran and they have been able to communicate two technical reports for publication in J of Optimization theory in the area of Linear Complementarity Problem and game theory.

Dr Surajit Pal worked on measuring capabilities of zero- inflated processes. Apart from academic teaching and research, faculty members have also been involved in training on Six-Sigma methodology for participants from industries.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
G. Ravindran	Stochastic Games, Linear Complementarity Problem and its generalizations, Tensor Analysis, spectral theory and applications	Sunil Kumar, A.R. Sricharan, T. Parthasarathy.
Surajit Pal	Process control and capability evaluation of univariate and multivariate zero- inflated count data	Susanta Kumar Gauri

3. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, DELHI

Research

The SQC & OR unit, ISI, Delhi has been conducting short term training programs online during the pandemic also. Besides this, one research scholar is being nurtured by Dr. Rina Chakravorty (supervisor) and Dr. S.K. Neogy (co-supervisor). Three training programs for the companies have been conducted at their premises by Dr. Rina Chakravorty.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Rina Chakravorty	Design of Experiments – Static Characteristics, Dynamic Characteristics and Categorical Characteristics in a multi response processes.	S.K. Gauri
	Decision making in multi-response with multi-criteria scenario.	
	Reliability Optimization and Game theory	S.K. Neogy, Sajal Ghosh
Samir Kumar Neogy	Mathematical Programming, Linear Complementarity Problem and its generalizations, Optimization problem in graph theory, Matrix Theory (Study of Matrix Classes useful in Complementarity, Optimization and Game Theory), Non-cooperative games, Algorithms for Stochastic Games.	T.E.S. Raghavan, Dipti Dubey, Gambheer Singh, Promila Kumar, Vatsalkumar Nandkishor Mer, Neetu Gupta

4. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, HYDERABAD

Research

General Training programs on topics such as Six Sigma, Statistics & Machine Learning, etc. were conducted. Consultancy assignment on Development of Sampling methodology at Banks, and In-house Training programs at various industries were taken up.

Current Areas of Research

Name of the DCSW Member	Research topic(s)
A L N Murthy	Statistical Modelling, Machine Learning, Time Series, Medical Statistics, Six Sigma
G Murali Rao	Machine Learning, Data Science, Six Sigma
G S R Murthy	Operations Research
S M Subhani	Fixed Point Theorem

Projects

Externally funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Online Program on Statistics and Machine Learning	I-689	5 January, 2022	240 Hours (Six Months)	G S R Murthy	General Training Program	N A

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Six Sigma Training and Guidance (Wave III) for achieving Business Excellence	I-678	November, 2019	November, 2021	A L N Murthy	ITC Limited, Paper Boards and Specialty Papers Division, Bhadrachalam, Telangana	39,60,000/- exclusive of GST

Projects done for Govt. of India/State Govts

NEW PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Developing Sampling Methodology	ISP(CT)/SBI/ SQCHYD/22-006	March, 2022	6 months	G M Rao	State Bank of India	10,00,000/-

5. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, KOLKATA

Research

The faculty members of SQC & OR unit , Kolkata are engaged in teaching in M. Tech (QROR), B. Stat and MS(QE) programs, research in various topics of quality, reliability and operations research and providing consultancy in different industries in India and overseas. During April '21-March '22 there are 17 journal publications and one book has been published. There are two publications in conference proceedings. The research topics include Linear Complementarity Problem, software and hardware reliability, statistical process control, process capability analysis, supply chain management, survival analysis, reverse logistic etc.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Arup K.Das	On some properties of w-uniqueness in tensor complementarity problem	
	Modeling Multiobjective Transportation Problem Using Fuzzy Set Theory	Firoz Ahmad
	Bounded homotopy path approach to find the solution of linear complementarity problems	A. Dutta and R. Jana
	Properties of K- type block matrices in the context of complementarity problem	A. Dutta
Arup Ranjan Mukhopadhyay	Sustainable Development and Supply Chain Management	Prof. Sadhan Kumar Ghosh (Mechanical Engineering epartment, Jadavpur University)
	Sustainable Development and Waste Management	
	Statistical Process Control	
Ashis Kumar Chakraborty	Hardware and Software Reliability	Dr. Soumen Dey, Pallabi Ghosh, Subrata Rath, Dr. Moutushi Chatterjee, Retuparna Dutta
	Statistics and Machine Learning	Souvik Manna
Biswabrata Pradhan	Cumulative entropy of progressively type-II censored order statistics and associated optimal life testing-plans	Siddhartha Chakraborty and Ritwik Bhattacharya
	Comparisons of coherent systems with active redundancies under some semi-parametric models	Arindam Panja and Pradip Kundu
	Stochastic comparisons of frailty and resilience models	
	Sequential reliability sampling plans with game theoretic approach	Rathin Das
M. Z. Anis	Distributional properties of the Rayleigh distribution and some characterizations based on the truncated first moment.	M. Ahsanullah
	Investigation of the properties of the process capability index Cp when the observations are auto-correlated and also affected by measurement errors.	K Bera
	Characterization of the Unit-Gompertz distribution	
Prasun Das	Improvement of customer experience in retail Banking	Prof. I. Mukherjee, (MAKAUT, W.B.)
	An installment purchase system and its comparison in a deteriorating economic order quantity model	Snigdha Karmakar
	An economic production quantity model with refurbishment policy in dual-channel logistics	
	Assessment of Reverse Logistics for Bakery Products	Debanjana Datta
Susanta Kumar Gauri	Developing tools and techniques for statistical process control of zero-inflated processes	Dr. Surajit Pal

Projects

Internally funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Data Analytic Approach towards Modeling of Reverse Logistics	September, 2019	March, 2022	Prasun Das

Externally funded Projects

NEW PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Talent Development and Projects	I081	February, 2022	6 months	Amitava Bandyopadhyay	Tata Steel	12,00,000/-

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Normalization of Marks	I064	1 April, 2020	3 years	Ashis Kumar Chakraborty	The Admission Committee for Professional Courses, Gujrat	27,00,000/- plus overhead charges
2	Providing Support for Large Government Projects	I070	March, 2022	5 months	Amitava Bandyopadhyay	QCI	12,00,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Six Sigma Green Belt Programme	I 074	25 October, 2021	2 November, 2021	Arup Ranjan Mukhopadhyay	Electrosteel Castings Ltd	2,71,400/-
2	Talent Development and Projects	I069	August, 2020	July, 2021	Amitava Bandyopadhyay	Tata Steel	20,00,000/-

Projects done for Govt. of India/State Govts

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Development of Statistical Model for Reliability Estimation of the Flight Software of Launch Vehicles of ISRO	E129	January 2020	4 Years	Ashis Kumar Chakraborty	Indian Space Research Organisation	21,49,000/-
2	Training Program at 4 Small Arms OFs	I055	July, 2019	3 Years	Ranjan Sett	Ordnance Factory, MoD	75,00,000/-

COMPLETED PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Training Program at 4 Small Arms OFs	I054	May, 2019	June, 2021	Amitava Bandyopadhyay	Ordnance Factory, MoD	70,00,000/-

6. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, MUMBAI

Research

SQC & OR Unit, ISI, Mumbai commenced its operations from 1965. It has served a wide variety of organizations, both Manufacturing and Service, across the country through training and consultancy in the fields of Statistics and Operations Research.

The unit activities can be described in the following categories.

- Consultancy and project assignments
- Conducting in plant and general Training

Projects

Internally funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Workshop on Statistical Techniques in Research Methodology	14 December, 2021	4 days	Ashok Sarkar

Externally funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Business Analytics & Data Mining Certification program.	I-921	6 August, 2021	31 October, 2021	Ashok Sarkar	External Participants	7,62,228/-
2	Training on SPC & Process Modelling.	I-924	28 September, 2021	30 September, 2021		UPL Ltd.	1,35,000/-
3	Six Sigma Green Belt Certification program.	I-925	9 November, 2021	26 November, 2021		L & T - Mysore -CTEA	2,70,000/-
4	Six-Sigma Green Belt Certification program.	S-596	26 July, 2021	30 July, 2021		L & T - MADH	1,00,000/-
5	Six Sigma Green Belt Training & Certification (Online)	I-916	24 April, 2021	9 May, 2021	Sagar Sikder	External Participants	3,20,000/-
6	Six-Sigma Green Belt Certification program	I-919	2 August, 2021	6 August, 2021		Naval Armament Inspection, Mumbai	2,00,000/-
7	Six Sigma Green Belt Training & Certification (Online)	I-920	10 July, 2021	25 July, 2021		External Participants	4,60,000/-
8	Six Sigma Black Belt Training and Certification Program	I-922	16 August, 2021	9 October, 2021		External Participants	7,00,000/-
9	Six Sigma Green Belt Training & Certification Program (Online)	I-923	27 November, 2021	12 December, 2021		External Participants	5,00,000/-
10	Six Sigma Green Belt Training & Certification Program (Online)	I-926	5 March, 2022	20 March, 2022		External Participants	4,80,000/-

7. STATISTICAL QUALITY CONTROL & OPERATIONS RESEARCH UNIT, PUNE

Research

The Unit is currently engaged in reaching out industries and academicians for application of statistics in the industries and society, at large, under the umbrella of Six Sigma and Data Science. Recent research work being carried out by the unit is in the field of Six Sigma, DFSS, Lean Six Sigma, Data Analytics and Reliability Analysis.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
S. Rath	Reliability Improvement and modelling	Dr. Asish Chakraborty
	Implementing Six Sigma in Telecom Sector	Prof. Ratri Parida (IMT, Gaziabad) & Ramkrushna Padhy (IIM, Sambalpur)
	Supply Chain Analytics	Prof. Ratri Parida (IMT, Gaziabad)

Projects

Externally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Consulting on Six Sigma	I840	10 January, 2022	6 months	S. Rath	Eduplusnow, Pune	1,60,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Training Programmes in Data Science & Six Sigma	I840	1 April, 2021	31 March, 2022	S. Rath	Eduplusnow, Pune	24,00,000/-
2	Training Programme – Six Sigma Green-Belt	I841	12 July, 2021	8 November, 2021		Schott Kaisha, Gujarat	2,00,000/-
3	Training Programme - Six Sigma Green-Belt	I842	6 December, 2021	9 March, 2022		Schott Glass, Gujarat	2,00,000/-

3.7 THEORETICAL STATISTICS AND MATHEMATICS DIVISION (TSMD)

Professor In-Charge: ANTAR BANDYOPADHYAY, SMU, Delhi

Office: 7, S.J.S. Sansanwal Marg, ISI, New Delhi- 110 016

1

Stat-Math Unit (SMU), Bangalore

- **Head of Unit:** JAYDEB SARKAR
- **Number of Faculties:** Twenty-Three (23)
- **Number of Non-Scientific Workers:** One (1)
- **Number of Research Scholars:** Eighteen (18)
- **Number of Visiting Scientists:** Thirty-One (31)
- **Office:** 8th Mile, Mysore Road, ISI, Bengaluru - 560 059

2

Stat-Math Unit (SMU), Delhi

- **Head of Unit:** ARUP KUMAR PAL
- **Number of Faculties:** Twelve (12)
- **Number of Non-Scientific Workers:** Two (2)
- **Number of Research Scholars:** Twelve (12)
- **Number of Visiting Scientists:** Eighteen (18)
- **Office:** 7, S.J.S. Sansanwal Marg, ISI, New Delhi- 110 016

3

Stat-Math Unit (SMU), Kolkata

- **Head of Unit:** RITABRATA MUNSHI and GOPAL KRISHNA BASAK
- **Number of Faculties:** Twenty-Six (26)
- **Number of Scientific Workers:** One (1)
- **Number of Non-Scientific Workers:** Six (6)
- **Number of Research Scholars:** Thirty-nine (39)
- **Number of Visiting Scientists:** Thirty-one (31)
- **Office:** 3rd floor, A.N. Kolmogorov Bhavan, ISI, Kolkata-700 108

1. STAT-MATH UNIT (SMU), BANGALORE

Research

Stat-Math Unit Bangalore Center has been very active from 2021 to 2022 in conducting research in various fields of Mathematics such as Algebraic Geometry, Number Theory, Operator Theory, Operator Algebras, Quantum Probability, Probability and Statistics, Stochastic geometry, Random topology, Random graphs, Bayesian Statistical Inference, Statistical Ecology, Group actions, COVID related work, etc. During this period, the unit has been very productive in publishing papers in journals of international repute.

The Unit was also involved in organizing conferences and conducting the Math Olympiad and Madhava mathematics competition. It also hosted a good number of postdocs and visitors.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Siva Athreya	Stochastic Analysis (Stochastic Partial Differential Equations and Stochastic Differential Equations) » Random walks among mobile traps » Random Graphs » Tree-valued Processes » Computational Epidemiology	Anita Winter, Leonid Mytnik, Rajesh Sundaresan, Atul Shekar, D. Yogeshwaran, Mathew Joseph, Carl Mueller
B V Rajarama Bhat	Operator Moment dilations	Anindya Ghatak and Santosh Kumar
	Iterative roots of functions	Chaithanya Gopalkrishna
	Fixed points of UCP maps	Samir Kar and Bharat Talwar
	Products of symmetries of von Neumann algebras	Soumyashant Nayak and P. Shankar
Mathew Joseph	Stochastic Partial Differential Equations	Siva Athreya, Carl Mueller, Kunwoo Kim, Mohammud Foondun, Vivek Kumar
Ramdin Mawia	Sign changes of Kloosterman sums	Satadal Ganguly, Olivier Ramaré
	Spectral gap problem	Farrell Brumley, Bart Michels
	Brun-Titchmarsh type theorems for quadratic fields etc.	P. Akhilesh, Olivier Ramaré
Anita Naolekar	Homological algebra, Category theory	Abhishek Banerjee, Mamta Balodi
	(non)-associative rings and algebras	Ashis Mandal, Abdenacer Makhlouf, Rabeya Basu
C.R. E. Raja	Cocompactness of cofinite groups	
	Dynamical systems of various types	Dr. M. Singh
Jaydeb Sarkar	Operator theory and operator algebras	N. Bala and N. Ghosh, D. Pradhan, S. Das, K. Dhara and A. Sensarma, N. Rakshit, M. Suryawanshi, P. Muthukumar
Maneesh Thakur	Classification of strongly self-isotopic Jordan algebras and its consequences for algebraic groups	Holger Petersson, Fern Universitaet, Hagen, Germany
D. Yogeshwaran	Stochastic geometry ; Random topology	P. Skraba, B. Blaszczyszyn, J. E. Yukich, G. Peccati, C. Bhattacharjee, F. den Hollander, R. Kotecky, M. Krishnapur

Projects

Externally-funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Limit theorems in Random Geometry and Topology	E516	18 December, 2020	3 Years	D. Yogeshwaran	SERB	6,60,000/-
2	The Stochastic Heat Equation	E518	19 February, 2021	3 years	Mathew Joseph	SERB	6,60,000/-
3	On the cohomology and deformations of leavitt path algebras and applications	N564	9 November, 2020	3 years	Anita Naolekar and Abdenacer Makhlouf	Indo-French Centre for the Promotion of Advanced Research (IFCPAR)/Department of Science and Technology	24,35,706/-
4	Factorizations of bounded analytic functions and kernels	E512	25 June, 2020	3 years	Jaydeb Sarkar	DST	28,90,888/-
5	Coupled Stochastic Partial Differential Equations (SPDE's)	E513	16 January, 2020	3 years	B. Rajeev	DST	27,68,788/-
6	Swarnajayanthi Fellowship	E510	25 June, 2019	5 years	Parthanil Roy	DST	51,83,080/-
7	IFCAM	NA	June, 2018	3 years and extended by 2 years (due to COVID)	Yogeshwaran Dhandapani; Bartlomiej Blaszczyszyn	Indo-French Centre for Applied Mathematics	Funds released only for travel and food expenses
8	JC Bose Fellowship project	N528	1 March, 2017	5 Years + 5 Years (Two Term)	B V Rajarama Bhat	SERB	95,00,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	n-tuples of commuting isometries	E508	28 May, 2018	31st March 2021	Jaydeb Sarkar	DST	6,60,000/-
2	Stochastic Analysis and Its Applications	E507	28 May, 2018	31st March 2021	Siva Athreya	DST	6,60,000/-
3	Stochastic Partial Differential Equations	E506	28 May, 2018	31st March 2021	B. Rajeev	DST	6,60,000/-
4	Probabilistic and Statistical Aspects of Branching Random Walks	E509	28 May, 2018	31st March 2021	Parthanil Roy	DST	6,60,000/-

2. STAT-MATH UNIT (SMU), DELHI

Research

The Unit currently has 4 Statisticians and 8 Mathematicians. They continued to work in their respective areas. Many of them were involved in external projects funded by various agencies.

The members resumed normal activities online soon after the challenges faced due to the second wave of the covid pandemic. The Unit also continued its weekly seminar program in online mode.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
Antar Bandyopadhyay	Branching Random Walk	Pratha Pratim GhoshDelhi
	Interacting Urn Models	Deborshi Das; Dr. Shuei Mano, ISM, Japan; Dr. Gursharn Kaur, NUS, Singapore; and Dr. Neeraja Sahasrabudhe, IISER, Mohali.
Arindam Chatterjee	Network sampling, Low rank matrices, Resampling, Likelihood for nonstandard data, Spatial statistics	Debraj Das, IIT Bombay; S.N. Lahiri, Washington Univ; Soutir Bandyopadhyay, Colorado School of Mines.
Arup K. Pal	Quantum groups and Noncommutative Geometry	Partha Sarathi Chakraborty, Manabendra Giri
Issan Patri	Operator Algebras and Quantum Groups	Kunal Mukherjee, Pierre Fima, Francois Le Maitre, Malay Mandal
	Applications of Mathematics to Biological Systems	Garima Rani
Rahul Roy	Brownian web	Azadeh Parvaneh, Kumarjit Saha, Anish Sarkar
Swagata Nandi	Estimation and related problems in multichannel signals	Debasis Kundu
	Weighted least squares in signal processing models	Debasis Kundu, Rhythm Grover
	Random Amplitude chirp models	Rhythm Grover

Projects

Internally funded Projects

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	Start Up Grant	1 April, 2021	31 March, 2022	Issan Patri

Externally funded Projects

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	DST Inspire	N-732	3 April, 2017	2 April, 2022	Issan Patri	DST	35,00,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Interacting Urn Schemes	N-726	19 March, 2019	18 March, 2022	Antar Bandyopadhyay	SERB - MATRIX, DST	2,20,000/- per year
2	Structure and representations of the C^* algebra of continuous functions on type A_{n} quantum groups	N-722	12 July, 2018	11 July, 2021	Arup K. Pal	SERB,DST, Govt. of India	6,00,000/-
3	Statistical methods of high – dimensional binary regression models in Presence of response misclassification	N-715	11 May, 2018	11 May, 2021	Arindam Chatterjee	SERB,DST, Govt. of India	2,20,000/- per year
4	Scaling limits in directed random trees-applications in models of drainage	N-719	24 May, 2018	24 May, 2021	Anish Sarkar	SERB,DST, Govt. of India	6,00,000/-
5	Ineference problem in reliability	N-731	6 February, 2019	5, February, 2022	Isha Dewan	SERB,DST, Govt. of India	6,00,000/-
6	Confett percolation and covered area fraction	N-717	19 May, 2018	18 May, 2022	Rahul Roy	SERB,DST, Govt. of India	6,00,000/-
7	Irreducibility and Galois groups of Polynomials	N-716	13 June, 2018	13 June, 2021	Shanta Laishram	SERB,DST, Govt. of India	2,20,000/- per year
8	Geometry on the space of matrices and positivity properties	N-725	11 March, 2019	10 March, 2022	Tanvi Jain	SERB,DST, Govt. of India	6,60,000/-

Projects done for Govt. of India

ONGOING PROJECTS

Sl. No	Name of the project	A/c No.	Starting Date	End date	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	BOBASIO Region Airspace Safety Assessment Study	I-402	January, 2011	Renewed upto May 2023	Antar Bandyopadhyay	Airports Authority of India (AAI)	9,50,000/- per year

3. STAT-MATH UNIT (SMU), KOLKATA

Research

SMUK focuses on research in Mathematics, Probability and Theoretical Statistics. The unit currently has 27 faculty members, 5 of them are Bhatnagar awardee. In Statistics the main focus are in: Statistical Study of Agreement, Statistical Inference, Statistical Study of Surveillance, Statistical Study of Apportionment Index, Statistical Modeling of Dyadic Interactions, Parametric and non-parametric classification, Study of Robust Estimators. Non-parametric statistics, Rates of convergence in Central Limit Theorem (CLT), Law of iterated logarithms (LIL) and Characterization theorems, High dimensional time series. In Probability Theory the main focus of research are: Stochastic Processes, Limit Theorems, Rates of Convergence and Expansions, Stochastic Integrals, Stochastic Differential Equations, Stability of stochastic dynamical systems, Two-time scale. Random Walks, Martingale Theory and Stochastic Calculus, Stochastic approximation, Markov Chain Simulation, Random Continued Fractions, Bernoulli Convolutions and Iterated Function Systems, Large-dimensional Random Matrices, Record values, Extreme values, Moral hazard problems in economics, Resampling plans, Time series. and Kernel density estimates, Urn Model Asymptotics, free probability analogue of subexponential distribution, Asymptotics of Randomly weighted sum, Non-commutative probability, Diffusion approximations, Inference in panel data under cross-sectional dependence, Stochastic modelling of political business cycle Stochastic Modelling of financial crisis through trade and capital inflow, High dimensional random matrices and its applications, Free probability. In mathematics the main topics of research are: Noncommutative geometry: Levi civita connections, Hopf algebroid and their actions on noncommutative spaces, quantum symmetry, Commutative Algebra, Affine Algebraic Geometry, History of Mathematics, Analytic Number Theory, Circle method, Analytic theory of L-functions, Differential Geometry, non holonimic distributions of co-rank greater than 1, Harmonic analysis on harmonic manifolds, Riemann surfaces, Rigidity problems for negatively curved manifolds, Motivic Homotopy Theory.

Current Areas of Research

Name of the DCSW Member	Research topic(s)	Collaborator(s)
ARUP BOSE	High dimensional sample covariance and Wigner matrices with independent entries.	Priyanka Sen
	High dimensional cross-covariance matrices	Monika Bhattacharjee, Apratim Dey
	COVID-19	Madhuchhanda Bhattacharjee, Kappara Divya
	Linear spectral statistics for high dimensional matrices.	Shambhu Nath Maurya
	High dimensional sample autocovariance matrices.	Walid Hachem
	Welfare effect of limiting bank loans. Economy of voluntary public service.	Debashis Pal
	Welfare effect of limiting bank loans. Economy of voluntary public service.	David Sappington
	Bulk behaviour of high dimensional skew symmetric random matrices	Soumendu Sundar Mukherjee
	Wigner matrices with independent entries	Koushik Saha, Arusharka Sen
	Kernel based estimation of distribution function	Santanu Datta
DEBASHISH GOSWAMI	Noncommutative Geometry, Quantum Groups	J. Bhowmick, S. Bhattacharjee, Sk. Asfaq Hossain, Indranil Biswas (TIFR Mumbai), Alex Chirvasitu (Uuiv of SUNY Buffalo, USA), S. Joardar (IISER Kolkata), G. Landi (Univ. of Trieste, Italy)
Gopal K Basak	Optimal lockdown strategy	Chandramauli Chakraborty, Pranab Das, Nitesh Kansara
	Informal Sector Estimation	
SAMIK BASU	Unstable homotopy operations	
	Topological Hochschild homology of regular quotients	
	Equivariant homotopy theory	

Name of the DCSW Member	Research topic(s)	Collaborator(s)
BISWARANJAN BEHERA	Harmonic analysis on local fields	Md. Nurul Molla
	Maximal operators on family of general sets on topological spaces	
	Wavelet analysis on local fields of positive characteristic	
KINGSHOOK BISWAS	Holomorphic dynamics, Riemann surfaces, Geometry of negatively curved manifolds, Harmonic manifolds	Ricardo Perez-Marco, Rudra P. Sarkar
Utsav Choudhury	Motivic Homotopy theory	Amit Hogadi (IISER Pune), Neeraj Deshmukh (IISER Pune, University of Zurich) and Biman Roy
	Affine Algebraic Geometry	Amit Hogadi (IISER Pune), Neeraj Deshmukh (IISER Pune, University of Zurich) and Biman Roy
	Theory of motives	
SAMYA KUMAR RAY	Analysis on non-commutative L_p-spaces	G. Hong, X. Lai, B. Xu, A. Chattopadhyay, C. Pradhan, S. Sarkar
	Grothendieck inequalities	Gadadhar Misra, R. Gupta
MITRA KOLEY	Commutative Algebra	Matteo Varbaro
	Algebraic Geometry	A. J. Parameswaran

Projects done for Govt. of India/State Govts

NEW PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	DST Inspire Fellowship	E177	2 August, 2021	Five Years	Samya Kumar Ray	DST, Govt. of India	1,09,78,000/-
2	DST Inspire Fellowship	E183	1 August, 2021	Five Years	Mitra Koley	DST, Govt. of India	1,09,78,000/-
3	DST Inspire Fellowship	E179	1 September, 2021	Five Years	Debapratim Banerjee	DST, Govt. of India	1,09,78,000/-
4	J C Bose National Fellowship	E171	8 October, 2021	Five Years	Ritabrata Munshi	SERB, Govt. of India	95,00,000/-

ONGOING PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	J C Bose National Fellowship	264	1 January, 2019	Five Years	Arup Bose	SERB, Govt. of India	95,00,000/-
2	J C Bose National Fellowship	E043	25 July, 2016	5 Years + 5 Years (Two Term)	Debashish Goswami	SERB, Govt. of India	1,63,00,000/-
3	Limit Theorems in urn Models	E140	March, 2020	Three Years	Krishanu Maulik	SERB, Govt. of India	6,60,000/-
4	DST Inspire Fellowship	E149	10 June, 2020	Five Years	Sayan Chakraborty	DST, Govt. of India	1,09,78,000/-

COMPLETED PROJECTS

Sl. No.	Name of the project	A/c No.	Starting Date	Duration	Principal Investigator(s)	Funding agency	Sanctioned amount (₹)
1	Ring structures on Thom spectra	E114	March, 2019	March, 2022	Samik Basu	SERB, Govt. of India	6,60,000/-

3.8 Library, Documentation and Information Science Division (LDISD)

Chief Librarian: KISHOR CHANDRA SATPATHY

Office: 1st Floor, S.N. Bose Bhawan, ISI, Kolkata 700108

1

Library, Bangalore Centre

- **Name of the Primary Contact:** JISHNU BISWAS (Library in Charge),
- **Address for Postal Communication:** 8th Mile, Mysore Road, ISI, Bengaluru 560059
- **Year of Establishment:** 1960

2

Library, Chennai Centre

- **Name of the Primary Contact:** KALPANA. T.M.,
- **Address for Postal Communication:** 110, Nelson Manicakm Road, Aminjikarai, Chennai 600049
- **Year of Establishment:** 2011

3

Library, Delhi Centre

- **Name of the Primary Contact:** UDAYA BHANU KANDHA,
- **Address for Postal Communication:** 7, S. J. S. Sansanwal Marg, ISI, New Delhi 110 016
- **Year of Establishment:** 1974

4

Library, North-East Centre, Tezpur

- **Name of the Primary Contact:** KAKOLI GOGOI
- **Address for Postal Communication:** Punioni, Solmara, Tezpur-784501
- **Year of Establishment:** 2011

5

Central Library, Kolkata

- **Name of the Primary Contact:** KISHOR CHANDRA SATPATHY
- **Address for Postal Communication:** 1st Floor, S.N. Bose Bhawan, ISI, Kolkata 700108
- **Year of Establishment:** 1933

1. LIBRARY, BANGALORE CENTRE

The Bangalore Centre of the Indian Statistical Institute was conceived by Prof. P. C. Mahalanobis during 1960s, even when the city was emerging as a center of science. It is a tribute to his foresight that the Institute is now well established in one of the most vibrant scientific communities in India.

Indian Statistical Institute Bangalore Centre Library is aiming to be identified as a model library in the Indian academic scenario. ISI Bangalore Centre Library has also initiated interactive applications for its users. The library has developed a very distinguished collection in different knowledge domains such as Mathematics, Statistics, Systems Science, Information Science, Economics, Quality Management & Operations Research, Library & Information Science, Computation & Artificial Intelligence and so on. Various services are designed to meet the information needs of the faculty members, students, research scholars and visiting scientists. Walk-in users from the other institutions are also permitted to use the library. Major activities of the Library are given below.

Collection Development:

The library procures journals, books and other reading materials for users. The library subscribes to all major reputed journals in print and electronic form both foreign as well as Indian in the said fields. It has also a good collection of reference documents, govt. statistical reports and books on general interests. Currently, the total collection of the library is 31,011 books and 20,335 bound volumes.

Membership:

More than 231 members registered and facilities were extended to around 404 walk-in users during this period. Consequent to Corona Pandemic, no students/ members are visiting Library.

Current Content Service:

Content pages of around 3040 journals have been scanned.

Circulation Service:

Consequent to Corona Pandemic, no students/ members are visiting to Library.

Service Added:

Library members can remotely access to all the important resources subscribed by the Kolkata library (e-books, e-journals) online. Other services are like lending, Inter library Loan, content search service, reading room service, reference service, reprography service, and electronic document delivery service etc.

The library provides RemoteXs facility to its users for accessing e-resources remotely. The library is also providing a plagiarism checking facility through iThenticate/URKUND to teachers and research scholars of the Institute.

Details about the Current Status of the Library

231 Total Members as on March 31, 2022	**1 Prof** **2 Non Prof** Total Library Personnel as on March 31, 2022
31,011 Books	**39** E-Books
600 CDs	

2. LIBRARY, CHENNAI CENTRE

ISI Chennai Centre library started in 2010. SQC & OR unit library was established in 1959 and ISI Chennai Centre Hostel Library in 2010. These libraries merged with the Central Library in 2013. Chennai Centre library is fully automated with Koha (Library Automation software), Biometric patron recognition, Fully RFID enabled with ISO standards. Database entries in Koha were updated (in Z39.50 Standard bibliographic format) for all the books. Web OPAC and user self-management systems incorporated with Koha. Books are classified under UDC and arranged accordingly with shelf guides etc. This evolving library aims to a vibrant collection in the fields of Statistics, Applied Statistics, Mathematics, Computer Science, Statistical Quality Control and Operation Research making it prototypical in functioning, administration and unique in the collection.

Library Collection:

The Library maintains an excellent collection of books, journals, magazines, question papers, multimedia resources etc. The library has a total collection of around 6223 books and reading materials. Institutional membership with the Indian Institute of Technology, Madras was renewed regularly for extending the collection. Books from the Chennai center were referred by faculties from ISI Bengaluru through interlibrary loan. A total of Rs. 18193 was spent from the annual budget on books and one magazine. Total Rs. 75000 was spent on Computer.

Library Services:

Library members can remotely access all the important resources subscribed by the Kolkata library (e-books, e-journals) online. Other services are like lending, Inter-Library Loan, content search service, reprography service and document delivery service etc. ISI Chennai Library website focuses to provide access to relevant information services, bibliographic and full text digital and printed resources to support the Scholarly Community of the Institute. It also shares a platform with ISI group institutions in Resource sharing to broaden resource availability. The library is also open for reference to academic users of other educational and scientific institutions and their neighboring regions. The library provides a RemoteXs facility to its users for accessing e-resources remotely. The library is also providing a plagiarism checking facility through URKUND to teachers and research scholars of the Institute. Library regularly organizes user orientation programme. The total number of documents circulated this year was 225. The number of Requests for Inter-Library Loan was 4.

30
Total Members as on March 31, 2022

01
Total Library Personnel as on March 31, 2022

6223
Books

156
Number of Circulations held in the Year

03 (CPDA)
Books Collection Development in 2021-22

3. LIBRARY, DELHI CENTRE

The Indian Statistical Institute, Delhi Centre, maintains an academic library, which aims to be a leading library in the fields of Economics, Mathematics, Statistics, Operations Research and Statistical Quality Control.

The library caters mainly to the needs of students, scholars and staff of the Institute. However, it is also open for reference to academic and research users of other educational and scientific institutions of the city and its neighboring regions.

It is one of the modern libraries with an extensive collection of books, journals, CDs, reports, government publications and other documents in print and electronic formats. The ISI Delhi Centre library also acts as one of the NBHM regional libraries of northern India and provides information resources to support academic and research activities in the areas of Mathematics, and allied subject areas.

Library Services:

Koha, library management software became fully operational on 24 February 2019 using the library local server. The database of books and journals available is updated regularly and a Web-OPAC facility has been provided for students and teachers to search for documents.

Library members can remotely access to all the important resources subscribed by the Kolkata library (e-books, e-journals) online. Other services are like lending, Inter-Library Loan, content search service, reading room service, reference service, reprography service, Current Awareness Service, Web-OPAC Facility and electronic document delivery service etc. More than 1500 publications have been circulated among the members, 200+ documents delivered electronically. The number of Requests for Inter-Library Loan was 10 and a total of 50+ requests were received for repro photo services.

The library provides RemoteXs facility to its users for accessing e-resources remotely. A total of 600+ documents were downloaded and 1000 hits were received through RemoteXs. The library is also providing a plagiarism checking facility through iThenticate/URKUND to teachers and research scholars of the Institute.

Library organized regular user orientation programme for users, Koha training for library staff, followed Coordination Committee guidelines under the supervision of Chief Librarian, ISI Kolkata on procurement of e-resources and other reading materials. Library has started new "Alert Services" for the users. Library is open for extended hours (5.30 p.m. to p.m., Monday to Friday and 10.00 a.m. to 2.00 p.m. on Saturday).

Details about the Current Status of the Library

166 Total Members as on March 31, 2022	**03** Total Library Personnel as on March 31, 2022
33978+ Books	**2500+** relevant books access are available via RemoteXs.
18638 Journals	**5000+** relevant e-journals are now available via RemoteXs from the Central Library
Rs. 908907 Annual Budget Spent by the Library	**690** CDs/DVDs

DESCRIPTION OF THE FACILITIES OR SERVICES PROVIDED

Items Delivered in Electronic Format / ILL	80+
Data Downloads/ Hits via RemoteXs	6000+ (MBs) /1500+ Hits
Number of Circulations held in the Year	600+
Usage Statistics of Plagiarism Software	15
Requests Received for Repro-photo Services	30+ papers scanned and given to users. more than 200 pages of photocopies provided to users.
Details about Web-based Services Provided	Library collection details, E-resources A-Z list of Journals, Databases, and other publications. Library services details, Requisition E-forms for ILL, Photocopies request, Book purchase, Library membership etc. Library Timings, Web-OPAC, etc.
Promotional Activities Performed in Library	Awareness about the e-resources available through RemoteXs. How to run Off-Campus access of ISI Library e-resources via RemoteXs facilities
New Services Undertaken by the Library	Alert Service
Other Relevant Information	The National Board of Higher Mathematics, (NBHM) has recognized ISI Delhi Centre library as a regional library of the NBHM. Under this scheme faculties and research students from other universities/colleges in the northern region are entitled to use the facility offered by the Delhi Centre library for their research work or references of Mathematics and Statistics journals and books.

Collection Development in 2021-22

Head	Details
Books	Books have procured in response to faculty and scholar academic needs.
Journals	30 journals, both foreign and Indian have been subscribed in the year 2022.
Access to online databases	Faculty, research scholars, and students allow to access all subscription of e-resources procured by ISI Central Library through the RemoteXs services. User by using their personal user id and password, can access to all library e-resources through the RemoteXs site.
E-books	Faculty, research scholars, and students allow to access all e-books procured by ISI Central Library through the RemoteXs services. User by using their personal user id and password, can access to all e-books collection through the RemoteXs site.
CDs	5+

4. LIBRARY, NORTH-EAST CENTRE, TEZPUR

ISI N-E Centre Library shifted to its present permanent location in June, 2019. The ISI NE Centre Library was established in the year 2011 and the Library performs an important role in academic activities of the Institute from its inception. The Library endeavour's to provide value services to its user community by developing quality documents in the field of Statistics, Mathematics, Economics and other allied subjects. The Library has a good collection on the three main subjects. Further, it has limited collection in the fields of Computer Science, Soil Science, Library Science, Environmental Science etc. The ISI N-E Centre Library always tries to fulfil the needs of the user community.

A total of 40 bibliographic records were processed. A total of Rs.432853.00 was spent from the annual budget on books and other materials.

Library Services:

Library uses Koha, library management software. The database of books and journals available is updated regularly and a Web-OPAC facility is available for students and teachers to search the library collection.

Library members can remotely access to all the important resources subscribed by the Kolkata library (e-books, e-journals) online. The library provides RemoteXs facility to its users for accessing e-resources remotely. The library is also providing a plagiarism checking facility through URKUND to teachers and research scholars of the Institute. Other Library Services are: Circulation Service, Reading Room Service, Inter-Library Loan Service, Reference Service, Photocopy service, Electronic document delivery service, Current awareness service, Web-OPAC Facility, Web Enable Library Services (Access to online resources). More than 850 publications have been circulated among the members this year. A total of 170 requests were received for repro photo services.

Details about the Current Status of the Library

42
Total Members as on March 31, 2022

01
Total Library Personnel as on March 31, 2022

3105
Books

Rs. 610824
Annual Budget Spent by the Library

Student Project Report - Print-53,
e-format-21,
Summer Internship Report (4) Technical Report (4), Gift Item (Book-16), Gift Item (Magazine-11)

DESCRIPTION OF THE FACILITIES OR SERVICES PROVIDED

Items Delivered in Electronic Format / ILL	23
Data Downloads/ Hits via RemoteXs	Data downloads 776.17 MB/255
Number of Circulations held in the Year	350
Usage Statistics of Plagiarism Software	17
Number of Hits counted in the Lib Website	2327

Collection Development in 2021-22

Head	Details
Books	118

5. CENTRAL LIBRARY, KOLKATA

The Central Library occupies a unique place in the academic and research activities of the Institute. The Central Library moved to its present location in 1978, and it occupies 5 floors (60000sq.ft) of a ten-storied building at Kolkata. The Central Library seeks to:

- Meet the informational, educational, recreational, and cultural interests and needs of the user community by providing timely access to print and non-print resources appropriate to those needs.
- Encourage and facilitate reading, literacy and lifelong learning by supplying resources in a variety of formats designed to interest, inform, and enlighten.
- Protect the public's right to know by providing equal access to information needed for informed and effective daily living, decision making, problem solving and thoughtful participation in civic/community affairs.
- Provide the highest quality service and organize and display the collection for easy, open access by all.
- Maintain publication exchange program of the Institute with regional, international, national and foreign institutions and organizations.
- Continue to function as the Eastern Regional Library of the National Board of Higher Mathematics [NBHM], Department of Atomic Energy, and Government of India since 1989.

DETAILS ABOUT THE CURRENT STATUS OF THE LIBRARY

Total Members as on March 31, 2022 :	2305 (Staff 444, Students & res Sch. 675, Ins. Member 1085, Project & others 103)	
Total Library Personnel as on March 31, 2022 :	Total 30, (Professional: 20; Non-prof:10)	
Total Collection as on March 31, 2022:	**Physical (Print)**	**Digital (Electronic)**
Books :	138555 purchased books and 26761 Complementary books, Thesis - 542	6880
Journals :	100	20000
Annual Budget Spent by the Library :	11 crore	
Total Storage (in MBs) used for In-house Digital Contents of the Library :	10.65 GB (Koha database)	Data stored in Dspace 26 GB.
Bibliographic Records Added to the ILM & DAM Systems of the Library :		Out of 7110 full text records in IR 132 records (74 dissertations, 51 thesis, 5 ISI Scientist Pub., 2 Annual Reports) during 21-22
DESCRIPTION OF THE FACILITIES OR SERVICES PROVIDED		
Number of Circulations held in the Year	15,509=(Checkout-3489, Checkin-3425, Renewal-2011, Local Use-378, CD-Rom-18, References-3450, Dean's Library Circulation 1130)	
Number of Requests for Inter Library Loan & checking of Plagiarism Software	2 Inter Library Loan books have been issued & 60 articles were sent on ILL. 44 (4 internal & 40 External) Users check their documents. Amount earned as a service charges Rs. 14455/-	

Services of the Library Division @ ISI Kolkata

Over the years, the ISI Central Library has attained the distinction of being one of the richest libraries in India in the areas of mathematics, statistics, economics, theoretical computer science and related areas. To achieve the goals of the Library, the following activities were undertaken during the year under report.

Collection Development: The Library maintains an excellent collection of books, journals, reports, rare and special collections, government publications, data-books, theses and other documents/ materials in print and electronic formats.

During the year under report, the library accessioned 110 printed books and added SAGE e-Books Collection (183), Cambridge e-Books Collection (169), approximately 512 e-books from Springer and AMS eBook subject Collection (Mathematics and Statistics) which is accessible across the centers through IP ranges. The Library has accessioned more than 167 bound volumes of journals (the total number of bound volumes of journal is 80027) and subscribed to 100 scholarly journal titles in print. Apart from this several journal titles were received as complimentary and in exchange with Sankhya. The library received and processed more than 537 loose issues of journals. Besides this, the library has added a collection of 3 English books and 43 Hindi books on literature, humanities, travel, health and recreation and 22 Daily Newspapers & Magazines, and 15 Puja Sankhya in its Workers' Circulating Library.

The library has a good collection of electronic resources on different media and has access to several online journals/ databases. The library has provided online access to about 20000+ full-text journals and renewed all major online databases like MathSciNet, AMS, IMS journals, IEL online of the IEEE/IEE publications, Econlit with full text, Science Direct, Springer, Taylor & Francis, Wiley, OUP, CUP, Duke Mathematical Society Journals, Euclid Prime, ACM Digital

Library, JSTOR, Project Muse, SAGE along with SCOPUS and ProQuest databases.

This year Wall Street Journal, EPWRF Indian Time Series, Proceedings of the Royal Society A & B, J-Gate and J-Gate datatype, World Scientific (WSP)-Computer Sc. and Mathematics Collection, Geological Society of American & Geology journals. The Marking of the Modern World: All parts (Part I to III) with the Economist Historical Archive update 2004-2015 were added to the collection. The library has also subscribed to Census data and acquired online report databases (IP &/or Password based) for providing data services to the potential users. Subscribed online databases are namely – Economic Outlook (CMIE), States of India (CMIE), IndiaStat (Socio-economic Statistical Information & facts on India), Districts of India (only West Bengal Districts), CEIC Databases (Global DB + Daily DB + Indian Premium DB).

Library has Institutional tie-ups with several professional bodies like ILA, IASLIC, BLA, DELNET, British Council etc. Library renders electronic document delivery services bases on online /offline databases in India and abroad. Library also provides data download services with high-end computing facilities as well as photo-copying, data-copying, and printing etc.

Services: The ISI-Library, since its inception has been providing a variety of library and information services to its users. The services presently being provided include:

Web-OPAC: Members use this facility to browse and search the database to see the status of a document including their own transactions.

Lending/Document Delivery Service: During this period 15,509 books and other documents were issued to the user on loan and reference. Publications from the Government of India and other international organizations and data CDs, were issued to users for reference purposes. It provided email-based reminder services like 7-day advance alert, long overdue notice and check-in information.

Inter-library Loan (ILL): 2 books were lent to other libraries on ILL.

Current Awareness Service: 3 monthly lists of current additions to the library were made available online.

Self-Photocopying Service: The library provided the Self-photocopying service in its periodical section, which was available every day throughout the library hours.

Electronic Document Delivery Service: Full-text articles and/or bibliographical data were provided through email from online resources. Besides electronic document delivery, 200 pages of printouts were also supplied against demand.

Online Full-Text Access to Journals/ Database: During the period under review, the library has provided services from more than 20000+ online journals and major databases like MathSciNet, Econlit with full text, Science Direct, Springer Link, T & F Journal online, Willy Inter-Science, Oxford University Press Journals, CUP Journals, JSTOR, IEEE/IEE publications, ACM Digital Library and Current Index to Statistics (CIS) on Web through consortia. Online access is available through a campus-wide network.

Publication exchange programme:

The library maintains the publication exchange programme of 'Sankhya-the Indian Journal of Statistics' with 35 National and International Institutions/ Organizations. The 23 international agencies are from various countries of the world such as Bangladesh, Belgium, Brazil, Canada, China, Taiwan, Croatia, Czech Republic, Denmark, France, Hungary, Italy, Japan, Pakistan, Poland, Romania, Russia, Slovakia, Spain, Switzerland, Thailand, UK and USA.

Reprographic & Photographic Service:

During the period under report the Reprography & Photography Unit, Library Division has carried out its regular works of Photocopying more than 1,82,459 copies (approx.). Total Program Covered 85, Photograph was taken 4131 snaps, Passport Print 213, Colour Print 1666, Spiral Binding 157, Lamination 43, Graphic Design 911.

The Unit renders unique services in graphic designing, image processing, developing digital photo archives, scanning and restoration of old photographs, art photography, scientific photographic work. It also provides services like modification of image files, poster printing, color printing, spiral binding, lamination, photographic coverage of various events like ISI Council meeting, ISI convocation, seminar, conference, visit of dignitaries, cultural and sports activities of the institute etc. It also carries out indoor photography like scientific photography for different scientific units. A Digital Photo Archive has been developed to store photographs along with their metadata.

Documentation Service: A searchable bibliographic database has been prepared on scientific contributions made by the ISI scientists on all subject fields since 1934.

General Enquiry Assistance & Consultation Service: Assistance has been extended to 280 external visitors including participants of the Winter School, NBHM Nurture

Programme, Summer Research School and visiting students of different institutions.

Users have been provided off-campus E-resources access facility of Central Library via RemoteXs round the clock (24X7).

New initiatives taken by the library:

1) Nearly 1915 old and mutilated books were listed and the process of withdrawal from the koha collection is to be started soon.

2) IR was updated with for 132 records (74 dissertations, 51 theses, 5 ISI Scientist's Pub., 2 Annual Reports)

3) Preservation and conservation: Near about 1200 volumes of journals, books, and reports have been sent for binding this year which were pending for some time. 2 Rare and Valuable books, that have been damaged & mutilated, are Digitized and preserved for users.

4) Like each and every year, this year also library staff prepared the biographies of the Convocation Addressee and Special Guest and uploaded both Convocation Address and bio sketche(s) of the speakers and related documents in our Institutional Repositories.

5) Listing of segregation/categorization and processing of around 1000 very old documents (Books, Reports etc).

6) A new policy has been initiated for submission of doctoral dissertations (awarded by ISI) to the Institutional Repository with a mandate to make the public-funded research available through open-access. In this regard, a declaration of the individual researcher is prescribed for execution.

7) A no of online user awareness programmes were organised.

Projects

Internally funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)
1	DATAhub: ISI Research Data Management Project	2021	2 Years	Kishor Chandra Satpathy and Monali Mitra Paladhi
2	Arrangement & Digitization of PCM Memorial Museum & Archive Materials	2021	2 Years	Kishor Chandra Satpathy and Monali Mitra Paladhi

3.9 COMPUTER AND STATISTICAL SERVICE CENTRE (CSSC) KOLKATA

Head of Unit : DEBA PRASAD MANDAL (From 1st Apr, 2021 – 30th Sep, 2021)
UJJWAL BHATTACHARYA (1st Oct, 2021 – 31st Mar, 2022)

Office: 4th Floor, S. N. Bose Bhavan, Indian Statistical Institute, Kolkata - 700108

Research

The Computer and Statistical Service Centre (CSSC) of the Institute is housed at the main campus of the Institute situated in the northern part of the city of Kolkata. This Centre takes care of management, maintenance and support of its entire IT infrastructures and related issues of its users comprising students of its various curriculum, faculty, scientists and administrative staff.

Also, CSSC takes care of IP Telephony and e-library of the Institute, FACT accounting server used by its accounts departments of various centres including outlying ones, Video Conferencing with the help of tools like WebEx or ZOOM. Its service staff worked seamlessly to provide computational services to its entire strength of faculty and student working remotely during the pandemic period. It manages a fleet of computational servers which include a GPU server, an Email server, a Web server and several others. The LAN (wired) connections of various Units, Centres, Offices including Hostels, Guest House, Auditoriums, lecture halls etc. as well as their wireless (Wi-Fi) connectivity are managed and maintained by CSSC support staff in a seamless manner. CSSC manages the website of the Institute. Their staffs take care of updates of the website as when it is needed. Also, it takes care of publishing / announcing information about important events (conferences/ workshops/ schools/ lectures/ meetings etc.),

public notices including tenders advertisements for jobs in temporary or permanent positions, achievements and event/ archival pictures of the Institute through display systems placed at the corridors of different buildings in ISI Kolkata campus as well as the website.

Two computing labs at CSSC equipped with a large number of computers are available for their use by the researchers and students of the Kolkata campus of ISI. Practical classes of various regular academic programmes like B. Stat., M. Stat., M. Tech. (CS), M. Tech. (QR & OR), M. S. (QE) etc. are organized in these labs throughout the year. The online teaching facility of the Institute is also being supported by CSSC staff. Regular classes conducted remotely for the students of outlying centres or by the faculties of these centres through video conferencing facilities are managed by CSSC. Additionally, its staffs provides regular assistances for conducting various online meetings including special or periodical meetings of ISI council as well as the academic council of the Institute are arranged and managed by CSSC staff. CSSC has a special examination hall suitable for conducting computer based tests.

CSSC takes the responsibility of bulk purchases of various hardware and software items, their distributions, record keeping, maintenance, supply of certain consumables etc. to meet the common computational needs of its researchers and administrative staff. CSSC often provides technical support and arranges training for the staff employed at various scientific and administrative divisions of the Institute's Kolkata campus.

Major Activities & Associated Resources

Resource	Brief Overview of Resources Available as on 31st March 2022
Servers	CSSC manages a fleet of servers which include (i) CISCO UCS 460M2, (ii) CISCO UCS B460M4 , (iii) TANDBERG MCU 4505, (iv) CISCO UCS C240 M3 S V01, (v) CISCO UCS C210 M2 and (vi) CISCO UCS B5108 AC 2 V01
Virtualization	VMware virtualization software
Networking	The IT infrastructures of this Institute include (i) computer labs, (ii) networking facility based on both wired and wireless network architecture, (iii) computational servers supported by several high performance devices, (iv) virtualization of servers, (v) support for super high performance computation based on GPU facilitating machine learning based research studies, (vi) internet facility and its security through firewall, (vii) email server, (viii) design, updates and regular maintenance of the website, (ix) various operating systems including Microsoft Windows, Linux, IBM AIX, (x) compilers of various computer languages including C/C++, JAVA, R, Python, FORTRAN etc., (xi) various software packages which includes R, Matlab and its various Tool Boxes, Mathematica, SPSS etc., (xii) various database packages like MYSQL, PostgreSQL, (xiii) IDRISI (Geological Information System), (xiv) online meeting support through Zoom online video conferencing tool.
Software for use by students, faculty and CSSC	C/C++, JAVA, R, Python, FORTRAN, R, Matlab and its various Tool Boxes, Mathematica, SPSS, MYSQL, PostgreSQL, IDRISI (Geological Information System), online meeting support through Zoom online video conferencing tool
IP Telephony	CSSC also takes care of IP Telephony
Video-conferencing	The video conferencing facility is available for participants from different platforms like VC endpoints, personal computers and Smartphone. Its large VC room has state-of-the-art facilities equipped with one smart display and the latest 360 degrees audio capturing system for organization of meetings of various groups such as academic council meetings or administrative meetings, presentations by various individuals like aspiring candidates for its faculty positions, classes for students of its outlying centres, expert's lectures by the faculties of the Institute for attendees from outside the Institute etc. It has also an additional small VC room equipped with limited facilities to accommodate meetings having overlapping schedules Its' support staff extends all technical helps on a regular basis to various groups or individuals through arranging / managing Video Conferences as and when these are needed.

Resource	Brief Overview of Resources Available as on 31st March 2022
VPN Connectivity	It is maintaining the connection (using Site-to-Site Virtual Private Network, i.e., VPN) with Delhi, Chennai, Tezpur and Bangalore Centres and the Giridih Unit of the Institute. Outlying Centres / Branches of the Institute use this VPN connectivity to utilize the IT infrastructures of CSSC at Kolkata.
Computing Laboratories No. and capacity)	Lab facilities for all the students of Kolkata Headquarter of the Institute are provided by the CSSC. Practical classes of regular courses like B. Stat., M. Stat., M. Tech. (CS), M.Tech. (Q.R. & O.R.), M.S. (Q.E.), and M. Stat. take place regularly at the computer laboratories of CSSC throughout the year. Certain courses of various streams like B. Stat. (Delhi centre), M.Tech. (CS), PGDSMA etc. are often organized online through video conferencing facility managed by CSSC. It has also facility for conducting Computer Based Tests (CBT) of a group of students of limited number
Disbursal of Desktops/ Laptops	The CSSC takes responsibility periodically for making bulk purchases and their distributions, keeping records etc. of Laptop and Desktop computers to meet their requirements of the faculties, research students and administrative workers

Resources acquired

Resource	Brief Overview
Software for use by students, faculty and CSSC	Zoom Cloud Meeting Education Host Licenses for 50 Users, Zoom Cloud Recording 500 GB Monthly Usage for 1 Year, Zoom Conference Room Connector

3.10 ACADEMIC CENTRES

1

THE CENTRE FOR ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (CAIML), Kolkata

- **Centre Head:** NIKHIL RANJAN PAL
- **Number of Faculties:** Fifteen (15), Associate Members
- **Number of Non-scientific Workers:** One (1), Associated Staff Member
- **Office:** 4th Floor, SN Bose Bhawan, 203 B. T. Road, Kolkata - 700108

2

THE CENTRE FOR RESEARCH ON THE ECONOMICS OF CLIMATE, FOOD, ENERGY AND ENVIRONMENT (CECFEE), Delhi

- **Centre Head**: E. SOMANATHAN
- **Number of Faculties**: Twenty-three (23); of which six are faculty in the Economics and Planning Unit of ISI, Delhi while more than half the researchers are faculty at other institutions like IISc, IIT-Mumbai, Delhi School of Economics, Institute of Economic Growth, Ashoka University, Shiv Nadar University, South Asian University, Environment Defense Fund etc.
- **Number of Non-scientific Workers**: One (1)
- **Number of Research Scholars**: Two (2)
- **Office**: 7 S.J.S. Sansanwal Marg, Delhi, New Delhi - 110016

3

THE CENTER FOR SOFT COMPUTING RESEARCH (CSCR), Kolkata

- **Centre Head:** SHUBHRA SANKAR RAY
- **Number of Faculties:** Four (4)
- **Number of Non-scientific Workers:** Three (3)
- **Number of Research Scholars:** Nine (9)
- **Office:** 1stFioor, R. A. Fisher Bhawan, 203 B. T. Road, Kolkata - 700108

4

R .C. BOSE CENTRE FOR CRYPTOLOGY & SECURITY (RCBCCS), Kolkata

- **Centre Head:** MRIDUL NANDI
- **Number of Faculties:** Four (4)
- **Number of Non-scientific Workers:** Three (3)
- **Number of Research Scholars:** Eight (8)
- **Office:** 203, B T Road, Kolkata - 700108

5

TECHNOLOGY INNOVATION HUB (TIH), Kolkata

- **Centre Head:** ASHISH GHOSH
- **Number of Faculties:** Seventeen (17)
- **Number of Non-scientific Workers:** Four (4)
- **Number of Research Scholars:** One (1)
- **Office:** 203 B. T. Road, Kolkata - 700108

1. THE CENTRE FOR ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (CAIML), KOLKATA

Research

The centre is engaged in doing research in several niche areas of artificial intelligence (AI) and machine learning (ML). One of these areas addresses advanced ML techniques for cryptanalysis for the defence research and development organisation (DRDO). In another project, the centre is working on developing a reinforcement learning model for the prediction of stages in Duchenne Muscular Dystrophy under the support from Google. In addition, researchers are involved in designing domain knowledge aware deep learning system for healthcare analytics and statistical data analytics for improving energy efficiency of electric vehicles. The centre is also engaged in providing AI/ML expertise to industry houses for addressing their challenging issues as well as equipping them with the state of the art skills. Apart from research and consultancy services, the centre is organising training programs for developing high-end manpower in the field of data analytics.

Current Areas of Research

Name of Faculty	Research topic(s)	Collaborators (s)
Malay Bhattacharyya	Machine learning for cryptanalysis, reinforcement learning for healthcare	Lakshmi B. Raman
Nikhil R Pal	Machine Learning for cryptanalysis, Collaborative Neurodynamic Optimization for feature selection, Neural networks for Reservoir Engineering	Jun Wang, Jian Wang
Utpal Garain	Machine learning for cryptanalysis, domain knowledge aware deep learning systems	Soumadeep Saha, Arijit Ukil and Arpan Pal

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	Advanced Machine Learning Techniques for Cryptanalysis	December, 2021	3 Years	Nikhil R. Pal	1,92,13,700/-
2	AI-guided systematic intervention and prediction of progression in Duchenne Muscular Dystrophy	September, 2021	1 year	Malay Bhattacharyya	7,27,500/-
3	Mentoring / guiding the MOLIT team members on issues of ML / AI towards the achievement of improved results in their AI/ML based Projects	July, 2021	1 Year 3 Months	Ujjwal Bhattacharya	16,52,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	Domain Knowledge Augmented ECG Analytics	1st September, 2021	31st March, 2022	Utpal Garain	19,38,000/-

2. CENTRE FOR RESEARCH ON THE ECONOMICS OF CLIMATE, FOOD, ENERGY AND ENVIRONMENT (CECFEE), DELHI

Research

The first meeting of the Board of Management (BoM) of CECFEE was held on March 2021 and was chaired by Dr. K. Vijay Raghavan, Principal Scientific Adviser to the Government of India, and Chair of the BoM. Inputs from the Board were sought on recommended research areas and prospects for collaborations with the Government, private, and way forward for fundraising and endowments. The Chair felt that there is a need to find and leverage the interface between academia and application, which is an area that his office can help facilitate. The Second BoM meeting was held on 7th April 2022.

The Board recommended the Umbrella Agreement of Environment and Development (EfD) Initiative 2021-2024. EfD India is now the host center for the cross-country collaborative - Emission Pricing for Development (EPfD). The EPfD collaborative is led by CECFEE (EfD-India, E. Somanathan), MCC (J. Steckel) and the University of Gothenburg (T. Sterner). This entails increased international collaboration in future research and enhanced support to researchers from other EfD countries to participate in the program. The first major project under the Collaborative titled "Optimal Emissions Pricing in lower-middle-income countries accounting for household emissions from traditional cooking" (MS-1169) was approved by the EfD Research Committee in 2021.

The 4th ISI Review Committee constituted by the Ministry of Statistics and Programme Implementation, Government of India, gave very positive feedback on CECFEE for creating a space for itself internationally and opined that the Centre should be further strengthened to not only become self-sustaining in all its activities but should also be generating surplus resources.

The lockdown and Covid-19 restrictions impacted fieldwork activities in the ongoing projects. The CECFEE annual workshop could not be held due to the pandemic. In 2021, the Department of Economic Affairs of the Ministry of Finance asked CECFEE and a few thinktanks to put in a proposal to study carbon pricing to act as background information for the Department in its engagement with the G20 countries. This is still in the review process, but it is an indicator that CECFEE is now seen as one of the major centers of expertise on climate economics in India.

CECFEE members had 45 publications and 5 book chapters in various national and international journals (Annexure-II) between 2021 and April 2022. Several CECFEE members were part of discussion forums and interviewed by the media. Three articles by CECFEE researchers were published in the EAERE magazine (volume 14), which formed a part of the compendium presented before COP 26, Glasgow. The research work titled –The impact of temperature on productivity and labor supply: Evidence from Indian manufacturing' featured in over 40 news publications. A recent publication in the journal of World Development Perspectives, which discusses why there is no need or rationale for new coal plants in India, has garnered a lot of attention.

Current Areas of Research

Faculty Name	Research Topic(s)
Ridhima Gupta	A study on the effects of heat and pollution on absenteeism in India
Shoibal Chakravarty	Coal plants have very high operating costs once pollution damages are taken into account
E. Somanathan	The primary drivers of human-elephant conflict in Assam, India, and the effect of anti-depredation squads in resolving these conflicts
Kanishka Kacker	Contribution of coal-fired power plants (in India and the US) to the concentration of atmospheric PM2.5 and its effect on mortality
Farzana Afridi, Kanika Mahajan	The gendered effects of climate change: Production shocks and labor response in agriculture
Kanika Mahajan	Gender and Mechanization: Evidence from Indian Agriculture
Shoibal Chakravarty	Coal plants have very high operating costs once pollution damages are taken into account.

Faculty Name	Research Topic(s)
Kanishka Kacker	Identifying the effects of coal plants on Air Pollution
Shivani Wadehra	A Framework for designing Behavioral & Economic policy tools to reduce marine plastic debris
Rohini Somanathan	A Behaviour-based Approach to the Estimation of Poverty in India
Shoibal Chakravarty	Estimating missing deaths in Delhi's COVID-19 data, 2020

Projects

Externally-funded Projects

NEW PROJECTS

Sl. No.	Name of the project	Starting Date	Duration	Principal Investigator (s)	Sanctioned amount (₹)
1	Distributional effects of the COVID-19 lockdowns in India1	1st January, 2021	2 Year	Rohini Somanathan (Co-PI Siva Athreya)	48,82,680/- (2021-2022)
2	Data quality assessment – during and post data collection for different indicators in the domains of demography, health, and nutrition	1st January, 2021	6 Months	Mudit Kapoor	21,77,985/-

ONGOING PROJECTS

Sl. No.	Name of the project	Starting Date	Completion Date	Principal Investigator (s)	Sanctioned amount (₹)
1	Adverse weather events, forced migration and human development outcomes in India: A district-level analysis1	1st January, 2020	31st December, 2021	Abhiroop Mukhopadhyay	24,38,382/-
2	Impact of COVID lockdown and post lockdown recovery of the urban informal sector1	25th August, 2020	31st December, 2021	Saudamini Das	10,94,400/-
3	Ascertaining the costs for collection and recycling of PET bottles between formal and informal sectors and creating appropriate incentives to increase it	20th March, 2019	30th October, 2021	Shivani Wadehra	18,95,172/-
4	Effects of heat on the incomes of workers in the informal sector1	7th June, 2019	31st December, 2021	Saudamini Das	35,49,494/-
5	Clean air transitions in Indian Cities1	7th June, 2019	31st December, 2021	Rohini Somanathan	23,52,075/-
6	Marine Collaborative1	15th September, 20219	31st December, 2021	Shivani Wadehra	51,90,226/-
7	Human Casualties and Wildlife Conservation in India (Partnership Development Grant with University of British Columbia)	27th March, 2020	21st March, 2023	E. Somanathan	$166,000

[1] Population Council, India

[2] The International Centre for Integrated Mountain Development (ICIMOD), Nepal

Publications:

Forty-nine publications, including four book chapters, were published during 2021 – 2022. Among these, thirty-eight publications including one book chapter with ISI affiliations feature under Publications in Journals section, under **EPU, Delhi** (Chapter 5 of the AR) while the remaining **29** publications including **4** book chapters by **CECFEE** members (faculty from other institutions), in topics falling under **CECFEE**'s scope, are listed below:

Books & Book-chapters:

1. Mitra, Arup, **Saudamini Das**, Amarnath Tripathi, Tapas Kumar Sarangi, and Thiagu Ranganathan. 2021. "Climate Change Impact on Livelihood and Well-Being of Rural Poor." In Climate Change, Livelihood Diversification and Well-Being (Springer Briefs in Economics), 1–25. Springer, Singapore. https://doi.org/10.1007/978-981-16-7049-7_1.
2. Somanathan, E. (ed.) 2021. "No Brainers and Low-Hanging Fruit in National Climate Policy". CEPR Press, London. https://cepr.org/chapters/no-brainers-india.
3. Das, Saudamini. 2022. "Valuing the Role of Mangroves in Storm Damage Reduction in Coastal Areas of Odisha" edited by A. K. E. Haque, P. Mukhopadhyay, M. Nepal, and M. R. Shammin. Climate Change and Community Resilience 257–273. Springer Nature, Singapore. https://doi.org/10.1007/978-981-16-0680-9_17.
4. Ghosh, Parikshit, and Vaibhav Ojha. 2022. "Integration without Coordination: Revisiting Globalization in the Light of the Pandemic" edited by M. Dutta, Z. Husain, and A. K. Sinha. The Impact of COVID-19 on India and the Global Order 297–310. Springer Nature, Singapore. https://doi.org/10.1007/978-981-16-8472-2_14.

Journal Articles:

1. Birthal, Pratap S., Jaweriah Hazrana, and **Digvijay S. Negi**. 2021. "Effectiveness of Farmers' Risk Management Strategies in Smallholder Agriculture: Evidence from India." Climatic Change 169(3). doi: 10.1007/s10584-021-03271-1.
2. Birthal, Pratap S., Jaweriah Hazrana, and **Digvijay S. Negi**. 2021. "Impacts of Climatic Hazards on Agricultural Growth in India." Climate and Development 13(10):895–908. doi: 10.1080/17565529.2020.1867045.
3. Birthal, Pratap S., Jaweriah Hazrana, **Digvijay S. Negi**, and Ghanshyam Pandey. 2021. "Benefits of Irrigation against Heat Stress in Agriculture: Evidence from Wheat Crop in India." Agricultural Water Management 255. doi: 10.1016/j.agwat.2021.106950.
4. Bishnu, Monisankar, Shresth Garg, Tishara Garg, and Tridip Ray. 2021. "Optimal Intergenerational Transfers: Public Education and Pensions." Journal of Public Economics 198. doi: 10.1016/j.jpubeco.2021.104411.
5. Chiplunkar, Gaurav, and **Sabyasachi Das**. 2021. "Political Institutions and Policy Responses during a Crisis." Journal of Economic Behavior & Organization 185:647–70. doi: 10.1016/j.jebo.2021.03.018.
6. Das, Sabyasachi, Souvik Dutta, and Abhirup Sarkar. 2021. "Political Economy of Third Party Interventions." Journal of Public Economics 195. doi: 10.1016/j.jpubeco.2020.104331.
7. Gupta, Ridhima, and Martino Pelli. 2021. "Electrification and Cooking Fuel Choice in Rural India." World Development 146. doi: 10.1016/j.worlddev.2021.105539.
8. Karnad, Divya, Dhruv Gangadharan, and Yarlagadda Chaitanya Krishna. 2021. "Rethinking Sustainability: From Seafood Consumption to Seafood Commons." Geoforum 126:26–36. doi: 10.1016/j.geoforum.2021.07.019.
9. Lokhande, Nitin, and **Haripriya Gundimeda**. 2021. "MGNREGA: The Guaranteed Refuge for Returning Migrants During COVID-19 Lockdown in India." The Indian Economic Journal 69(3):584–90. doi: 10.1177/00194662211023848.
10. Mahajan, Kanika, and Shekhar Tomar. 2021. "COVID -19 and Supply Chain Disruption: Evidence from Food Markets in India." American Journal of Agricultural Economics 103(1):35–52. doi: 10.1111/ajae.12158.
11. McDonough, Ian K., Punarjit Roychowdhury, and **Gaurav Dhamija**. 2021. "Measuring the Dynamics of the Achievement Gap Between Public and Private School Students During Early Life in India." Journal of Labor Research 42(1):78–122. doi: 10.1007/s12122-020-09307-2.

12. Roychowdhury, Punarjit, and **Gaurav Dhamija**. 2021. "The Causal Impact of Women's Age at Marriage on Domestic Violence in India." Feminist Economics 27(3):188–220. doi: 10.1080/13545701.2021.1910721.

13. Singh, Aparajita, and **Haripriya Gundimeda**. 2021. "Analysing Drivers of Efficiency in the Leather Industry: A Two-Stage Double Bootstrap DEA Approach." Benchmarking: An International Journal. doi: 10.1108/BIJ-04-2021-0178.

14. Singh, Aparajita, and **Haripriya Gundimeda**. 2021. "Measuring Technical Efficiency and Shadow Price of Water Pollutants for the Leather Industry in India: A Directional Distance Function Approach." Journal of Regulatory Economics 59(1):71–93. doi: 10.1007/s11149-020-09422-z.

15. Singh, Prachi, and Sagnik Dey. 2021. "Crop Burning and Forest Fires: Long-Term Effect on Adolescent Height in India." Resource and Energy Economics 65. doi: 10.1016/j.reseneeco.2021.101244.

16. Thomas, Bejoy K., Soumyajit Bhar, and **Shoibal Chakravarty**. 2021. "Imagining Sustainability beyond COVID-19 in India." Ecology, Economy and Society-the INSEE Journal 4(1):13–20.

17. Zimmermann, Lauren, Subarna Bhattacharya, Soumik Purkayastha, Ritoban Kundu, Ritwik Bhaduri, **Parikshit Ghosh**, and Bhramar Mukherjee. 2021. "SARS-CoV-2 Infection Fatality Rates in India: Systematic Review, Meta-Analysis and Model-Based Estimation." Studies in Microeconomics 9(2):137–79. doi: 10.1177/23210222211054324.

18. Bandyopadhyay, Sutirtha, and **Bharat Ramaswami**. 2022. "The Representative Agent Bias in Cost of Living Indices." Bulletin of Economic Research 74(1):155–78. doi: 10.1111/boer.12286.

19. Chakravarty, Shoibal, and Ashwin K. Seshasdri. 2022. "A Framework for Evaluating India's Net Zero Commitments." Current Science 122(7):759–60.

20. Dhamija, Gaurav, Manini Ojha, and Punarjit Roychowdhury. 2022. "Hunger and Health: Reexamining the Impact of Household Food Insecurity on Child Malnutrition in India." The Journal of Development Studies 58(6):1181–1210. doi: 10.1080/00220388.2022.2029419.

21. Dureja, Abhishek, and **Digvijay S. Negi**. 2022. "Coping with the Consequences of Short-term Illness Shocks: The Role of Intra-household Labor Substitution." Health Economics 31(7):1402–22. doi: 10.1002/hec.4514.

22. Gilman, Eric, Martin Hall, Hollie Booth, Trisha Gupta, Milani Chaloupka, Hannah Fennell, Michel J. Kaiser, **Divya Karnad**, and E. J. Milner-Gulland. 2022. "A Decision Support Tool for Integrated Fisheries Bycatch Management." Reviews in Fish Biology and Fisheries 32(2):441–72. doi: 10.1007/s11160-021-09693-5.

23. Gupta, Trisha, **Divya Karnad**, Shruthi Kottillil, Sudha Kottillil, and E. J. Milner Gulland. 2022. "Shark and Ray Research in India Has Low Relevance to Their Conservation." Ocean & Coastal Management 217. doi: 10.1016/j.ocecoaman.2021.106004.

24. Karnad, Divya. 2022. "Incorporating Local Ecological Knowledge Aids Participatory Mapping for Marine Conservation and Customary Fishing Management." Marine Policy 135. doi: 10.1016/j.marpol.2021.104841.

25. Khurana, Saloni, and **Kanika Mahajan**. 2022. "Public Safety for Women: Is Regulation of Social Drinking Spaces Effective?" The Journal of Development Studies 58(1):164–82. doi: 10.1080/00220388.2021.1961747.

Recognition:

ECONOMETRIC SOCIETY FELLOWSHIP (FIRST INDIAN WOMEN FELLOW)

R. Somanathan, CECFEE, Delhi: 2021

3. CENTER FOR SOFT COMPUTING RESEARCH (CSCR), KOLKATA

Research

The Center for Soft Computing Research: A National Facility was established at the Indian Statistical Institute (ISI), Kolkata, in 2004 by the Department of Science & Technology (DST), New Delhi under its prestigious IRHPA program. The Center has been declared in 2010 an Associate Institution of ISI. Research activities are conducted in enriching as well as developing new soft computing technologies in the framework of modern AI and data science. These include granular computing, computational theory of perception, theory of cognition, cybernetics, information processing in plants and small animals, and machine-mind architecture, with fore-front application areas like granular data mining, granular deep learning, cognitive vision, soft deep architecture, video analytics, social network analysis, bioinformatics, pollution analytics, assistive technology, and computing with words.

Current Areas of Research

Name of Faculty	Research topic(s)	Collaborators (s)
Ashish Ghosh	Deep Learning; Data Science and Machine Learning, Automated Pollution Prediction and Rainfall Prediction	
Kuntal Ghosh	Cognitive Science, Cybernetics, Information processing in plants and small animals, Computational Biology, Psychophysics, Graph Manipulation Algorithms, Information Technology for Accessibility and Health Care Applications	Anjan Chowdhury, Keerthi S. Chandran, Amrita Mukherjee, Sandipa Roy, Barnini Bhattacharyya, Shibsankar Roy, Bijay Bal, Chandra Das, Shilpi Bose, Arpan K Maiti
Sankar Kumar Pal	Granular Mining, Granular Deep Learning, Computational Theory of Perception, Rough Sets, Z-numbers, Energy Distribution in Smart Grid, Safety Analytics, Pollution and Climate Analytics, Video Analytics, and Soft Computing.	A. Pramanik. J. Maiti, P. Mitra, S. Misra, Debarati B. Chakraborty, Romi Banerjee, Pritam Paral, Dasari Arun Kumar, Debashree Dutta
Shubhra Sankar Ray	Bioinformatics, Computational Biology, Neural Networks, Soft Computing	Joginder Singh, Jayanta K. Pal, Sampa Misra

Projects

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1.	(CSR funding) Status of virulence of COVID-19 in urban population of Eastern India: An empirical study from Kolkata Municipal Corporation and its North suburb	30th September, 2021	1 year	Kuntal Ghosh	3,00,000/-
2.	(DST-WOS-B funding) Towards development of assistive technology for Indian sign language: cognitive analysis and application development	4th October, 2021	3 years	Sandipa Roy (Mentor: Kuntal Ghosh)	29,31,768/-

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	SERB National Science Chair	1st August, 2020	3 years	Sankar Kumar Pal	1,32,00,000/-
2	Networking on Data Science and Machine Learning under DST-ICPS Programme	23rd January, 2019	3 years (extended till 31st March, 2023)	Ashish Ghosh	83,47,400/-
3	Coordination of Cluster Projects under Data Science Research	23rd January, 2019	3 years (extended till 31st March, 2023)	Ashish Ghosh	58,90,000/-

Activities of the Centre

Lectures:

Sl. No.	Date	Title of the Lecture	Name of the Speaker	Affiliation of the Speaker
1	15th September, 2021	Fuzzy based approach for detection of object in space-based observation	Sanmoy Bandyopadhyay	IIT, Indore
2	27th August, 2021	Come let's rewrite the stars and make our computers startle and start!	Madhushree Chakrabarty	Former Fullbright Nehru Postdoctoral Fellow, Center for Cognitive Neurosciences, University of Pennsylvania

Publications:

Book Chapters

1. Bhattacharya, B., Banerjee, N., Chatterjee, S., Bhattacharya, R., **Ghosh, K.** and Mukherjee, S.: Individualized Helmet: An Approach for Reducing Road Traffic Injury Casualties, Ergonomics for Improved Productivity, pp. 841-846, Springer, 2021.

Journal Publications

1. Bardhan, A., Samui, P., **Ghosh, K**., Gandomi, A. H. and Bhattacharyya, S.: ELM-based adaptive neuro swarm intelligence techniques for predicting the California bearing ratio of soils in soaked conditions, Applied Soft Computing, 110, p.107595, 2021
2. Bose, S., Das, C., Banerjee, A., **Ghosh, K**., Chattopadhyay, M., Chattopadhyay, S. and Banik, A.: An ensemble machine learning model based on multiple filtering and supervised attribute clustering algorithm for classifying cancer samples, Peer J Computer Science, **7**, e671, 2021
3. Garg, A., Das, S., Maiti, J. and **Pal, S. K.:** Granulized Z-VIKOR Model for Failure Mode and Effect Analysis, IEEE Trans. Fuzzy Systems, **30(2),** pp. 297-309, 2022
4. Mazumdar, D., Mitra, S., **Ghosh, K.** and Bhaumik, K.: Analysing the patterns of spatial contrast discontinuities in natural images for robust edge detection, Pattern Analysis and Applications, **24 (3)**, pp. 1403-1425, 2021
5. Misra, S., Mondal, A., Kumar, S. P. Sudheer and **Pal, S. K**.: SEED: QoS-Aware Sustainable Energy Distribution in Smart Grid, IEEE Trans. Sustainable Computing, **7(1)**, pp. 211-220, 2022
6. **Pal, S. K.,** Pramanik, A., Maiti, J. and Mitra, P.: Deep Learning in Multi-Object Detection and Tracking: State of the Art, Applied Intelligence, (Invited paper in the special issue on thirtieth anniversary of the journal), **51**, pp. 6400–6429, 2021
7. **Pal, S. K,:** Rough Set and Deep Learning: Some Concepts, Academia Letters, Article **1849**, pp.1-6,2021, (https://doi.org/10.20935/AL1849).
8. Pramanik, A., **Pal, S. K.,** Maiti, J. and Mitra, P.: Granulated RCNN and Multi-class Deep SORT for Multi-Object Detection and Tracking, IEEE Trans. Emerging Topics in Computational Intelligence, **6(1)**, pp. 171-181, 2022

9. Roy, S., Bhattacharya, B., Bal, B. and **Ghosh, K.:** A microscopic study on scattering in tissue section of Alternanthera philoxeroides under polarized light, Journal of biosciences **46 (3)**, pp. 1-8, 2021

Publication in Conference Proceedings

1. Chandran, K. S. and **Ghosh, K.**: Recurrent Convolutional Neural Networks trained by psychophysics data can predict EEG response to flicker, Perception, **50 (1_SUPPL),** Proceedings of the Conference on 43rd European Conference on Visual perception, p. 132-132, 2021
2. Chowdhury, A., Srinivasan, S., Bhowmick, S., Mukherjee, A. and **Ghosh, K.**: Constant community identification in million scale networks using image thresholding algorithms, Proceedings of the 2021 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, pp. 116-120, 2021
3. **Ghosh, K.** and Chandran K. S.: A low-cost device and technique for generating big data in visual psychophysics to train brain models, Perception, **50 (1_SUPPL),** Proceedings of the Conference on 43rd European Conference on Visual perception p. 85-85**,** 2021
4. Mukherjee, A., Paul, A. and **Ghosh K**.: Bounded Human Ability for Stereopsis, Perception, **50 (1_ SUPPL)**, Proceedings of the Conference on 43rd European Conference on Visual perception, p. 208-208, 2021

Awards and Recognition

Science Academy Fellowships:

ASIA-PACIFIC ARTIFICIAL INTELLIGENCE ASSOCIATION (AAIA)

SANKAR KUMAR PAL
Emeritus Professor; National Science Chair; Former Director: 2021

HONOURS & RECOGNITIONS

SANKAR KUMAR PAL
Emeritus Professor; National Science Chair; Former Director AICTE Distinguished Chair Professor, 2021

Editorial Assignments

SANKAR KUMAR PAL

Emeritus Professor; Former Director

Associate Editor: Information Sciences (Elsevier), Fuzzy Sets and Systems (Elsevier), International Journal Pattern Recognition and Artificial Intelligence (World Scientific), Journal of Data, Information and Management (Springer), International Journal Computational Intelligence and Applications (World Scientific), LNCS Trans. on Rough Sets (Springer), Engineering Applications of Artificial Intelligence (Elsevier)

Executive Advisory Editor: Data-Centric Engineering (Cambridge Univ. Press), International Journal of Approximate Reasoning, International Journal of Computational Science and Engineering, International Journal of Business Intelligence and Data Mining

SHUBHRA SANKAR RAY

Associate Editor: The Editorial Board of Sadhana, Indian Academy of Sciences; May 2019 - December 2021

Scientific Assignments

Sankar Kumar Pal
Emeritus Professor; Former Director

» Keynote Lecture, Cognizance, Annual Technical Fest , IIT, Roorkee (17th April, 2021)

» Invited Speaker, Fourth International Seminar on Intelligent Computing (ISIC 21), Department of Computer Science and Engineering, Assam University in association with IEEE Computational Intelligence Society Kolkata (4th October, 2021)

- Keynote Lecture, 7th IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (IEEE WIECON-ECE 2021), Dhaka, Bangladesh (5th December, 2021)
- Keynote Lecture, 5th Mediterranean Conference on Pattern Recognition and Artificial Intelligence (MedPRAI 2021), Istanbul, Turkey (17-18th December, 2021)
- Keynote Lecture, 6th International Conference on Data Management, Analytics and Innovation (ICDMAI-2022) (14-16th January, 2022)
- Keynote Lecture, Third International Conference on Advances in Distributed Computing and Machine Learning (3rd ICADCML) ((14-16th January, 2022)
- Distinguished Chair Professorial Lecture Series, AICTE, Bombay College of Pharmacy, Mumbai, The Indian Pharmaceutical Association, Maharashtra State Branch (8th, 22nd, and 29th January, 2022)
- Keynote speech, International Workshop on Artificial Intelligence and Applications (IWAIA2022), Doha, Qatar (18-20th February, 2022)
- Keynote speech, VISHLESHAN-22: Research Scholar Day and Doctoral Colloquium, Department of Industrial and Systems Engineering, IIT, Kharagpur (26th March, 2022)
- Keynote speech, Techkriti'22: The Annual Technical and Entrepreneurship Festival, IIT, Kanpur (27th March, 2022)
- Chief Guest Speech, CEReS2022: The Computing and Electronics Research Summit, Birla Institute of Technology & Science Pilani, Hyderabad Campus, Hyderabad (30th March, 2022)

Kuntal Ghosh

- Invited Lecturer, A full course on Cognitive Modelling, M.Phil.(Cognitive Science), Jadavpur University (September, 2021- January,2022)
- Invited Lecturer, Introduction to Speech Processing and its Applications using AI-ML (ISPA), Faculty development program (FDP) of AICTE Training and Learning (ATAL) Academy, CDAC-Kolkata (26th October, 2021)
- Invited Speaker, Chapter Webinar, Indian Academy of Neuroscience Kolkata (5th November, 2021)

4. R. C. BOSE CENTRE FOR CRYPTOLOGY & SECURITY (RCBCCS), KOLKATA

Research

The Centre aims at the promotion of interdisciplinary research in Mathematics, Computer Science and Statistics towards furtherance of teaching, research as well as training and development in Cryptology and Cyber Security. It acts as a national hub for cryptographic requirements, cutting-edge research activities and indigenous capacity building in all relevant fields of study.

Major activities of the Centre include teaching, training and research in Cryptology and Security. The Centre promotes sustained collaboration in focused research areas, and serves as a meeting point for eminent scholars. It also conducts training programs targeted to produce a critical mass of experts to cater to the national and international requirements in this niche area.

Current Areas of Research

Name of Faculty	Research topic(s)	Collaborators (s)
Anisur Rahaman Molla	Security in Distributed Computing/ Byzantine Computation	Manish Kumar, John Augustine, Yadu Vasudev (IIT Madras), Gopal Pandurangan (UoH, Texas, USA), Ajay D. Kshemkalyani (UI, Chicago, USA), Gokarna Sharma (KSU, USA)
	Mobile Agents/ Robotics	Sumathi Sivasubramaniam, Prabhat Kumar Chand, Kaushik Mondal(IIT Ropar),Subhrangsu Mandal (IIIT Guwahati), William K. Moses Jr. (UoH, Texas,USA)
	Distributed graph algorithms	Sumathi Sivasubramaniam, Manish Kumar, Prabhat Kumar Chand
Debrup Chakraborty	Symmetric Key Cryptography	Palash Sarkar, Cuauhtemoc Mancillas Lopez, Sebati Ghosh, Avisekh Mazumder, Samir Kundu

Name of Faculty	Research topic(s)	Collaborators (s)
Goutam kumar Paul	Quantum Information / Computing / Cryptography	Anindya Banerji (CQT, Singapur), Ritabrata Sengupta (IISER, Behrampur)
	Symmetric Cryptanalysis	Mostafizar Rahman, Amit Jana, Dhiman Saha(IIT Bhilai)
Sabyasachi Karati	Elliptic-Curve Crypto	None
	Hash-based Crypto	Prof. Rei. Safavi-Naini
	Isogeny-based Crypto	None

Projects

Externally-funded Projects

NEW PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	Differential Privacy of Covid Data	20th September, 2021	1 Year	Samarjit Das	5,00,000/-

ONGOING PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	NTRO	November, 2019	3 Years	Mridul Nandi	8,98,00,000/-

COMPLETED PROJECTS

Sl. No	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1	Exploration of Suitable Metric for TRNG	November, 2019	31st March 2022	Goutam Paul	37,52,000/-

Activities of the Centre

Visiting Scientists

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Awards/Recognition/Publications of Visiting Scientists
1	Ritam Bhaumik	Researcher in a Starting Research Position, Cryptography, France	Nov 19, 2021 - Jan 20, 2022	Research on "Quantum Cryptography and Provable Security"
2	Kaushik Chakraborty	Senior Research Associate, University of Edinburgh, UK	Dec 20, 2021 - Jan 20, 2022	Research on "Quantum Cryptography and Provable Security"

Training Programmes

Sl. No.	Dates	Training Programmes conducted	Collaborator	Venue
1	July, 2021 – March, 2022	TCS- Faculty Development Programme		RCBCCS, KOLKATA

5. TECHNOLOGY INNOVATION HUB (TIH), KOLKATA

Research

The Technology Innovation Hub, IDEAS (Institute of Data Engineering, Analytics and Science Foundation), is a Section-8 not-for-profit company incorporated at the Indian Statistical Institute Kolkata under a National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS) of the Government of India. It is a sector-agnostic Innovation Hub in the technology vertical "Data Science, Big Data Analytics, and Data Curation" to be supported by the Department of Science and Technology (DST), Govt. of India. In particular, attempt will be made to develop the following:

» Fast and scalable algorithms for learning

» Mathematical modelling, simulation and statistical inference from big data

- Developing novel data analytic models for two main application areas: smart agriculture and video surveillance
- Specific models for geo-spatial, climate informatics, oceanographic and cosmological data
- New models of deep learning and their parallel implementation for data reduction
- Classification and applications of the same for object recognition, video processing and design of smart surveillance systems
- Devise algorithms to analyse the complex and evolving networks in social media.
- New methodologies for designing effective medical diagnostic tools and non-invasive therapeutic measures with knowledge from imaging, genomics, histomics, and clinical data analysis.
- Text and document analysis and recognition.
- Statistical verification and testing of the proposed models.

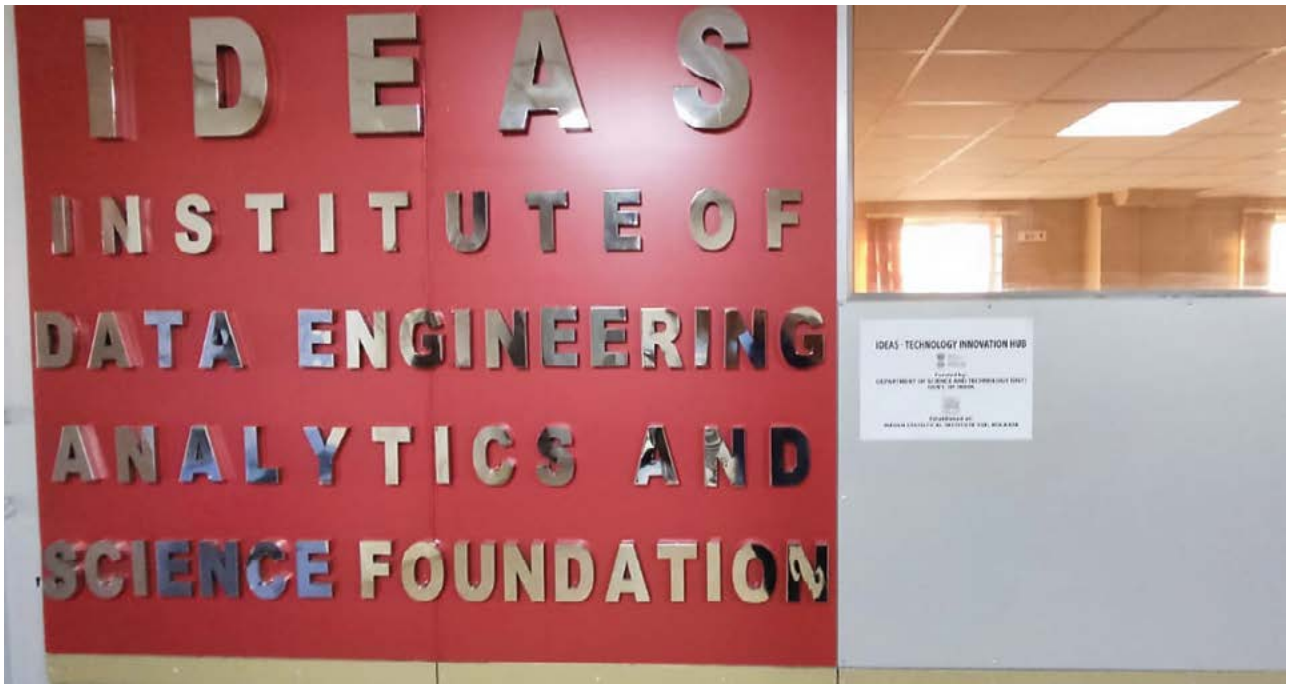
The hub would further explore varied applications of the methods discussed above which include IoT based smart city and village design, smart agriculture, Smart camera based surveillance systems, Smart transportation systems, Smart medical diagnostic, and non-invasive therapeutic schemes. The approach of the hub is to pioneer the establishment of smart India. One of the major accomplishments of the hub would be to institutionalize a process that will bring industry projects into the classroom.

Projects

Externally-funded Projects

NEW PROJECTS

Sl. No.	Name of the project	Starting Date	Duration	Principal Investigator(s)	Sanctioned amount (₹)
1.	NTPC- Video Surveillance	18th October, 2021	1 Year	Umapada Pal and Ashish Ghosh	



Chapter - 4

Awards & Recognitions

12 **Science Academy Fellowships**

11 National | **1** International

11 **Awards**

1 P. C. Mahalanobis Award: Distinguished Educator

1 Prasanta Chandra Mahalanobis Medal for Young Scientist

1 C.R. Rao National Award in Statistics for Young Statisticians

1 INSA Medal for Young Scientist

1 VLSI Society of India Women in Technology Leadership Award

1 INSPA Rathna Award, Indian School Psychology Association

1 Infoshare Award of American Society for Information Science & Technology

4 Others

AWARDS & RECOGNITIONS

Members of the Faculty of this Institute have been recognized, both nationally and internationally, for their contributions to research and other academic activities. Like every other year, some faculty members have received prestigious awards and honours, in recognition of their excellence in their areas of expertise. Many of them have been elected members of learned societies while many others have taken up the academic responsibility of serving the editorial board of prestigious national and international peer reviewed journals. Their achievements are highlighted below-

4.1 SCIENCE ACADEMY FELLOWSHIPS (National and International)

INDIAN NATIONAL SCIENCE ACADEMY (INSA)

Siva Athreya, SMU Bangalore	2022
Rahul Roy, SMU Delhi	2021

INDIAN ACADEMY OF SCIENCES

Rahul Roy, SMU Delhi	Since 2010
B. S. Daya Sagar, SSIU, Bangalore	2022 – Lifetime

NATIONAL ACADEMY OF SCIENCES OF INDIA

Rahul Roy, SMU Delhi	Since 2011

INDIAN SOCIETY FOR PROBABILITY AND STATISTICS (ISPS)

Arup Bose, SMU, Kolkata	2021

INDIAN SOCIETY FOR MEDICAL STATISTICS

Saurabh Ghosh, HGU, Kolkata	2022

INDIAN NATIONAL ACADEMY OF ENGINEERING

Susmita Sur-Kolay, ACMU, Kolkata	2021

ASIA-PACIFIC ARTIFICIAL INTELLIGENCE ASSOCIATION (AAIA)

Umapada Pal, CVPRU, Kolkata	2021

INSPIRE FACULTY RESEARCH FELLOWSHIP, DST, GOVT. OF INDIA

Anisur Rahaman Molla, CSRU, Kolkata	6 years (Nov, 2016 - Oct, 2022)

WEST BENGAL ACADEMY OF SCIENCE AND TECHNOLOGY (WAST)

Sarbani Patranabis-Deb, GSU, Kolkata	2021

J.C. BOSE NATIONAL FELLOW, DST-SERB

Arup Bose, SMU, Kolkata	Jan 2019—Dec 2023

4.2 AWARDS

P. C. MAHALANOBIS AWARD: DISTINGUISHED EDUCATOR

Ashis Kumar Chakraborty, SQC & ORU, Kolkata : in Mathematics, Statistics and other Science Disciplines, 2020 (Delivered on 17.12.2021)

PRASANTA CHANDRA MAHALANOBIS MEDAL (2020)

Arup Bose, SMU, Kolkata : 2021

INDIAN NATIONAL SCIENCE ACADEMY MEDAL FOR YOUNG SCIENTIST

Tridib Kumar Mondal, GSU, Kolkata : 2021

PROF. C.R. RAO NATIONAL AWARD IN STATISTICS FOR YOUNG STATISTICIANS 2021, MoSPI, GoI

Kiranmoy Das, ISRU, Kolkata : 2021

DR. C. R. RAO GOLD MEDAL, INDIAN SOCIETY FOR PROBABILITY AND STATISTICS

Sudheesh K. K., ASU, Chennai : in Statistics, 2021

INSPA RATHNA AWARD 2021, INDIAN SCHOOL PSYCHOLOGY ASSOCIATION

Debdulal Dutta Roy, PRU, Kolkata : 2021

VLSI SOCIETY OF INDIA WOMEN IN TECHNOLOGY LEADERSHIP AWARD

Susmita Sur-Kolay, ACMU, Kolkata : 2022

BEST ASSOCIATE EDITOR AWARD, IEEE SMC SOCIETY

Swagatam Das, ECSU, Kolkata : 2021
Transactions on Cybernetics

BEST PAPER AWARD, IEEE

Swagatam Das, ECSU, Kolkata : 2021

IEEE GEOSCIENCE AND REMOTE SENSING SOCIETY DISTINGUISHED LECTURER

B. S. Daya Sagar, SSIU, Bangalore : 2020-2023

INFOSHARE AWARD OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE & TECHNOLOGY

Jiban K. Pal, Library, Kolkata : 2021

4.3 HONOURS & RECOGNITIONS

ABHIROOP MUKHOPADHYAY, EPU, Delhi

Associate Researcher, Centre de Sciences Humaines; 2021onwards

ARUP BOSE, SMU, Kolkata

Adjunct Professor, University of Hyderabad; Jul 2021—Jul 2022

BISWANATH DUTTA, DRTC, Bangalore

Secretary, International Society for Knowledge Organization (ISKO); since 2020
Editorial Board Member, International Journal of Metadata, Semantics and Ontologies; since 2018

B. S. DAYA SAGAR, SSIU, Bangalore

Distinguished Lecturer, IEEE Geoscience and Remote Sensing Society (GRSS), Notable Research Contribution, Geosciences and Remote Sensing; 2020-2023
Member, Honors and Recognition Committee (HRC), American Geophysical Union (AGU); 2022-2023

CHETAN GHATE, EPU, Delhi

Director, Institute of Economic Growth (IEG); Feb 07, 2022 - Feb 07, 2025

E. SOMANATHAN, EPU, Delhi

Invited Researcher in the K-CAI research network for a renewable three-year term King Climate Action Initiative (K-CAI); since Apr 2021

FARZANA AFRIDI, EPU, Delhi

Lead Academic, International Growth Centre India program; 2020 onwards
Non-resident Fellow, Centre for Development Economics and Sustainability, Monash University; 2022

M. Z. ANIS, SQC & OR, Kolkata

Vice-President (Membership & Outreach), International Society for Business & Industrial Statistics; 2021-23

M. KRISHNAMURTHY, DRTC, Bangalore

Library Committee Member, Sri Devaraj Urs Academy of Higher Education, Kolar; 2021-2022

MADHURA SWAMINATHAN, EAU, Bangalore

Conference President, Indian Society of Agricultural Economics; 2021
Chair, Research Advisory Committee, ICAR-Central Institute for Women in Agriculture; 2022-25
Chairperson, Kerala State Planning Board, Expert Sub Group on A Program to Modernise and Update Statistical Databases in Agriculture; Sep 01-Oct 21, 2021
Visiting Professor, Centre for Development Studies, Thiruvananthapuram; Feb-Apr, 2022

MONISANKAR BISHNU, EPU, Delhi

Research Associate, The Centre for Applied Macroeconomic Analysis (CAMA), the Australian National University (ANU), Australia; since May 2020
Affiliate, the Australian Research Council (ARC) Centre of Excellence in Population Ageing Research (CEPAR); since Apr 2020

NILADRI SEKHAR DASH, LRU, Kolkata

Panel Member, Test Development and Paper Setting for 'Linguistics' for the UGC-NET 2022, National Testing Agency (NTA), Govt. of India; 2021-2022
External Expert, RAC for PhD program for the School of Humanities, Management and Social Sciences, The Neotia University, Kolkata; Feb 2022-Jan 2026
Board of Studies Member, BA & MA in English Programme, Amity University, Kolkata, Aug 2021- Jul 2023

SARBANI PATRANABIS-DEB, GSU, Kolkata

Expert on Frontier Basins of India for Oil Exploration, Oil and Natural Gas Commission (ONGC); 2021 onwards
Adviser, Union Public Service Commission (UPSC); since 2020

TAPAS BASU, Reprography and Photography Unit, Kolkata

Acceptance of Six Photgraphs in 21st Chhayapath International Salon of photography (digital) ; 2021

UTPAL GARAIN, CVPRU, Kolkata

Indian-side coordinator, Workshop on AI, Indo-French Knowledge Summit 3, French Institute in India; Nov, 2021

4.4 MEMBERSHIPS

ABHIROOP MUKHOPADHYAY, EPU, Delhi

Member: Executive Council, International Institute of Population Sciences (IIPS); 2020 onwards

ANISUR RAHAMAN MOLLA, CSRU, Kolkata

Regular Member	:	ACM; 2021

ARUP BOSE, SMU, Kolkata

Member	:	Joint Science Education Panel, Three National Academies, INSA; 2022—2024 Advisory Board, Proceedings of Mathematical Sciences, Indian Academy of Sciences; 2022—2024 National Committee for India, International Mathematical Union; 2020— 2023 West Bengal State Council of Science & Technology; Jan 2021--Jul 2022
Board Member	:	NBHM; since 2019
Executive Committee Member	:	West Bengal State Council of Science & Technology; Jul 2021— 2024
Convener	:	Fellows Committee, Indian Academy of Sciences; 2019—2021

ARUP K. DAS, SQC & OR, Kolkata

Member	:	MathSciNet; 2017 onwards

BISWANATH DUTTA, DRTC, Bangalore

External Member	:	Doctoral Committee, IIIT Dharwad; 2021 onwards
Organizing Committee cum Programme Committee Member	:	IEEE International Conference on Semantic Computing; since 2017
Program Committee Member	:	Sixteenth International Conference on Information processing (ICInPro-2021); 2021 International Conference on Metadata and Semantics Research; since 2020

BIMAL KUMAR ROY, ASU, Kolkata

Chairman : National Statistical Commission; Jul 15, 2019 - Jul 14, 2022

B. S. DAYA SAGAR, SSIU, Bangalore

Member : The Honors and Recognition Committee (HRC), American Geophysical Union (AGU); 2022-2023

Editorial Board Member : The Mathematical Geosciences, International Association of Mathematical Geosciences (IAMG); since 2019. The Computers & Geosciences, Elsevier Publishers; 2014-2022

CHETAN GHATE, EPU, Delhi

Member : Philippines Economic Society; 2021 onwards

DARPA SAURAV JYETHI, TASU, North-East Centre, Tezpur

Member : Diversity Committee, International Society of Exposure Science; since 2017

DEBASIS MISHRA, EPU, Delhi

Council Member : Game Theory Society; 2021-2027

DEBARATI MUKHERJEE, GSU, Kolkata

Life Fellow : Palaeontological Society of India, Lucknow; since 2014
Geological Society of India, Bangalore; since 2014

DEVIKA P. MADALLI, DRTC, Bangalore

Member : Technical Advisory Board, Research Data Alliance; 2021-2025

DHURJATI PRASAD SENGUPTA, GSU, Kolkata

External Member : Board of Studies, Department of Geology, Presidency University, Kolkata; since 2018
Undergraduate Board of Studies, Geology, University of Calcutta, Kolkata; since 2019
Ph.D., Committee, Department of Geology, Presidency University; since 2018
Ph.D., Committee, Department of Geology, University of Calcutta; since 2019

Member : Society of Vertebrate Paleontology, USA; since 1994
Paleontological Association, UK; since 2018

E. SOMANATHAN, EPU, Delhi

Member : The Lancet COVID-19 Commission Task Force on Green Recovery; since 2021
Economic Advisory Board, Environmental Defence Fund, NY; Feb 2021 onwards

FARZANA AFRIDI, EPU, Delhi

Member : Editorial Board, Ideas for India (IGC-India Central blog); since 2015
Editorial Board. 'Sarvekshana' - the official journal of the National Sample Survey Organization of India, Ministry of Statistics and Program Implementation; 2019-2024
Editorial Board, The Indian Journal of Labour Economics; 2021-2026
International Union for the Scientific Study of Population's (IUSSP) Panel on Population, Poverty and Inequality (PoPovIn); 2019-21
Steering Group, International Growth Centre; 2021 onwards

Awards and Recognitions

KANSIHKA KACKER, EPU, Delhi

Elected Member : International Statistical Institute; 2020-Lifetime

KALPANA. T. M., Library, Chennai

Life Membership : Society for the Advancement of Library and Information Science, Chennai; 2021
The Madras Library Association; 2021

KISHOR CHANDRA SATPATHY, Library, Kolkata

Member : Price Negotiation Committee for Purchase of E-Resources, Presidency University, Kolkata; 2020-22
Selection Committee, Central Library, University of Calcutta; 2022
Advisory Committee for Collection Development of Print & e-Resources, National Library, Kolkata; 2022-23
Committee on Tender Document for Digitization of Old and Brittle Rare Books and Manuscripts, National Library, Kolkata; 2021-22
Content Selection Committee, Scope Database; 27 Oct 2021
South Asian Librarian Advisory Board, Cambridge University Press; Since 2020

M. KRISHNAMURTHY, DRTC, Bangalore

Subject Expert : Union Public Service Commission, New Delhi; 2021-2023

MADHURA SWAMINATHAN, EAU Bangalore

Member : Statistical Commission, Government of Kerala; 2020-22

MONALI MITRA PALADHI, Library, Kolkata

Member : Indian Association of Special Libraries and Information Centres, Governing Body; 2020-22

MUDIT KAPOOR, EPU, Delhi

Member : Technical Advisory Group, Niti Aayog, National Data Analytics Platform project; 2021 onwards
Technical Advisory Group, Niti Aayog, District Investment Potential project; 2021 onwards

PRASUN DAS, SQC & OR, Kolkata

Member : Apex Committee, Joint Plant Committee (JPC), Ministry of Steel; Apr 2017 onwards

PARTHASARATHI GHOSH, GSU, Kolkata

Member : International Association of Sedimentologists; 2022

SABYASACHI BHATTACHARYA, AERU, Kolkata

Extended Member : Calcutta Mathematical Society, University of Calcutta; 2021-22
Calcutta Statistical Association, University of Calcutta; 2021-22
Biomathematical Society of India, Jadavpur University; 2021-22

SARBANI PALIT, CVPRU, Kolkata

Member	:	IEEE; since 1987 Asia Pacific Neural Network Society; since 2021 Advisory Board of the Mathematical and Physical Sciences Division, School of Arts and Sciences, Ahmedabad University; 2021

TAPAN KUMAR MANDAL, Library, Kolkata

Life Member	:	Society for the Advancement of Library and Information Science, Chennai; since 2020

TARUN KABIRAJ, ERU, Kolkata

External Member	:	Academic and Administrative Policies of the Department, Board of Studies, Department of Economics, Jadavpur University; 2012 onwards

UJJWAL BHATTACHARYA, CVPRU, Kolkata

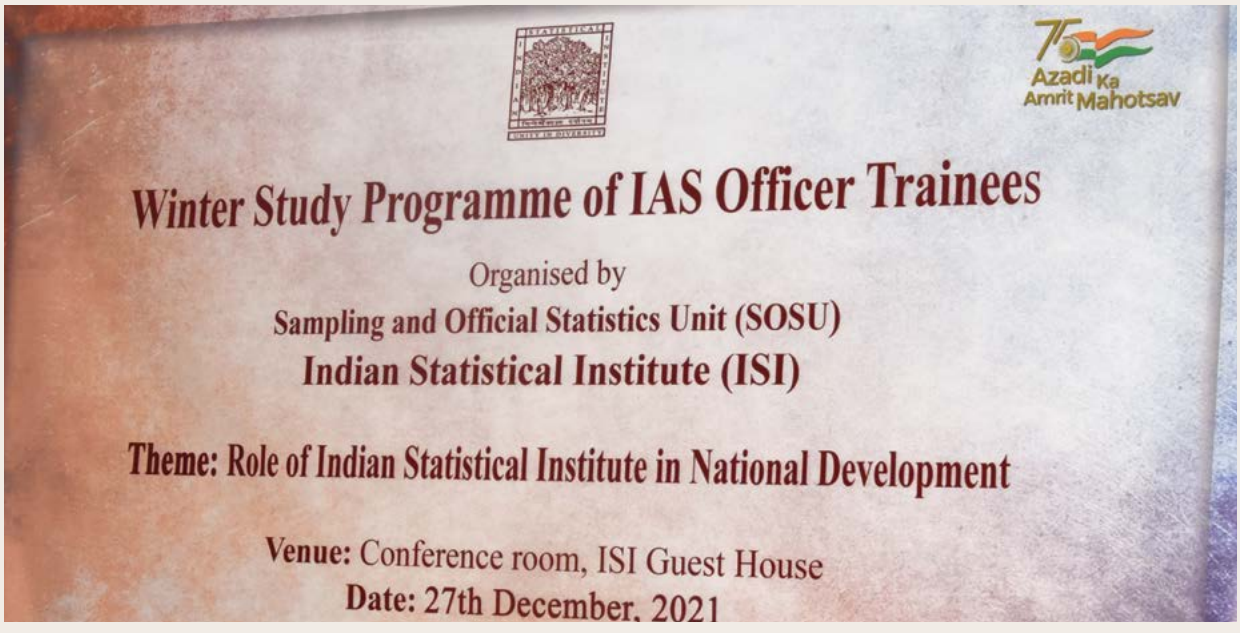
Senior Member	:	IEEE; 1995
Life Member	:	IUPRAI; 1998

UMAPADA PAL, CVPRU, Kolkata

Member	:	IAPR Fellow, Selection Committee; since 2018 IAPR; since 1994 Steering Committee, Asian Conference of Pattern Recognition (ACPR); since 2020
Senior Member	:	IEEE; since 2016
Life Member	:	Computer Society of India; since 2000

UTPAL GARAIN, CVPRU, Kolkata

Senate Member	:	Indian Institute of Information Technology (IIIT), Kalyani; since Nov 2021
Founding Member	:	TinyML Academic Network working group (a program that is a collaboration between ICTP, Harvard, Edge Impulse, and the TinyML Foundation); since Jul 2021
Member	:	IEEE; since 2010



4.5 EDITORIAL ASSIGNMENTS

ABHIK GHOSH, ISRU, Kolkata

Technical Editor	:	Sankhya, Series A & B, Springer; since 2016

ABHIROOP MUKHOPADHYAY, EPU, Delhi

Academic Editor	:	PLOS ONE; 2021 onwards

AMARTYA KUMAR DUTTA, SMU, Kolkata

Editorial Board Member	:	The Mathematics Consortium (TMC) Bulletin; since July 2019 Journal of Indian Mathematical Society, Informatics Publishing Limited and The Indian Mathematical Society; Dec 2021 onwards
Corresponding Editor	:	Bhavana; since 2020

ANTAR BANDYOPADHYAY, SMU, Delhi

Associate Editor	:	Journal of Statistical Planning and Inference (JSPI), Elsevier; since 2012 Calcutta Statistical Association Bulletin, Calcutta Statistical Association; since 2022
Editorial Board Member	:	Little Mathematical Treasures, Ramanujan Mathematical Society and Universities Press; since 2012
Scientific Committee & Editorial Board Member	:	Colombian Journal of Statistics (Revista Colombiana de Estadística, RCE), Universidad Nacional de Colombia; since 2015

ARUNAVA SEN, EPU, Delhi

Associate Editor	:	Social Choice and Welfare, Springer; since 2000 Mathematical Social Sciences; since 2002 Economic Theory; since 2015
Advisory Editor	:	Journal of Mathematical Economics; 2020 onwards

ARINDAM CHATTERJEE, SMU, Delhi

Associate Editor	:	Journal of Statistical Planning and Inference; 2021 onwards

ARUP BOSE, SMU, Kolkata

Editor	:	Random Matrix Theory and Applications, World Scientific Press; Sep 2021 onwards
Associate Editor	:	Random Matrix Theory and Applications, World Scientific Press; Jul 2020—Aug 2021

ASHIS KUMAR CHAKRABORTY, SQC & OR, Kolkata

Senior Associate Editor	:	OPSEARCH, Springer; since 2020
Associate Editor	:	IAPQR Transactions; since 2019

B. S. DAYA SAGAR, SSIU, Bangalore

Editor-In-Chief	:	Encyclopedia of Mathematical Geosciences, Springer Nature International; 2019- 2023
Guest Editor	:	Journal of Selected Topics in Applied Earth Observation and Remote Sensing (JSTARS), IEEE Geoscience and Remote Sensing Society (GRSS); 2021-2022

BISWABRATA PRADHAN, SQC & OR Unit, Kolkata

Associate Editor	:	Indian Society for Probability and Statistics; since 2021

B. V. RAJARAMA BHAT, SMU, Bangalore

Member Advisory Board	:	Proceedings of the Indian Academy, Mathematical Sciences; Jan 2022 onwards
Member Editorial Board	:	Indian Journal of Pure and Applied Mathematics; since 2017 Journal of the Ramanujan Mathematical Society; since 2013 Ramanujan Mathematical Society Newsletter; since Jul 2019 Annals of Functional Analysis; since 2010
Managing Editor	:	Infinite Dimensional Analysis, Quantum Probability and Related Topics; Apr 2021 onwards
Editors-in-Chief (one of)	:	Springer, Indian Statistical Institute series; since 2018

D YOGESHWARAN, SMU, Bangaluru

Associate Editor	:	Journal of Applied and Computational Topology; since 2019

DEBASIS MISHRA, EPU, Delhi

Associate Editor	:	Social Choice and Welfare (Journal), Springer; since 2016
Advisory Editor	:	Games and Economic Behavior (Journal); 2019 onwards

DIBAKAR GHOSH, PAMU, Kolkata

Associate Editor	:	Frontier in Computational Neuroscience; since Mar 2021 Frontiers in Network Physiology; since Mar 2021
Advisory Editor	:	Chaos; since Jan 2022

E. SOMANATHAN, EPU, Delhi

Co-Editor	:	Environment and Development Economics, Cambridge University Press Journal; 2021 onwards

FARZANA AFRIDI, EPU, Delhi

Academic Editor	:	PLOS One; 2018-21
Associate Editor	:	Oxford Open Economics; 2021 onwards

INDRANIL MUKHOPADHYAY, HGU, Kolkata

Editorial Board Member	:	Scientific Reports; since 2020
Associate Editor	:	Statistics and Applications; since 2021

JAYDEB SARKAR, SMU, Bangalore

Editorial Board Member	:	Quaestiones Mathematicae, Journal of the South African Mathematical Society; 2021 Proceedings of Mathematical Sciences, Journal of the Indian Academy of Sciences; since Feb 2021 Indian Journal of Pure and Applied Mathematics; since 2020

JIBAN K. PAL, Library, Kolkata

Editorial Board Member	:	Re3data- COREF, German Research Foundation (DFG); 2021
Review Editor	:	Frontiers in Research Metrics and Analytics; 2021

Awards and Recognitions

KIRANMOY DAS, ISRU, Kolkata

Associate Editor	:	Sankhya, Series B, Springer; 2019-2022

KISHOR CHANDRA SATPATHY, Library, Kolkata

Chief Technical Advisor	:	Journal of the Indian Anthropological Society; since 2021
Reviewer	:	Managing University and Institutional Libraries in 21st century, Shree Publisher; 2021 Role of Libraries, Archives and Museums in Achieving Civic Engagement and Social Justice in Smart Cities, IGI Global, USA; 2021 College Libraries, West Bengal College Library Association; 2021 IASLIC Bulletin, IASLIC, Kolkata; 2021 WDL, TERI, New Delhi; 2021

M. Z. ANIS, SQC & OR Unit, Kolkata

Associate Editor	:	IAQPR Transactions; 2021 onwards

MADHURA SWAMINATHAN, EAU, Bengaluru

Editorial Advisory Board Member	:	Global Social Challenges; 2021 onwards

MATHEW JOSEPH, SMU, Bengaluru

Associate Editor	:	Sankhya Series A; 2022 onwards

MONISANKAR BISHNU, EPU, Delhi

Associate Editor	:	Journal of Asian Economics; since Jun 2020

MONALI MITRA PALADHI, Library, Kolkata

Assistant Editor:	:	ILSA, IASLIC; 2021-22

NILADRI SEKHAR DASH, LRU, Kolkata

Editorial Board Member	:	SN Social Sciences (ISSN: 2662-9283); since 2020 International Journal of Innovative Studies in Sociology and Humanities; since 2015
Review Board Member	:	Journal of Language and Language teaching; since 2019

PRADIP BHATTACHARYYA, AERU, Kolkata

Editor	:	Applied Sciences (Special Issue), MDPI; since 2020

PRABAL ROY CHOWDHURY, EPU, Delhi

Editor	:	Indian Growth and Development Review; since 2016

RAGHUNATH CHATTERJEE, HGU, Kolkata

Associate Editor	:	Frontiers in Genetics, Cancer genetics and oncogenomics; 2021 ongoing
Editor (Special Issue)	:	Frontiers in Bioscience (Special Issue); since 2012

RAHUL ROY, SMU, Delhi

Chief Editor	:	Indian Journal of Pure and Applied Mathematics; since 2020

RITA SAHARAY, ISRU, Kolkata

Associate Editor	:	Sankhya, Series A, Springer; since Apr 2016

RITUPARNA SEN, ASU, Bangalore

Editor	:	Applied Stochastic Models in Business and Industry; 2021-2023
Associate Editor	:	Sankhya Series B, Springer; since 2016 Journal of the Indian Statistical Association; since 2021

SARBANI PATRANABIS-DEB, GSU, Kolkata

Editor	:	Geological Magazine, Cambridge University Press, UK; since 2016
Executive Editor	:	Mesoproterozoic Basins recording Earth's Middle Age (Thematic issue), Geological Magazine, Cambridge University Press, UK; 2021-2022

SAURABH GHOSH, HGU, Kolkata

Editor	:	Sankhya (Series B), Springer; 2022-2024

SATYA R. CHAKRAVARTY, Honorary Visiting Professor, ERU, Kolkata

Editor	:	Social Choice and Welfare; since Jan 2013 Journal Economic Inequality; since 2003 Review of Income and Wealth; since Aug 2018

SIVA ATHREYA, SMU, Bangalore

Chief-Editor	:	Electronic Communications in Probability; 2021-2023

SUDHEESH K KATTUMANNIL, ASU, Chennai

Associate Editor	:	Journal of the Indian Statistical Association; since Apr, 2020

SWAGATAM DAS, ECSU, Kolkata

Editor-in-Chief	:	Swarm and Evolutionary Computation (SCI Indexed), Elsevier; 2011 onwards
Editor	:	Engineering Applications of Artificial Intelligence, Elsevier; since 2013 PeerJ Computer Science; since 2015
Associate Editor	:	IEEE Transactions on Evolutionary Computation; 2022 onwards IEEE Transactions on Cybernetics; since 2020 Pattern Recognition, Elsevier; since 2017 Information Sciences Journal, Elsevier; Since 2010 Neurocomputing, Elsevier; since 2013
Editorial Board Member	:	Information Fusion; since 2020

TARUN KABIRAJ, ERU, Kolkata

Associate Editor	:	Indian Growth and Development Review; 2008 onwards

Tapan Kumar Mandal, Library, Kolkata

Review and Advisory Editor	:	College Libraries, West Bengal College Library Association Kolkata; since 2020
Peer Review Board Member:		Pragya, Academic Peer Review Journal, Khudiram Bose Central College, Kolkata; since 2019

UJJWAL BHATTACHARYA, CVPRU, Kolkata

Guest Editor : Frontiers in Agronomy; since 2020

UMAPADA PAL, CVPR, Kolkata

Editor-in-Chief : S N Computer Science, Springer Nature; since 2019

Associate Editor : Pattern Recognition, Elsevier; since 2015
Pattern Recognition Letters, Elsevier; since 2014
International Journal of Document Analysis and Recognition, Springer; since 2012
ACM TALLIP, ACM; since 2011
IET Biometrics, IET; since 2016
International Journal of Pattern Recognition and Artificial Intelligence, World Scientific; since 2021
Machine Intelligence Research, Springer; since 2021

UTPAL GARAIN, CVPR Kolkata

Associate Editor : International Journal of Document Analysis and Recognition, Springer; since 2011
Sádhanã, Springer; since 2019

Chapter - 5

Publications

APA Referencing Style format has been used for enlistment of the institute publications. Book references are arranged alphabetically by Author name(s) with the Division name in parenthesis. Articles published in Book Chapters, Conference Proceedings and Journal articles appear alphabetically by Author name(s) for 2021 followed by 2022 under each Division. Names in bold denote ISI faculty.

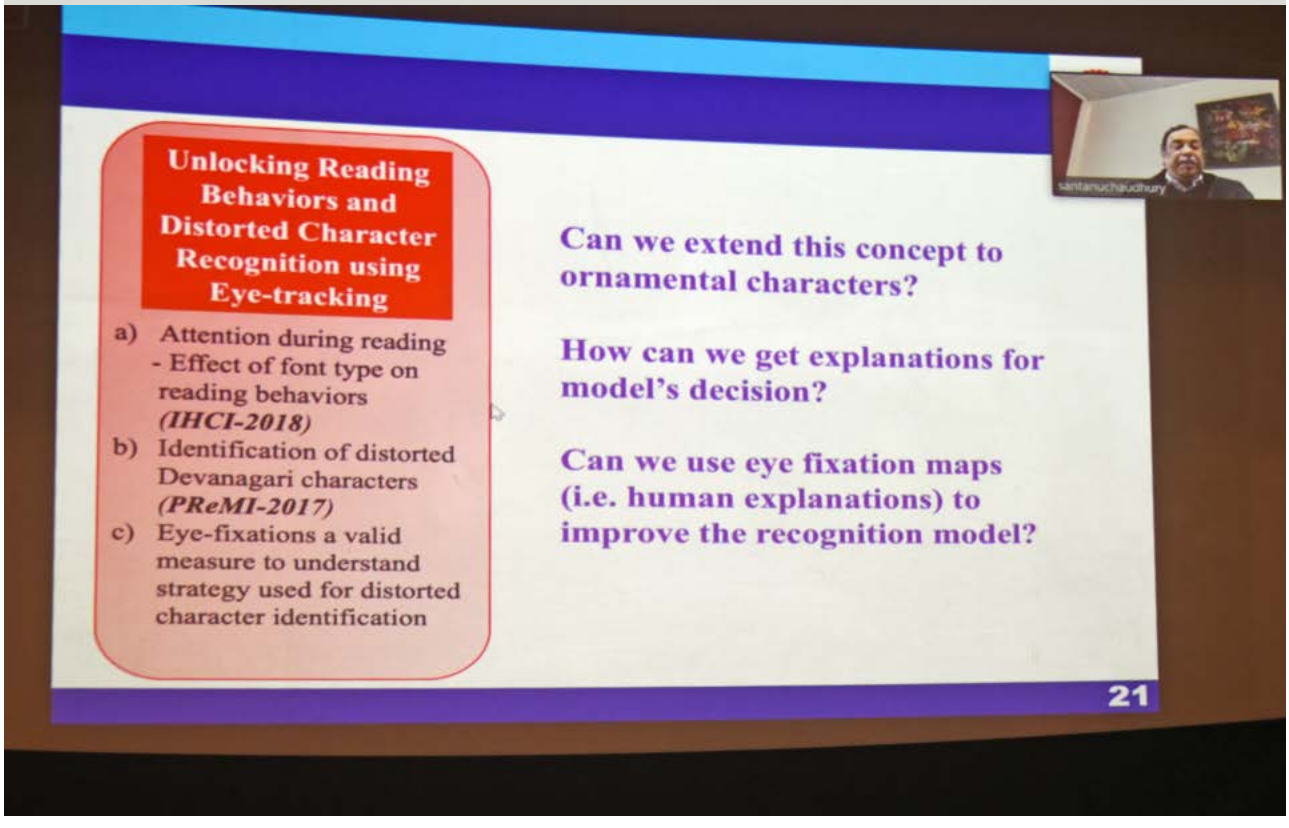
Total No. of Publications:

17
Books

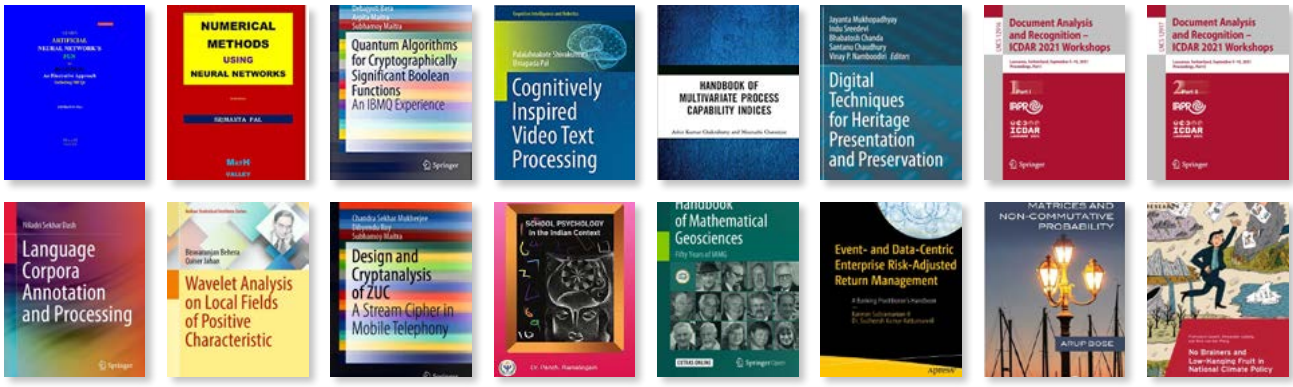
42
Book Chapters

134
Conference Proceedings

477
Journal Articles



5.1 BOOKS PUBLISHED



BOOKS

1. Barney Smith, E. H., & **Pal, U (Eds.)**. (2021). *Document Analysis and Recognition* (*Part I Lecture* Notes in Computer Science; Vol. 12916). Springer, 508p. ISBN: 978-3-030-86197-1 [CCSD]
2. Barney Smith, E. H., & **Pal, U. (Eds.)** (2021). *Document Analysis and Recognition* (*Part II* Lecture Notes in Computer Science; Vol. 12917). Springer, 945p. ISBN: 978-3-030-86158-2 [CCSD]
3. **Behera, B.,** & Jahan, Q. (2021). *Wavelet Analysis on Local Fields of Positive Characteristic*. Singapore: Springer, 333p. https://doi.org/10.1007/978-981-16-7881-3 [TSMD]
4. **Bose, A. (2021)**. *Random Matrices and Non-commutative Probability*. New York: Chapman & Hall, 286p. https://doi.org/10.1201/9781003144496 [TSMD]
5. **Chakraborty, A. K.,** & Chatterjee, M. (2021). *Handbook of Multivariate Process Capability Indices*. New York: CRC press, 352p. https://doi.org/10.1201/9780429298349 [SQC&ORD]
6. **Dash, N. S.** (2021). *Language Corpora Annotation and Processing*. Singapore: Springer Nature, xxx, 272p., https://doi.org/10.1007/978-981-16-2960-0 [SSD]
7. Ganguly, D., Gangopadhyay, S., **Mitra, M.**, & Majumder, P. (2021). *FIRE 2021: Forum for Information Retrieval Evaluation*. https://dl.acm.org/doi/proceedings/10.1145/3503162 [CCSD]
8. Mukherjee, C. S., Roy, D., & **Maitra, S**. (2021). *Design and Cryptanalysis of ZUC: A Stream Cipher in Mobile Telephony*. Singapore: Springer, 92p. https://doi.org/10.1007/978-981-33-4882-0 [ASD]
9. Mukhopadhyay, J., Sreedevi, I., **Chanda, B.,** Chaudhury, S., & Vinay, P. Namboodiri (Eds.). (2020). *Digital Techniques for Heritage Presentation and Preservation*. Cham: Springer, xiv, 272p. https://doi.org/10.1007/978-3-030-57907-4 [CCSD]
10. **Pal, S.** (2021). *Learn Artificial Neural Network's Fun for Beginners: An Illustrative Approach*. Math Valley, 384p. ASIN: B09FH5SN8G [CCSD]
11. **Pal, S.** (2021). *Numerical Methods Using Neural Networks*. Math Valley, 680p. ASIN: B09H69NX1Y [CCSD]
12. Ramalingam, P., & **Dutta Roy, D.** (2021). *School Psychology in Indian context*. Puducherry: Indian School Psychology Association, 250p. ISBN: 9789391690007 [SSD]
13. **Daya Sagar, B. S.,** Cheng, Q., McKinley, J., & Agterberg, F. (2023). *Encyclopedia of Mathematical Geosciences*. Springer International Publishers, 1844p. https://doi.org/10.1007/978-3-030-26050-7 [CCSD]
14. **Somanathan, E.** (2021). No brainers in Indian. (No Brainers and Low-Hanging Fruit in National Climate Policy Series), London: CEPR Press, https://cepr.org/chapters/no-brainers-india [SSD]
15. Shivakumara, P. & **Pal, U.** (2021). *Cognitively Inspired Video Text Processing*, Singapore: Springer Nature, 283p. https://doi.org/10.1007/978-981-16-7069-5 [CCSD]
16. Tharrmashastha, S. A. P. V., Bera, D., Maitra, A., & **Maitra, S.** (2021). *Quantum Algorithms for Cryptographically Significant Boolean Functions: An IBMQ Experience*. Singapore: Springer, xiii, 118p. https://doi.org/10.1007/978-981-16-3061-3 [ASD]
17. Kannan, S., & **Sudheesh, K. K**. (2022). *Event and Data-Centric Enterprise Risk Adjusted Return Management: A Banking Practitioner's Handbook*. New York: Spring Nature, xxvii, 1090. https://link.springer.com/book/10.1007/978-1-4842-7440-8 [ASD]

5.2 PUBLICATIONS IN BOOKS CHAPTERS

Applied Statistics Division (ASD)

1. Mukhopadhyay, N., De**, S. K.** & Yang, T. Y. (2021). Sequential Confidence Set and Point Estimation of the Population Gini Index by Controlling Accuracies Relative to the Population Mean. In N. Mukhopadhyay & P. P. Sengupta (Eds.*) Gini Inequality Index: Methods and Applications* (Chapter 8, pp.145-170). New York: CRC Press. https://doi.org/10.1201/9781003143642
2. **Roy, S.**, Sadhukhan, S., & **Sen, A.** (2021). Recent Results on Strategy-Proofness of Random Social Choice Functions. In Borkotokey, S., Kumar, R., Mukherjee, D., Rao, K.S.M., Sarangi, S. (Eds.) *Game Theory and Networks* (Indian Statistical Institute Series. pp. 63–87).Singapore: Springer. https://doi.org/10.1007/978-981-16-4737-6_4
3. Jha, J., & **Biswas, A.** (2022). Regression models for directional variables. In SenGupta, A. & Arnold, B.C. (Eds.) *Directional Statistics for Innovative Applications* (pp.333-348). Singapore: Springer Nature. https://doi.org/10.1007/978-981-19-1044-9

Biological Sciences Division (BSD)

4. Basu, I. & **Mukhopadhyay, S.** (2021). Psychological health of Dementia Caregivers: An Overview. In M. K. Shankardas (Ed.) *Dememntia Care* (pp.199-226). Singapore: Springer. https://doi.org/10.1007/978-981-16-3864-0_12
5. Edmonds, C., Mehtta, M., Noy, I., & Banik, P. (2021) The Climate-(Ir) resilient Society of the Indian Sundarbans. In R.C. Brears (Ed.) The Palgrave Handbook of Climate Resilient Societies (pp.-1897 19250). Cham: Palgrave Macmillan. https://doi.org/95_6-42462-030-3-978/10.1007
6.. Ghosh, A., **Mukhopadhyay, S.** (2021). Living with Age in Slums: A Systematic Review. In Shankardass, M. K. (Eds.) *Ageing Issues in India: Practices, Perspectives and Policies* (Vol. 32, pp.115-141). Singapore: Springer. https://doi.org/-5827-16-981-978/10.1007 7_3
7. Mandal, J., Golui, D., Ray, P., & **Bhattacharyya, P.** (2022). Heavy Metal Pollution in Soil and Remediation Strategies. In N. Mandal et al (Eds.) Soil Management for Sustainable Agriculture (Chapter 20, pp.505-530). USA: Apple Academic Press. http://dx.doi.org/10.1201/9781003184881

Computer and Communication Sciences Division (CCSD)

8. Chakravarty, S., & **Somanathan, E**. (2021). No brainers in India. In F. Caselli, A. Ludwig, & R. van der Ploeg (Eds.), *No Brainers and Low-Hanging Fruit in National Climate Policy* (pp. 49–55). Centre for Economic Policy Research Press.
9. Challa, A., Danda, S.,& **Daya Sagar, B. S.** (2021). Binary Mathematical Morphology. In B. S. DayaSagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_53-1
10. Danda, S., Challa, A., & **Daya Sagar B. S.** (2021). Binary Partition Tree In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_54-1
11. Danda, S., Challa, A., & **Daya Sagar, B. S.** (2021). Grayscale Mathematical Morphology. In B. S. DayaSagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences*(Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_151-1
12. Danda, S., Challa, A., & **Daya Sagar, B. S.** (2021). Morphological Dilation. In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences*. (Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_212-1
13. Danda, S., Challa, A., & **Daya Sagar, B. S.** (2021). Morphological Opening. In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series) Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_214-1
14. **Daya Sagar, B. S**. (2021). Rodriguez-Iturbe, Ignacio. In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Switzerland: Springer Cham. https://doi.org/10.1007/978-3-030-26050-7_394-1
15. **Krishnamurthy, M.** (2021). Data repositories in Academic and Research Institute. In P. K. Jain & S. Shukla (Eds.) *Transitions and Transformations in*

Academic Libraries and Higher Education. ISBN: 978-80-3127-234-2

16. **Pal, M.,** & **Bandyopadhyay, S.** (2021). Occupant Actions Selection Strategies Based on Pareto-Optimal Schedules and Daily Schedule for Energy Management in Buildings. In S. Ploix, M. Amayri, & N. Bouguila (Eds.), *Towards Energy Smart Homes* (pp. 249–270). Springer International Publishing. https://doi.org/10.1007/978-3-030-76477-7_8
17. Santra, T., Banerjee, N., Chatterjee, S., Chatterjee, A., **Ghosh, K.,** & Mukherjee, S. (2021). Linkage between Select Anthropometric Measures and Pulmonary Function Indicator: A Study on Bengalee MaleAutomobile Workers. In M. Muzammil, A. Ali Khan, & F. Hasan (Eds.) *Ergonomics for Improved Productivity* (pp.847-855) = Proceedings of HWWE 2017. Singapore: Springer. https://doi.org/10.1007/978-981-15-9054-2
18. Wadhwani, M., Kundu, D., Chakraborty, D., & **Chanda, B.** (2021). Text Extraction and Restoration of Old Handwritten Documents. In J. Mukhopadhyay, I. Sreedevi, B. Chanda, S. Chaudhury, & P. Vinay (Eds.) *Digital Techniques for Heritage Presentation and Preservation* (pp.109-132). Switzerland: Springer Nature, https://doi.org/10.1007/978-3-030-57907-4
19. Challa, A., Danda, S., & **DayaSagar, B. S.** (2022). Morphological Erosion. In B. S. DayaSagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Switzerland: Springer Cham. https://doi.org/10.1007/978-3-030-26050-7_213-1
20. Dawn, S., & **Das, M.,** & **Bandyopadhyay, S.** (2022). Graph Representation Learning for Protein Classification. In R. K. Rout, S. Umer, S. Sheikh, & A. L. Sangal (Eds.), *Artificial Intelligence Technologies for Computational Biology*. Taylor and Francis Group
21. **Daya Sagar, B. S.** (2022). Korvin, Gabor. In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences (Encyclopedia of Earth Sciences Series)*. Switzerland: Springer Cham. https://doi.org/10.1007/978-3-030-26050-7_368-2
22. Jana, P., & **Mohanta, P. P.** (2022). Recent Trends in 2D Object Detection and Applications in Video Event Recognition. In R. N. Mir, V. K. Sharma, R. K. Rout & S. Umer (Eds.) *Advancement of Deep Learning and its Applications in Object Detection and Recognition*. River Publishers
23. Kumar, D., & Maji, P. (2022). Neuro-Rough Hybridization for Recognition of Virus Particles from TEM Images. In S. De, R. Das, S. Bhattacharyya, &U. Maulik (Eds.), Applied Smart Health Care Informatics: A Computational Intelligence Perspective. UK: John Wiley & Sons. https://doi.org/10.1002/9781119743187.ch7
24. Lim, S.L., & Daya Sagar, B. S. (2022). Morphological Pruning. In B. S. Daya Sagar, Q. Cheng, J. McKinley, &F. Agterberg (Eds.) Encyclopedia of Mathematical Geosciences. Encyclopedia of Earth Sciences Series. Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_215-1
25. Nasibullah, & **Mohanta, P. P.** (2022). Recent Advances with Object Detection. In R. N. Mir, V. K. Sharma, R. K. Rout & S. Umer (Eds.) *Advancement of Deep Learning and its Applications in Object Detection and Recognition*. River Publishers
26. Panda, R.M., & **Daya Sagar, B. S.** (2022). Data Acquisition. In B. S. DayaSagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_73-1
27. Panda, R.M., & **Daya Sagar, B. S.** (2022). Decision Tree. In B. S. DayaSagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences* (Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_81-1
28. Quiros-Vargas, J., Siegmann, B., Damm, A., Wang, R., Gamon, J., Krieger, V., **Daya Sagar, B. S.**, Muller, O., & Rascher, U. (2022). Fractal Geometry and the Downscaling of Sun-Induced Chlorophyll Fluorescence Imagery. In B. S. Daya Sagar, Q. Cheng, J. McKinley, & F. Agterberg (Eds.) *Encyclopedia of Mathematical Geosciences*(Encyclopedia of Earth Sciences Series). Cham: Springer. https://doi.org/10.1007/978-3-030-26050-7_120-1
29. **Saha, S.**, Ray, S., & **Bandyopadhyay, S.** (2022). Integrating Two Deep Learning Models to Identify Gene Signatures in Head and Neck Cancer from Multi-Omics Data. In S. De, R. Das, S. Bhattacharyya, & U. Maulik (Eds.), *Applied Smart Health Care Informatics* (pp. 67–81). Wiley. https://doi.org/10.1002/9781119743187.ch4

Library, Documentation and Information Science Division (LDISD)

30. **Kalpana, T.M**. (2021). Sustainable development towards Librarianship. In Gopalakrishnan. S. & Gopalakrishnan. S (Eds.) *20 Pearls of Librarianship: A Right Book At Right Time* (ICT Chapter 5; Vol. 1), ISBN: 9-798512-054147

31. **Mitra Paladhi, M. & Das, P. K**. (2022). Open Peer Review – promoting transparency and integrity in scholarly OA publishing: a review. In A. Biswas, & M. Das Biswas (Eds.), *Panorama of Open Access: Progress, Practice & Prospects*. (pp.196 – 213). New Delhi, India: Ess Ess Publications.ISBN: 9789392594366
32. Bezbaruah, P., **Satpathy, K. C.**, & Kashyap, R. (2022). Marketing of Library During Covid-19: A case study of Youtube. In S. Bhattacharjee (Ed.) *Teaching-Learning Process Offline to Online Classes* (pp.184-190). New Delhi: Raghav Publication. ISBN: 9789393655103

Physics and Earth Sciences Division (PESD)

33. Dey, M. & **Maiti, S. K.** (2021). Thermoelectric Phenomena at Nanoscale Level. In W. Schommers (Ed.) *Topics in Nanoscience, Part I: Basic Views, Complex Nanosystems: Typical Results and Future Physics* (Series on the Foundations of Natural Science and Technology; Vol. 15, pp.241-309). Singapore: World Scientific. ISBN: 978-981-124-267-0 (Hardcover), ISBN: 978-981-124-387-5 (ebook) (2022).https://doi.org/10.1142/9789811242687_0006

Social Sciences Division (SSD)

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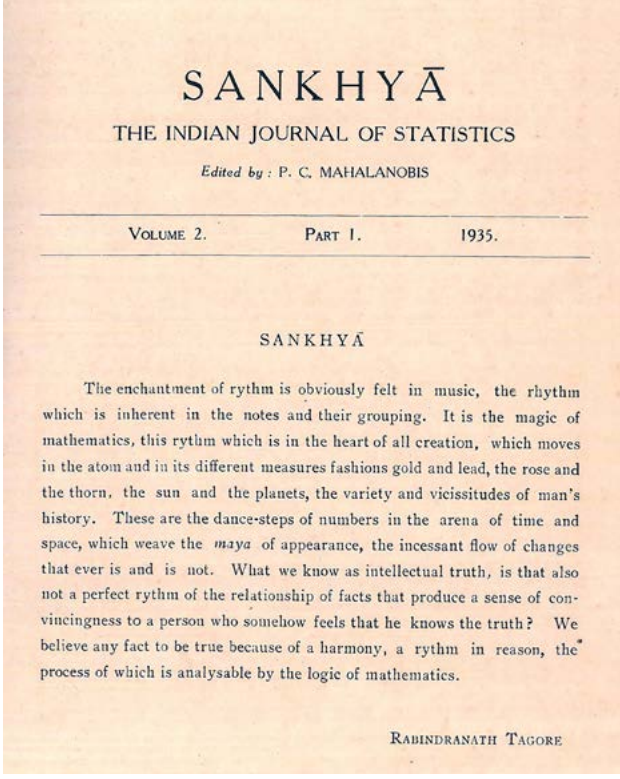
5.5 The Official Publication of ISI, Sankhyā



SANKHYĀ

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SANKHYĀ

The enchantment of rythm is obviously felt in music, the rhythm which is inherent in the notes and their grouping. It is the magic of mathematics, this rythm which is in the heart of all creation, which moves in the atom and in its different measures fashions gold and lead, the rose and the thorn, the sun and the planets, the variety and vicissitudes of man's history. These are the dance-steps of numbers in the arena of time and space, which weave the *maya* of appearance, the incessant flow of changes that ever is and is not. What we know as intellectual truth, is that also not a perfect rythm of the relationship of facts that produce a sense of convincingness to a person who somehow feels that he knows the truth? We believe any fact to be true because of a harmony, a rythm in reason, the process of which is analysable by the logic of mathematics.

RABINDRANATH TAGORE

1. A Brief Overview

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	Saurabh Ghosh, Indian Statistical Institute, Kolkata, India
Technical Editors	Biswaranjan Behera, Indian Statistical Institute, Kolkata, India
	Abhik Ghosh, Indian Statistical Institute, Kolkata, India
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3. Issues Published

Regular Issues	**Series A:** February 2022 (Volume 84 Issue 1)
	Series B: May 2021(Volume 83 Issue 1)
	November 2021 (Volume 83, Issue II)
Special Issues (if any) with short description	**Series A:** August 2021 (Volume 83 Issue 1: **Special issue in honour of C.R. Rao**, edited by Soumendra Nath Lahiri)

Chapter - 6

Other Academic Activities

No. of Patents : 6

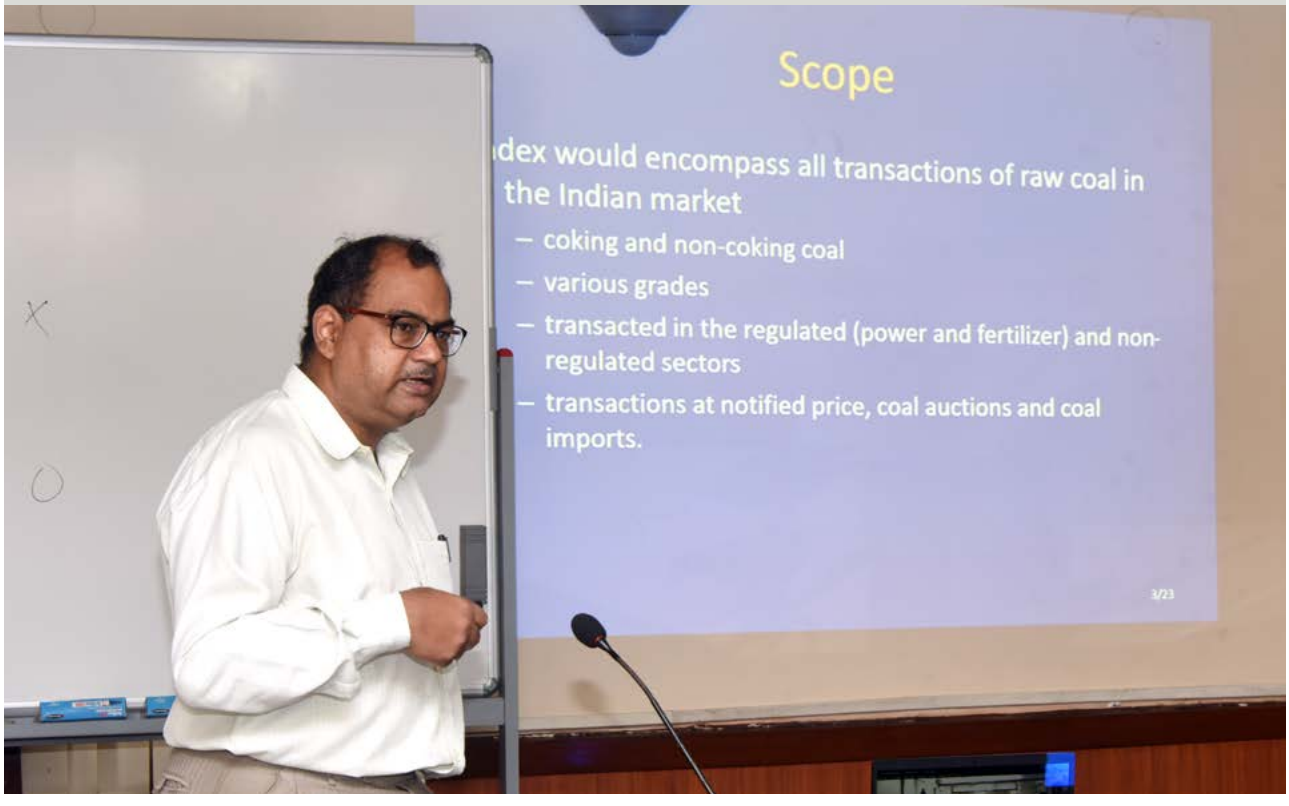
Filed	: 4 (National – 1, International – 3)
Granted	: 2 (International)

No. of MoUs : 57

New	: 17 (National – 12, International – 5)
Existing	: 40 (National – 29, International – 11)

No. of Visiting Scientists: 134

National	: 119
International	: 15



6.1 Patents

IPRs Filed

Serial no.	Title of Patent	Application No. & Date of filing	Name of the Inventor(s)*	Status	Country name where filed
1.	Fine-Grained Classification of Retail Products	2021245099 dated 5-Oct-2021	Avishek Kumar Shaw, Shilpa Yadukumar Rao, Pranoy Hari, **Dipti Prasad Mukherjee (ECSU)**, Bikash Santra	Examination Requested	Australia
2.	Fine-Grained Classification of Retail Products	21200388.3 dated 1-Oct-2021	Avishek Kumar Shaw, Shilpa Yadukumar Rao, Pranoy Hari, **Dipti Prasad Mukherjee (ECSU)**, Bikash Santra	Filed	Europe
3.	Fine-Grained Classification of Retail Products	17/450,066 dated 5-Oct-2021	Avishek Kumar Shaw, Shilpa Yadukumar Rao, Pranoy Hari, **Dipti Prasad Mukherjee (ECSU)**, Bikash Santra	Filed	USA
4.	Method and system for automated estimation of coal rank and phase fraction of coal samples	202231014312 dated 16-Mar-2022	Avinash Kumar Tiwary, Rashmi Singh, Pratik Swarup Dash, Suman Ghosh, **Dipti Prasad Mukherjee (ECSU), B Uma Shankar (MIU)**	Filed	India

* Name in bold denotes ISI faculty

IPRs Granted

Sr. no.	Title of Patent	IPR No.	Grant Date	Name of the Inventor(s)*	Country name where filed
1.	Method and System for Region Proposal based Object Recognition for Estimating Planogram Compliance	AU2020205301	10-Nov-2021	Avishek Kumar Shaw, Rajashree Ramakrishnan, Shilpa Yadukumar Rao, Pranoy Hari, **Dipti Prasad Mukherjee (ECSU)**, Bikash Santra	Australia
2.	Sentiment Analysis of Human being with Effective Word Embedding Methodologies	AU2021102725	21-May-2021	S. Sagnika, B.S.P. Mishra and **Saroj K. Meher (SSIU)**	Australia

* Name in bold denotes ISI faculty

6.2 Memorandum of Understanding (MoUs)

Over the last several years, the Institute has been very actively pursuing institution-level collaboration in fields of mutual interest that has led to Memoranda of Understanding (MOUs) with a number of universities/academic institutions as well as industrial organisations. These MOUs range from collaborative research to research grants for students/faculty as well as student/faculty exchange programmes. At present, the Institute has new MOUs signed and some ongoing ones (both national and international) with the following institutions/ organisations:

1. New MoU signed

Sl. no.	University/ Institution/ Organization	Country	Effective from	Duration
1.	Department of Biotechnology, Government of India	India	01-04-21	2 Years
2.	Ministry of Science & Technology and IDEAS – Institute of Data Engineering, Analytics and Science Foundation	India	13-04-21	5 Years
3.	Tata Consultancy Services	India	01-05-21	1 Year
4.	Airport Authority of India	India	16-05-21	2 Years
5.	Coursera	USA	30-06-21	Perpetual
6.	Quality Council of India	India	01-07-21	1 Year
7.	Springer Nature Singapore Pte Ltd.	Singapore	06-07-21	5 Years
8.	National Research University, Higher School of Economics	Russia	24-08-21	5 Years
9.	Tata Consultancy Services	India	01-09-21	7 Months
10.	International Business Machines Corporation (IBM)	USA	01-10-21	1 Year
11.	Tata Consultancy Services (Extension of Master Collaboration Agreement)	India	02-10-21	5 Years
12.	NTPC Ltd.	India	18-10-21	1 Year
13.	Medclin Research Private Limited	India	30-09-21	5 Years
14.	Moscow State University named after M.V.Lomonosov Tashkent Branch, Tashkent, Uzbekistan	Uzbekistan	31-12-22	5 Years
15.	CESC Limited	India	28-01-22	3 Years
16.	Ramakrishna Mission Vivekananda Educational and Research Institute	India	01-02-22	3 Years
17.	Tata Memorial Centre	India	07-03-22	5 Years

2. Continuing MoUs

A partial list of continuing MoUs is given below:-

Sl. No.	University/ Institution/ Organization	Country	Valid until
1.	Defence Research and Development Organisation (DRDO)	India	Oct-25
2.	University of Groningen	Netherlands	Feb-25
3.	University of Reading	England	Jun-24

Other Academic Activities

Sl. No.	University/ Institution/ Organization	Country	Valid until
4.	University of Amsterdam	Netherlands	May-24
5.	TCS Foundation	India	Jan-24
6.	Springer (India) Pvt. Ltd.	India	Nov-23
7.	Università degli Studi di Trieste	Italy	Nov-23
8.	MIT-Skills, Pune	India	Oct-23
9.	University of Hyderabad	India	Sep-23
10.	Basque Centre for Applied Mathematics (BCAM)	Spain	May-23
11.	University of Auckland	New Zealand	May-23
12.	AXISCADES Engineering Technologies limited	India	Nov-22
13.	Wisekey India Private Limited	India	Oct-22
14.	Geological Survey of India, Ministry of Mines	India	Oct-22
15.	National Technical Research Organisation (NTRO)	India	Aug-22
16.	Agreement for ISI-IEG Research Project under EfD Agreement	India	Jun-22
17.	Tata Consultancy Services Limited	India	May-22
18.	Ramakrishna Mission Vidyamandira	India	Apr-22
19.	University of Technology, Sydney	Australia	Mar-22
20.	Kidney Care Society	India	Feb-22
21.	CSIR National Metallurgical Laboratory, Government of India	India	Nov-21
22.	Dauphine Université Paris	France	Nov-21
23.	School of Electrical Engineering, Kyungpook National University	South Korea	Nov-21
24.	Tata Consultancy Services Limited	India	Oct-21
25.	Tata Steel	India	Sep-21
26.	University of Gothenburg under EfD Agreement	Sweden	Sep-21
27.	Larsen & Toubro Infotech Limited	India	Sep-21
28.	IIT Kanpur, IIT Kharagpur & ABB Power Technology Services Private Limited	India	Aug-21
29.	Cognizant Technology Solutions India Pvt. Ltd.	India	Aug-21
30.	Institute for Financial Management and Research	India	Jul-21
31.	Defence Research and Development Organisation (DRDO)	India	Jun-21
32.	Institute of Economic Growth	India	Jun-21
33.	London School of Economics	England	May-21
34.	Airport Authority of India	India	May-21
35.	Ericsson India Pvt. Ltd	India	May-21
36.	Tata Institute of Fundamental Research	India	May-21
37.	Tata Consultancy Services Limited	India	Apr-21
38.	Institute for Financial Management and Research, Chennai	India	Apr-21
39.	Tata Consultancy Services Foundation	India	Apr-21
40.	Wipro Limited	India	Feb-21

6.3 MUSEUMS

6.3.1 Geology Museum

GENERAL INFORMATION

Name of In-charge:	Dhurjati Prasad Sengupta, Shiladri Sekhar Das, Debarati Mukherjee
Physical Address:	Ground floor, Platinum Jubilee Building, ISI, Kolkata-700 108
Founded in:	1962
Founded by:	Pamela L. Robinson along with Sohan Lal Jain and Tapan Roy Chowdhury
Maintained by:	Geological Studies Unit, Kolkata

Brief Overview

The Museum of the Geological Studies Unit, Indian Statistical Institute, Kolkata, is a unique repository of terrestrial Mesozoic vertebrates as well as Cenozoic marine vertebrates and invertebrates. The museum has the holotypes of nearly 50 new taxa of fossil vertebrates ranging from Permian (~255 My) to Cretaceous (65 My) Period as well as many new invertebrate taxa ranging from Eocence (~55 My) to Miocene (~5 My). Complete and partial skeletons of several vertebrate fossils including the oldest Permian reptile of India, Triassic terrestrial vertebrates, Jurassic and Cretaceous dinosaurs, dinosaur eggs and several Jurassic fishes are exhibited in this Museum. There are several holotypes and paratype specimens kept in the repository attached to the museum. The museum also contains fossils of Eocene whales and other marine mega-invertebrate fossils, foraminifera etc. It also contains stromatolites, fossil plants among others.

Major Collections

Sl. No.	Name of Collection	Brief Overview of Collection
1	Mounted skeleton of *Barapasaurus tagoeri*	Barapasaurus is a genus of basal sauropod dinosaur from Early Jurassic rocks of India.
2	Mounted skeleton of *Isisaurus colberti*	Isisaurus is a genus of titanosaurid dinosaur from the Late Cretaceous period from India.
3	Skeletal elements of *prosauropods* and *abelisaurids*	Prosauropods were large herbivorous dinosaurs of the Triassic and Early Jurassic. Abelisaurids were carnivorous bipedal theropod dinosaurs. Rahiolisaurus is an abelisaurid, which existed in India during the Late Cretaceous period.
4	Mounted skeleto of *Hypardepedon huxlei*	Rhynchosaurs are a group of extinct herbivorous Triassic archosauromorph reptiles with a unique dentition pattern.
5	Numerous skeletal elements of *Parasuchus hislopi*	Phytosaurs are an extinct group of large, mostly semiaquatic Late Triassic archosauriform reptiles having superficial similarity with the crocodiles.
6	Numerous skeletal elements of *Wadiasaurus indicus* and *Reschnisaurus cristarhynchus*	kannemeyeriid dicynodont (non-mammalian synapsid) from the Middle Triassic Yerrapalli Formation of India.
7	*Endothiodon mahalanobisi* and related fauna	Various medium and small dicynodonts are known from Late Permian Kundaram Formation of India that includes Endothiodon.
8	*Pamelaria dolichotrachela* and *Yerrasuchus deccanensis*	Pamelaria is an extinct allokotosaurian archosauromorph reptile and Yarasuchus is an extinct genus of avemetatarsalian archosaur known from Middle Triassic of India.

Other Academic Activities

Sl. No.	Name of Collection	Brief Overview of Collection
9	Numerous skeletal elements of *Shringasaurus indicus*	Shringasaurus (meaning "horned lizard") is an extinct genus of allokotosaurian archosauromorph from the Middle Triassic (Anisian) of India.
10	Numerous skeletal elements of *Cherninia denwai, Paracyclotosaurs crookshanki, Eryosuchus rajareddyi, Compsocerops cosgriffi* and *Panthasaurus maleriensis*	All temnospondyl amphibians known from various Triassic Formations of India.
11	Many new taxa of Cenozoic gastropods	
12	Other Cenozoic invertebrate taxa	

Mounted skeleton of Barapaaurus tagorei, a Jurassic dinosaur

New Initiatives

» An outreach initiative has been taken by Dr. Sanjukta Chakravorti through an engagement grant from the Palaeontological Association of London based on the exhibits of the Geology Museum. The name of the program is "Museum on the wheels, when you cannot come to the museum, the museum comes to you" and it aims to develop awareness about fossils and palaeontological heritage of India among the school children, especially in West Bengal, Eastern India. The project initially started in West Bengal and will gradually include the entire India. The project wants to make students aware of the fossils of India through lectures, storytelling, TV programme and outreach workshops with school children.

» As a part of the project a webinar of 30 minutes titled "Long Long Time Ago" for kids of age group 7 - 12 years have been organized by Dr. Chakravorti through the Geology Museum and supported by the Regional Science Centre, Tirupati, under the Ministry of Cultural affairs of the Govt. of India.

» Another webinar titled "Mass extinction, chronicle of life and death long time ago" was also organized. Several schools in Kolkata, like the Holy Child School, B. D. Memorial International, Indus valley International and others participated in the above written outreach program.

» You Tube video and teaser of the said programs are also uploaded. The links are as follows- 1. https://youtu.be/zG2iv2owV-w and 2. https://youtu.be/h0ES0phF83Q

Visitors

Many national experts as well as students of vertebrate palaeontology visited the Museum in 2021-2022 to study the rare collections.

List of visitors

Sl. No.	Name	Affiliation	period of visit
1	Prof. Sanghamitra Ray	Department of Geology & Geophysics, IIT Kharagpur	November 29 - 30, 2021
2.	Dr. Debajit Datta	Research Fellow of Department of Geology & Geophysics, IIT Kharagpur	December 01 - 31, 2021
3.	Mr. Juned Zariwala	The Maharaja Sayajirao University, Baroda	January 03 - 06, 2022

6.3.2 PRASANTA CHANDRA MAHALANOBIS MEMORIAL MUSEUM AND ARCHIVES

GENERAL INFORMATION

Name of In-charge :	Kishor Chandra Satpathy
Physical Address :	Amrapali, ISI, 204 B T Road, Kolkata-700 108
Founded in :	29th June 1993
Founded by :	Indian Statistical Institute

Brief Overview of the Museum and Archives

PCMMM&A Building (Amrapali)

In the year 1993 Prasanta Chandra Mahalanobis Memorial Museum & Archives (PCMMM&A) has started its journey as a museum and archive on the occasion of the birth centenary celebration of Professor Prasanta Chandra Mahalanobis (PCM). This museum and archives was established in the historic building Amrapali which was the residence of Prasanta Chandra Mahalanobis from 1941 and the nest or the nucleus of the Indian Statistical Institute Kolkata from its inception. Setting up a museum and archives for the systematic preservation of the documents related to the formulation and development period of this Institute was a dream project of Professor Prasanta Chandra Mahalanobis, but due to his sudden demise on 28th June 1972 the project was terminated. During 1991 the Institute took the initiative to establish a museum and archives to pay homage to the founder of the Indian Statistical Institute, Professor Prasanta Chandra Mahalanobis.

Its major objective is the collection, documentation, preservation, restoration, display and communication of personal, administrative as well as rare source materials connected with the life, legacy of Prof. Mahalanobis and the formation of the Indian Statistical Institute, which also encompasses the historical growth of the Institute and of statistical science in India.

The Museum

It is housed in Amrapali, the erstwhile residence of Professor Mahalanobis, located on the campus of the Institute at Kolkata. The ground floor of the house, on the eastern side, has a permanent exhibition on the life and work of PCM through photographic displays. The display of the museum consists of five galleries. There are 921 exhibits through 101 panels and a collection of artifacts related to PCM on display in these galleries. An open lounge called the Chatal, study room of PCM and personal areas of the residence have been preserved for the audience on the first floor at the house. In 2016, a new gallery on the special relationship of Prasanta Chandra Mahalanobis and his wife, Nirmal Kumari Mahalanobis with Rabindranath Tagore was inaugurated on the 1st floor.

Archives

The archival materials trace the history of the development of statistics in the Indian sub-continent during the PCM's lifetime and beyond, with special reference to his outstanding contributions in this area. They include official and personal documents, files, correspondence, scientific and literary papers, photographs, newspaper cuttings, diaries, and manuscripts related to Prasanta Chandra Mahalanobis and Nirmal Kumari. Audio-visual materials like sound recordings and film footage, negatives and slides, also form a part of this collection. There are roughly 3 lakh documents, of which around 1.9 lakh have been already gone through preservation treatments depending on their conditions. Digitization of the documents commenced in 2007. To date around 25,000 documents have been digitized and metadata of approximately 20,000 documents have been saved on a customized server, while around 2000 documents have been uploaded to the D-space server.

Note: Presently the Museum & Archives has been shifted to the third floor of the library building temporarily for the renovation work of the existing museum building (Amrapali). The physical museum space is closed for the time being for the general visitors. With prior permission serious visitors can access the museum and archives. Also PCMMM&A has its presence in the virtual platforms (Instagram& Facebook). General visitors can reach through these digital mediums.

PCM Museum and Archives: Major Collections

Name of Collection	Brief Overview of Collection
Manuscripts	3,00,000 Manuscripts (Typescript/ Handwritten)
Books	550 approx.
Audio-video[Spool, Record, Cassettes]	93 nos., 89 nos.,101 nos.
Photographs	4000 approx.
Negatives	5000 approx.
Slides	1236 slides approx.
Artifacts	1330 approx.

Major Activities

Reference Services Provided	» Nikhil Menon, Assistant Professor, Department of History, University of Notre Dame » Dr. Sanjoy Ghosh, Global Exploration Advisor, Shell International, London, UK. » Chetan Ghate, Professor, Indian Statistical Institute, Delhi. » Sananda Sahoo, Ph.D. Candidate, Media Studies, Faculty of Information and Media Studies, Western University » Sunish Kumar Deb, Assistant Secretary, Bangiya Bijnan Parishad (Archival Documents on Professor S. N. Bose). » Sandipan Mitra, Ph.D. Student, Presidency University (Letters to PCM regarding ISI Council 1931-1934). » Atanu Hait, was provided with reference assistance for his work from PCMMM&A. » Prof. Debasis Mitra from Florida Institute of Technology, visiting CVPRU as Fulbright-Nehru Senior Scholar
Guided Tours & Special Visits	» Guided tours were provided by the PCMMM&A Trainees to the individuals and special visitors.
Student Group Demonstration	 Museum Demonstration by PCMMM&A Trainees Group of seventeen college students from Maharani Kasiswari College including three teachers of Library and Information Studies were given the museum demonstrated by the PCMMM&A Trainees.
Preservation Treatment	» Conservation and preservation of the documents to ensure availability to present and future researchers. During this financial year, approximately 1519 nos. of archival documents were provided preservation treatment after assessing their condition.
Accessioning	» Accessioning of 200 books belongs to PCM's study.

Other Academic Activities

Digital Accessioning	»	Digital accessioning of approximately 50 books.
Damaged Book Identification	»	Identification and sorting of around 20 damaged books of PCM's study.

Participation in events

1. PCMMM&A collaborated and participated in MILLI SESSION 2021 during International Archives Week on 7th-13th June 2021.

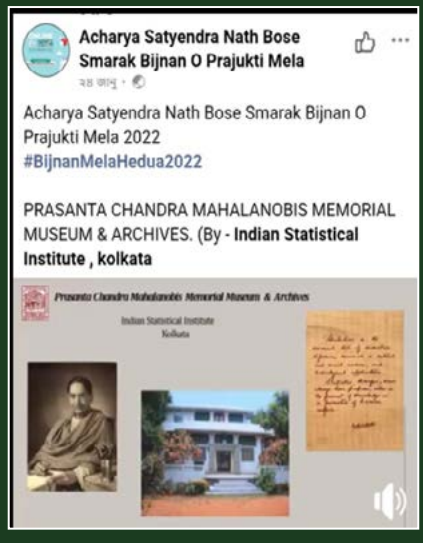
2. Showcased P.C.Mahalanobis' life, contribution, research output and glorious past of ISI in the exhibition titled "Cluster of Museum". The theme of the exhibition was "The Future of Museum: recovered and re-imagined" organized by the Kolkata Centre for Creativity & Pashchimbanga Sangrahalaya Samiti on the occasion of World Heritage week from 19th- 25th November 2021.

3. Curated an exhibition on the life and scientific contribution of Professor P.C. Mahalanobis on the occasion of the 91st foundation day of the Indian Statistical Institute on 17th December 2021 at PJA building, ISI Kolkata.

4. A Group of IAS officer trainees from LBSNAA visited the library and Museum on 27th December 2021. A special exhibition was organized to showcase Prof. P.C. Mahalanobis' life and contribution towards Statistics in India as well as Nation. A rare collection of the archives was displayed on this occasion.

Other Academic Activities

5. Prasanta Chandra Mahalanobis Memorial Museum & Archives have participated in the Bijnan Prajukti Mela 2022 on the digital platform from 20nd to 23rd January 2022. A virtual exhibition has been designed and presented on the main aims and objectives of Prasanta Chandra Mahalanbis Memorial Museum & Archives including life and works of Professor Mahalanobis. This virtual exhibition has been designed with a voice over in story telling mode by Deputy Librarian Smt. Monali Mitra Paladhi.



6.4 Scientific Assignments

A.L. N. MURTHY, SQC & OR Unit, Hyderabad

1. Guest Faculty, Statistical Quality Control (SQC) for QA, TSO Programme – Quality Assurance Engineering, BARC Training School, Nuclear Fuel Complex (NFC), Hyderabad (May 03 – 21, 2021
2. Invited speaker, Statistical Modelling for Process Improvements in Textile Industries, Faculty Development Programme, Department of Textile Technology, Osmania University, Hyderabad (Sep 21, 2021)

ABHIROOP MUKHOOADHYAY, EPU, Delhi

1. Conference, Social Capital, Western Economic Association Meeting (Virtual) (Jun 27 - Jul 01, 2021)

ANISUR RAHAMAN MOLLA, CSRU, Kolkata

1. Speaker, Byzantine Agreement and Leader Election, Tutorial, ACM Symposium on Principles of Distributed Computing (PODC) (Jul 30, 2021)

ANTAR BANDYOPADHYAY, Stat-Math Unit, Delhi

1. Planery Speaker, Random Recursive Tree, Branching Markov Chains and Urn Models, 5th International Conference on Recent Advances in Mathematical Sciences and its Applications (RAMSA-2021), Jaypee Institute of Information Technology, Noida, UP (Virtual) (Dec, 02, 2021)
2. Colloquium Speaker, a classical random reinforcement model viewed differently!, Department of Mathematics Colloquium, Ashoka University, Sonipath, HR (Jan 18, 2022)

ARUP BOSE, Stat-Math Unit, Kolkata

1. Invited talk, National Statistics Day Celebration, Department of Statistics, University of Calicut (Virtual) (Jun 29, 2021)
2. Invited talk, Workshop on COVID-19: Data and Modelling, University of Hyderabad (Virtual) (Jul 09 - 10, 2021)
3. Keynote speaker, International Conference on Emerging Trends in Statistics and Data Science and 40th Annual Convention of ISPS, Indian Society for Probability and Statistics(ISPS) (Virtual) (Sep 07-10, 2021)
4. Plenary speaker, the 4th BRICS Math. Conference, IISER Trivandrum (Virtual) (Dec 07-10, 2021)
5. Invited talk, 28th International Workshop on Matrices and Statistics, Manipal University (Virtual) (Dec 13 - 15, 2021)
6. Plenary speaker, ICDS Conference, Osmania University/ ISPS (Virtual) (Mar 11-13, 2022)

ASHIS KUMAR CHAKRABORTY, SQC & OR Unit, Kolkata

1. Keynote speaker, Evolution of Data Science, International Conference on Applications of Operational Research in Business and Industries (AORBI 2021) and 54th Annual convention of ORSI, Government Model Autonomous Holkar Science College, Indore (Dec 18, 2021)
2. Invited Talk, Quality, Statistics, Machine Learning and Data Science, pre-convention international workshop on Innovations on Data & Statistical Sciences, Osmania University, Hyderabad (Mar 10, 2022)

ASHISH GHOSH, MIU, Kolkata

1. Keynote talk, Data Science, Birla Institute of Technology, Mesra (Apr 29, 2021)
2. Keynote talk, Deep Learning, Birla Institute of Technology, Mesra (May 29, 2021)

B. S. DAYA SAGAR, SSIU, Bangalore

1. Examiner for PhD Thesis, Jyoti Rao Phule University, Pune, Doctoral Committee Member, Pune University (Feb – Jul, 2021)
2. Keynote address, Mathematical Morphology in Spatial Data Sciences: An Overview, International Conference on Data Science, Computation and Security, CHRIST, Pune Lavasa Campus (Virtual) (Apr 17, 2021)
3. Examiner for PhD Thesis, Doctoral Committee Member, University of Hyderabad, Hyderabad (May – Dec, 2021)

4. Invited Talk, ATAL Faculty Developemnt Programme, Mathematical Morphology and image Analysis, ATAL FDP on Machine Learning and Computer Vision (Advanced), Vignan University, Guntur (Jul 07, 2021)
5. Invited Talk on Mathematical Morphology in Geosciences, Remote Sensing and Geospatial Data Science: An Overview, IEEE GRSS-Bangalore Chapter's Two Weeks Summer School on Machine Learning and Deep Learning for Remote Sensing Applications, NIT-Surathkal (Jul 15, 2021)
6. Invited Talk, ATAL FDP on Applications on Artificial Intelligence on Geospatial Data, Mathematical Morphology in Geosciences, Remote Sensing, and Geospatial Data Science: An Overview, Maulana Abul Kalam Azad University of Science and Technology, West Bengal (Virtual) (Jul 26, 2021)
7. IEEE GRSS DL Talk, Mathematical Morphology in Geosciences, Remote Sensing and Geospatial Data Science: An Overview, IEEE CIS/GRSS Joint Chapter Hyderabad Section event in Association with Guntur Section (Virtual) (Aug 21, 2021)
8. IEEE GRSS DL Talk, IEEE GRSS Brazil Chapter, Mathematical Morphology in Processing and Analysis of the Digital Elevation Models, IEEE GRSSBrazili Summer School, the IEEE Brazil GRSS-ISPRS Chapter, Santa Catarina State University (UDESC), Brazil (Virtual) (Nov 11, 2021)
9. IEEE GRSS DL Talk, IEEE GRSS Mumbai Chapter, Geospatial Intelligence and Mathematical Morphology, IEEE GRSS Bombay Chapter event, IEEE GRSS Bombay Chapter, Mumbai (Virtual) (Dec 04, 2021)
10. IEEE GRSS DL Talk, IEEE GRSS Mumbai Chapter, Processing and Analysis of Digital Elevation Models (DEMs) via Grayscale Granulometries, Morphological Interpolations and Morphological Distances, IEEE GRSS Bombay Chapter event, IEEE GRSS Bombay Chapter Mumbai (Virtual) (Dec 11, 2021)

B.V. RAJARAMA BHAT, Stat-Math Unit, Kolkata

1. Invited speaker, Tokyo-Kyoto Joint Operator Algebra Seminar (Virtual) (May 25, 2021)
2. External Expert, Faculty Selection Committee, IIIT Delhi (Jun, 2021)
3. External Expert, Faculty promotion meeting, IMSc, Chennai (Jun, 2021)
4. External Expert, PhD Scholarship Promotion, IIT Mumbai (Jun, 2021)
5. Committee member, Pre-exam meeting, CSIR, Delhi (Jun, 2021)
6. Committee member, INSPIRE Selection, INSA, Delhi (Jun, 2021)
7. External expert, Faculty Selection, IIT Jammu (Jul, 2021)
8. Invited speaker, Noncommutative algebra, probability and analysis in action, Alfried Krupp Kolleg in Greifswald, Germany (Sep 20-25, 2021)
9. Key Note address, 27th International Conference of the International Academy of physical science (CONAPS XXVII) on Mathematical Analysis and its applications, Central University of Kerala (Oct 26-28, 2021)
10. External expert, Evaluation for award nomination, Govt. of Haryana (Dec 01 – Jan 20, 2022)
11. Invited speaker, Cynosure & National Symposium - 2021 on Advances in Mathematics, IIT Ropar (Dec 21-22, 2021)
12. External Expert, Promotion of faculty member, IIT, Kanpur (Jan 30, 2022)
13. External Expert, Review of PMRF application, IISc, (Mar 06 -10, 2022)
14. Member, Board of Studies for integrated MSc-Phd Program, KSOM, Calicut (Mar 21, 2022)
15. Member, Advisory Board and Chair for a session, International Conference on Semigroups, Algebra, and Operator theory (ICSAOT-22), Cochin University of Science and Technology (CUSAT), Cochin (Mar 28-31, 2022)

BHABATOSH CHANDA, ECSU, Kolkata

1. Invited Talk, Webinar on Digital Geometry and Its Applications to Image Analysis: Research Trends, Morphological network: Network with morphological neurons, IIIT Kalyani (Apr 21-23, 2021)
2. Invited Talk, webinar on Machine Learning in Digital Image Processing, Machine learning techniques in image processing: An introduction, STCET students', chapters of IE(I) (May 22, 2021)
3. Invited Talk, International Conference on Smart Technologies for Sustainable Development, Smart technologies for Sustainable development and

Education sector, ICSTSD2021, JIS College of Engineering, Kalyani (Oct 28-29, 2021)

4. Invited Talk, Autoencder and its variants, ADASIVA, IIIT Allahabad (Dec 06-10, 2021)
5. Invited Talk, 12th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2021), Morphological network, ICVGIP 2021, IIT Jodhpur (Dec 20-22, 2021)

BISWANATH DUTTA, DRTC, Bangalore

1. Invited Talk, Webinar on CODO Knowledge graph for combating the pandemic COVID-19, AICTE ATAL-sponsored FDP Workshop, NIT Kurukshetra (Jul 02, 2021)
2. Invited Talk, Webinar on Discover the Ontologies and Vocabularies using MOD Ontology, AICTE ATAL-sponsored FDP Workshop, NIT Kurukshetra (Jul 22, 2021)
3. Invited Talk, Webinar on Knowledge graph for combating COVID-19, the case of CODO initiative, Winter School 2021, 2nd Indo-US Knowledge Graph and Semantic Web Conference (KGSWC-2021) (Nov 15, 2021)
4. Invited Talk, Webinar on Levering Narrative for Knowledge Graph in Medicine, KnowDive Seminar, University of Trento, Italy (Nov 17, 2021)
5. Invited Talk, Webinar on CODO: an ontology for collection and analysis of multiparadigm COVID-19 data, Ontology Summit 2022 session on Knowledge Graph Approach to Combat COVID-19 (Mar 09, 2022)

BOBY JOHN, SQC & OR Unit, Bangalore

1. Resource Person, Design of Experiments, workshop on Design & Analysis of Experiments, BMS College of Engineering, Bangalore (Virtual) (Apr 22-23, 2021)
2. Invited lecture, Regression using R, Statistics Day Seminar, Christ Academy Institute for Advanced Studies, Bangalore (Jun 29, 2021)
3. Resource person, Data Science using python, Faculty Development Program on Machine Intelligence, Loyola College of Engineering, Chennai (Virtual) (Nov 23, 2021)
4. Invited lecture, Logistic regression using R, Workshop on Research Methodology, Maulana Azad National Urdu University, Hyderabad (Virtual) (Mar 24, 2022)

CRE RAJA, Stat-Math Unit, Bangalore

1. Delivered lecture, group actions and power maps, workshop on totally disconnected locally compact groups via group actions, BANFF international research station, Canada (Virtual) (Aug 17, 2021)
2. Delivered lecture, Mostow's theorem on lattices in locally compact groups, International conference on mathematical sciences and applications, Department of mathematics, St. Joseph's college, Trichy (Virtual) (Mar 10, 2022)

CHETAN GHATE, EPU, Delhi

1. Discussant, Inflation Targeting in India: An Interim Assessment by Eichengreen et al, Annual ABFER Conference, Asian bank of financial and economic research (ABFER), Philippines (Virtual) (Jun, 2021)
2. Meeting, Waddesdon Club of Finance Leaders Meeting, Finance Leaders Meeting, Chatham House, London, U.K (Virtual) (Jul, 2021)
3. Panellist, COVID-19 Pandemic and Revival Strategies of Global and BRICS, Webinar on COVID-19 Pandemic and Revival Strategies of Global and BRICS, BRICS NU (Virtual) (Aug, 2021)
4. Forum, Macroeconomics, Citi Virtual Global Macro Forum, Citi (Virtual) (Oct, 2021)
5. Monetary Economics, Conference on Growth and Development, BRICS NU (Virtual) (Nov, 2021)
6. Meeting, Monetary Economics, Philippians Economic Society, Philippians (Virtual) (Nov, 2021)

DEBARATI MUKHERJEE, GSU Kolkata

1. Invited Speaker, WHAT THE FOSSIL BONES TELL? DST-GATI SPONSORED, International Webinar on Emerging Trends in Geosciences and its Social impact (ETGS 2022), National Institute of Technology Rourkela, Odisha (Feb 03, 2022)

DEBDULAL DUTTA ROY, PRU, Kolkata

1. Delivered lecture, Webinar on Consciousness and it's Dynamics in Rabindrik Psychotherapy, Rishi Aurobindo Institute of Teacher Education, Department of Education & NSS, Gourab Guin Memorial College, Shyampur Siddeshwari Mahavidyalay and Howrah & Kultikri Institute of Higher Studies, Jhargram (2021)

2. Webinar on Nero plasticity and Music Therapy, Lalbaba college (2021)
3. Delivered lecture, Development and validation of the verbal reasoning Ability Test battery, Constructing a Cognitive Test, Adamas University (Apr 23, 2021)

DEVIKA P. MADALLI, DRTC, Bangalore

1. Panelist of a Policy Dialogue, Open Access in South Asia, Policy Dialogue, Centre for Civil Society, New Delhi, India (2021)
2. Keynote Address, Open Content Metrics, National Convention on Knowledge, Library and Information Networking (NACLIN), Developing Library Network, New Delhi (2021)

DHURJATI PRASAD SENGUPTA, GSU, Kolkata

1. Day long lecture on Gondwana vertebrates and field techniques, Gondwana Paleontology with an emphasis on the Biostratigraphy, Paleobiogeography and Palaeoclimate interpretation, e-Training Geological Survey of India, The Field Training Centre-Kuju Geological Survey of India (Jun 15 -18, 2021)

DIBAKAR GHOSH, PAMU, Kolkata

1. Invited talk, 12th Conference on Nonlinear Systems and Dynamics, Sastra University, Tamil Nadu (Dec 18, 2021)

DIGANTA MUKHERJEE, SOSU, Kolkata

1. Sampling Design & Methodology, Technical Advisory Committee (TAC) for Sixth round, National Family Health Survey (NFHS-6), 2021 (Since 2019)
2. Member, Technical Advisory and Monitoring Co-Chairperson, - Sub-Group I on Recommending Committee, the Global Adult Tobacco Survey-3 (CATS-3), India, 2021 (Since 2020)
3. Technical Expert, Directorate of Economics and Statistics (DES) and RBI, Union Territory of Jammu and Kashmir (UT, J&K), 2021 (Since 2019)

DIPTI PRASAD MUKHERJEE, ECSU, Kolkata

1. Invited Speaker, Research Methodology, Meeting of Research Scholars, Sister Nivedita University, Kolkata (Apr 03, 2021)
2. Invited Speaker, Deep Learning or Cheap Learning, Workshop on Deep Learning, School of Computer Engineering, KIIT, Bhubaneswar (Jan 19, 2022)

E. SOMANATHAN, EPU, Delhi

1. Invited for his experience and insights in shaping up the new country programming strategy of UNDP India, Consultation Workshop The formulation of the Country Program Document, UNDP (Aug 19, 2021)
2. participate in a roundtable with Robert Blake Special Advisor, U. S. Special Presidential Envoy for Climate, The Embassy of the United States of America (Oct 01, 2021)
3. Panel discussion, India's Interim Climate Policy: Preparing for Net Zero, ClimateX 2021, The Global Alliance of Universities on Climate (GAUC) and the Divecha Centre for Climate Change, IISc, Bengaluru (Virtual) (Oct 26, 2021)
4. Paper presentation on Electric stoves as a solution for household air pollution: Evidence from rural India, BRICS NU DSE-ISI Conference, Delhi School of Economics, University of Delhi (Nov 12-13, 2021)
5. Invited to Interact with graduate students and faculty at Food and Resource Economics, and collaborate with researchers on a series of projects related to the research, The University of British Columbia, Vancouver Campus (Feb 27 – Mar 02, 2022)

E. V. GIJO, SQC & OR Unit, Bangalore

1. Invited speaker, Lean Six Sigma, Refresher Program on Current Trends in Industrial Engineering, G H Patel College of Engineering & Technology (Virtual) (May 26, 2021)
2. Invited speaker, Importance of Statistics in Business and Industry, Special sessions for M.Sc. students, Kannur University, Kannur (Virtual) (Dec 07, 2021)

FARZANA AFRIDI, EPU, Delhi

1. Seminar/Talk on accelerating gender equality in India post Covid, LSE Festival, London School of Economics, U.K. (Virtual) (2021)
2. Report panel on State of Working India, Azim Premji University, Bengaluru (Virtual) (2021)
3. Seminar/Talk on Covid-19 Impact and Pathways to Recovery, IGC-India (Virtual) (2021)

4. Seminar/Talk, Webinar on ISB Impact Forum Reflections on Development Economics, Indian School of Business, Hyderabad (Virtual) (2021)
5. Panel, India Policy Forum, emerging from the Long Shadow of Covid-19 panel, National Council of Applied Economic Research, New Delhi (Virtual) (2021)
6. Panel, Clean Cooking in India: How can we make LPG affordable? CEEW Panel, Council on energy, environment and water, New Delhi (Virtual) (2021)
7. Participation, Annual Global Conference on Research to Policy (IHOPE), The Milken Institute, USA (Virtual) (2021)
8. Lecture on Annual Economics Festival, Miranda House Annual Economics Festival, Miranda Foundation (Virtual) (2022)
9. Panel, Social Protection, Georgetown University, USA (Virtual) (2022)

G.S.R. MURTHY, SQC & OR Unit, Hyderabad

1. Taught a course to M.Sc. students of IIT, Tirupati, Stochastic Processes and Time Series, Teaching Assignment, IIT Tirupati, Andhra Pradesh (Jan – Apr 2022)

HARI CHARAN BEHERA, SRU, Giridih

1. Invited talk, Land record management in tribal areas: pertaining issues and prospects, e-Training Programme on Land Policy and Governance in Scheduled Area, National Institute of Rural Development & Panchayati Raj (NIRD&PR), Ministry of Rural Development, Government of India (Aug 23, 2021)
2. Unit Contribution in Under-graduate/ PG Course, Unit-10 development of Forest Policy and Tribes, Indira Gandhi National Open University (IGNOU), www.egyankosh.ac.in//handle/123456789/86954 (Jan 2022)
3. Co-Chair, Technical session-1-B: Livelihoods and Traditional Knowledge, Indian Anthropology Congress, 2022 (Feb 21-23, 2022)

HOLENDRO SINGH CHUNGKHAM, AOSU, Tezpur

1. Researcher, Stockholm University, Stockholm, Sweden (Jul 21, 2021- Dec 31, 2022)

ISSAN PATRI, Stat-Math Unit, Delhi

1. Speaker, Mathematics Seminar, Department of Mathematics, Maharaja Agrasen College (Mar 11, 2022)

JIBAN K PAL, Library, Kolkata

1. Jury Member, International Paper Contest (IPC-2022), American Society for Information Science & Technology (ASIS&T), USA (Feb,2022
2. Invited talks, Career Guidance Program on Library & Information Science, West Bengal Minorities Development and Finance Corporation (WBMDFC) (Virtual) (Feb 11, 2022)

KINGSHOOK BISWAS, Stat-Math Unit, Kolkata

1. Talk, Quasi-metric antipodal spaces and maximal Gromov hyperbolic spaces, TIFR Colloqium, Tata Institute of Fundamental Research, Mumbai (Virtual) (Oct 28, 2021)
2. Talk, The Fourier transform on harmonic manifolds, TIFR-CAM Colloqium, Tata Institute of Fundamental Research Centre for Applicable Mathematics, Bangalore (Virtual) (Nov 09, 2021)
3. Mini-course, Mostow rigidity and the marked length spectrum, CIMPA workshop, Centre International de Mathematiques Pures et Appliquees, Paris, France (Virtual) (Jan 19-27, 2022)
4. Talk, Uniformization of elliptic curves, Bhaskara Maths Seminars, Bhaskaracharya Prathisthan, Pune (Virtual) (Feb 16, 2022)
5. Talk, Quasi-metric antipodal spaces and maximal Gromov hyperbolic spaces, IISER Mohali Colloqium, Indian Institute of Science Education and Research, Mohali (Virtual) (Feb 25, 2022)

KISHOR CHANDRA SATPATHY, Library, Kolkata

1. Chairperson, National Level Webinar on Virtual Teaching/Learning process focusing on open source, digital library and content development, Rabindrik Psychotherapy Research Institute Trust (Virtual) (2021)
2. Member, International Advisory Board - Scope Database, Oct 27, 2021

Other Academic Activities

3. Resource Person, Delivered an invited lecture, Emerging Technologies in Managing Libraries & Research, Department of Library and Information Science Maharaja Bir Bikram University (Apr 09, 2021)
4. Resource Person, Three-day Training Programme, Accessing E-Resources, Mahatma Gandhi State Institute of Public Administration, Punjab (Virtual) (Jun 28, 2021)
5. Resource Person, Refresher course on Changing Trends in the Library Services and LIS Education, Designing Innovative Library Spaces, UGC-Human Resource Development Centre, Doctor Hari Singh Gour Vishwavidyalaya, Sagar (MP) (Sep 02, 2021)
6. Resource Person, Refresher Course, Use of Online Information Resources in Teaching during Pandemic Situation, Department of Library and Information Science, Jadavpur University (Sep 24, 2021)
7. Panelist, India Virtual Summit 2021, Beyond Covid 19: A changed world for Librarians & Publishers, Springer Nature (Oct 20, 2021)
8. Resource Person, Educational Leaders Conference, Exploring Higher Education in a Pre-Post Pandemic World: A Multi-Stakeholder Perspective, Fortune Institute of International Business (FIIB) (Oct 22, 2021)
9. Resource Person, National Education Day Celebration, Research Metrics in Heigher Education, Department of Education, Assam Don Bosco University (Nov 11, 2021)
10. Resource Person, National Level FDP, Advanced Quantitative Research Method for Social Sciences Using SPSS & AMOS, Bharatiya Vidya Bhavan Institute of Management Science, Kolkata (Virtual) (Nov 16-20, 2021)
11. Chairperson, Indian Association of Teachers of Library and Information Science (IATLIS), Department of Library and Information Science, University of Calcutta (Nov 25 – 27, 2021)
12. Resource Person, National Conference on advancement of Quality Education and Self-Realization in Research, Department of Education, Library & Information Science and Mass Communication, RKDF University, Ranchi (Dec 11-12, 2021)
13. Resource Person, National Webinar on Unequal Pay: Gender Discrimination at Workplace, Bibliometric Mapping of General Issues among Tea Garden Labours in Indian Research Landscape, North-Eastern Hill University (NEHU), Shilong (Dec 16, 2021)
14. Chairperson, Two-day International Conference, Role of Information and Communication Technology (ICT) during Covid- 19, Department of Computer Science & Learning Resource Centre, Aggarwal College Ballabhgarh (Jan 29 – 30, 2022)
15. Resource Person, Two-day International Conference on role of Information and Communication Technology (ICT) during Covid- 19, Department of Computer Science & Learning Resource Centre, Aggarwal College Ballabhgarh (Jan 29-30, 2022)
16. Resource Person, Delivered an invited lecture on Digital Dimensions in Higher Education and Research, University of Calcutta (Feb 02, 2022)
17. Resource Person, Delivered an invited lecture on Reimagining the Library Spaces, DRTC (Feb 22, 2022)
18. Resource Person, Two Day National Conference on Sustainable and Modern Public Library System: Emerging Trends, Department of Library and Information Science Maharaja Bir Bikram University (Mar 15 - 16, 2022)
19. Biographical note published in "Biography India 2021" & Asia Pacific Who's Who (Vol: XVIII)" (2021) published by Rifacimento International

KUNTAL GHOSH, MIU, Kolkata

1. Invited Speaker, Brainwave – Connections to Cognition, Amity Institute of Biotecnology (Sep 10, 2021)
2. Invited Speaker, National Science Day, North-Eastern Hill University (Feb 28, 2022)

M. KRISHNAMURTHY, DRTC, Bangalore

1. Invited speaker, Databases and Metrics: What they are and how to use them, UGC refresher Course, Department of Political Science, Bengaluru University (Aug 26, 2021)
2. Invited speaker, Research Metrics: An Overview, Department of Political Science, Bengaluru University (Aug 26, 2021)
3. Invited speaker, Research and Publishing Metrics and Research, University Engineering College, Bangalore University, Bangalore (Dec 18, 2021)

4. Invited speaker, National Level Webinar on Role of Library in New Education Policy, Sheshadripuram Academy of Business and Management (Dec 31, 2021)
5. Invited speaker, Participatory Teaching Methods: Principles and Approaches, ICSSR sponsored Capacity Building Program, Davanagere University, Davanagere, Karnataka (Mar 11, 2022)
6. Invited speaker, Internet Resources for Social Scientists: Methods and Tools, ICSSR sponsored Capacity Building Program, Davanagere University, Davanagere (Mar 11, 2022)

MOLLY CHATTOPADHYAY, EAU, Bangalore

1. Invited speaker, Gender Discrimination in Plantation Industry, National Women Commission sponsored Webinar on Unequal Pay: Gender discrimination at workplace, School of Education, North Eastern Hill University, Shillong (Dec 15, 2021)

MONALI MITRA PALADHI, Library, Kolkata

1. Completed 5-week Course-Certificate received, 5-week online course, Copyright for Educators and Librarians jointly offered by Duke University, Emory University and The University of North Carolina at Chapel Hill (Virtual) (Jul 04, 2021)
2. Resource Person, Delivered an invited lecture, Ways to Promote your library, University of Calcutta (Aug 1, 2021)
3. Presenter, Presented a paper, Response to the Covid-19 pandemic: an exploratory study of ISI Library Kolkata, International Conference on Library and Information Science (VICLIS 2021), SLTC in collaboration with the Department of LIS, University of Kelaniya, Sri Lanka, Dept of LIS, University of Kerala, India and the NSLRC at the NSF, Sri Lanka (Aug 23, 2021)
4. Resource Person, Delivered an invited lecture, Event Management for Libraries, Central University of Punjab (Sep 22, 2021)
5. Swayam Arpit Course Certification, SWAYAM (using MOOCS platform) ARPIT (Annual Refresher Programme in Teaching), Emerging Trends & Technologies in Library & Information Services (ETTLIS), MHRD, conducted by IIT Delhi (Virtual) (Dec 01, 2020 - Mar 31, 2021)

NABANITA DAS, ACMU, Kolkata

1. External Expert, Advisory Board, School of Engineering and Technology Mizoram University, Board Meeting, Mizoram University, Aizwal (May 20, 2021)
2. Invited Speaker, 5G Net Works, Inter-disciplinary Refresher Course on Science and Technology by UGC HRDC, Mizoram University, Aizwal (Sep 29, 2021)

NAQUEEB AHMAD WARSI, ECSU, Kolkata

1. Invited speaker, Quantum OR Bound, International Conference on Quantum Information and Foundations (ICQIF-2022), (Virtual) (Feb 14-24, 2022)

NILADRI SEKHAR DASH, LRU, Kolkata

1. Plenary Speech, Issues in Designing a Digital Dictionary for Digital India, Week-long Webinar Lectures, Punjabi Linguistics Association and Department of Linguistics and Punjabi Lexicography, Punjabi University, Patiala (Jun 15, 2021)
2. Plenary Speech, Interlanguage: Understanding the Concept and its Implications in Second Language Acquisition, Monthly Webinar Lecture Series, Department of English Studies, Akal University, Bhatinda, Punjab (Jun 17, 2021)
3. Keynote Speech, Language Corpus Annotation: Issues, Challenges, and Implications, International Workshop on Computational Analysis of Aggressive Texts on Social Media, Dept. of CSE, Chittagong University of Engineering and Technology, Bangladesh (Jun 25, 2021)
4. Plenary Speech, ELC for ELT: Adding New Shades to Data Driven Learning, Faculty Development Program on Exploring Globalised Space(s): Contemporary Trends in Literature and Language, Amity Institute of English Studies and Research, Amity University, Kolkata (Jul 13, 2021)
5. Keynote Speech, Language and Society: A Labyrinth We Live In, National Level Webinar on Language: A Tool for Social Relevance and Communication, Department of Law, Aligarh Muslim University, Jangipur, Murshidabad (Aug 10, 2021)
6. Plenary Speech, Use of Corpus in Development of MT Systems, Intensive Training-cum-Orientation Programme on Translation and Interpretation, National Translation Mission, Central Institute of Indian Language, Mysore (Sep 28, 2021)

7. Plenary Speech, Understanding the Interface between Language and Society, Orientation Course on Introduction to Linguistics, Department of English, Panskura Banamali College, Panskura, Medinipur (Virtual) (Sep 30, 2021)
8. Plenary Speech, Natural Language Processing: An Introduction, Special Lecture for students of Computer Science, School of Advanced Science and Languages (SASL), VIT Bhopal University, Bhopal (Nov 13, 2021)
9. Plenary Speech, Language Corpus Generation, Processing, and Utilization in Linguistics and Language Technology, Refresher Course in Computational Social Sciences, UGC-HRDC, Osmania University, Hyderabad (Virtual) (Dec 17, 2021)
10. Plenary Speech, Linguistic Analysis of Tribal Language Data, interactive training session for the students of M.A. in English, Department of English, Vidyasagar University, Midnapore (Virtual) (Jan 15, 2022)
11. Plenary Speech, Collecting Data and Information for Designing an Indigenous Dialect Community Profile, 3rd Faculty Induction Programme (FIP), UGC-HRDC, Osmania University, Hyderabad (Virtual) (Jan 25, 2022)
12. Plenary Speech, Digitization & Documentation of an Indigenous Indian Language: A True Story, Regional Language Policies, Course of the UNESCO Chair Language Policies for Multilingualism, Federal University of Santa Catarina, Brazil & Pompeu Fabra University, Barcelona, Spain (Feb 02, 2022)
13. Plenary Speech, Applications of Tools and Techniques of Language Technology for Digitization of Classical Texts, webinar on Corpus Building and Digitization of Classical Odia Texts, Centre of Excellence for Studies in Classical Odia, Bhubaneswar (Feb 14, 2022)
14. Plenary Speech, Collecting Data and Information for Designing an Indigenous Dialect Community Profile, 34th Faculty Induction Programme (FIP), UGC-HRDC, Osmania University, Hyderabad (Virtual) (Feb 17, 2022)
15. Plenary Speech, Challenges Involved in Sustainable Revitalization of Endangered Languages, Symposium on Linguistic Diversity, Endangered Languages, and Sustainability, Indian Anthropology Congress, Department of Anthropology, University of Hyderabad, Telangana (Feb 22, 2022)
16. Plenary Speech, Corpus Linguistics and Social Studies, 48-All India Conference of Dravidian Linguists (AICDL-48), Bharathiar University, Coimbatore, Tamil Nadu (Feb 26, 2022)
17. Plenary Speech, Language Technology and Its Application in Various Domains of Human Knowledge, training program on Research Methodology in Language, Literature, and Culture-Bengali, Eastern Regional Language, Department of Higher Education, Govt. of India, Laxmisagar, Bhubaneswar (Virtual) (Mar 17, 2022)
18. Plenary Speech, Understanding the Concept of Machine Translation, 3-Month Certificate Course in Translation, Department of English, Ramakrishna Mission Residential College, Narendrapur, West Bengal (Mar 29, 2022)

PARTHA SARATHI MUKHERJEE, ISRU, Kolkata

1. Member, 2020 Wilcoxon and Youden Prize Committee for the journal Technometrics, (Mar-Jun, 2021)

PRADIPTA MAJI, MIU, Kolkata

1. Keynote Lecture, International Joint Conference on Rough Sets (IJCRS), Bratislava, Slovakia (Sep 22, 2021)

RAMIJ RAHAMAN, PAMU, Kolkata

1. Invited speaker, True Multipartite Engagement and Secure Communication, Summer school on Quantum Information and Quantum Technology 2021 (QIQT-21), IISER Kolkata (Virtual) (Jun 14 – Jul 18, 2021)
2. Invited speaker, Secure quantum communication based on measurement inputs, the National Quantum Science and Technology Symposium, IIIT Hyderabad, IEEE Quantum Initiative in association with Quantum Ecosystems Technology Council of India (Virtual) (Jul 26 – Aug 03, 2021)

RAGHUNATH CHATTERJEE, HGU, Kolkata

1. Invited speaker, Genetics and Epi-genetics in Human Diseases: Psoriasis as a Case Study, Biological Sciences Seminar Series, IISER Kolkata (Oct 20, 2021)

RITUPARNA SEN, ASU, Bangalore

1. Invited talk, Statistics Department, Savitribai Phule Pune University (Sep 29, 2021)
2. External examiner of PhD dissertation, IIT Madras (Oct 13, 2021)

RABINDRANATH JANA, SRU, Kolkata

1. Invited Special Participant / Guest, technical sessions 1,2 & 3, two days International Webinar on Trend in care and Support for the Elderly, Department of Sociology, M.S. University, Tamil Nadu in collaboration with Tamil Nadu State Council for Higher Education (TANSCHE) (Virtual) (Mar 18-19, 2022)

S.M. SUBHANI, SQC & OR Unit, Hyderabad

1. Subject Expert, Statistics Syllabus (B.Sc & M.Sc Statistics), Industry Academia Meet, Department of Mathematics & Statistics, St. Joseph's Degree & PG College, Hyderabad (Mar 11, 2022)
2. Invited lecture, Application of SQC Techniques using R, UGC sponsored National Seminar, Department of Statistics, Acharya Nagarjuna University (Mar 17, 2022)
3. External Committee Member, Science, Technology, & Innovation Ecosystem, Interactive meet, ITC, Kakatiya Hotel (Mar 25, 2022)

SABYABACHI BHATTACHARYA, AERU, Kolkata

1. Webinar, escalating role of Statistics in population dynamics and ecology and its future prospect, Understanding genes to ecosystems ecology through modern research, Department of Zoology, Visva Bharati (Mar 25, 2022)

SAMIR KUMAR NEOGY, SQC & OR Unit, Delhi

1. Plenary Speaker, Recent Advances in Copositive Optimization and It's Application in Graph Theory, 27th International Conference of International Academy of Physical Sciences, School of Computational and Integrative Sciences, Jawaharlal Nehru University, New Delhi (Oct 27, 2021)
2. Invited Speaker, Max Plus Algebra and its application in Optimization Problem & GameTheory, International Conference on Emerging Trends in Mathematical Modeling: Post Pandemic Era, Techno India University, Kolkata (Jan 07, 2022)

SIVA ATHREYA, Stat-Math Unit, Bangalore

1. Infosys Chair Professor, Chennai Mathematical Institute (Sep – Nov, 2021)
2. Invited Speaker, Workshop on Population Genetics and Statistical Physics-in synergy, Oberwolfach Mathematics Institute (Mar 06, 2022)

SAROJ K. MEHER, SSIU, Bangalore

1. External Expert, Doctoral Committee Member, Ph.D. Program, Computer Science Department, Vellore Institute of Technology, Andhra Pradesh (Apr 11, 2021 for 4 yrs.)
2. Keynote Lecture, Why and What is Deep Autoencoder: A Tutorial Perspective, ATAL FDP Program, Department of Computer Science and Engineering, Birla Institute of Technology, Mesra, Ranchi (Apr 29 - May 05, 2021)
3. Keynote Lecture, Deep Domain Adaptation for pattern classification, ATAL FDP Program, Department of Computer Science and Engineering, Birla Institute of Technology, Mesra, Ranchi (May 24-29, 2021)
4. Keynote Lecture, Domain Adaptation with interpretable architecture for remote sensing image classification, GRSS workshop, Department of Computer Science and Engineering, NIT Suratkol, Karnataka (Jul 05-16, 2021)
5. Domain Expert, Question Paper Setter, B. Tech Computer Science, Biju Pattnaik University of Technology, Rourkela, Odisha (Jul 14, 2021)
6. External Expert, Doctoral Committee Member, Ph.D. Program, Computer Science Department, Vellore Institute of Technology, Vellore (Aug 01, 2021 for 4 yrs.)
7. External Expert, Doctoral Committee Member, Ph.D. Program, Computer Science Department, Biju Pattnaik University of Technology, Rourkela, Odisha (Sep 05, 2021 for 4 yrs.)
8. Domain Expert, Question Paper Setter, M. Tech Computer Science, Biju Pattnaik University of Technology, Rourkela, Odisha (Oct 11, 2021)
9. External Expert, Doctoral Committee Member, Ph.D.

Program, Computer Science Department, Kalinga Institute of Technology, Bhubaneswar, Odisha (Nov 09, 2018 for 4 yrs.)

10. Keynote Lecture, Spatial Information-based Self learning Semisupervised classification model and its applications, 6th International Conference on Computational Intelligence in Data Mining (ICCIDM-2021), Department of CSE, Aditya Institute of Technology and Management (AITAM), Tekkali, Andhra Pradesh (Dec 11-12, 2021)
11. Keynote Lecture, Semisupervised Leaning with Neural Networks for improved pattern classification, International conference on Biologically Inspired Techniques in Many-Criteria Decision Making (BITMDM-2021), Fakir Mohan University, Balasore, Odisha (Dec 20-21, 2021)
12. External Expert, Doctoral Committee Member, Ph.D. Program, Computer Science and Engineering Department, Silicon Institute of Technology, Bhubaneswar (Mar 03, 2022)
13. External Advisor, Departmental Advisory Committee, Computer Science Department Don Bosco Institute of Technology, Kumbalgodu, Mysuru Road, Bengaluru (Mar 07, 2022)

SUJATA GHOSH, CSU, Chennai

1. Jury Member, Logic, E.W. Beth Best Dissertation Award Committee, FoLLI, The Association for Logic, Language and Information (2021)
2. PC Co-chair, Logic, 9th International Conference on Logic, Rationality and Interaction, Xi'an, China, (Oct 16 – 19, 2021)

SUPRATIK PAL, PAMU, Kolkata

1. Invited colloquium, Commemorating 75 years of India's independence: Azadi ka Amrit Mahotsav, Indian Institute of Astrophysics, Bengaluru (Virtual) (Nov 02, 2021)
2. Keynote lecture, National Science Day Celebration, NIT Silchar (Virtual) (Feb 28, 2022)
3. Invited colloquium, Commemorating 75 years of India's independence: Azadi ka Amrit Mahotsav, IISER Tirupati (Virtual) (Mar 31, 2022)

SUSHMITA MITRA, MIU, Kolkata

1. Webinar, IEEE CIS (Jul 03, 2021)
2. Keynote Lecture, Three-days workshop on Recent Trends in Biomedical Imaging and Applications, Indian Institute of Information Technology, Allahabad (Virtual) (Aug 20, 2021)
3. Plenary talk, Webinar, SUSTech, China (Nov 30, 2021)
4. Invited talk, University of Iowa, USA (Mar 10, 2022)
5. Invited talk, Purdue University, USA (Mar 25, 2022)
6. Keynote talk, IEEE ISBI 2022, ITC Royal, Kolkata (Mar 29, 2022)

SHUBHRA SANKAR RAY, MIU, Kolkata

1. Invited speaker, Career in Statistics, Hello DD Career Plus, DD Bangla channel, Doordarshan Kendra, Kolkata (Sep 09, 2021)

T. KARTHICK, CSU, Chennai

1. Invited Speaker, International Conference on Discrete Mathematics, Department of Mathematics, Manonmaniam Sundaranar University, Tirunelveli (Oct 11-13, 2021)
2. Guest Lecture, Applications of Graph theory in Computer Science, VIT University, Chennai (Nov 10, 2021)
3. Thesis Examiner, Graph Theory, SSN College of Engineering, Anna University, Chennai (Oct 12 – Nov 12, 2021)
4. Doctoral Committee Member for two Ph. D students, Graph Theory, SRM University, Chennai (Feb 11, 2021 onwards)
5. Doctoral Committee Member for three Ph.D. students, Graph Theory, VIT University, Chennai (May 04, 2021 onwards)

TAPAN KUMAR MANDAL, Library, Kolkata

1. Nodal Officer, Constitutional Day & Ambedkar Jayanti, eSamikSha, Ministry of Statistics and Programme Implementation, Govt. of India (2020-22)

TARUN KABIRAJ, ERU, Kolkata

1. Presented a paper, Free Licensing in a Differentiated Duopoly, Workshop on Innovation and Licensing, Stony Brook Centre for Game Theory, USA (Virtual) (Jul 15 - 16, 2021)

UJJWAL BHATTACHARYA, CVPRU, Kolkata

1. Invited Lecture, Machine Learning in Multimedia Applications, AICTE – ISTE Sponsored Induction / Refresher Programme on Next Generation Computing and Its Application, Kamaraj College of Engineering and Technology, Virudhunagar, Tamilnadu (Dec 18, 2021)
2. Key Speaker, Machine Learning in Multimedia Applications, Faculty Development Programme (FDP) on Applications of Machine Learning & Deep Learning in Computer Vision, Dr. B. C. Roy Engineering College, Durgapur (Mar 29, 2022)

UMAPADA PAL, CVPRU, Kolkata

1. Reviewer, a set of papers, ICCV-2021, Canada (Oct 12 - 15, 2021)
2. Invited talk, Role of Deep Learning in Image Analysis, AICTE- ISTE Sponsored Induction/Refresher Course on Deep Learning, Birla Institute of Technology, MESRA (May 24-29, 2021)
3. Invited talk, Deep Learning Applications in Image Analysis, AICTE sponsored Short Term Training Programme (STTP) on Data science and Machine learning, Narula Institute of Technoloty, Kolkata (Jun 07-11, 2021)
4. Invited talk, Pattern Recognition and its Recent Applications, AICTE Training and Learning (ATAL) Sponsored FDP on Principles of AI, ML and Deep Learning, University of Mysore, Mysore (Jun 21-25, 2021)
5. Reviewer, 5 papers, 16th ICDAR, International conference on Document Analysis and Recognition (Sep 05-10, 2021)
6. Chair, workshop under ICDAR conference, 16th ICDAR, International conference on Document Analysis and Recognition (Sep 05-10, 2021)
7. Invited talk, Pattern Recognition and its Application in Air Writing Recognition Without Depth Sensors, IEEE CIS Summer School on Emerging Research Trends in Artificial Intelligence and Computational Intelligence 1, NIT, Arunachal Pradesh (Nov 15-19, 2021)
8. Tutorial talk, Document Image Analysis and its Recent Trends, 9th International Conference on Pattern Recognition and Machine Intelligence, Kolkata (Dec 15 - 18, 2021)

UTPAL GARAIN, CVPRU, Kolkata

1. Reviewer, Reviewing five papers, 60th ACL, Association for Computational Linguistics (May 20-27, 2021)
2. Invited talk, Neural NLP, Research Conclave, CSE, Central Institute of Technology (CIT), Kokrajhar (May 23, 2021)
3. Invited talk, Domain-knowledge augmented deep learning, TCS Innovation Lab (Jun 02, 2021)
4. Invited talk, Advances in AI and its current challenges, Training Programme on Data Science and Machine Learning, Department of CSE, Narula Institute of Technology (NIT), Kolkata (Jun 08, 2021)
5. Inaugural speech as the Chief Guest, Advances in AI and Blockchain technologies, INNOTECH-2021 (INNOvation meets TECHnology), Lal Bahadur Shastri Institute of Management, Delhi (Jul 24, 2021)
6. Invited talk, Big Data Analytics, Big Data Analytics for Policy Planners, International Statistical Education Centre (ISEC) (Aug 31, 2021)
7. Reviewer, Reviewing four papers, 16th CDAR, International conference on Document Analysis and Recognition (Sep 05-10, 2021)
8. Industry Liaisons, Organising Industry track, 9th International conference on Pattern Recognition and Machine Intelligence (PReMI'21), PReMI'21 (Dec15-18, 2021)
9. Meta reviewer (Senior PC Member), reviews for a set of papers and writing meta reviews, 36th AAAI 2022, American Assoc. for Artificial Intelligence (AAAI) (Feb 22 - Mar 01, 2022)

YOGESHWARAN DHANDAPANI, Stat-Math Unit, Bangalore

1. Seminar, Random Topology, IISER Trivandrum (Virtual) (Sep 27 & 29, 2021)
2. Workshop, Random Topology, CIMAT, Mexico (Virtual) (Sep 28, 2021)
3. Seminar, Random Topology, University of Groningen (Virtual) (Oct 22, 2021)
4. Workshop, Random Topology, QMU London (Virtual) (Jan 31, 2022)
5. Workshop, Probability, Jain College, Bangalore (Mar 25, 2022)

6.5 Visiting Scientists

The following Visiting Scientists, Post-doctoral and Faculty Fellows were associated with the various Divisions in the Institute during 2021-2022

Applied Statistics Division (ASD)

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
1	Debashis Kushary	Rutgers University	Sep 21 – Dec, 2021	ASU, Kolkata	
2	Madhurima Mukhopadhyay	ISI, Kolkata	Oct 01 - Dec, 2021	ASU, Kolkata	
3	Soumendu Sundar Mukherjee	INSPIRE Faculty Fellow	Jun 03, 2019-Jun 02, 2024	ISRU, Kolkata	**Mukherjee, S.S.**, Sarkar, P., and Bickel, P.J. (2021). Two provably consistent divide-and-conquer clustering algorithms for large networks. Proceedings of the National Academy of Sciences, 118(44). https://doi.org/10.1073/pnas.2100482118

Computer and Communications Sciences Division (CCSD)

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached
1	Mriganka Mandal	Institute of Mathematics for Industry, Kyushu University	Oct 25, 2021 – Mar 31, 2022	CSRU
2	Sanjit Chatterjee	Indian Institute of Science, Bengaluru	Dec 01, 2020 – Nov 30, 2021	CSRU
3	Tapas Paul	Indian Institute of Technology, Kharagpur	Nov 17, 2021 – Feb 20, 2022	CSRU
4	Avishek Gupta	ISI, Kolkata	Dec 20, 2021 – Mar 19, 2022	ECSU, Kolkata
5	Bikash Santra	ISI, Kolkata	Dec 16, 2021 – Mar 26, 2022	ECSU, Kolkata
6	Narayan Changder	ISI, Kolkata	Feb 04 – Mar 31, 2022	ECSU, Kolkata
7	Sujoy Kumar Biswas	ISI, Kolkata	Apr 01 – Jun 30, 2021	ECSU, Kolkata
8	Satchidananda Dehuri	Fakir Mohan University	Dec 13, 2021 – Mar 31, 2022	MIU, ISI Kolkata
9	Sumanta Ray	Aliah Universty	Dec 09, 2021 – Mar 31, 2022	MIU, ISI Kolkata

Physics and Earth Sciences Division (PESD)

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
1	Dilip Saha	Honorary Visiting Professor, ISI	1 Year	GSU, Kolkata	1. Banerjee, A., Majumder, T., Patranabis-Deb, S., **Saha, D.** (2022) Nature of Mineralizing Fluid in Paleoproterozoic Dolomite Hosted Talc Deposits, Cuddapah Basin, India. J Geol Soc India 98, 18–22 doi.org/10.1007/s12594-022-1922-4 2. Wabo, H., Beukes, N., Patranabis-Deb, S., **Saha, D.**, Belyanin, G., Kramers, J., 2021 Paleomagnetic and 40Ar/ 39Ar age constraints on the timing of deposition of deep-water carbonates of the Kurnool Group (Cuddapah basin) and correlation across Proterozoic Purana successions of Southern India. Journal of Asian Earth Sciences, doi.org/10.1016/j.jseaes.2021.104984, 3. Deb, G.K., **Saha, D.**, Patranabis-Deb, Banerjee, A., 2021. Coexisting Arc and MORB signatures in the Sonakhan greenstone belt, India: late Neoarchean – early Proterozoic subduction rollback and back-arc formation. American Journal of Science 321, 1308-1349. 4. **Saha, D.**, 2021. Universal stage measurements in petrofabric analysis revisited. Journal Earth System Science 130, 116,doi.org/10.1007/s12040-021-01618-x, 5. **Saha, D.**, Bachhar, P., Deb, G., Patranabis-Deb, S., Banerjee, A. (2021). Tectonic evolution of the Paleoarchean to Mesoarchean Badampahar-Gorumahisani belt, Singhbhum craton, India - mplications for coexisting arc and plume signatures in a granite-greenstone terrain. Precambrian Research 357, 1308-1349, doi.org/10.1016/j.precamres.2021.106094, 1 J
2	Nibedita Rakshit	Visiting Scientist, ISI	1 month	GSU, Kolkata	Nil
3	Paramita Das	Visiting Scientist, ISI	3 months	GSU, Kolkata	Nil
4	Sanjukta Chakravorti	Visiting Scientist, ISI	10 months	GSU, Kolkata	**Ghoshal, S., (MIU, Kolkata RS) Bhowmick, P., Chakrabarti, A., Sur-Kolay, S., (MIU, Kolkata) Chakravorti, S.,(GSU, Kolkata, RS)** and **Sengupta, D., (GSU, Kolkata)** "3D Reconstruction from Micro-CT Slices for Non-Destructive Viewing inside a Fossil," 2021 36th International Conference on Image and Vision Computing New Zealand (IVCNZ), 2021, pp. 1-6, doi: 10.1109/IVCNZ54163.2021.9653270.

Other Academic Activities

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
5	Saswati Bandyopadhyay	Honorary Visiting Professor, ISI	1 year	GSU, Kolkata	1. Datta, D., Ray, S. and **Bandyopadhyay, S.** (2021) Cranial morphology of a new phytosaur (Diapsida, Archosauria) from the Upper Triassic of India: implications for phytosaur phylogeny and biostratigraphy. Papers in Palaeontology, 7, 675-708, doi:10.1002/spp2.1292. 2. Ezcurra, M. D., **Bandyopadhyay S.,** and Gower, D. J., (2021) A new erythrosuchid archosauriform from the Middle Triassic Yerrapalli Formation of south-central India. Ameghiniana, 58(2): 132–168, doi.org/10.5710/AMGH.18.01.2021.3416 3. Ezcurra, M. D., **Bandyopadhyay S.,** and Sen, K., (2021) A new faunistic component of the Lower Triassic Panchet Formation of India increases the continental non-archosauromorph neodiapsid record in the aftermath of the end-Permian mass extinction. Journal of Paleontology, 1-11, 2021. doi:10.1017/jpa.2021.100 4. Nesbitt, S. J., Stocker, M., Ezcurra, M. D., Fraser, N. C., Heckert, A. B., Parker, W. G., Mueller, B., Sengupta, S., **Bandyopadhyay, S.,** Pritchard, A. C. and Marsh, A. (2022) Widespread Azendohsaurids (Archosauromorpha, Allokotosauria) from the Late Triassic of western USA and India, Papers in Palaeontology, 8 (1), p. 1-29; doi: 10.1002/spp2.1413. 5. Sengupta, S. and **Bandyopadhyay, S.** (2022) The osteology of Shringasaurus indicus, an archosauromorph from the Middle Triassic Denwa Formation, Satpura Gondwana Basin, Central India, Journal of Vertebrate Paleontology, e2010740 doi:10.1080/02724634.2021.2010740
6	Somnath Dasgupta	INSA Senior Scientist, Geological Studies Unit, ISI, Kolkata & Honorary Professor, IISER, Kolkata	1 year	GSU, Kolkata	1. Padmaja, J., Sarkar, T., **Dasgupta S.,** Dash, J.K., Bhutani, R & Chauhan, H (2021) High pressure granulite facies metamorphism at the interface of the Archean Bastar craton and the Proterozoic Eastern Ghats Belt. Precambrian Research (Elsevier), 363, 106330 doi.org/10.1016/j.precamres.2021.106330 2. Padmaja,J., Sarkar, T., Sorcar,N., Mukherjee,S., Das,N & **Dasgupta, S (In press)** Petrochronological evolution of Mg-Al granulites and associated metapelites from the contact zone of the Archean Bastar craton and Proterozoic Eastern Ghats Province, and its implications. Geosystems and Geoenvironment (Elsevier) doi.org/10.1016/j.geogeo.2022.100041

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
7	Tapan Chakraborty	Honorary Visiting Professor, ISI	1 Year	GSU, Kolkata	1. S. Kundu, T. Hazra, S. Bera, **T. Chakraborty,** M. A. Khan (2021) Occurrence of monocot leaf remains from Siwalik (late Miocene) sediments of Himachal Pradesh, western Himalaya. Journal of the Botanical Society of Bengal, 75 (2), 151-155 2. K. Ghosh, **T. Chakraborty** (2022) Impact of human intervention structures on the rivers: An investigation of the spatiotemporal variation of grain size in the Tista River, eastern Himalayas. Earth Surface Processes and Landforms; doi: 10.1002/esp.5374
8	Arjun Mani	University of Southern California, USA	Nov 29, 2021 – Feb 24, 2022	PAMU, Kolkata	
9	Some Sankar Bhattacharya	University of Hong Kong	Sep 22 – Oct 31, 2021	PAMU, Kolkata	
10	Souvik Pramanik	ISI, Kolkata	Nov 26, 2021 – Jan 31, 2022	PAMU, Kolkata	
11	Tamal Guha	ISI, Kolkata	Nov 15 – Dec 24, 2021	PAMU, Kolkata	

Social Sciences Division (SSD)

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
1	Mehak Majid	University of Jammu and Kashmir	Jan 01 – Mar 2022	EAU, Bangalore	
2	Albin Erlanson	University of Essex, Colchester	Jan 10 – Jan 31, 2022	EPU, Delhi	
3	Amparo Castelló Climent	University of Valencia, Spain	Mar 01 – May 20, 2022	EPU, Delhi	
4	Gurbachan Singh	ISI, Kolkata	Jan 10 - Mar 31, 2022	EPU, Delhi	
5	Kunal Dasgupta	Indian Institute of Management, Bengaluru	Jan 10 – March 31, 2022	EPU, Delhi	
6	Lokendra Kumawat	Department of Economics, Delhi University	Sep 20 – Dec 20, 2021 and Jan 05 – Feb 05, 2022	EPU, Delhi	

Other Academic Activities

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
7	Piyali Das	Indian Institute of Management, Indore	Sep 20 – Dec 20, 2021 and Jan 05 – Feb 05, 2022	EPU, Delhi	
8	Renuka Sane	National Institute of Public Finance and Policy	Sep 20 – Dec 20, 2021 and Jan 05 – Feb 05, 2022	EPU, Delhi	
9	Rohit Kumar	ISI, Kolkata	Apr 01 – Oct 31, 2021, Nov 01 – Jan 31, 2022 and Feb 15 – Mar 02, 2022	EPU, Delhi	
10	Sabyasachi Das	Ahoka University, Sonipat	Jan 10 - Mar 31, 2022	EPU, Delhi	
11	Sonal Yadav	Umea University, Sweden	Jun 04 – Aug 04, 2021 and Dec 09, 2021 – Jan 31, 2022	EPU, Delhi	
12	Sreoshi Banerjee	Economic Research Unit, ISI, Kolkata	Aug 16, 2021 – Apr 30, 2022	EPU, Delhi	
13	Abhirup Sarkar	ISI, Kolkata	Jan 01, 2021 - Dec, 2022	ERU, Kolkata	Teaching courses in the MSQE Programme **Publication:** **Sarkar, Abhirup**, Das, Sabyasachi and Dutta, Souvik: (2021) Political Economy of Third Party Interventions, Journal of Public Economics, ELSEVIER, 1-14.
14	Bikas K. Chakraborty	Centre for Applied Mathematics & Computational Science, Saha Institute of Nuclear Physics, Kolkata	Aug 01, 2021 – Jul 31, 2022	ERU, Kolkata	Collaborative research with Professor Manipushpak Mitra
15	Chaitali Sinha	ISI, Kolkata	Feb 01, 2021 till date	ERU, Kolkata	Post-Doctoral Fellow (funded by ICSSR)
16	Prasenjit Banerjee	Economics, School of Social Sciences Economics, The University of Manchester, Netherlands	Nov 11, 2021 - 15 Jan, 2022	ERU, Kolkata	Collaborative research with Dr. Priyadarshi Banerjee

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
17	Satya Ranjan Chakravarty	Honorary Visiting Professor, ERU, ISI, Kolkata	Jun 01, 2021 – May 31, 2022	ERU, Kolkata	**Publications:** 1. **Chakravarty, Satya R.** and Palash Sarkar: (2021).Designing Income Distributions with Specified Inequalities, Economic Theory Bulletin 9, 2021, 297–311. 2. **Chakravarty, Satya R.** and Palash Sarkar: (2021). An Inequality Paradox: Relative versus Absolute Indices? Metron-International Journal of Statistics, 79, 2021, 241-254. 3. **Chakravarty, Satya R.**, N. Mukhopadhyay and P.P. Sengupta: (2021). An Axiomatic Analysis of Generalized Gini Air Quality Indices, Contemporary Research on Gini's Inequality Indix and Beyond, CRS Press (Taylor and Francis Group), Florida, 125-144.
18	Aditi Lahiri	Oxford University, UK	Mar 15, 2022	LRU, Kolkata	
19	Alok Ranjan Pal	CEM, Kolaghat, WB, I	Sep 07, 2021	LRU, Kolkata	
20	Anik Nandi	Leiden University, The Netherlands	Jan 21, 2022	LRU, Kolkata	
21	Arpita Bose	University of Reading, UK	Dec 16 - 17, 2021	LRU, Kolkata	
22	Atul Aman	VIT University, Bhopal	Aug 01, 2021	LRU, Kolkata	
23	Amrita Bhattacharyya	Amity University, Kolkata	Nov 08, 2021	LRU, Kolkata	
24	N. Ramesh	Bharathiar University Coimbatore	Nov 24-27, 2021	LRU, Kolkata	
25	Paramita Nandi	Kerala University, Trivandram,	Jul 26, 2021	LRU, Kolkata	
26	S. Arulmozi	University of Hyderabad	Nov 24-27, 2021	LRU, Kolkata	
27	Damodar Suar	KIIT, Bhuneswar	Jan 19, 2022	PRU, Kolkata	
28	Mrinal Mukherjee	WBUTTEPA.	Jan 19, 2022	PRU, Kolkata	
29	Santoshi Halder	Calcutta University	Jan 19, 2022	PRU, Kolkata	

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
30	Shah Alam	AMU	Jan 20, 2022	PRU, Kolkata	
31	Sushmita Mukhopadhyay	IIT, Kharagpur WB	Jan 20, 2022	PRU, Kolkata	
32	Prasenjit Banerjee	University of Manchester, UK	Dec 21, 2020 – Nov 30, 2021	SOSU, Kolkata	

Theoretical Statistics and Mathematics Division (TSMD)

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
1.	Abhishek Juyal	IMSc., Chennai	Sep 01, 2021 for 2 years	SMU, Bangalore	On ranks of quadratic twists of a Mordell curve", accepted for publication in the Ramanujan Journal (doi.org/10.1007/s11139-022-00585-1
2.	Anindya Ghatak	NISER, Bhubaneshwar	Jul 01, 2021 - Feb 28, 2022 Mar 01, 2022 for 2 years	SMU, Bangalore	
3.	Aryaman Sensarma	ISI, Kolkata	Jul 01, 2020 for 2 years	SMU, Bangalore	
4.	Bharat Talwar	University of Delhi	Sep 01, 2021- Jan 31, 2022	SMU, Bangalore	
5.	Chaitanya G.K.	NIT, Surathkal	Jul 01, 2021 for 2 years	SMU, Bangalore	Awarded the Chebyshev Grant to attend ICM 2022 in St. Petersburg, Russia (online).
6.	Deepak Kumar Pradhan	IIT Kanpur	Jul 01, 2019 - 3 years	SMU, Bangalore	
7.	Gadadhar Misra	J.C. Bose Fellow	Aug 01, 2021 – Aug 31, 2023	SMU, Bangalore	Misra, Gadadhar; Pramanick, Paramita; Sinha, Kalyan B.; A trace inequality for commuting d-tuples of operators. Integral Equations Operator Theory 94 (2022), no. 2, Paper No. 16, 37 pp.
8.	Lavy Koilpitchai	IIT Madras	Jul 01, 2019 - 3 years	SMU, Bangalore	
9.	Mahesh K. Krishna	Aditya College of Engineering and Technology, AP	Oct 01, 2021 - Mar 31, 2021	SMU, Bangalore	
10.	Mamta Balodi	IISc., Bangalore	Aug 23, 2021 - Feb 22, 2022	SMU, Bangalore	
11.	Manpreet Singh	IIT, Delhi	Mar 01 - May 31, 2022	SMU, Bangalore	
12.	Narayan Rakshit	ISI, Kolkata	Apr 01, 2019 - Feb 22, 2022	SMU, Bangalore	

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
13.	Nanda Kishore S. Reddy	IISc., Bangalore	Apr 02, 2018 - for five years	SMU, Bangalore	
14.	Neeru Bala	IIT, Hyderabad	Nov 03, 2021 for one year	SMU, Bangalore	Invariant subspace of idempotent on Hilbert spaces (with Nirupam Ghosh and Jaydeb Sarkar). URL: https://arxiv.org/pdf/2204.12222.pdf
15.	Nirupam Ghosh	Visvesvaraya Institute of Technology, Nagpur	Mar 01, 2021 for 2 years	SMU, Bangalore	
16.	P. Muthukumar	ISI, Chennai	Apr 01, 2019 - Feb 28, 2022	SMU, Bangalore	Awarded P. K. Jain Award by Indian Mathematical Society in 2021 Publication: Snehasish Bose, P. Muthukumar and Jaydeb Sarkar, Beurling type invariant subspaces of composition operators, J. Operator Theory, 86 (2), 2021, 425-438.
17.	Ranjan Bera	IIT, Hyderabad	Aug 01, 2021 for 2 years	SMU, Bangalore	
18.	Rahul Maurya	IIIT, Allahabad	Dec 27, 2021 - Jun 26, 2022	SMU, Bangalore	
19.	Samir Kar	IIT, Jammu	Jul 01, 2021 for 2 years	SMU, Bangalore	
20.	Satyendra Kumar Mishra	Post-Doctoral Fellow, ISI, Bangalore	Jul 01, 2020 - Mar 31, 2022	SMU, Bangalore	
21.	Satyaki Mukherjee	U.C. Berkeley	Aug 16 – Feb 2022	SMU, Bangalore	
22.	Sekhar Ghosh	NIT, Rourkela	Oct 28, 2021 for one year	SMU, Bangalore	Sekhar Ghosh & Dumitru Motreanu (2022). Infinitely many large solutions to a variable order nonlocal singular equation, Fractional Calculus and Applied Analysis, 1-18 pp. DOI: 10.1007/s13540-022-00039-x
23.	Sudip Ranjan Bhuia	IIT, Hyderabad	Feb 01, 2021 – Jul 31, 2022	SMU, Bangalore	Awarded Research Excellence award from IIT Hyderabad
24.	Snehasish Bose	Jadavpur University	Feb 01, 2019 – Jan 31, 2022	SMU, Bangalore	
25.	Souvik Pal	HRI, Allahabad	Nov 01, 2021 for one year	SMU, Bangalore	Preprints - Classification of irreducible Harish-Chandra modules over full toroidal Lie algebras and higher-dimensional Virasoro algebras https://arxiv.org/pdf/2203.06148.pdf
26.	Safdar Quddus	Inspire Faculty, IISc., Bangalore	Dec 13, 2021 - Mar 12, 2022	SMU, Bangalore	

Other Academic Activities

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
27.	Satyajit Sahoo	Utkal University, Bhubaneswar	Mar 10, 2022 – Jun 09, 2022	SMU, Bangalore	
28.	Sneh Bala Sinha	IISc., Bangalore	Nov 01 – Jan 31, 2022	SMU, Bangalore	
29.	U. N. Bhosle	INSA Senior Scientist	Jan 01, 2019 - for five years	SMU, Bangalore	
30.	Vivek Kumar	PDF, KAUST, Saudi Arabia	Nov 08, 2021 – Feb 28, 2022 Mar 01, 2022 for 2 years	SMU, Bangalore	Vivek Kumar, Stochastic fractional heat equation perturbed by general gaussian and non-gaussian noise" in Statistics and Probability Letters journal DOI: https://doi.org/10.1016/j.spl.2022.109381
31.	Ankita Jindal	IIT, Delhi	Nov 01, 2020 - Dec 31, 2021	SMU, Delhi	
32.	Anilesh Mohari	IMSc	Oct 14 – 19, 2021	SMU, Delhi	
33.	Chiranjit Ray	HRI, Allahabad	Nov 01, 2021 – Oct 31, 2023	SMU, Delhi	
34.	Deepak Prajapati	The Chinese University of Hong Kong	Nov 01, 2020 - Nov 10, 2021	SMU, Delhi	
35.	Ekhnath Ghate	TIFR, Mumbai	Jan 04 - 07, 2022	SMU, Delhi	
36.	Gunjan Sapra	ISI, Bangalore	Nov 09, 2020 – Jul 08, 2021	SMU, Delhi	
37.	Ishan Mata	ISI, Delhi	Oct 27, 2021 – Oct 26, 2022	SMU, Delhi	
38.	Leena Kulkarni	IIT, Bombay	Jan 17 - Apr 16, 2022	SMU, Delhi	
39.	Moumanti Poddar	IISER, Pune	Feb 07 – 20, 2022	SMU, Delhi	
40.	Mohammad Amin Sofi	University of Kashmir	Feb 18 - 24, 2022	SMU, Delhi	
41.	Neha Gupta	IIT, Ropar	Dec 23, 2021 – Dec 22, 2022	SMU, Delhi	
42.	Rhythm Grover	IIT Kanpur	Nov 01, 2020 - Aug 15, 2021	SMU, Delhi	
43.	Ruhul Ali Khan	Indian Institute of Engineering Science and Technology, Shibpur	Nov 11, 2021 – Mar 31, 2022	SMU, Delhi	

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
44.	Samriddho Roy	TIFR, Bangalore	Nov 05 , 2021 – Mar 31, 2022	SMU, Delhi	
45.	Sibaprasad Barik	IIT, Bombay	Dec 01, 2020 - Sep 30, 2021	SMU, Delhi	
46.	Sunil Das	ISI, Delhi	Nov 15, 2021 – Mar 31, 2022	SMU, Delhi	
47.	Thomas Xavier	Kannur University, Kerala	Oct 26, 2021 – Oct 25, 2022	SMU, Delhi	
48.	Tattwamasi Amrutam	Ben Gurion University, Israel	Aug 09 – Oct 08, 2021	SMU, Delhi	
49.	Arindam Dey	HRI Allahabad	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	
50.	Angshuman Roy	ISI, Kolkata	Oct 01, 2020 – Oct 19, 2021	SMU, Kolkata	
51.	Bappa Bisai	IIT, Bombay	Feb 01 – Nov 30, 2021	SMU, Kolkata	
52.	Biplab Paul	NISER, Bhubaneswar	Aug 02 – Oct 31, 2021	SMU, Kolkata	
53.	Dibyendu Mondal	IIT, Bombay	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	
54.	Debapratim Namerjee	TIFR, Bangalore	Sep 01, 2021 – Aug 31, 2026	SMU, Kolkata	
55.	Indranil Biswas	TIFR	Dec 20 - 24, 2021	SMU, Kolkata	
56.	Joydip Saha	IIT, Gandhinagar	Feb 01, 2021 – Jan 31, 2024	SMU, Kolkata	
57.	Jyotirmoy Sengupta	Indian Association for the Cultivation of Science	Dec 20 - Dec 24, 2021	SMU, Kolkata	
58.	Kummari Mallesham	HRI, Allahabad	Feb 01, 2021 – May 31, 2022	SMU, Kolkata	
59.	Kajal das	ISI, Bangalore	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	
60.	Kuntal Chakraborty	IISER, Pune	Jan 10, 2022 – Mar 31, 2022	SMU, Kolkata	
61.	Mitra Koley	TIFR, Mumbai	Dec 01, 2022 – Jul 31, 2026	SMU, Kolkata	

Other Academic Activities

Sl. No.	Name of the Visiting Scientist	Affiliation	Duration	Unit Attached	Awards/Recognition/Publications of Visiting Scientists
62.	Mostafizar Khandakar	IIT, Bhilai	Feb 09 – Mar 28, 2022	SMU, Kolkata	
63.	Mithun Kumar Das	The Institute of Mathematical Science	Mar 30 – Apr 15, 2022	SMU, Kolkata	
64.	Nilkantha Das	NISER, Bhubaneswar	Oct 10 – Nov 18, 2021	SMU, Kolkata	
65.	Nilanjan das	IIT, Kharagpur	Oct 25, 2021- Oct 24, 2022	SMU, Kolkata	
66.	Pinka Dey	IISER, Mohali	Feb 01, 2021 – Jan 31, 2024	SMU, Kolkata	
67.	Pranendu Darbar	IMSc	Feb 01, 2021 – Mar 31, 2022	SMU, Kolkata	
68.	Ramdin Mawia	ISI, Bangalore	Mar 21 – Apr 16, 2022	SMU, Kolkata	
69.	Ritwik Pal	NISER, Bhubaneswar	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	
70.	Ramdin Mawia	HRI, Allahabad	Jan 01, 2018 – Jun 28, 2021	SMU, Kolkata	
71.	Sourabh Kumar Singh	IIT, Kanpur	Dec 12, 2021 – Jan 01, 2022	SMU, Kolkata	
72.	Sourav Sen	Harish Chandra Research Institute	Feb 14 – Mar 04, 2022	SMU, Kolkata	
73.	Sukrit Chakraborty	ISI, Kolkata	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	
74.	Sumit Kumar Rano	IIT Guwahati	Aug 01, 2021 – Jut 31, 2024	SMU, Kolkata	
75.	Suvrajit Bhattacharjee	ISI, Delhi	Jan 04 - Nov 30, 2021	SMU, Kolkata	
76.	Subhankar Sau	IIT, Madras	Mar 04 – Mar 31, 2022	SMU, Kolkata	
77.	Sayan Chakraborty	IISER, Bhopal	Jun 10, 2020 – Jun 09, 2025	SMU, Kolkata	
78.	Samya Kumar Ray	IIT, Goa	Aug 02, 2021 – Aug 01, 2026	SMU, Kolkata	
79.	Tathagata Mondal	IIT, Kanpur	Aug 01, 2021 – Jul 31, 2024	SMU, Kolkata	

Chapter - 7

EVENTS

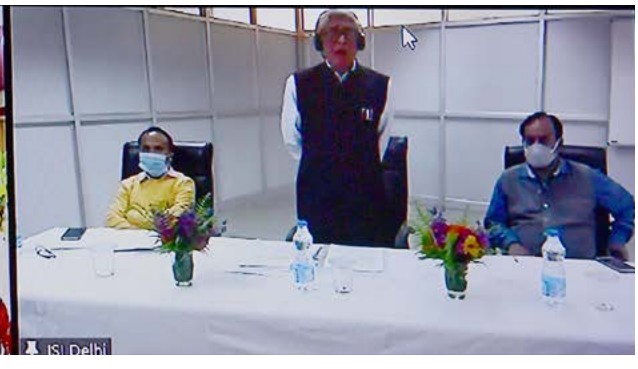
76 - **No. of Conferences, Symposia, Workshops & Training Programme Organised**

113 - **No. of Lectures**

10 - **No. of Outreach Activities**

7.1 CONVOCATION

The 56th Convocation of the Indian Statistical Institute was held on 2nd March, 2022, at 2:30 pm. It started with a Vedic Hymn by the ISI Club, followed by welcome address by Shri Bibek Debroy, President, ISI delivered virtually and annual review by Prof. Sanghamitra Bandyopadhyay, Director, ISI. Convocation Address by Prof. Gagandeep Kang (FRS), Christian Medical College, Vellore (Chief Guest) was delivered virtually. Degrees and Diplomas were awarded to students by Prof. Debasis Sengupta, Dean of Studies. A vote of thanks was given by Prof. Debasis Sengupta, Dean of Studies, ISI. The Convocation was closed by Shri Bibek Debroy, followed by the National Anthem by the ISI Club.



The outgoing batch of students of all degree and diploma programmes were next felicitated. The meritorious students were awarded their medals and prizes for outstanding performance in the programmes by Prof. Debasis Sengupta, Dean of Studies, after which the students were individually presented with their degrees and diplomas. Prof. Debasis Sengupta, Dean of Studies, ISI offered the vote of thanks







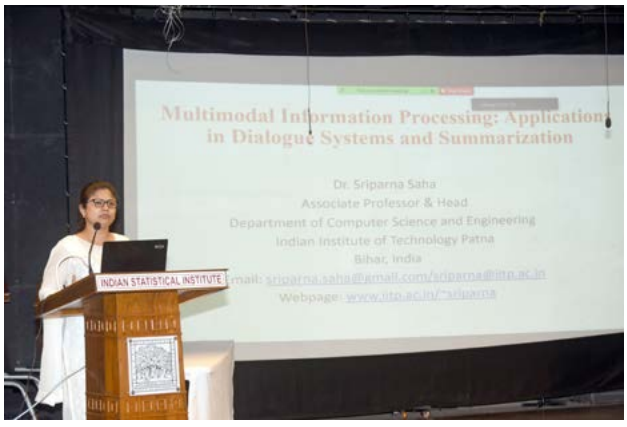

7.2 Conferences, Symposia, Workshops & Training Programmes

1. Conferences, Symposia and Workshops

Sl. no.	Dates	Conferences Symposia and Workshops Conducted	Collaborator	Organizing Unit	Venue
1	Jun 24-25, 2021	Spatial Data Sciences	IEEE Bangalore Section GRSS Chapter, and TIS@ISI	SSIU, Bangalore	Virtual
2	Jun 24-26, 2021	National Workshop on Psychotherapeutic Approaches: Cognitive Behaviour Therapy: Principles and Applications	Adamas University	PRU, Kolkata	Virtual
3	Jun 27 - Jul 1, 2021	6th Conference and Workshop on Statistical Methods in Finance	Chennai Mathematical Institute	ASU, Bangalore	Virtual
4	Jul 6-8, 2021	In search of Consciousness & Healthy Living	Rishi Aurobindo Institute of Teachers Education	PRU, Kolkata	Virtual
5	Sep 18, 2021	Neuroplasticity and Music Therapy	Lalbaba College	PRU, Kolkata	Virtual
6	Nov 26, 2021	Workshop on the Mahalanobis Growth Model		EPU, Delhi	IIC, New Delhi
7	Dec 14, 2021	Workshop on Statistical Techniques in Research Methodology		SQC & OR Unit, Mumbai	Virtual
8	Dec15-18, 2021	9th International Conference on Pattern Recognition and Machine Intelligence		MIU, Kolkata	Virtual
9	Dec 20-22, 2021	16th Annual Conference on Economic Growth and Development		EPU, Delhi	Virtual
10	Jan 4, 2022	PIXELS AND PATTERNS: One Day Workshop Celebrating the Contributions of Prof. Bhabatosh Chanda in the Areas of Image Processing, Computer Vision and Pattern Recognition		ECSU, Kolkata	Platinum Jubilee Auditorium and Virtual
11	Jan12-19, 2022	Workshop on Research Methodology and Statistical Package on Social Science (SPSS).		BAU, Kolkata	ISI, Kolkata
12	Jan 17-20, 2022	42nd International Conference on Quantum Probability, and Infinite Dimensional Analysis (QP-42)	B.V. Rajarama Bhat (Organizer)	SMU, Bangalore	Virtual
13	Jan 17-22, 2022	5th Winter School on Mathematics (Linear Algebra such as Diagonalisation, Canonical forms etc.) for postgraduate students		TASU, Tezpur	Virtual
14	Feb 15-16, 2022	4th Annual Research Symposium on Science Outreach Program		AERU, Giridih	ISI, Giridih

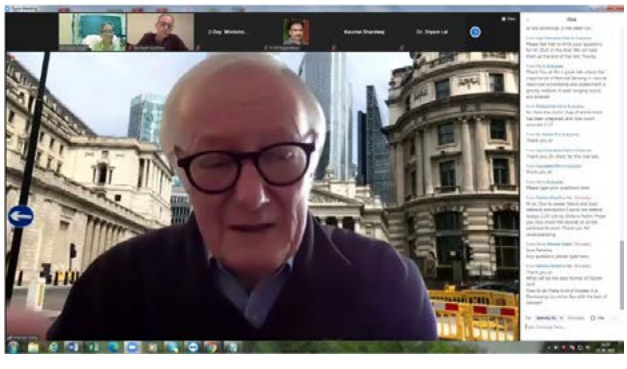
Sl. no.	Dates	Conferences Symposia and Workshops Conducted	Collaborator	Organizing Unit	Venue
15	Feb 14-24, 2022	International Conference on Quantum Information and Foundations (ICQIF-2022)	University of Calcutta, S. N. Bose National Centre for Basic Sciences and Bose Institute, Kolkata, India	PAMU, Kolkata	Virtual
16	Mar 7-12, 2022	Workshop on Computational Statistics and Data Analytics		ISRU, Kolkata	Virtual
17	Mar 29 – 31, 2022	Prof. R.L. Karandikar Conference		SMU, Delhi	Virtual
18	Mar 30, 2022	One Day Workshop on Machine Intelligence and Applications		MIU, Kolkata	ISI Kolkata

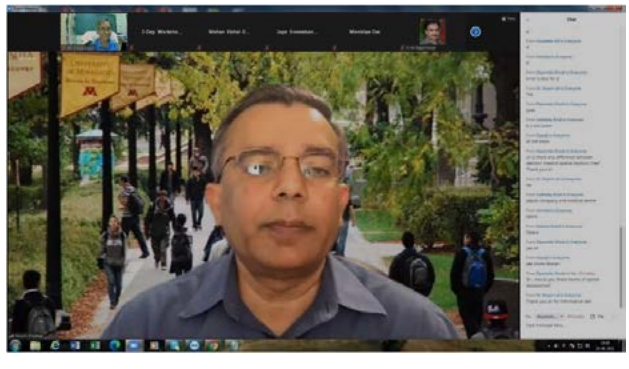
Events


Multimodal Information Processing: Application in Dialogue Systems and Summarization
Dr. Sriparna Saha
Associate Professor & Head
Department of Computer Science and Engineering
Indian Institute of Technology Patna
Bihar, India
INDIAN STATISTICAL INSTITUTE


INTERNATIONAL CONFERENCE
ON
QUANTUM INFORMATION AND FOUNDATIONS


INDIAN STATISTICAL INSTITUTE
PIXELS AND PATTERNS





2. Training Programmes

Sl. no.	Dates	Training Programmes conducted	Collaborator	Organizing Unit	Venue
1	Nov 2019 – Nov 2021	Six Sigma Training and Guidance (Wave III) for achieving Business Excellence (ALN Murthy)		SQC & OR Unit, Hyderabad	ITC Limited, Paper Boards and Specialty Papers Division, Bhadrachalam, Telangana
2	Apr, 2021	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
3	Apr 14-16, 2021	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
4	Apr 24 - 25, May 1 - 2 & 8 - 9, 2021	Six Sigma Green Belt Training & Certification program		SQC & OR Unit, Mumbai	Virtual
5	May, 2021	Statistics for Researchers	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
6	May - Jun, 2021	Six Sigma Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
7	May 3 – 28, 2021	Six Sigma Green Belt Training		SQC & OR Unit, Hyderabad	Virtual
8	Jun 26, 27, 2021; Jul 3, 4, 10, 2021	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
9	Jun - Aug, 2021	Six Sigma Master Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
10	Jun 21 – 11 Aug, 2021	Six Sigma Implementation (Training and Project guidance)		SQC & OR Unit, Hyderabad	All India Institute of Ayurveda, New Delhi (Virtual)
11	Jul - Sep, 2021	Six Sigma Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
12	Jul 6 - 8, 2021	Consciousness and its Dynamics in Rabindrik Psychotherapy	Rishi Aurobindo Institute of Teachers Education	PRU, Kolkata	Virtual
13	Jul 7 - 9, 2021	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
14	Jul 10 - 11, 17 - 18 & 24 - 25, 2021	Six Sigma Green Belt Training & Certification		SQC & OR Unit, Mumbai	Virtual
15	Jul 26 - 30, 2021	Six Sigma Green Belt Certification program		SQC & OR Unit, Mumbai	Virtual
16	Aug 5 - 6, 2021	UGC HRDC Refresher Course: Faculty Development Programme	Ranchi University	Ranchi University	Virtual
17	Aug 7, 8, 14, 21, 22, 2021	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual

Events

Sl. no.	Dates	Training Programmes conducted	Collaborator	Organizing Unit	Venue
18	Aug 28, 29; Sep 4, 5, 11, 12, 18, 19, 25, 26; Oct 3, 9, 10, 16, 17, 23, 24, 30, 31; Nov 13, 14, 20, 21, 27, 28; Dec 4, 5, 11, 12, 18, 19, 25, 26 2021; Jan 2, 8, 9, 15, 16, 22, 23, 29, 30; Feb 5, 6, 12, 13, 19, 20, 26, 27; Mar 5, 6, 12, 13, 19, 20, 26, 27; Apr 2, 3, 9, 10, 16, 17, 23, 24, 30; May 7, 8, 14, 15, 21, 22, 28, 29; Jun 4, 5, 11, 12, 18, 19, 25 2022	Data Science	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
19	Aug 28, 29; Sep 4, 5, 11, 12, 18, 19, 25, 26; Oct 3, 9, 10, 16, 17, 23, 24, 30, 31; Nov 13, 14, 20, 21, 27, 28; Dec 4, 5, 11, 12, 18, 19, 25, 26; 2021; Jan 2, 8, 9, 15, 16 2022 :	Data Engineering	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
20	Aug 28, 29; Sep 4, 5, 11, 12, 18, 19, 25, 26; Oct 2, 3, 2021	Six Sigma Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
21	Aug 2021- Feb 2022	Certification Course on Cryptology		CSRU, Kolkata	Virtual
22	Aug 2 – 6, 2021	Six Sigma Green Belt Certification program		SQC & OR Unit, Mumbai	Virtual
23	Aug 4 - 6, 2021	Six Sigma Black Belt, 1st Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
24	Aug 6 - 8, Aug 20 - 22, Sep 10 - 12, Sep 24 - 26, Oct 8 - 10, Oct 29 - 31, 2021	Business Analytics & Data Mining during Certification	In collaboration with SQC&ORU Kolkata and Bangalore	SQC & OR Unit, Mumbai	Virtual
25	Aug 16 -21, Aug 30 - Sep 4, Sep 20 - 25, Oct 4 - 9, 2021	Six Sigma Black Belt Training and Certification Program		SQC & OR Unit, Mumbai	Virtual
26	Sep 6 - 9, 2021	Program on Six Sigma Black Belt, 2nd Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
27	Sep 25, 26; Oct 2, 3, 9, 10 , 16, 17, 23, 24, 30, 31; Nov 13, 14, 20, 21, 27, 28, 2021	Six Sigma Master Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
28	Sep 22 - 24, 2021	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
29	Sep 24 - Oct 2, 2021	Semantic Web & Classification & Indexing Systems		DRTC, Bangalore	Virtual
30	Sep 27 - 30, 2021	Business Analytics, Data Mining and Operations Research, 1st Module		SQC & OR Unit, Delhi	ISI Delhi Centre
31	Sep 28 - 30, 2021	SPC & Process Modelling		SQC & OR Unit, Mumbai	Virtual

Sl. no.	Dates	Training Programmes conducted	Collaborator	Organizing Unit	Venue
32	Oct 5 - 8, 2021	Business Analytics, Data Mining and Operations Research, 2nd Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
33	Oct 16, 17, 23, 24, 30, 2021	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
34	Oct 26-29, 2021	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
35	Nov 9-11 and 24-26, 2021	Six Sigma Green Belt Certification Programme		SQC & OR Unit, Mumbai	Virtual
36	Nov 10 - 12, 2021	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
37	Nov 17 - 20, 2021	Six Sigma Black Belt, 3rd Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
38	Nov 13, 14, 20 , 21, 27, 28; Dec 4, 5, 11, 12, 18, 19, 2021	Six Sigma Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
39	Nov 15, 16, 17, 18, 22, 23, 24, 25, 29, 30; Dec 1, 2, 4, 6, 12, 16, 19, 22, 26, 29, 2021	DFSS Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
40	Nov 23 - 26, 2021	Business Analytics, Data Mining and Operations Research, 3rd Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
41	Nov 16 - 18, 2021	Six Sigma Black Belt, 4th Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
42	Dec 25, 26, 2021; Jan 1, 2, 8, 9, 15, 16, 22, 23, 29, 30 2022	Six Sigma Master Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
43	Dec 25, 26, 2021; Jan 1, 2, 8, 2022	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
44	Dec 27, 2021	Winter Study Programme of I.A.S. Officer Trainees		SOSU, Kolkata	SOSU, Kolkata
45	Nov 27 - 28, Dec 4 - 5 & 11 - 12, 2021	Six Sigma Green Belt Training & Certification Program		SQC & OR Unit, Mumbai	Virtual
46	Dec 13 - 16, 2021	Business Analytics, Data Mining and Operations Research, 4th Module		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
47	Jan 5 – Jun 30, 2022 (240 Hours)	Program on Statistics and Machine Learning		SQC & OR Unit, Hyderabad	Virtual
48	Jan 19 - 21, 2022	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
49	Jan 24 - 28, 2022	Industrial Training under the subject headings of Institutional Repository		DRTC, Bangalore	DRTC, Bangalore

Events

Sl. no.	Dates	Training Programmes conducted	Collaborator	Organizing Unit	Venue
50	Jan 24-28, 2022	Panel Models and Their Applications		SERU, Tezpur	Virtual
51	Jan 21 - Mar 12, 2022	Winter School on Deep Learning: From Perceptrons to Transformers		ECSU, Kolkata	Virtual
52	Jan 2, 8, 9, 15, 16, 22, 23, 29, 30; Feb 5, 6, 12, 13, 19, 20, 26, 27; Mar 5, 6, 12, 13, 19, 20, 26, 27; Apr 2, 3, 9, 10, 16, 17, 23, 24, 30; May 7, 8, 14, 15, 21, 22, 28, 29, 2022	Advanced Data Analytics	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
53	Jan 29, 30, 22; Feb 5, 6, 12, 2022	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
54	Jan 24 – 28, 2022	Panel Models and Their Applications		SERU, North-East Centre	Virtual
55	Feb 19, 20, 26, 27; Mar 5, 6, 12 , 13, 19, 20, 26, 27, 2022	Six Sigma Black Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual
56	Mar 5 - 6, 12 - 13 & 19 - 20, 2022	Six Sigma Green Belt Certification Programme		SQC & OR Unit, Mumbai	Virtual
57	Mar 16 - 18, 2022	Six Sigma Green Belt		SQC & OR Unit, Delhi	ISI Delhi Centre (Virtual)
58	Mar 19, 20, 25, 26, & Apr 2, 2022	Six Sigma Green Belt	Marketed and organised by eduplusnow, Pune	SQC & OR Unit, Pune	Virtual

7.3 LECTURES

Applied Statistics Division (ASD)

Sl. no.	Date	Title of the Lecture	Name of the Speaker	Affiliation of the Speaker	Organizing Unit
1	May 25, 2021	Structural Stigma and All-Cause Mortality of Sexual Minorities: Non-Proportional Hazards with Univariate Frailty	Arnab Bhattacharjee	Heriot- Watt University Edinburg	ASU, Kolkata
2	July 13, 2021	Application of Statistical Machine Learning in Biomarker Selection	Shibasish Dasgupta	Pfizer	ASU, Kolkata
3	August 24, 2021	Re-scaling bootstrap for complex survey design	Sanghmitra Pal	WBSU University	ASU, Kolkata
4	August 31, 2021	Finding the Optimal Dynamic Treatment Regime using Smooth Surrogate Loss	Nilanjana Laha,	Harvard University	ASU, Kolkata
5	November 30, 2021	Modeling and analysis of panel count data with multiple modes of recurrence	P G Sankaran	CUSAT	ASU, Kolkata
6	January 11, 2022	Assessing directionality of dependence by directed mutual information	Saumik Purkayastha	University of Michigan	ASU, Kolkata
7	January 20, 2022	Efficient Variational Approach to Sparse Bayesian Neural Network for Model Compression	Diptarka Saha	University of Illinois at Urbana-Champaign, USA	ISRU, Kolkata
8	January 25, 2022	Prediction in order statistics and its associated properties	Ritwik Bhattacharya	Technology de Monterrey Campus Queretaro, Mexico	ASU, Kolkata
9	January 27, 2022	A Subsampling-based Approach on Network Model Parameter Estimation and Two Sample Hypothesis Testing to Reduce Complexity	Kaustav Chakraborty	University of Illinois at Urbana-Champaign, USA	ISRU, Kolkata
10	February 01, 2022	The pandemic: An observational study and policy option	Debashis Paul	University of California, Davis	ASU, Kolkata
11	February 03, 2022	fiBAG: Functional Integrative Bayesian Analysis of High-dimensional Multiplatform Genomic Data	Rupam Bhattacharya	Department of Statistics, University of Michigan, USA	ISRU, Kolkata
12	February 08, 2022	Fractional Brownian markets with time-varying volatility and high-frequency data	Ananya Lahiri	IIT, Tirupati	ASU, Kolkata
13	February 10, 2022	Selecting “optimal” robust tuning parameter	Sancharee Basak	Sister Nivedita University, Kolkata	ISRU, Kolkata
14	February 24, 2022	Median bias, HuIC, and valid inference	Arun Kumar Kuchibhotla	Department of Statistics and Data Science, Carnegie Mellon University, USA	ISRU, Kolkata
15	March 08, 2022	Generalizations of Some Distance Based Classifiers for HDLSS Data	Subhajit Dutta	IIT, Kanpur	ASU, Kolkata
16	March 29, 2022	Today’s Music on Internet :A walkthrough from technology to business	Soumik Das	Techno Main, Salt Lake, West Bengal	ASU, Kolkata

Computer and Communications Sciences Division (CCSD)

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
1	September 27, 2021	"Five Laws Lecture" Series to commemorate the contribution of late Prof S.R Ranganathan	K S Raghavan	Former Faculty, DRTC, Indian Statistical Institute, Bangalore	DRTC, Bangalore
2	February 23, 2022	Knowledge Management (KM) Strategies on Knowledge Economy	V Krishnamurthy	Dayanand Sagar University, Hosur Main Road, Bangalore	DRTC, Bangalore
3	February 24, 2022	Innovative ways to enhance user's satisfaction in Libraries	Sangeeta Kaul	DELNET, New Delhi	DRTC, Bangalore
4	February 25, 2022	Why KM,KM Myths, KM Lifecycle	Raghu BA	PES University, Bangalore	DRTC, Bangalore
5	March 24, 2022	Reading Habits among the Youths	Rajani Jayram	Jain University, Bangalore	DRTC, Bangalore
6	March 30, 2022	New Trends in Library Management Software	Rajani Jayram	Jain University, Bangalore	DRTC, Bangalore
7	March 31, 2022	Some applications of ML in Healthcare	Neelam Sinha	IIIT, Bangalore	ACMU, Kolkata

Physics and Earth Sciences Division (PESD)

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
1	October 07, 2021	Electrophoretic transport of soft particles with hydrophobic/ hydrophilic rigid inner core: an overview	Bharti	Department of Mathematics, NIT Patna	PAMU, Kolkata
2	October 08, 2021	An earthquake measuring scale	Ranjit Das	Department of Computing & Systems Engineering Universidad Católica Del Norte, Chile	TASU, Tezpur
3	December 08, 2021	Inflationary magnetogenesis with reheating phase from higher curvature coupling	Tanmoy Paul	Chandannagar College, Chandannagar, Hooghly, West Bengal.	PAMU, Kolkata
4	December 22, 2021	From abstract matrix models to observations in the sky	Suddhasattwa Brahma	Higgs Centre for Theoretical Physics, School of Physics & Astronomy. The University of Edinburgh, Scotland, UK	PAMU, Kolkata
5	March 09, 2022	Sources of Primordial Gravitational Waves as Probe of Particle Physics	Anish Ghoshal	Institute of Theoretical Physics, University of Warsaw, Poland	PAMU, Kolkata
6	March 11, 2022	Universal schemes for detecting entanglement in two-mode Gaussian states: Stokes-like operator based approach	Sibasish Ghosh	Theoretical Physics Group, The Institute of Mathematical Sciences (IMSc), Chennai, India	PAMU, Kolkata
7	March 14, 2022	Understanding multifractal, scale-free and small world weighted planar stochastic lattice	Md. Kamrul Hassan	Theoretical Physics Group, Department of Physics, University of Dhaka, Bangladesh	PAMU, Kolkata

Social Sciences Division (SSD)

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
1.	April 01, 2021	Towns and Rural Land Inequality in India	Prashant Bharadwaj	University of California, San Dieg, USA	EPU, Delhi
2.	April 02, 2021	Import Competition, Formalization, and the Role of Contract Labor	Vidhya Soundarajan	Indian Institute of Management - Bangalore	EPU, Delhi
3.	April 09, 2021	Social Media and Xenophobia: Evidence from Russia	Maria Petrova	Pompeu Fabra University, Barcelona, Spain	EPU, Delhi
4.	June 25, 2021	Incentives and Efficiency in Matching with Transfers: Towards Nonquasilinear Package Auctions	Ryan Tierney	University of Southern Denmark	EPU, Delhi
5.	July 16, 2021	How to De-reserve Reserves	Bertan Turhan	Iowa State University, USA	EPU, Delhi
6.	July 23, 2021	Til Dowry Do Us Part: Bargaining and Violence in Indian Families	Rossella Calvi	Rice University, USA	EPU, Delhi
7.	August 06, 2021	Culture, Economic Shocks and Conflict: Does trust moderate the effect of price shocks on conflict?	Hasin Yousaf	University of New South Wales, Australia	EPU, Delhi
8.	August 13, 2021	A model of online click behavior	Levent Ulku	ITAM, Mexico	EPU, Delhi
9.	August 20, 2021	Indecisiveness in Collective Choice	Sean Horan	University of Montreal, Canada	EPU, Delhi
10.	August 27, 2021	The Unholy Trinity: Regulatory Forbearance, Government-Owned Banks and Zombie Firms	Nirupama Kulkarni	CAFRAL, Mumbai	EPU, Delhi
11.	September 10, 2021	Labor migration, capital accumulation, and the structure of rural labor markets	Taryn Dinkelman	University of Notre Dame, USA	EPU, Delhi
12.	September 17, 2021	Is vertical foreclosure a concern in markets featuring network effects?	Shiva Sekhar	University of Passau, Germany	EPU, Delhi
13.	October 01, 2021	Blockchains, Liquid Democracy and Information Aggregation	Amrita Dhillon	Kings College, London UK	EPU, Delhi
14.	October 08, 2021	Intergenerational Impacts from the World's Largest Early Childhood Program	Saravana Ravindran	National University of Singapore	EPU, Delhi
15.	November 12, 2021	Using Latent Factor Models for Causal Inference with and without Instrumental Variable	Sauvik Banerjee	Indian Institute of Technology, Mumbai	EPU, Delhi
16.	November 19, 2021	Causal Inference for Discrimination	Sunil Kumar	India Institute, Kings College London, UK	EPU, Delhi
17.	November 25, 2021	Problems and challenges involved in Dravidian WordNet	S. Arulmozi	Centre for Applied Linguistics & Translation Studies, University of Hyderabad	LRU, Kolkata

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Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
18.	November 26, 2021	Wildfires, Smoky Days, and Labor Supply	Ron Chan	University of Manchester, UK	EPU, Delhi
19.	November 27, 2021	Problems and challenges involved in representing concepts and ideas of tribal and minority communities in WordNet.	N. Ramesh	Dept. of Linguistics, Bharathiar University, Coimbatore	LRU, Kolkata
20.	December 03, 2021	Security-bid Auctions with Information Acquisition	Yunan Li	City University of Hong Kong, Hong Kong	EPU, Delhi
21.	December 10, 2021	Crowding in School Choice	Yu Zhou	Kyoto University, Japan	EPU, Delhi
22.	January 19, 2022	Manuscript Structure, Style and Content.	Santoshi Halder	Calcutta University	PRU, Kolkata
23.	January 19, 2022	Reviewing the manuscript	Mrinal Mukherjee	WBUTTEPA	PRU, Kolkata
24.	January 19, 2022	Plagiarism and Ethics	Damodar Suar	KIIT, Bhubaneswar	PRU, Kolkata
25.	January 20, 2022	Organization of manuscript according to APA format	Shah Alam	Aligarh Muslim University	PRU, Kolkata
26.	January 20, 2022	Ethical committee formation and implementation	Sushmita Mukhopadhyay	IIT, Kharagpur	PRU, Kolkata
27.	January 28, 2022	Informed Citizens and Gender Inequality in Political Outcomes: Quasi-Experimental Evidence from India	Abhishek Chakravarty	University of Manchester, UK	EPU, Delhi
28.	February 25, 2022	Deconstructing Aggregate Fluctuations	Girish Bahl	University of Western Australia	EPU, Delhi
29.	March 04, 2022	Forced Displacement, Mental Health, and Child Development: Evidence from the Rohingya Refugees	Asad Islam	Monash University, Malaysia	EPU, Delhi
30.	March 09, 2022	On the Measures of Electoral Volatility	Sandip Sarkar	School of Economics, XIM University, Bhubaneswar	ERU, Kolkata
31.	March 15, 2022	Characterizing phonological properties of nasality in Bengali words	Aditi Lahiri	Language and Brain lab, Oxford University, UK	LRU, Kolkata
32.	March 15, 2022	Global Growth and Development: Why Emerging Countries Matter?	Manoj Pant	Indian Institute of Foreign Trade, Delhi	EPU, Delhi
33.	March 18, 2022	Quantifying the Inefficiency of Multi-unit Auctions for Normal Goods	Brian Baisa	Amherst College, USA	EPU, Delhi
34.	March 25, 2022	Statistical Uncertainty and Coarse Contracts	Justin Burkett	Georgia Institute of Technology, Georgia	EPU, Delhi

SQC & OR Division (SQC&ORD)

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
1.	October 23, 2021	Ishteaqul Islam Memorial Lecture on Digital Twins and Healthcare	Mark Goh	National University of Singapore	SQC & OR, Bangalore
2.	November 20, 2021	Data Science and Artificial Intelligence on Gaming	Mridul Sachdeva	Games 24 x 7	SQC & OR, Bangalore
3.	November 27, 2021	Application of Data Science in the OTT Industry	Pramit Samanta	ZEE5	SQC & OR, Bangalore
4.	December 04, 2021	Applications of AI/ML in Banking Sector	Diptanshu Bhardwaj	Optum Healthcare	SQC & OR, Bangalore
5.	December 11, 2021	Skill Developed versus Industry Expectations versus Hidden Challenges/ opportunities	Aniruddha Mitra	Citi Financial Services	SQC & OR, Bangalore
6.	December 14, 2021	Research Opportunities in Data Science	Tanujit Chakraborty	Sorbonne Universite	SQC & OR, Bangalore
7.	December 18, 2021	Data Science and Machine Learning in Manufacturing World	Shikha Talwar	Cummins Inc.	SQC & OR, Bangalore
8.	January 11, 2022	Introduction to Natural Language Processing	Souradip Chakraborty	University of Maryland	SQC & OR, Bangalore
9.	February 12, 2022	Industrial Projects and Trends in Data Science	Madhur Modi	Renew Power	SQC & OR, Bangalore
10.	February 19, 2022	Implementation of Data and Analytics in various industries	Kumar Ankur	GE Aviation	SQC & OR, Bangalore

Theoretical Statistics and Mathematics Division (TSMD)

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
1.	April 07, 2021	Quaternion Algebras with Derivations	Amit Kulshrestha	IISER Mohali	SMU, Delhi
2.	April 12, 2021	An entropic interpretation of the cutoff phenomenon for finite Markov chains	Justin Salez	University of Paris-Dauphine, Paris	SMU, Bangalore
3.	April 19, 2021	Some non-existence results for the stochastic wave equation	Mohammud Foondun	University of Strathclyde, U. K.	SMU, Bangalore
4.	April 19, 2021	Phase Analysis for a family of Stochastic Reaction-Diffusion Equations	Kunwoo Kim	POSTECH, Korea	SMU, Bangalore
5.	April 22, 2021	On the minimization of general types of Riesz-like energies	Aldo Pratelli	University of Pisa, Italy	SMU, Bangalore
6.	April 28, 2021	Explicit isogenies of prime degree over quadratic fields	Barinder Banwait	HRI Allahabad	SMU, Delhi
7.	May 03, 2021	Active Cases and Disease Extinction in the Stochastic SIR Model: Estimates with Probabilistic Guarantees	Gugan Thoppe	IISc., Bangalore	SMU, Bangalore
8.	May 03, 2021	Large deviations of mean-field interacting particle systems in a fast varying environment	Sarath Yasodharan	IISc., Bangalore	SMU, Bangalore

Events

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
9.	May 06, 2021	A divide and conquer strategy for low-rank and sparse factor regression	Aditya Mishra	Flatiron Institute, US	SMU, Bangalore
10.	June 24, 2021	The four levels of fixed points in mean-field models	Rajesh Sundaresan	IISc., Bangalore	SMU, Bangalore
11.	July 12, 2021	Interacting polya urns with removals as linear competition process	Stanislav Volkov	Lund university, Sweden	SMU, Kolkata
12.	August 27, 2021	Diophantine Approximation with Prime Restriction in Real Quadratic Number Fields	Dwaipayan Mazumder	RKMVU, Belur	SMU, Kolkata
13.	September 09, 11, 16 & 18 2021	Vector Bundles and Characteristic Classes	S M Srivastava	Indian Association for the Cultivation of Science	SMU, Kolkata
14.	September 13, 2021	S. C. Bagchi Memorial Lecture	Malabika Pramanik	University of British Columbia, Vancouver and Director, Banff International Research Station, Alberta, Canada	SMU, Kolkata
15.	September 20, 2021	Community Detection with Contextual Multilayer Networks	Sagnik Nandi	University of Pennsylvania	SMU, Kolkata
16.	October 04, 2021	Percolation of worms	Balázs Ráth and Sándor Rokob	Budapest University of Technology, Hungary	SMU, Bangalore
17.	October 18, 2021	Genealogy of the N-particle branching random walk with polynomial tails	Sarah Penington	University Bath, U. K.	SMU, Bangalore
18.	November 08, 2021	A non-technical introduction to the Liouville quantum gravity metric	Riddhipratim Basu	ICTS, Bangalore	SMU, Bangalore
19.	November 08, 2021	Environment seen from infinite geodesics in Liouville quantum gravity	Riddhipratim Basu	ICTS, Bangalore	SMU, Bangalore
20.	November 10, 2021	Supersymmetric cluster algebras and the unity of mathematics	Ashish Srivastava	St. Louis University, USA	SMU, Delhi
21.	November 15, 2021	Spatial Analysis of environmental bioassays with odds, risk and survival ratio regressions	Debashis Mondal	Dept. of Mathematics and Statistics, Washington University in St louis	SMU, Kolkata
22.	November 25, 2021	Diophantine inequalities for generic quadratic forms	V. Vinay Kumaraswamy	School of Mathematics, TIFR Mumbai	SMU, Kolkata
23.	November 22, 2021	Persistence exponent for Gaussian Stationary Processes	Sumit Mukherjee	Columbia University, New York	SMU, Bangalore
24.	December 01, 2021	Quaternion Algebras with Derivations	Amit Kulshrestha	IISER Mohali	SMU, Delhi
25.	December 01, 03, 07 & 08, 2021	Lecture series: Higher categories in geometry and physics	Pranav Pandit	ICTS, Bangalore	SMU, Bangalore

Sl. no.	Date	Title of Lecture	Name of Speaker	Affiliation of Speaker	Organizing Unit
26.	December 06, 2021	Metastability for the dilute Curie-Weiss model with Glauber dynamics	Elena Pulvirenti	TU Delft, Netherlands	SMU, Bangalore
27.	December 06, 2021	Metastability for the Curie-Weiss model on inhomogeneous random graphs: results and challenges	Saeda Marello	University of Bonn, Germany	SMU, Bangalore
28.	December 08, 2021	Density of modular points in pseudo-deformation rings	Shaunak Deo	IISc Bengaluru	SMU, Delhi
29.	December 15, 2021	Convex co-compactness, in rank one and beyond	Mitul Islam	Research Center Geometry and dynamics, University of Heidelberg	SMU, Kolkata
30.	December 22, 2021	Shifted Convolution Problems with Weighted Average	Saurabh Kumar Singh	Mathematics and Statistics Department, IIT Kanpur	SMU, Kolkata
31.	January 19, 2022	Some interesting superelliptic curves and their rational points	Pranabesh Das	Dalhousie University, Canada	SMU, Delhi
32.	January 24, 2022	The Geometry of Random Spherical Eigenfunctions.	Domenico Marinucci	University Rome Tor Vergata, Italy	SMU, Bangalore
33.	January 24, 2022	Nodal Length of Random Eigenfunctions: a Detailed Overview	Maurizia Rossi	University Milano-Bicocca, Italy	SMU, Bangalore
34.	February 02, 2022	Quantum automorphism and permutation groups	Makoto Yamashita	University of Oslo, Norway	SMU, Delhi
35.	February 07, 2022	Disordered Monomer Dimer Models on Cylinder Graphs	Kesav Krishnan	University of Illinois Urbana-Champaign, US	SMU, Bangalore
36.	February 21, 2022	The free energy of pure spherical models: computation from the TAP approach	Eliran Subag	Weizmann Institute of Science, Israel	SMU, Bangalore
37.	February 23, 2022	q-Araki-Woods algebras, factoriality	Kunal Mukherjee	IIT Madras	SMU, Delhi
38.	March 14 & 16, 2022	Ashok Maitra Memorial Lectures 2021-22: Some mathematical models of evolution Spatial population models Modelling hybrid zones: travelling waves in the Allen-Cahn equation (and how to stop them)	Alison Etheridge	University of Oxford, U.K.	SMU, Bangalore
39.	March 28, 2022	Lecture Series in Analytic Number Theory	Olivier Ramaré	CNRS/Aix-Marseille Université, France	SMU, Kolkata

7.4 Outreach Activities

The Institute organized the following outreach activities

Sl. No.	Date/ Duration	Title of the Outreach Activities conducted	Number of Participants	Name of the Target Audience	Purpose/ Objective	Organizing Unit
1	Apr 01, 2021	Webinar on Data Science	54	Industry practitioners	Reaching out to aspiring data scientist in Industry	SQC & OR Unit, Pune in collaboration with Eduplusnow, Pune
2	Apr 06, 2021	Appearing for review of statistics syllabus at master degree level	12	Shivaji University, Board of studies of Statistics	Making statistics more interesting in master degree curriculum	SQC & OR Unit, Pune in collaboration with Shivaji University, Kolhapur
3	Apr 12, 2021	Webinar on Six Sigma & Data Science	43	Industry practitioners	Reaching out to aspiring Six Sigma and data scientist in Industry	SQC & OR Unit, Pune in collaboration with Eduplusnow, Pune
4	Aug 29, 2021	Long long time ago- a story on Palaeontology (Virtual)	140 (YouTube video viewed by 661 so far)	Relevant YouTube viewers	Awareness on Palaeontology and the Indian fossil heritage	Dr. S. Chakraborty of GSU, Kolkata in collaboration with Regional Science Centre, Tirupati, under the Ministry of Cultural affairs of the Govt. of India.
5	Nov, 2021	Mass extinction, chronicle of life and death long time ago (Virtual)	100	Students from schools of Kolkata, like the Holy Child School, B. D. Memorial International, Indus Valley International and others	Awareness on Palaeontology and the Indian fossil heritage	Dr. S. Chakraborty of GSU, Kolkata
6	Dec 29, 2021 - Jan 14, 2022	Outreach Program on Data Science using Python	180	College Students, Research Scholars and Faculties	To provide the science and engineering graduate students with the glimpses of Institute's potential to equip them with the capability of extracting useful insights from large datasets and create awareness among them on various post-graduate courses offered by Indian Statistical Institute	SQC & OR Unit, Bangalore
7	Jan 17-22, 2022	Winter School in Mathematics	25	Post Graduate students of the North Eastern States	Training and Capacity building	TASU, Tezpur

Sl. No.	Date/ Duration	Title of the Outreach Activities conducted	Number of Participants	Name of the Target Audience	Purpose/ Objective	Organizing Unit
8	Feb 12, 2022	Collaborative project with ISI on health	1000 (in phase I)	-	Conduct a study on anaemia	SOSU, Kolkata in collaboration with Centre for Research in Biological Sciences, Jiva-Vijnan-Anweshan-Niketan (JIVAN), Ramakrishna Mission Vivekananda Educational and Research Institute
9	Mar 03, 2022	2nd round of Madhava Mathematics Competition (offline) for Bangalore region	5	Candidates of Madhava mathematics Competition	Evaluation/examination	SMU
10	Mar 15, 2022	Asian Pacific Mathematical Olympiad (APMO) controlled by Homi Bhaba Centre for Science Education	2	Discovering, encouraging and challenging mathematically gifted high-school students	Creating opportunities for the exchange of information on school syllabi and practice	SMU

Chapter - 8

Administration

313 No. of Scientific and Technical Workers

347 No. of Non-Scientific Workers

564 No. of Male Workers

96 No. of Female Workers

Covid-19 Vaccination Programme

1040 Covishied (Final doses)

20 Covaxin (Final doses)

GENERAL ADMINISTRATION

8.1 Administrative Services Division

The Administrative Services Division at the Headquarters caters to the various needs of the Scientific Workers in all the Scientific Units of the Institute engaged in various scientific, research and academic activities and provides them with necessary infrastructural facilities in their pursuit of excellence. The centres at Delhi, Bangalore, Chennai and Tezpur, each having a number of scientific units, by and large are getting administrative support from the administrative units/sections there. The Administrative Services Divisions of the Institute has the following units at the Headquarters in Kolkata:

Sl. No.	Name of the Unit
1.	Accounts Section
2.	Audio-Visual Unit
3.	Canteen
4.	Cash Unit
5.	CE (A & F)'s Office
6.	Central Stores
7.	Council Section
8.	Despatch Unit
9.	Director's Office
10.	Electrical Maintenance Unit
11.	Engineering Unit
12.	Estate Office
13.	Guest House
14.	Hostels
15.	House Building Advance Cell
16.	Human Resource Development Unit

Sl. No.	Name of the Unit
17.	Import & Travel Cell
18.	Internal Audit Cell
19.	Legal Cell
20.	Medical Expenses Reimbursement Unit
21.	Medical Welfare Unit
22.	Personnel Unit
23.	Provident Fund Unit
24.	Public Relations Unit
25.	Printing and Publication Unit
26.	Official Language Cell
27.	Retirement Benefit Cell
28.	RTI, Grievance, Complaints and Vigilance Cell
29.	Security Unit
30.	SC / ST / OBC Liaison Cell
31.	Telephone Unit
32.	Transport Unit

Apart from the above mentioned Units, there are few cells dealing with Budget, and other issues to take care of the specific needs of the Institute. The Administrative Services Division also looks after the running of Hostels for Students, Research Scholars and International Statistical Education Centre (ISEC) Trainees and also the running of Canteens for the workers and students of the Institute. The other outlying Units are controlled directly by the Headquarters at Kolkata. The Administrative Services Division takes the responsibility for all new constructional activities of the Institute at its Headquarters and also at outlying centres/ branches. A brief report on the construction and other activities during the year is narrated in the subsequent paragraphs.

The Administrative activities in the four Centres, namely Delhi, Bangalore, Chennai and North East Centre at Tezpur and in other outlying branches of the Institute and Giridih Office are more or less similar to the Headquarters but on a much smaller scale.

8.2 Office Bearers of the Institute Administration during the year:

Director	**Prof. Sanghamitra Bandyopadhyay**		
Professors-in-Charge	Applied Statistics Division	Prof. Mridul Nandi	
	Biological Sciences Division	Dr. Raghunath Chatterjee	
	Computer and Communication Sciences Division	Prof. Krishnendu Mukhopadhyaya	
	Physics and Earth Sciences Division	Prof. Preeti Parashar	
	Social Sciences Division	Prof. Manipushpak Mitra	
	Theoretical Statistics and Mathematics Division	Prof. Antar Bandyopadhyay	
Head, Statistical Quality Control and Operations Research Division		Dr. Arup Ranjan Mukhopadhyay	
Head, Delhi Centre		Prof. Samir Kr. Neogy	
Head, Bangalore Centre		Prof. C.R.E. Raja	
Acting Head, Chennai Centre		Dr. D. Sampangi Raman	
Dean of Studies		Prof. Debasis Sengupta	
Chief Executive (A & F)		Brig J.N. Pandey (Retd)	
		1st April 2021 – 31st Aug. 2021	**1st Sept. 2021 – 31st March 2022**
Head, North-East Centre, Tezpur		Prof. Dipti Prasad Mukherjee	Prof. Balakrishnan Ramakrishnan

8.3 List of workers joined/ retired/ voluntarily retired/ resigned / terminated/ died during the year

A. Appointments

(i) Scientific / Technical Workers

Sl. No.	Name
1	Dr. Ramdin Mawia
2	Dr. B. Ramakrishnan
3	Dr. Vipin P. Veetil

(ii) Non-Scientific Workers

Sl. No.	Name
1.	Shri Sukhendu Majumder
2.	Shri Sudhanshu Malik
3.	Shri Prasun Chakrabarty
4.	Shri Tufan Pal

B. Retirement / Voluntary Retirement

(i) Scientific & Technical Workers

Sl. No.	Name
1.	Dr. Sauren Das
2.	Dr. Prasanta Pathak
3.	Shri Shib Sankar Das
4.	Dr. Manash Ranjan Gupta
5.	Shri Sugata Adhikari
6.	Shri Prabir Chakraborty
7,	Dr. Bhabatosh Chanda
8.	Shri Sanjoy Kr. Das
9.	Dr. Subhash Barman
10.	Dr. Swati Choudhury
11.	Shri T. Thangapazam
12.	Dr. Chandana Ghosh
13.	Dr. Tapan Chakraborty

(ii) Non-Scientific Workers

Sl. No.	Name
1.	Sm. Snigdha Das
2.	Shri Hiralal Khaskel
3.	Shri Bijan Kr. Barman
4.	Shri N. Krishnamoorthy
5.	Shri G. Vinaya Chandran Nair
6.	Shri Santa Ram Balmiki
7.	Shri Anil Kumar Shukla
8.	Shri Sasanka S. Sahoo
9.	Shri Kailash Hari
10.	Shri Dulal Biswas
11.	Shri Sekhar Kar
12.	Sm. Indrani Karmakar
13.	Shri Arup Sarkar
14.	Shri K.N. Subramanya
15.	Shri Chinmay Bhattacharya
16.	Shri Mahesh Shaw
17.	Sm. Shyamali Nath
18.	Shri Sekhar Rn. Pyne
19.	Shri Sankar Bahadur
20.	Shri Ram Nath Mahato
21.	Shri Bikash Rn. Biswas
22.	Shri Malay Kr. Basu
23.	Shri Anjan Mookherjee
24.	Shri Shibshankar Routh
25.	Shri Biswanath Paul
26.	Sm. Kamala Chakraborty
27.	Md. Fazlu Rahman
28.	Shri Sudip Kumar Chakraborty
29.	Shri Probir Chattoraj
30.	Shri Naba Kumar Deb
31.	Shri Debjyoti Biswas

C. Resignation

(i) Scientific Worker

Sl. No.	Name
1.	Dr. Susmita Ruj
2.	Dr. Rajat Subhra Hazra
3.	Dr. Vipin P. Veetil

(ii) Non-Scientific Workers

Sl. No.	Name
1.	Shri Swarat Sabui
2.	Shri Saradindu Thakur

D. Death

(i) Scientific Worker

Sl. No.	Name
1.	Md. Ishteaqul Islam

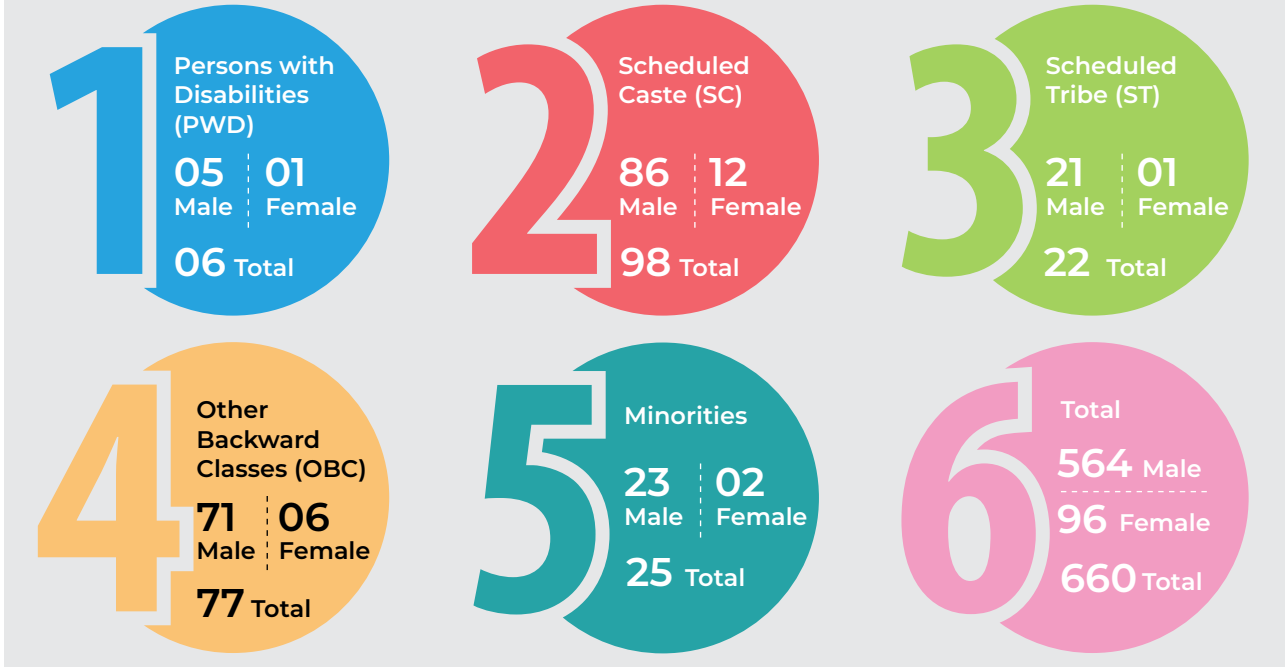
(ii) Non-Scientific Workers

Sl. No.	Name
1.	Shri Amal Tapadar
2.	Shri Amitava Bhattacharjee
3.	Shri Apurba Sarkar
4.	Shri Hari Sankar Shaw

8.4 Manpower by Gender, Social Category and Disability Group

A. Number of workers in the Institute as on 31st March 2022:

B. Breakup of manpower by Gender, Social Category and Disability group as on 31st March 2022



8.5 Annual Return on Cases of Sexual Harassment

1.	Number of complaints of sexual harassment received in the year	Nil
2.	Number of complaints disposed off during the year	Nil
3.	Number of cases pending for more than 90 days	Nil
4.	Number of workshops on awareness programmers against sexual harassment conducted during the year	Bangalore Centre - 1; Orientation Programme on sexual harassment for students on Feb 17, 2022 & Kolkata - 1
5.	Nature of action	Not Applicable

8.6 Applications received and action taken by the Institute under RTI Act, 2005

Name of the Appellate Authority	Sl. No.	Location	Name & Designation
	1	Kolkata	Prof. Sanghamitra Bandyopadhyay, Director
	2	Kolkata	Brig. Jagdish Narayan Pandey (Retd.), CE(A&F)
	3	Kolkata	Dean of Studies
	4	Delhi	Head, Delhi Centre
	5	Bangalore	Head, Bangalore Centre
	6	Tezpur	Head, North-East Centre, Tezpur
	7	Chennai	Head, Chennai Centre
Name of Central Public Information Officer	8	Delhi	Shri Samapan Padhi, Dy. CE (Admn.)
	9	Kolkata	Shri Durgam Giri, Sr. A.O.
	10	Kolkata	Shri Anjan Mookherjee, Sr. A.O.
	11	Kolkata	Shri Pratyush Banerjee, Dy. CE (Admn.)
	12	Bangalore	Ms. Ashwini Ganesh Tambe, Dy. CE (Admn.)
	13	Tezpur	Ms. Rimlee Bardhan, Engineer (Civil)'B'
	14	Chennai	A.O., Chennai Centre

The summary statement in this regard is given below: -

No. of Applications received	No. of Cases accepted	Decisions where requests were fully or partially rejected		No. of decisions from Appellate Authority	C I C decision			Amount collected (Rs.)		
		Fully rejected	Partially rejected		No. of decisions received	Penalty imposed	Disciplinary action (if any)	Fees	Other Charges	Penalty amount
175	173	2	0	27	1	0	0	2080	558	0

8.7 Major Construction / Repair works taken up by the Institute

A. Bangalore

CIVIL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work in progress	1	Construction of New Academic building	284,32,000/-
	2	Construction of Extension of Canteen Building	103,57,000/-

B. Delhi

CIVIL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work in progress	1	Renovation work of Guest House	64,32,800/-
	2	New Steel Structure of lift & Miscellaneous work near Faculty Block	23,50,000/-
	3	Rehabilitation of Platinum Jubilee Hostel	2,48,86,500/-
	4	Repair of Existing Campus Roads(Bitumen)	39,74,000/-
	5	Exterior Painting of A- Block, b-Block and D- Block	22,36,000/-
	6	Repair and water proofing work in (i) Faculty Block (ii) A - Block and (iii) Teaching Block	48,10,000/-

ELECTRICAL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work Completed	1	Supply Installation Testing and Commissioning of 500 KVA Transformer	17,17,793/-

C. Giridih

CIVIL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work in progress	1	Construction of boundary wall of upper farmhouse ongoing under construction of boundary wall	46,83,700/-

D. Kolkata

CIVIL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work in progress	1	R.C. Bose Centre for Cryptology and Security	1,67,00,000/-
	2	Construction of New Academic Building (G+5)	10,00,00,000/-
	3	Repairing of Over Head Reservoir at 205 B.T. Road, Campus	20,10,000/-
	4	Repair & Renovation works at ISEC & RS Hostel at 205 B.T. Road, Campus	30,94,667/-
Work Completed	1	Repair, Renovation work of M. Tech Hostel	60,00,000/-

E. North-East Centre, Tezpur

CIVIL WORK

	Sl. No.	Description of work	Total Amount (Rs.)
Work in progress	1.	The construction of the campus	50,80,912/-

8.8 Specific Achievements

8.8.1 Society Type Activities

A. Membership: (as on 31st March 2022)

Membership Type	Number of New Members	Number of Existing Members
Ordinary	09	305
Life	10	1038
Institutional	00	05
Total	19	1348

B. Finance Committee Meetings

Sl. No.	Date		Venue
1.	13.04.2021	Both in online and offline	Kolkata
2.	15.11.2021		Kolkata
3.	11.03.2022		Kolkata

C. Council Meetings

Sl. No.	Date		Venue
1.	16.04.2021	Both in online and offline	Kolkata
2.	24.07.2021		Kolkata
3.	18.11.2021		Kolkata
4.	03.01.2022		Kolkata
5.	14.03.2022		Delhi
6.	30.03.2022		Kolkata

D. Annual General Meeting

Sl. No.	Date	Venue
1.	23.11.2021 (Offline)	Kolkata

8.8.1 Awareness programmes conducted by Medical Welfare Unit

Medical Welfare Unit caters to the health care need of the students, faculty, workers and their family members of Indian Statistical Institute, Kolkata.

- Two (02) full time Resident Medical Officers perform regular OPD services as well as emergency medical services.
- Specialist clinic of EYE, ENT and Psychiatry are held two days a week.
- Regular counselling sessions by Two (02) numbers of psychological counsellors are held two days a week.
- Retired staff and their spouses are provided medical care on OPD basis.
- Some essential medicines are supplied by the pharmacy of MWU.
- All workers both temporary and permanent and all students of ISI undergo medical fitness test in MWU by the Resident Medical Officers.
- Medical fitness certification camp is organized every year by the MWU for the newly admitted students to the Institute.
- During lockdown MWU functioned relentlessly to provide Medical support to all beneficiaries of the Institute both by physical consultation and by telephonic consultation. Helped their admission in hospital by tying up with nearby Hospital.
- House visit for several patients was done who was seriously ill.
- Spreading of awareness of COVID appropriate behavior among the students and workers
- Medical Welfare Unit maintained the Standard Operating Procedure (SOP) of COVID-19 for the Institute with the guidance of SOP of State and Central Government.
- Counselling session for various worker/ staff at MWU.
- Doctors of MWU looked after the hygiene and sanitation measures at ISI campus.

Workplace vaccination against COVID-19 held at Medical Welfare Unit, Indian Statistical Institute, Kolkata

Rapid vaccination against COVID-19 was the need of the hour of 2021. As per directive of Ministry of Health and Family Welfare, ISI was allowed to undertake workplace vaccination program. Medical Welfare Unit started vaccination drive from 12th May 2021 to vaccinate as many beneficiaries as possible in collaboration with CMOH, 24 Parganas (North), Baranagar Municipality and Baranagar State General Hospital.

- Students, workers, dependant family members and some retired workers received first and second doses of vaccine.
- The total numbers of vaccine doses were 1619 in the financial year 2021-22. Among them, 1569 doses were of Covishield and 50 doses were of Covaxin.
- **Covaxin** - 50 doses of Covaxin were used. 30 doses were given as 1st dose and 20 doses were given as 2nd dose.
- **Covishield** - 1569 doses of Covishield were used. 529 doses were given as 1st dose and 1040 doses were given as 2nd dose.
- Standard Operating Procedure for Workplace Vaccination was followed and there were no adverse reaction to any of the vaccinated individual.
- MWU achieved highest single day vaccination of 179 persons on 27th August 2021. The Medical Welfare Unit worked as a team to achieve this success.

8.9 Brief description of specific achievements and functions related to the implementation of the Official Language Policy by the Official Language Cell of the Institute

Bangalore:

A. Hindi Pakhwara:

Sl. No.	Date	Name of the Competition
1	September 15 – 22, 2021	Quiz (Online)

Delhi:

A. Official Language Implementation Committee Members:

Sl. No.	Name	Designation
1	Prof. Samir K. Neogy	Head, Delhi Centre (Chairman)
2	Shri Samapan Padhi	Dy. Chief Executive (Member)
3	Shri S.A. Srinivas	Senior A.O. (Member)
4	Sm. Simmi Marwah	A.O. & In-Charge Hindi Cell (Member)
5	Shri Lalan Kumar Singh	Section Officer (Member)
6	Shri Praveen Pandey	Senior Assistant (Member)
7	Shri Amardeep Singh	Office Assistant 'B' (Convener)

B. Official Language Implementation Meeting:

Sl. No.	Date	Agenda
1	January 30, 2021	(I) Purchasing of Web Camera & Head Phone; (II) Recruitment of Hindi cadre employee; (III) Installation of UNICODE in all Computers of the Institute.
2	August 25, 2021	(I) Hindi-related inspection by the Ministry on July 16; (II) Discussion on the meeting of the Parliamentary Committee on Official Language concluded on 16 August; (III) Discussion on Hindi fortnight to be held in September; (IV) Discussion on Hindi workshop to be held in July-September quarter.
3	December 02, 2021	(I) Discussion on review report of parliamentary subcommittee; (II) Discussion on upcoming workshop; (III) Discussion on the quarterly report of the library; (IV) Discussion on review of quarterly report ended 30th September, 2021 received from Headquarters; (V) Discussion for sending the officers/employees of the Institute and the members of the Official Language Implementation Committee on training; (VI) Discussion on non-recruitment of Hindi officer despite the order of Hon'ble Parliamentary Official Language Committee.
4	January 13, 2022	(I) Discussion on non-recruitment of Hindi officer despite the order of Hon'ble Parliamentary Official Language Committee; (II) Discussion on mini fortnight to be held in January-February; (III) Discussion on cash reward scheme under the award scheme; (IV) Discussion for sending the officers/employees of the Institute and the members of the Official Language Implementation Committee on training.

C. Hindi Workshop:

Sl. No.	Date	Subject	No of participants	Speakers
1	June 29, 2021	Grammatical errors in Hindi	15	Shri Karan Singh
2	September 13, 2021	Proper fill up and submission of Hindi Quarterly Report	17	Shri Karan Singh
3	December 10, 2021	Grammatical errors in Hindi and its Solution	12	Shri Karan Singh
4	March 31, 2021	Noting and drafting in hindi	14	Shri Karan Singh

D. Hindi Pakhwara:

Sl. No.	Date	Name of the Competition	No of participants
1	September 15 - 22, 2021	(I) Hindi Nibandh Pratiyogita; (II) Hindi Aashubhashan Pratiyogita; (III) Hindi Kavita Path Pratiyogita; (IV) Computer Par Hindi Typing; (V) Anuvaad and Raajbhasha Hindi Shabdawali Pratiyogita; (VI) Hindi Praroop and Tippan Lekhan Pratiyogita	Upto 13

Giridih:

A. Official Language Implementation Committee Members:

Sl. No.	Name	Designation
1	Pradip Bhattacharyya	In-charge
2	Abhishek Mandal	A.O.
3	Ganesh Chandra Tudu	S.O.
4	Md. Naquib Akhtar	S.O.

B. Official Language Implementation Meeting:

Sl. No.	Date	Agenda
1	September 21, 2022	On doing most of the office work in the official language Hindi with regard to the in-depth discussion

C. Hindi Workshop:

Sl. No.	Date	Subject	No of participants
1	September 22, 2021	Speech Competition, Poetry Recitation Songs and Sher-Shayari etc	15

D. Hindi Pakhwara:

Sl. No.	Date	Name of the Competition	No of participants
1	September 22, 2021	Essay competition on Beti Bachao Beti Padhao, Importance of Discipline, Corruption etc.	8

Kolkata:

A. Official Language Implementation Committee Members:

Sl. No.	Name	Designation
1	Prof. Sanghamitra Bandyopadhyay, Director	Chair
2	Prof. Preeti Parashar	Chair (Acting)
3	Prof. Amita Pal	Member
4	Brigadier J.N. Pandey, Chief Executive (Admin. & Finance) Retd.	Member

Sl. No.	Name	Designation
5	Shri Amitabh Mukherjee, Deputy Chief Executive (Finance)	Member
6	Dr. Jadab Kumar Pal, Dy. Chief Executive (Adm.)	Member
7	Shri Anjan Mukherjee, Senior Administrative Officer	Member
8	Shri Pratyush Banerjee, Dy. Chief Executive (Adm.)	Member
9	Shri Manoj Kumar Pandey, Senior Administrative Officer	Member Convener
10	Shri Durgam Giri, Senior Administrative Officer	Member
11	Shri Raj Narayan Mukherjee, Administrative Officer	Member
12	Shri Sounak Chakraborty, Administrative Officer	Member
13	Shri Utpal Mahato, Administrative Officer	Member Convener (from 02.08.2021 to till date)
14	Shri Prashant Tiwari, Official Language Officer	Member

B. Official Language Implementation Committee Meeting:

Sl. No.	Date	Agenda
1	June 29, 2021	» Confirmation of the Minutes of the Last Meeting. » Discussion on Hindi Quarterly Progress Report. » Discussion on the Official Language Annual Program Year 2021-22. » Discussion on extension of Hindi Language Training (Praveen, Pragya and Parangat). » Discussion on nominating workers to participate in Online Hindi Intensive Workshops. » Discussion regarding creation of permanent Hindi Posts. » Discussion regarding the organization of Hindi Diwas and Hindi Pakhwada Program. » Discussion regarding organizing 05 days' Short Translation Training (Outreach) Program. » Discussion on Official Language Implementation related inspection in all the departments/ sections/units of the Institute. » Discussion on any other subject with the permission of the Hon'ble Chairman.
2	October 29, 2021	» Confirmation of the Minutes of the Last Meeting. » Discussion on Hindi Quarterly Progress Report. » Discussion on the Official Language Annual Program Year 2021-22. » Discussion on nominating workers to participate in online Hindi Intensive Workshops. » Discussion on nomination for the training in "5 days Basic Training Program for working in Hindi on Computer". » Discussion on the purchase of Hindi Books for the Library. » Discussion on making the logo of the Institute bilingual under the assurances given to the Institute by the Third Sub-Committee of the Parliamentary Committee on Official Language. » Discussion regarding participation by the Institute in the All India Official Language Conference organized by the Department of Official Language, Ministry of Home Affairs, Government of India during November 13-14, 2021. » Discussion on Official Language Inspection of Delhi Centre and Giridih Branch by the Headquarters Kolkata. » Discussion on any other subject with the permission of the Hon'ble Chairman.
3	January 21, 2022	» Confirmation of the Minutes of the Last Meeting. » Discussion on Hindi Quarterly Progress Report. » Discussion on the Official Language Annual Program Year 2021-22. » Discussion on extension of Hindi Language Training (Praveen, Pragya and Parangat). » Nomination of workers to participate in online Hindi Intensive Workshops. » Discussion regarding creation of permanent Hindi posts. » Discussion to be nominated for training in 05 Half Working Days Online Oriented Program. » Discussion on publication of Rajbhasha In-House Magazine in order to promote the Official Language in the Institute. » Discussion on any other subject with the permission of the Hon'ble Chairman.

Sl. No.	Date	Agenda
4	March, 2022	» Confirmation of the Minutes of the Last Meeting. » Discussion on Hindi Quarterly Progress Report. » Discussion on the Official Language Annual Program Year 2021-22. » Discussion on nominating workers to participate in online Hindi Intensive Workshops. » Discussion regarding creation of permanent Hindi posts. » Discussion on conducting Virtual Official Language Inspection of Tezpur Centre and Bangalore Centre by the Headquarters. Kolkata. » Discussion on organizing 05 days Short Translation Training (outreach) Program in the Institute by Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata Centre. » Discussion on procurement for distributing Administrative Terminology (Hindi-English and English-Hindi) published by the CSTT, GoI, for the promotion of Official Language in Hindi workshops to be organized by the Institute. » Discussion on any other subject with the permission of the Hon'ble Chairman.

C. Hindi Workshop:

Sl. No.	Date	Subject	No of participants	Speakers
1	June 29, 2021	"Role of Translation in Noting Drafting"	22	Chief Guest Speaker: Shri Navin Prajapati, Senior Consultant (Official Language) and In-charge, Kolkata Centre, Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India.
2	September 14, 2021	"Techniques and Principles of Translation"	20	Chief Guest Speaker: Shri Navin Prajapati, Senior Consultant (Official Language) and In-charge, Kolkata Centre, Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India.
3	December 23, 2021	First Session: "Noting-Drafting and Translation Exercises"	25	Chief Guest Speaker: Use of Indian Languages on Computer Shri Navin Prajapati, Senior Consultant (Official Language) and In-charge, Kolkata Centre, Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India.
		Second Session: Use of Indian Languages on Computer		Chief Guest Speaker: Shri Rajesh Chaturvedi, Chief Manager (Rajbhasha), SBI, Headquarter, Kolkata
4	March 30, 2022	First Session: "Importance of Translation in Official Language Policy"	20	Chief Guest Speaker: Shri Navin Prajapati, Senior Consultant (Official Language) and In-charge, Kolkata Centre, Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India.
		Second Session: "Role of Translation in Rajbhasha Implementation"		

D. Hindi Pakhwara:

Sl. No.	Date	Name of the Competition	No of participants
1	September 14, 2021	Inauguration of Hindi Diwas, Hindi Pakhwada & Hindi Workshop	35
2	September 15, 2021	Hindi Poem Recitation Competition	19
3	September 16, 2021	Hindi Debate Competition	15
4	September 17, 2021	Hindi Extempore Competition	17
5	September 20, 2021	Hindi Patriotic Song Singing Competition	15
6	September 21, 2021	Hindi Speech Competition (Work from Home – in today's context)	20
7	October 28, 2021	Hindi Fortnight Closing & Prize distribution Ceremony	Near about 40

E. Technical Workshop:

Sl. No.	Date	Subject	No of participants	Speaker/ Organizer
1	September 14, 2021	Crash Translation Training Program	16	Under the aegis of Central Translation Bureau, Kolkata
2	December 23, 2021	Crash Translation Training Program	24	Under the aegis of Central Translation Bureau, Kolkata
3	March 30, 2022	Crash Translation Training Program	20	Under the aegis of Central Translation Bureau, Kolkata

F. Any other special Workshop/ Training Programme:

Sl. No.	Date	Subject	No of participants	Speaker/ Organizer
1	May 03, 2021 - May 07, 2021	Five Days Online Intensive Hindi Workshop	02	Central Hindi Training Institute, Department of Official Language, Ministry of Home Affairs, Government of India, New Delhi.
2	June 07, 2021 - June 11, 2021	Five Days Online Intensive Hindi Workshop	02	Central Hindi Training Institute, Department of Official Language, Ministry of Home Affairs, Government of India, New Delhi.
3.	June 21, 2021 – June 25, 2021	Five Days Online Intensive Hindi Workshop	02	Central Hindi Training Institute, Department of Official Language, Ministry of Home Affairs, Government of India, New Delhi.
4	December 06, 2021 –December 10, 2021	Five Days Online Intensive Hindi Workshop	02	Central Hindi Training Institute, Department of Official Language, Ministry of Home Affairs, Government of India, New Delhi.
5	March 07, 2022 - March 11, 2022	Five Days Online Intensive Hindi Workshop	02	Central Translation Bureau, Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata.
6	September 29, 2021	Online Meeting of Town Official Language Implementation Committee	02	Town Official Language Implementation Committee, Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata.
7	July, 2021 - November, 2021	Organization of Classes for Hindi Language Training (Praveen/ Pragya/Parangat)	26 (Praveen/ Pragya/ Parangat)	Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata.
8	January, 2022 - May, 2022	Organization of Classes for Hindi Language Training (Praveen/ Pragya/Parangat)	25 (Praveen/ Pragya/ Parangat)	Hindi Teaching Scheme, Department of Official Language, Ministry of Home Affairs, Government of India, Kolkata.

G. Miscellaneous

Sl. No.	Date	Subject	Organized by
1	July 26, 2021-July 27, 2021	Official Language Inspection of ISI Kolkata	Ministry of Statistics and Programme Implementation, New Delhi
2	December 20, 2021	Online Official Language Inspection of ISI Delhi Centre	Official Language Cell, ISI Kolkata
3	December 21, 2021	Online Official Language Inspection of ISI Giridih Branch	Official Language Cell, ISI Kolkata

8.10 Reports on various activities of the Institute

A. Celebration of Independence Day

Bangalore:

75th Independence Day of our country celebrated by the Institute on 15th August 2021. Prof. C.R.E Raja, Head Bangalore Centre had hoisted the flag. Staff, students and campus residents attended the function. As part of Azadi Ka Amrit Mahotsav rendered of National Anthem of India

Hyderabad:

The workers at Hyderabad Unit celebrated 75th Independence Day. The National Flag was hoisted at Hyderabad Unit on the occasion of Independence Day on 15th August 2021 by Dr. S. M. Subhani, Head of SQC & OR Unit, Hyderabad..

Kolkata:

Indian Statistical Institute observed the 75th Independence Day on 15th August, 2021 by hoisting the National Flag in the Institute premises. A large number of faculty & staff, research scholars, students, guests and dignitaries were present to grace the event.

Tezpur:

The national flag was hoisted at the North-East Centre of the Institute on the occasion of the 75th Independence Day (Azadi Ka Amrit Mahotsav) on 15th August, 2021 by Prof. B. Bamakrishnan, Acting Head, North-East Centre.

B. Celebration of Republic Day

Bangalore:

The Bangalore Centre celebrated the 73rd Republic day of our country on 26th January 2022. Prof. C.R.E Raja, Head Bangalore Centre had hoisted the flag. Staff, students and campus residents had attended the function.

Hyderabad:

The workers at Hyderabad Unit celebrated 73rd Republic Day. The National Flag was unfurled by Mr. K Venkata Ramana, Section Officer at Hyderabad Unit on the Republic Day on 26th January 2022.

Kolkata:

To mark the 73rd Republic Day of India, Indian Statistical Institute organized a National Flag hoisting ceremony. Workers with their families, research scholars, students, guests and dignitaries were present maintaining all Codid-19 guidelines to make the event a grand success.

Tezpur:

The North-East Centre celebrated 73rd Republic Day on 26th January, 2022. The national flag was unfurled by Prof. B. Bamakrishnan, Acting Head, North-East Centre.

C. Celebration of Birth Anniversary of Prof. P. C. Mahalanobis

Bangalore:

Birth Anniversary of PC Mahalanobis was celebrated on 29th June 2021 in our centre. Workers and students were assembled in front of PCM Bust and Centre Head garlanded to PCM Bust. The workers day program organised by the ISI Kolkata and the Statistics Day 2021 celebrations organized by the MoSPI were attended through VC attended by the staff and students

Hyderabad:

The workers at Hyderabad Unit observed the 128th Birth Anniversary of Prof. P.C. Mahalanobis and National Statistics Day on 29 June, 2021 by paying homage to the founder of the Institute. Dr. S M Subhani, Head of the Unit garlanded the PCM statue.

Kolkata:

Indian Statistical Institute celebrated the 128th Birth Anniversary of Professor P.C. Mahalanobis on 29th June, 2021 as 'Workers' Day' in all its Centres including Headquarters at Kolkata. Due to the pandemic situation, all workers attended the programme virtually. The whole event was divided into two halves. In the first half there were speakers like Prof. Arun Kumar Chaudhuri who was formerly associated with ISI and Dr. Ashok Kumar Lahiri, Chairman, ISI Council. The first half of the programme ended with a Film Show: 'PRASANTA CHANDRA MAHALANOBIS: THE TALE OF A SAVANT', Directed by: Buddhadeb Dasgupta. The second half started with address by President, ISI followed by a talk of Prof. Raj Reddy, Carnegie Mellon University, USA, titled "Future Role of Statistics in AI" and 'On His 128th Birth Anniversary, Reminiscence of Prasanta Chandra Mahalanobis and his Impact in today's Statistical Science" by Prof. Dipak Dey, University of Connecticut, US.

Pune:

29th June, 2021, Birth Anniversary of Professor Prasanta Chandra Mahalanobis was celebrated with by offering floral garlands to the Professor and the talks by Subrata Rath and the invited guest, Mr. Girish Mahindrakar, an eminent entrepreneur in the area of Pune, on the occasion. All other festivals such as Republic Day, Independence Day, Mahatma Gandhi's birthday are celebrated.

Tezpur:

Workers of North-East Centre observed the 128th birth anniversary of Prof. P. C. Mahalanobis and National Statistics Day on 29th June, 2021 by paying homage to the founder of the Institute.

D. Celebration of International Yoga Day

Kolkata:

Indian Statistical Institute in association with ISI Club organized International Yoga Day on 21st June, 2021. Due to the pandemic situation, workers were encouraged to observe the event independently without compromising the Covid guidelines like social distancing etc. This effort was well received by the workers of the Institute.

E. Celebration of Foundation Day

Kolkata:

The 91st Foundation Day of the Institute was celebrated on 17th December, 2021 at Platinum Jubilee Auditorium of the Institute maintaining all Covid related protocols. The programme included discussion on "Creating the Future: ISI@100 and Beyond", "Lessons Learnt from the Pandemic" by Dr. Sandip Chatterjee and panel discussion on "Nation Building and Role of ISI - Celebrating 75 years of India's independence: Azadi ka Amrit Mahotsav" where celebrated speakers like Shri Bibek Debroy, President, ISI; Dr. Ashok Lahiri, Chairman, ISI Council, Dr. G. P. Samanta, Chief Statistician of India and Secretary, MoSPI participated.

F. Celebration of International Women's Day

Kolkata:

The Institute celebrated International Women's Day on 8th March, 2022 in a grand manner. The theme was "Gender equality today for a sustainable tomorrow" The program covered a variety of events including invited talk by eminent journalist Dr. Swati Bhattacharjee, Senior Assistant Editor of Anandabazar Patrika, followed by a panel discussion on the topic "Break the Gender Bias Today" with renowned panelists like Prof. Debasis Bandyopadhyay, University of Auckland, Dr. Kanchan Gaba, Social Entrepreneur and Ms. Taniya Sanyal, the first woman firefighter to be appointed by the Airport Authority of India (AAI). A prize distribution ceremony also took place for the Poster and Essay competition, held in the Institute on "Gender equality today for a sustainable tomorrow". The celebration ended with a cultural programme organized by the faculty, students and staff of ISI with a theme "Behold her, single in the field-An Ode to the Eternal Symbiosis between Women and Nature".

G. Birth Anniversary celebration of Dr. B.R. Ambedkar

Bangalore:

Birth Anniversary of Dr. B.R Ambedkar was celebrated on 14th April 2021. This function was jointly organised by the ISI Administration and SC/ST and OBC Council of the ISI Bangalore Centre

Kolkata:

The SC/ST/BC Employees' Co-ordination Council of Indian Statistical Institute celebrated the 130th Birth Anniversary of Dr. B.R. Ambedkar on 14th April, 2021 with a garlanding ceremony on the said date. The Deputy Director and other employees of ISI graced the event.

H. Observation of Vigilance Awareness Week

Bangalore:

Our centre observed Vigilance Awareness Week from 26th October to 1st November 2021. Most of the employees had taken "Integrity Pledge for Organization and Rashtriya Ekta Diwas Pledge" on 29th October 2021 in Kannada, Hindi and English Languages.

Kolkata:

Indian Statistical Institute observed Vigilance Awareness Week from 26th October to 1st November, 2021. The theme of the Vigilance Awareness Week was 'Independent India @75 self-reliance with integrity'. All the employees of the Institute took oath to be vigilant in the workplace.


भारतीय सांख्यिकीय संस्थान
203, बी. टी. रोड, कोलकाता - 700108
सतर्कता जागरूकता सप्ताह
VIGILANCE AWARENESS WEEK
26 अक्टूबर - 01 नवंबर, 2021
"स्वतंत्र भारत @75: सत्यनिष्ठा से आत्मनिर्भरता"


भारतीय सांख्यिकीय संस्थान
203, बी. टी. रोड, कोलकाता - 700108
VIGILANCE AWARENESS W
26 अक्टूबर - 01 नवंबर, 202

I. Observation of Samvidhan Diwas (Constitution Day)

Bangalore:

ISI Bangalore centre staff participated Samvidhan Diwas (Constitution day)on 26 Nov. 2021 as part of Azadi Ka Amrit Mahotsov all the staff read the Preamble to the Constitution of India through online (https://readpreamble.nic.in).

Kolkata:

Apart from these events, ISI also celebrated the National Unity Day on 31st October, 2021, Constitution Day on 26th November, 2021 as a part of 'Azadi ka amrit Mahotsav' and commemorates the 'Eight anniversary of the Sexual Harassment of Women at Workplace Act, 2013' on 9th December, 2021.

J. Celebration of National Girl Child Day

Tezpur:

The North-East Centre conducted a painting competition on the theme of 'Empowering Girl Child' on the 'National Girl Child Day', 24th January 2022. Students from Class VI to Class X of nearby 'Solmara High School', 'Kabilabad High English School' & 'Napam M.V. School' participated in the competition. Winners were awarded prizes.

Chapter - 9

Annual Accounts

Balance Sheet as on 31st March 2022

(Amount in Rupees)

PARTICULARS	SCHEDULE	CURRENT YEAR (2021-22)	PREVIOUS YEAR (2020-21)
LIABILITIES			
Corpus / Capital Fund	1	2,18,95,63,322	2,00,83,73,753
Earnmarked / Endowment Funds	3	1,27,47,36,614	1,24,94,57,719
Current Liabilities & Provisions	7	25,87,79,793	42,22,16,723
Liabilities for Fixed Assets of Ext. Aided Fund		25,10,75,541	24,16,67,154
Liabilities for Fixed Assets of ISEC Fund		11,67,659	11,67,659
Liabilities for Fixed Assets of IGP Project		76,86,123	76,86,123
TOTAL		**3,98,30,09,052**	**3,93,05,69,131**
ASSETS			
Earnmarked / Endowment Funds	3	44,19,605	75,01,800
Fixed Assests	8	2,24,28,91,955	2,05,62,89,474
Investment / Assets From			
Earmarked / Endowment Funds	9	1,00,47,92,092	85,79,41,536
Current Assets, Loans and Advancs	11	47,09,76,077	75,83,15,385
Fixed Assets of Ext. Aided Fund		25,10,75,541	24,16,67,154
Fixed Assets of ISEC Fund		11,67,659	11,67,659
Fixed Assets of IGP Project		76,86,123	76,86,123
TOTAL		**3,98,30,09,052**	**3,93,05,69,131**
Significant Accounting Policies	24		
Contingent Liabilities & Notes on Accounts	25		

Signed in terms of our Report of even date.

Place: Kolkata
Date: 26.09.2022

Sd/-
A Mukherjee
Dy. Chief Executive (F)

Sd/-
Lt Col Sandeep Pal
Chief Executive (A&F) - Officiating

Sd/-
Sanghamitra Bandyopadhyay
Director

For R. Kothari & Co LLP
Chartered Accountants
(Firm Registration No. 307069E/ E300266)

Sd/-
Manoj Kumar Sethia
Partner
Membership No. 064308
ICAI UDIN: 22064308AVXAMW2551

Income & Expenditure Account for the Year ended on 31st March 2022

(Amount in Rupees)

PARTICULARS	SCHEDULE	CURRENT YEAR (2021-22)		PREVIOUS YEAR (2020-21)	
	GRANT GENERAL	GRANT GENERAL	GRANT GENERAL	GRANT GENERAL	GRANT GENERAL
INCOME					
Miscellaneous Receipts	12	1,17,24,476	6,31,23,549	3,23,55,405	1,80,00,000
Grant in Aid From Govt of India	13	238,19,46,360	18,37,15,172	223,78,72,063	21,18,00,108
TOTAL (A)		**239,36,70,836**	**24,68,38,721**	**227,02,27,468**	**22,98,00,108**
EXPENDITURE					
Establishment Expenses	20	242,94,43,139	0	232,22,41,545	0
Other Administrative Expenses	21	0	24,03,39,721	0	22,97,74,527
TOTAL (B)		**242,94,43,139**	**24,03,39,721**	**232,22,41,545**	**22,97,74,527**
Balance Being Surplus / (Deficit)[A-B]		-3,57,72,303	64,99,000	-5,20,14,077	25,581
Carried to Corpus/ Capital			-2,92,73,303	-5,19,88,496	
Significant Accounting Policies	24				
Contingent Liabilities & Notes on Accounts	25				

Signed in terms of our Report of even date.

Place: Kolkata
Date: 26.09.2022

Sd/-
A Mukherjee
Dy. Chief Executive (F)

Sd/-
Lt Col Sandeep Pal
Chief Executive (A&F) - Officiating

Sd/-
Sanghamitra Bandyopadhyay
Director

For R. Kothari & Co LLP
Chartered Accountants
(Firm Registration No. 307069E/ E300266)

Sd/-
Manoj Kumar Sethia
Partner
Membership No. 064308
ICAI UDIN: 22064308AVXAMW2551

Capital Utilization Statement for the Year on 31st March 2022

(Amount in Rupees)

PARTICULARS	CURRENT YEAR (2021-22)	PREVIOUS YEAR (2020-21)
GRANT RECEIVED FOR CREATION OF CAPITAL ASSETS	21,73,95,790	14,22,13,000
(INCL C/F OF PREVIOUS YEAR)		
TOTAL (A)	**21,73,95,790**	**14,22,13,000**
EXPENDITURE ON CREATION OF CAPITAL ASSETS	24,08,94,018	13,75,83,124
TOTAL (B)	**24,08,94,018**	**13,75,83,124**
NET BALANCE (A-B)	**-2,34,98,228**	**46,29,876**

Signed in terms of our Report of even date.

Place: Kolkata
Date: 26.09.2022

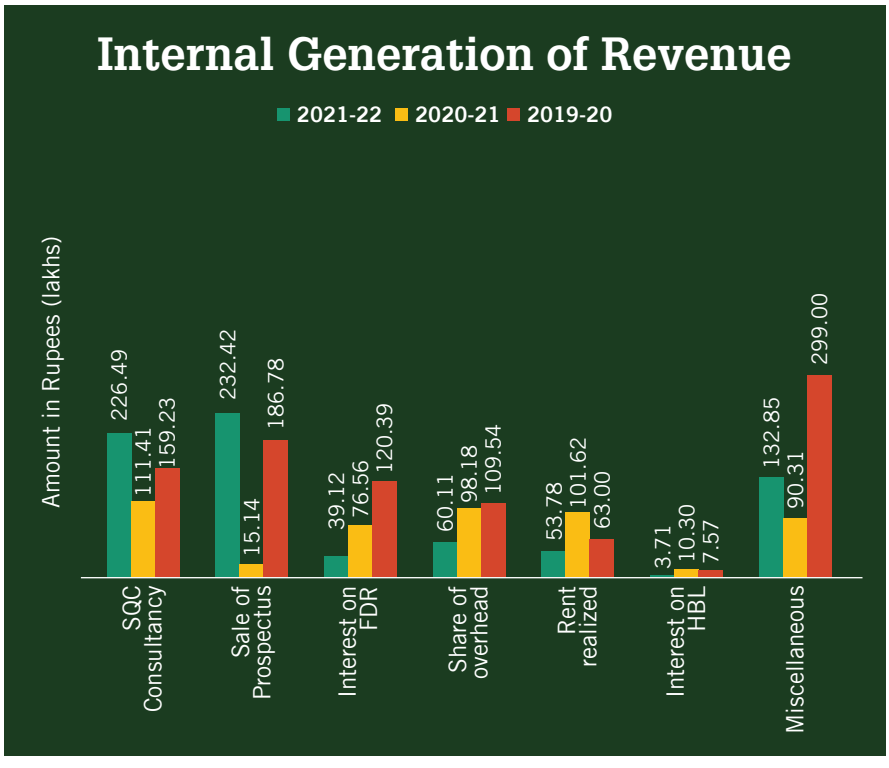
Sd/-
A Mukherjee
Dy. Chief Executive (F)

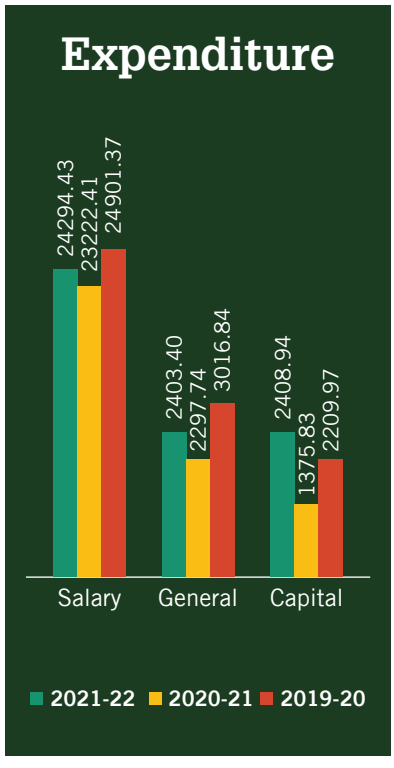
Sd/-
Lt Col Sandeep Pal
Chief Executive (A&F) - Officiating

Sd/-
Sanghamitra Bandyopadhyay
Director

For R. Kothari & Co LLP
Chartered Accountants
(Firm Registration No. 307069E/ E300266)

Sd/-
Manoj Kumar Sethia
Partner
Membership No. 064308
ICAI UDIN: 22064308AVXAMW2551
ICAI UDIN: 20058892AAAABG7529





Corrigendum

The summary statistics given on Page 137 does not reflect the achievements of the academic centres of ISI; hence may kindly be revised as follows:-

- **Science Academy Fellowships : 14**
  - National : 11
  - International : 3
- **Awards : 11**

The summary statistics given on Page 150 does not reflect the achievements of the academic centres of ISI; hence may kindly be revised as follows:-

- **Books: 18**
- **Book Chapters: 46**
- **Conference Proceedings: 138**
- **Journal Papers: 511**
- The Editorial Assignments of Faculties of the Center for Soft Computing Research (CSCR) are reported on page 133.
- The Scientific Assignments of Faculties of the Center for Soft Computing Research (CSCR) are reported on pages 133-134.
- The column headings of the Table on page 265 are incorrect. The corresponding correct headings are given below:

PARTICULARS	SCHEDULE	CURRENT YEAR (2021-22)		PREVIOUS YEAR (2020-21)	
		GRANT SALARY	GRANT GENERAL	GRANT SALARY	GRANT GENERAL

Notes

INDIAN STATISTICAL INSTITUTE
203 Barrackpore Trunk Road
Kolkata - 700 108, WB, INDIA
www.isical.ac.in