APRIL '25 - SEPTEMBER '25 DEPARTMENT OF MATHEMATICS VOLUME 2 ISSUE 1

NEWSLETTER

GANIT-MITRAM

A BI-ANNUAL NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS

Mission & Vision

Vision:

The Department of Mathematics envisions to become the carrier of the glory of the land of learning, in particular the learning of mathematics, which India was from time immemorial. The Department strives to be a part of the renewed journey of independent India in the path of excellence.

Missions:

1. To impart quality education in the Postgraduate level of Applied Mathematics.
2. To impart necessary mathematical knowledge at the undergraduate and Postgraduate levels of technological studies.
3. To produce quality research at par with the world standards.
4. To train up Ph.D. students in various disciplines of Mathematics.
5. To create an academic environment capable of attracting brilliant and motivated students.

The Department of Mathematics, Indian Institute of Engineering Science and Technology (IIEST), Shibpur, expresses profound sorrow at the passing of Professor Parbati Saha, a distinguished member of the faculty.

Professor Saha was an esteemed teacher, mentor, and colleague whose dedication to academic excellence and commitment to the Institute were truly remarkable. Her contributions to teaching, research, and the overall development of the department will be remembered with deep respect and gratitude.

The Department extends its heartfelt condolences to her family, friends, and all who had the privilege of knowing her. Her loss is deeply felt by the entire IIEST Shibpur community.

May her soul rest in peace.

From the Desk of HoD

The Indian Institute of Engineering Science and Technology, Shibpur (IIEST, Shibpur), formerly known as Bengal Engineering and Science University, is a premier publicly funded institute for higher education in engineering, science, and technology. It is located in Howrah on the banks of the river Hooghly. In 2014, it was designated as an Institute of National Importance under the National Institutes of Technology Act, 2007.

The Department of Mathematics is one of the prominent among the sixteen departments at IIEST, Shibpur. Since its establishment, the department has built a strong legacy of innovation in teaching, learning, and research. It specializes in developing expertise in diverse fields such as Algebra, Functional Analysis, Artificial Intelligence, Differential Equations, Differentiable Manifolds, Fluid Dynamics, Fuzzy Sets and Topology, Fractional Calculus, Integral Equations, Lie Algebra, Algebraic Graph Theory, Mathematical Modeling and Simulation, Mathematical Physics, Relativity, Cosmology and Astrophysics, Number Theory, Numerical Analysis, Non-linear Optimization, Mathematical Programming, Statistical Inference, Stochastic Processes, Vibration Problems, and Wavelet Transforms.

The department offers postgraduate programs including M.Sc. and Ph.D. degrees. Its faculty members are actively engaged in sponsored research projects supported by leading government agencies such as SERB, DST, BARC, DAE, and NBHM. Presently, nearly all faculty members have government-funded projects in various cutting-edge areas of mathematics.

A notable achievement for the department came when Stanford University, USA, released a report identifying the top 2% of scientists worldwide across multiple disciplines. Among them, four scientists belong to the Department of Mathematics at IIEST, Shibpur.

The department's ongoing research activities greatly enrich the academic experience for students, particularly at the graduate level. Handling the majority of common B.Tech. courses as well as specialized departmental courses, the department has maintained a strong tradition of delivering quality education, pioneering research, and excellent career opportunities for its students since its inception.

Looking ahead, the department aims to continue making significant contributions to both fundamental and applied mathematical research, bringing further distinction to the field of mathematics and to IIEST, Shibpur in particular.

Prof. Santanu Saha Ray

HoD, Department of Mathematics

Our Courses

Engineering Mathematics

Mathematics is taught to **all Engineering branches** in IIEST, Shibpur.

M.Sc.

There are currently **70 PG students** enrolled (**38** in first sem. and **32** in third sem.).

Ph.D.

- Degree Awarded in last 6 months: **04**
- Registered Research scholars on the average: **100**

- We are **15 Faculties** and **3 Staff members.**

OUR EXPERTISE

- Astrophysics
- Atomic & Molecular Scattering Theory
- Complex Analysis
- Cosmology
- Decision Theory
- Dynamical Systems
- Elasticity
- Fluid Dynamics
- Fractional Differential Equations
- Functional Analysis
- Fuzzy Logic
- Fuzzy Mathematical Systems
- Game Theory
- Integral Equations
- Linear Algebra
- Machine Learning
- Management Studies
- Mathematical Biology
- Mathematical Statistics
- Nonparametric inference
- Number Thoery
- Operator Theory
- Operations Research
- Optimization
- Partial Differential Equations
- Quantum Information Theory
- Relativity
- Reliability Theory
- Solid Mechanics
- Statistical Modelling
- Supply Chain Management

EVENTS

- On **June 19, 2025**, **Dr. Indranil Chakrabarty**, **Associate Professor** from **Centre for Quantum Science and Technology (CQST), IIIT Hyderabad**, presented a talk on **"NEGATIVE QUANTUM CONDITIONAL ENTROPY: A RESOURCE"**, highlighting significant advancements in the field of quantum information theory.

- On **June 23, 2025**, **Dr. Megan Govender**, **Professor** from **Department of Mathematics, Durban University of Technology, Durban, 4000, South Africa**, presented a talk on **"The role of Complexity in radiating stars"**, highlighting significant advancements in the field of Cosmology.

DEPARTMENTAL WEEKLY SEMINARS

- On August 25, 2025, Mr. Arijit Malakar (Enrolment no.: 2023MAP007 dated 07.08.2023) delivered a lecture titled "A Study On Rumor Propagation Process Considering The Impact Of Intentional Spreader".
- On September 2, 2025, Mr. Plaban Saha (Reg. no. 2024MAPR005 dated 02.02.2024) delivered a lecture titled "Introduction to Quantum Communication Protocol".
- On September 9, 2025, Mr. Prajjwal Parmar (Registration No.: 2023MAPR012) delivered a lecture titled "Theoretical Investigation on thermo-mechanical response of human skin tissue incorporating fractional derivatives".
- On September 16, 2025, Ms. Sathi Patra (Registration No. 2023MAPR015 dated 17.03.2023) delivered a lecture titled "Deep learning-driven architecture for the time series prediction of dengue cases".

OUR JOURNAL PUBLICATIONS

1. Akhtar, P., Karmakar, S., and Samanta, G., "Exploring tri-trophic food chain model with toxicity and additional food: Unraveling bifurcation, chaos, density variation and bistability", *International Journal of Biomathematics*, (2025), 2550024.
2. Barman, S., Jana, S., Majee, S., Patra, S., and Kar, T. K., "Impact of vaccination and media on a Caputo derivative-based fractional-order epidemic model with PRCC analysis", *International Journal of Dynamics and Control*, 13(9), (2025), 293.
3. Basak, A., and Debnath, U., "Accretion of Dark Energy onto Black Hole in Bumblebee Field", *European Physical Journal C*, Vol. 85, (2025) 665 (1-17).
4. Bhutia, L. T., Biswas, S., Kar, T. K., and Bhunia, B., "The influence of double delays in a diffusive predator–prey system: stability switching curves method", *Nonlinear Dynamics*, 113(13), (2025), 17311-17334.
5. Chakraborty, B., Mukhopadhyay, T., Kotal, A., and Debnath, U., "Reconstructions of Einstein-Aether Gravity from Barrow Agegraphic and New Barrow Agegraphic Dark Energy models: Examinations and

Observational Limits", *European Physical Journal C*, Vol. 85, (2025) 647 (1-30).

6. Choudhury, B.S., Metiya, N., Kundu, A., and Kundu, S., "Multivalued coupled coincidence Point results using admissibility", *Vestnik St. Petersburg University: Mathematics*, 58(3), 2025, 408–418.
7. Das, E., Kar, T. K., Bhutia, L. T., Biswas, S., and Bhunia, B., "Asymptotic and transient approaches of harvested predator–prey models with reaction–diffusion", *The European Physical Journal Plus*, 140(4), (2025), 310.
8. Das, K. P., and Debnath, U., "Possible Formation of Chaplygin Dark Star in Gravity from the Determinant of the Energy-Momentum", *Physics of the Dark Universe*, Vol. 48, (2025) 101959 (1-9).
9. Das, K. S., Ghosh, A., Das, P., Kabir, K. A., Das, P., and Ghosh, D., "Vaccination dilemmas in mitigating monkeypox outbreaks: An imitation dynamics game model approach", *Applied Mathematics and Computation*, 509, (2025), 15,129641.
10. Dutta, P., and Samanta, G., "Integrating epidemiological and game-theoretic model for pandemic mitigation", *Chaos, Solitons & Fractals*, 201, (2025), 117130.
11. Dutta, P., Samanta, G., and Nieto, J.J., "Nipah virus transmission dynamics: equilibrium states, sensitivity and uncertainty analysis", *Nonlinear Dynamics*, 113(9), (2025), pp.10617-10657.
12. Dutta, S., Dutta, P., Akhtar, P., and Samanta, G., "Bifurcation analysis and chaotic dynamics in an SIR model with nonlinear incidence and constrained healthcare capacity", *Chaos, Solitons & Fractals*, 201, (2025), 117329.
13. Dutta, S., Dutta, P., and Samanta, G., "Unraveling nipah virus transmission among bats, pigs, and humans: dynamics and control optimization", *The European Physical Journal Plus*, 140(9), (2025), pp.1-48.
14. Ghosh, A., and Debnath, U., "Gravitational Lensing by Deformed Horava-Lifshitz Black Hole in Rainbow Gravity", *Physics Letters B*, Vol. 868, (2025) 139686 (1-10).
15. Ghosh, R., Choudhury, B.S., Mezei, J.Z., Schneider, I., Pop, N., and Chakrabarti, K., "Rydberg states and new resonant states of the imidogen molecule NH: pathways for nitrogen release", *Physical Chemistry Chemical Physics*, 27(24), 2025, 13021–13032.

16. Ghosh, S., Saha, P., and Choudhury, B.S., "Iterated function system with fuzzy Banach orbital condition for fractal generation", *Mathematical Notes*, 117(1), 2025, 42-50.
17. Ghosh, S., Saha, P., Roy, S., Chakraborty, P., and Choudhury, B.S., "A hybrid fixed point result based on w-distances along with stability and well-posedness properties and an application", *Asian-European Journal of Mathematics*, 18(9), 2025, 2550030.
18. Halder, S., and Dhar, A. K., "Nonlinear modulation of capillary-gravity waves on shear flows including the effects of wind input and dissipation", *Physics of Fluid*, 37, (2025), 097120.
19. Halder, S., Francius, M., Dhar, A. K., Mukherjee, S., Hsu, H. C., and Kharif, C., "Vorticity effects on steady nonlinear periodic gravity-capillary waves in finite depth", *Journal of Fluid Mechanics*, 1010, (2025), A55.
20. Karmakar, S., and Pal Sarkar, S., "Higher-order memory enriched thermoelastic behavior under the presence of heat source in an initially stressed orthotropic medium", *Journal of Thermal Stresses*, 48(6), (2025), 679–706.
21. Karmakar, S., Mondal, N., Samanta, G. and Perc, M., "Prey-predator dynamics with adaptive hawk-dove strategies", *Chaos, Solitons & Fractals*, 200, (2025), 116934.
22. Khatun, Mst S., Ghosh, D., and Das, P., "Comparative analysis of reproduction number estimation and parameter inference in SEIR-based disease modeling", *Chaos, Solitons & Fractals*, 200, (2025),116927.
23. Khatun, Mst S., Paul, P., and Das, P., "Exploring cost-effectiveness analysis in delayed optimal control and complex dynamics of an epidemic model with media coverage", *Communications in Nonlinear Science and Numerical Simulation. 14*, (2025), 109109.
24. Kotal, A., and Debnath, U., "Impact of Entropy-Corrected Hoˇrava-Lifshitz Gravity on Modified Chaplygin Gas: A Cosmological Parameter Estimation", *Chinese Journal of Physics*, Vol. 98, (2025) 147-174.
25. Kotal, A., Maity, S., Debnath, U., and Pradhan, A., "Parameter Constraints and Cosmographic Analysis of Barrow Agegraphic and New Barrow Agegraphic Dark Energy Models", *European Physical Journal C*, Vol. 85, (2025) 565 (1-35).
26. Kotal, A., Sardar, A., Malakar, A., and Debnath, U., "Parameter Estimation of Barrow Agegraphic and New Barrow Agegraphic Dark Energy Models

in Fractal Universe: Correspondence with Scalar field Models", *Nuclear Physics B*, Vol. 1019, (2025) 117024 (1-68).

27. Majee, S., Jana, S., Kar, T. K., Anand, R., and Ramprabhakar, J., "Impact of incubation and gestation periods on the dynamics of a spatially heterogeneous eco-epidemiological model", *Scientific Reports*, 15(1), (2025), 19661.
28. Mandal, K. G., De, M., Das, P., and Maiti, M., "Strategies for Retailers' Sales Effort Competition under Random Demand and Manufacturer's Cost-sharing Contract", *Expert Systems with Applications*, 296, (2025), 129080.
29. Midya, D., Bhunia, B., and Kar, T. K., "Influence of prey refuge and fear effect on fractional order delayed predator-prey model", *Physica Scripta*, 100(5), (2025), 055212.
30. Mondal, D., and Debnath, U., "Entropy Relations and GUP Corrections of Ernst Black Hole*", International Journal of Geometric Methods in Modern Physics*, Vol. 22, No. 9 (2025) 2550056 (1-22).
31. Mondal, D., and Debnath, U., "Phase Structure of Einstein-Nonlinear-Maxwell-Yukawa Charged AdS Black Hole in Quintessence Field", *International Journal of Modern Physics A*, Vol. 40, No. 20 (2025) 2550068 (1-22).
32. Mondal, S., and Kar, T. K., "Delay-induced multiple stability scenarios on a fractional-order predator-prey model with Cosner functional response", *Physica Scripta*, 100, (2025), 095232.
33. Mondal, S., and Kar, T. K., "Hydra effect and stability analysis of a delayed predator–prey model with Allee effect in the predator", *The European Physical Journal Plus*, 140(7), (2025), 673.
34. Mukherjee, P., Debnath, U., Chaudhary, H., and Mustafa, G., "How parameter constraining can influence the mass accretion process of a Black Hole in the Generalized Rastall Gravity Theory?", *Journal of Cosmology and Astroparticle Physics*, Vol. 05, (2025) 085 (1-25).
35. Mukhopadhyay, T., Chakraborty, B., Kotal, A., and Debnath, U., "Reconstructions of f(P) and f(Q) gravity models from (m,n)-type Barrow Holographic Dark Energy : Analysis and Observational Constraints", *International Journal of Geometric Methods in Modern Physics*, Vol. 22, No. 8 (2025) 2550051 (1-37).
36. Nandi, S., Karmakar, S., Lahiri, A., and Pal Sarkar, S., "Investigation of Thermoelastic Response in Porous Materials with Memory Effects under

Ramp-Type Heating using Dual Phase Lag Theory", *European Journal of Mechanics / A Solids*, 2025.

37. Naskar, S., Molla, N. U., and Debnath, U., "Strong gravitational lensing by black holes in F(R)-Euler-Heisenberg Gravity's Rainbow", *Physics of the Dark Universe*, Vol. 49, (2025) 102009 (1-16).
38. Parmar, P., Karmakar, S., Lahiri, A., and Pal Sarkar, S., "Study of generalized two-dimensional bioheat problem in the context of memory-dependent derivative", *Journal of Thermal Biology*, Volume 129, (2025), 104107,
39. Parmar, P., Mandal, S., and Pal Sarkar, S., "Effect of Moving Heat Source within the Framework of Two-Temperature Higher Order Lagging Phenomena in Human Skin Tissue", *Mech. Solids*, 60, (2025), 261–277.
40. Parveen, L., and Mitra, M., "Block-Savits type characterizations using the Laplace transform and some related issues", *Journal of Applied Probability*, 62, (2025), 1193–1215.
41. Patra, S., Jana, S., Adak, S., Barman, S., Majee, S., and Kar, T. K., "A fractional-order mathematical approach to dengue transmission: Encompassing genetic algorithm-based optimization", *Journal of Computational and Applied Mathematics*, (2025), 116911.
42. Paul, P., Khatun, Mst. S., and Das., P., "Impact of prey herd behavior and predator hunting cooperation on eco-epidemic dynamics with impulsive harvesting control: a real-data approach", *The European Physical Journal Plus*, 140, (2025 Jun), 589.
43. Rahaman, M. J., and Saha Ray, S., "Auto-Bäcklund transformation, Painlevé analysis, and a variety of new multi-soliton solutions for the (2+1)-dimensional generalized Konopelchenko-Dubrovsky-Kaup-Kupershmidt system with time-dependent variable coefficients", *Physica Scripta*, Vol. 100, No. 7, 075251, 30 June 2025.
44. Roy, S., Gdawiec, K., Saha, P., and Choudhury, B.S, "Exploring fractal geometry through Das–Debata iteration: A new perspective on Mandelbrot and Julia Sets", *Chaos Solitons and Fractals*, 199, 2025, 116617.
45. Roy, S., Saha, P., and Choudhury, B.S, "Generation of Julia and Mandelbrot sets using an s-convex extension of the Noor iteration for a generalized rational complex function", *Physica Scripta*, 100, 2025, 095226
46. Roy, S., Saha, P., and Choudhury, B.S., "Fixed point problem of coupled Pata contractions by w-distances: Existence, well-posedness and

applications", *Journal of Contemporary Mathematical Analysis*, 60(4), 2025, 329-338.

47. Sagar, B., and Saha Ray, S., "Exploring computationally efficient stable numerical techniques for fractional Keller-Segel system modeling chemotaxis", *Mathematics and Computers in Simulation*, Vol. 232, pp. 50-74, June 2025.
48. Saha Ray, S., "Novel and Reliable Techniques for Two-Dimensional Stochastic Itô-Volterra Fredholm Integral Equations", *Mathematical Methods in the Applied Sciences*, Vol. 48, No. 13, pp. 12872-12889, September 2025.
49. Saha Ray, S., "The Impact of Noise on the Solution of the Stochastic Fractional Chiral Schrödinger Equation Forced by Multiplicative Noise in Itô Sense", *International Journal of Geometric Methods in Modern Physics*, Vol. 22, No. 07, 2550025 (2025), 1 June 2025.
50. Saha Ray, S., and Pramanick, S., "A novel numerical approach for variable-order space-time fractional KdV-Burgers-Kuramoto equation describing nonlinear physical phenomena", *Computational and Applied Mathematics*, Vol. 45, Article no. 7, 8 September 2025.
51. Saha Ray, S., and Pramanick, S., "Comparison of two-dimensional wavelets techniques for variable-order time fractional RLW-Burgers equation representing propagation of surface water wave in a channel", *Physics of Fluids*, Vol. 37, 081920, August 20 2025.
52. Saha, P., Mandal, M.K., and Choudhury, B.S., "Hierarchical quantum operation sharing of single- and two-qubit partially unknown quantum operations", *Quantum Information Processing*, 24(8), 2025, 251.
53. Saha, P., Mondal, P., and Choudhury, B.S., "Application of contraction mapping principle to the Hyers-Ulam-Rassias stability problem of pexiderized quadratic functional equation in modular spaces", *Acta Mathematica Universitatis Comenianae*, 94(1), 2025, 7-20.
54. Santra, N., and Samanta, G., "Optimizing oncolytic and immune-based cancer therapies: A mathematical approach to tumor dynamics", *International Journal of Biomathematics*, (2025), 2550081.
55. Sarkar, J., Pandey, M., Som, T., and Choudhury, B.S., "Generalized Hausdorff metric on -metric space and some fixed point results", *The Journal of Analysis*, 33(1), 2025, 411–425.
56. Vinita, and Saha Ray, S., "Lie symmetries with optimal subalgebra, quasi self-adjointness condition, conservation laws and power series solutions

for the Mikhailov-Shabat model in quantum theory", *Discrete & Continuous Dynamical Systems – S*, Vol. 18, No. 4, pp. 1093-1111, April 2025.

OUR CONFERENCE PUBLICATION

1. Mukherjee, S., and Dhar, A. K., "Modulational instability of interfacial gravity waves in the presence of a current jump", *Interactions*, 246, (2025), 73.

OUR BOOK CHAPTER PUBLICATIONS

1. Ghosh, M., Malakar, A., Banerjee, R., and Das, P., "Impact of Rumor Credibility and User Maturity on Rumor Propagation", *Intelligent Systems and Simulation*, (2025).

PH.D. AWARDED

1. **BIDHAN BHUNIA**, TITLE: **"MATHEMATICAL ANALYSIS OF HARVESTING EFFECTS ON DELAYED AND SPATIOTEMPORAL PREDATOR-PREY SYSTEMS WITH COMPLEX DYNAMICS''**, UNDER THE SUPERVISION OF **PROF. TAPAN KUMAR KAR.**
2. **BIJOY KUMAR DAS (PHD REGISTRATION NO. 2020MAPR050 DATE DECEMBER 12, 2020).** TITLE: **''EXPLORING THE COMPLEXITIES OF PREDATOR-PREY INTERACTIONS: EFFECTS OF FEAR, TOXICANTS AND DELAYED RESPONSES''**, AWARDED ON **22 MAY 2025**, UNDER SUPERVISION OF **PROF. GURUPRASAD SAMANTA**.
3. **SANCHARI GANGULY**, TITLE: **"GAME-THEORETIC STRATEGIES IN DECISION MAKING FOR SUPPLY CHAIN MODELS UNDER DIFFERENT ENVIRONMENTS''**, UNDER THE SUPERVISION OF **PROF. PRITHA DAS**.

4. **SWASTIKA SAHA MONDAL**, TITLE: **"FLAT PORTIONS ON THE BOUNDARY OF THE NUMERICAL RANGE OF COMPANION MATRICES AND CRAWFORD NUMBER OF SOME BORDERED MATRICES"**, UNDER THE SUPERVISION OF **DR. SARITA OJHA**.

FACULTY NEWS

(Information are obtained from the individual faculty members)

BEYOND THE CLASSROOM: ACADEMIC OUTREACH

- **PROF. A. K. DHAR** HAS DELIVERED **TWO LECTURE PRESENTATIONS** ON TWO PAPERS ENTITLED **"STABILITY ANALYSIS OF WEAKLY NONLINEAR COUNTER-TRAVELLING WAVES ON FINITE WATER DEPTH"** AND **"NONLINEAR MULTIPHASE OBLIQUELY PROPAGATING AND STANDING GRAVITY WAVES ON ARBITRARY WATER DEPTH"** ON **06.06.2025** AND **13.06.2025**, RESPECTIVELY, IN THE **DEPARTMENT OF MARINE ENVIRONMENTAL ENGINEERING** DURING THE VISIT TO THE **NATIONAL SUN YAT-SEN UNIVERSITY, KAOHSIUNG, TAIWAN** FROM **MAY 25, 2025** TO **JUNE 30, 2025** FOR RESEARCH WORK IN COLLABORATION WITH **PROF. H. C. HSU.**
- **PROF. PRITHA DAS** WAS INVITED AS AN **EXAMINER** OF THE **INTERNSHIP PROGRAM OF GRADUATING STUDENTS, JUNE 2025, CALCUTTA MATHEMATICAL SOCIETY.**
- **PROF. TAPAN KUMAR KAR** DELIVERED A **MINI SYMPOSIUM** TITLED AS **"ASYMPTOTIC AND SHORT-TERM RESPONSES OF PERTURBATION: A MATHEMATICAL COMPARISON OF STABILITY MEASURES"** AT THE **"JOINT MEETING OF THE ASIAN CONFERENCE FOR MATHEMATICAL BIOLOGY AND THE ANNUAL MEETING OF THE JAPANESE SOCIETY FOR MATHEMATICAL BIOLOGY" (ACMB-JSMB2025)** AT **INSTITUTE FOR LIFE AND MEDICAL SCIENCES, KYOTO UNIVERSITY YOSHIDA-HONMACHI, SAKYO-KU, KYOTO 606-8501, JAPAN,** FROM **JULY 7TH - 11TH, 2025.**
- **PROF. TAPAN KUMAR KAR** CHAIRED A SESSION **"[MS10] MODEL BIFURCATIONS AND ECOLOGICAL RELEVANCE"** AT THE **"JOINT MEETING OF THE ASIAN CONFERENCE FOR MATHEMATICAL BIOLOGY AND THE ANNUAL MEETING OF THE JAPANESE SOCIETY FOR MATHEMATICAL BIOLOGY" (ACMB-JSMB2025)** AT **INSTITUTE FOR LIFE AND MEDICAL**

SCIENCES, KYOTO UNIVERSITY YOSHIDA-HONMACHI, SAKYO-KU, KYOTO 606-8501, JAPAN, FROM **JULY 7TH - 11TH, 2025.**

- **PROF. SANTANU SAHA RAY** DELIVERED AN **INVITED LECTURE** IN THE **NATIONAL CONFERENCE ON EMERGING TRENDS OF MATHEMATICAL ANALYSIS AND APPLICATIONS, 2025 (NCETMAA 2025)**, ORGANIZED BY THE **DEPARTMENT OF MATHEMATICS, UNIVERSITY OF KALYANI**, DURING **11-12 SEPTEMBER, 2025**.

ADDITIONAL INFORMATIONS

- **PROF. GURUPRASAD SAMANTA** LISTED AMONG TOP 2% SCIENTISTS RECOGNIZED BY STANFORD UNIVERSITY IN 2025**.**
- **PROF. SANTANU SAHA RAY** LISTED AMONG TOP 2% SCIENTISTS RECOGNIZED BY STANFORD UNIVERSITY IN 2025**.**
- **PROF. TAPAN KUMAR KAR** LISTED AMONG TOP 2% SCIENTISTS RECOGNIZED BY STANFORD UNIVERSITY IN 2025**.**
- **PROF. UJJAL DEBNATH** LISTED AMONG TOP 2% SCIENTISTS RECOGNIZED BY STANFORD UNIVERSITY IN 2025**.**

STUDENT'S CORNER

ACHIEVEMENTS

POST-DOCS/JOBS

- **DR. DEBGOPAL SAHOO** JOINED AS AN **ASSISTANT PROFESSOR** AT **VIT-AP UNIVERSITY** ON **5 AUGUST, 2025**.
- **DR. SAYANI ADAK** JOINED AS AN **ASSISTANT PROFESSOR** IN THE **DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES** AT **HALDIA INSTITUTE OF TECHNOLOGY, ICARE COMPLEX, HATIBERIA, HALDIA, WEST BENGAL 721657**.
- **DR. MOUMITA GHOSH** JOINED **SR UNIVERSITY** AS AN **ASSISTANT PROFESSOR** ON **27TH JUNE, 2025**.

- **DR. NIYAZ UDDIN MOLLA** JOINED ON **12.06.2025** AS AN **ASSISTANT PROFESSOR** IN **MATHEMATICS**, **DESM DEPARTMENT**, **REGIONAL INSTITUTE OF EDUCATION (RIE), BHUBANESWAR-751022, ODISHA**.
- **MR. ALOK SARDAR** JOINED ON **12.08.2025** AS AN **ASSISTANT PROFESSOR** IN THE **DEPARTMENT OF BASIC SCIENCE AND HUMANITIES (MATHEMATICS)**, **DREAM INSTITUTE OF TECHNOLOGY, BISHNUPUR, KOLKATA-700104**.
- **MR. SANDIP MOI** JOINED AS **ASSISTANT PROFESSOR** AT **SR UNIVERSITY** ON **05.06.2025**.
- **MR. BIKSHAN CHAKRABORTY** JOINED AS AN **ASSISTANT PROFESSOR** IN **DEPARTMENT OF MATHEMATICS**, **GITAM SCHOOL OF SCIENCE** AT **GITAM (DEEMED TO BE UNIVERSITY), VISAKHAPATNAM CAMPUS** ON **20.08.2025**.

M.Sc. Final Thesis Highlights – 2025

1. **Afreen Kauser**, under the supervision of **Dr. Sarita Ojha**, presented her Thesis titled **"Normalized Laplacian Spectrum of subdivision-coronas of two regular graphs"**.
2. **Annesha Das**, under the supervision of **Dr. Nirupam Ghosh**, presented her Thesis titled **"Univalent Analytic Functions On Unit Disk"**.
3. **Megha Gola**, under the supervision of **Prof. U. Debnath**, presented her Thesis titled **"A Dynamical System Approach for Cosmological Models"**.
4. **Ritu R Bendre**, under the supervision of **Prof. S. Saha Ray**, presented her Thesis titled **"Riemann-Hilbert Method and Multi-Soliton Solutions of the Extended Modified Korteweg-de Vries Equation"**.
5. **Rekha Rani Mahanta**, under the supervision of **Dr. S. Pal Sarkar**, presented her Thesis titled **"A Hybrid Mathematical and Data-Driven Model for Risk Factor Analysis and Prediction of Gestational Diabetes Mellitus (GDM)"**.
6. **Priyanka Dutta**, under the supervision of **Dr. Sarita Ojha**, presented her Thesis titled **"The Spectrum of a Bounded Linear Operator"**.
7. **Priyambada Sahoo**, under the supervision of **Dr. Sarita Ojha**, presented her Thesis titled **"Analytic Continuation"**.
8. **Lipita Padhan**, under the supervision of **Prof. U. Debnath**, presented her Thesis titled **"Physical characteristics of wormhole geometries under**

Modified Chaplygin-Jacobi Gas Equation of state in the Context of Rastall gravity".

9. **Gopal Barik**, under the supervision of **Prof. G. P. Samanta**, presented his Thesis titled **"Dynamical analysis of a prey-predator model under the influence of fear felt by prey"**.
10. **Anjani Kumari**, under the supervision of **Dr. S. Alam**, presented her Thesis titled **"ÀPPLICATION OF MCDM UNDER NEUTROSOPHIC FUZZY NUMBER"**.
11. **Laboni Ghosal**, under the supervision of **Dr. Nirupam Ghosh**, presented her Thesis titled **"Harmonic Functions and Schwarz Lemma"**.
12. **Snigdha Das**, under the supervision of **Prof. B. S. Choudhury**, presented her Thesis titled **"CONTROLLED CYCLIC QUANTUM TELEPORTATION"**.
13. **Arnab Ghosh**, under the supervision of **Prof. Murari Mitra**, presented his Thesis titled **"Mathematical Theory of Reliability- A Brief Excursion"**.
14. **Subhajit Chanda**, under the supervision of **Prof. B. S. Choudhury**, presented his Thesis titled **"Application of fixed point methods in fractal generation"**.
15. **Subhra Kundu**, under the supervision of **Prof. Murari Mitra**, presented his Thesis titled **"An introduction to the theory of Vector Norm and Matrix Norm"**.
16. **Sushmita Kumari**, under the supervision of **Prof. U. Debnath**, presented her Thesis titled **"Black Hole Accretion of Generalized Chaplygin Gas"**.
17. **Ridhi Chanda**, under the supervision of **Prof. Pritha Das**, presented her Thesis titled **"Stock Price Prediction using LSTM Neural Networks"**.
18. **Tun Modak**, under the supervision of **Dr. S. Pal Sarkar**, presented her Thesis titled **"Matrix method of solution to generalized thermoelasticity in an isotropic infinite medium which has a cylindrical cavity"**.
19. **Gulshan Singh Parihar**, under the supervision of **Prof. Pritha Das**, presented his Thesis titled **"Mathematical Modeling of the Impact of Unemployment on Mental Stress Dynamics"**.
20. **Subhadip Maity**, under the supervision of **Prof. P. Saha**, presented his Thesis titled **"An Introduction to Intuitionistic Fuzzy Sets and Its Application"**.
21. **Arpan Majhi**, under the supervision of **Prof. Murari Mitra**, presented his Thesis titled **"Some Basic Aspects of Univariate Stochastic Order and Theory of Majorization"**.

22. **Dipayan Chatterjee**, under the supervision of **Dr. S. Pal Sarkar**, presented his Thesis titled **"Solution to generalized thermoelastic interaction in transversely isotropic elastic medium in two dimension using Matrix method"**.
23. **Suparna Saha**, under the supervision of **Prof. P. Saha**, presented her Thesis titled **"Some Applications of Intuitionistic Fuzzy Sets in Decision Making"**.
24. **Sayan Kumar Pal**, under the supervision of **Prof. Tapan Kr. Kar**, presented his Thesis titled **"Dynamical analysis of a Lotka-Volterra competitive model"**.
25. **Suman Maji**, under the supervision of **Prof. G. P. Samanta**, presented his Thesis titled **"Prey-Predator model with Holling Type III Functional Response in toxic habitat with additional food"**.
26. **Arjun Singh**, under the supervision of **Dr. S. Alam**, presented his Thesis titled **"INTRODUCING GREEN TECHNOLOGY IN INVENTORY SYSTEM WITH NOVEL ECO-FRIENDLY DEMAND INCORPORATIONG PARTIAL BACKLOGGING UNDER FUZZINESS"**.
27. **Saptaneel Das**, under the supervision of **Prof. S. Saha Ray**, presented his Thesis titled **"Solution of General Rosenau-RLW equation using Quintic B-splines collocation method"**.
28. **Bibhudatta Tripathy**, under the supervision of **Prof. B. S. Choudhury**, presented his Thesis titled **"Building blocks of quantum teleportation with a protocol namely "Bi-directional asymmetric quantum teleportation protocol initiated by Mentor with hierarchical control""**.
29. **Kulamani Sahoo**, under the supervision of **Prof. Tapan Kr. Kar**, presented his Thesis titled **"Dynamic analysis of a fractional-order SIR system incorporating optimal treatment and uncertainty analysis"**.
30. **Dipanjan Barman**, under the supervision of **Prof. Asoke Kumar Dhar**, presented his Thesis titled **"Third-order Non-linear Evolution Equation for Gravity Waves"**.
31. **Arati Patro**, under the supervision of **Dr. S. Alam**, presented her Thesis titled **"Assessment of best action for Battery Electric Vehicle by MCGDM technique on Cylindrical Neutrosophic Environment"**.
32. **Rahul Shukla**, under the supervision of **Prof. P. Saha**, presented his Thesis titled **"The Class of \alpha-\psi Contractive Mappings in b-Metric Spaces and Fixed Point Theorem"**.

33. **Megha Choudhary**, under the supervision of **Prof. Tapan Kr. Kar**, presented her Thesis titled **"Hydra effect in stable food chain model"**.
34. **Arijit Seth**, under the supervision of **Prof. Asoke Kumar Dhar**, presented his Thesis titled **"Third-order Non-linear Evolution Equation for Capillary-Gravity Waves"**.

RESEARCH SCHOLARS' ACADEMIC OUTREACH

- MR. KIRITI BHUSAN MAHATO ATTENDED THE INTERNATIONAL CONFERENCE ON "MATHEMATICAL METHODS AND NUMERICAL COMPUTATION FOR NONLINEAR DYNAMICS IN BIOLOGICAL AND PHYSICAL SCIENCES", FROM 5TH TO 7TH MAY, 2025 AT THE DEPARTMENT OF MATHEMATICS IN MAHADEVANANDA VIDYALAYA.
- MR. KIRITI BHUSAN MAHATO ATTENDED THE WORKSHOP ON MATLAB AND PYTHON PROGRAMMING (MPP-2025), FROM 19TH TO 23RD MAY, 2025 (ONLINE MODE) AT THE DEPARTMENT OF MATHEMATICS IN NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR.
- MS. PALAKSHI PAUL ATTENDED THE WORKSHOP ON MATLAB AND PYTHON PROGRAMMING (MPP-2025), FROM 19TH TO 23RD MAY, 2025 (ONLINE MODE) AT THE DEPARTMENT OF MATHEMATICS IN NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR.
- MS. DIPTI DOLAI ATTENDED THE WORKSHOP ON MATLAB AND PYTHON PROGRAMMING (MPP-2025), FROM 19TH TO 23RD MAY, 2025 (ONLINE MODE) AT THE DEPARTMENT OF MATHEMATICS IN NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR.
- MS. ADRITA GHOSH ATTENDED THE WORKSHOP ON MATLAB AND PYTHON PROGRAMMING (MPP-2025), FROM 19TH TO 23RD MAY, 2025 (ONLINE MODE) AT THE DEPARTMENT OF MATHEMATICS IN NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR.
- MS. PROTYUSHA DUTTA PRESENTED A PAPER TITLED "ANALYSIS OF EPIDEMIC DYNAMICS: INCORPORATING PRCC IN SIHRS MODEL WITH CONTROL STRATEGIES AND ENVIRONMENTAL FLUCTUATIONS" AT THE FOURTH INTERNATIONAL NONLINEAR DYNAMICS CONFERENCE (NODYCON 2025) IN STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, NJ, USA, FROM 22ND TO 25TH JUNE, 2025 (ONLINE MODE).
- MR. KIRITI BHUSAN MAHATO ATTENDED THE 5-DAY FACULTY DEVELOPMENT PROGRAM ON "TRANSCENDING MATHEMATICS:

THEORETICAL ESCALATION TO INTERDISCIPLINARY AND INDUSTRIAL INNOVATIONS'', FROM 21ST TO 25TH JULY, 2025 AT AMITY INSTITUTE OF APPLIED SCIENCES, KOLKATA - DEPARTMENT OF MATHEMATICS, AMITY UNIVERSITY KOLKATA.

- MR. ARIJIT MALAKAR ATTENDED THE AICTE TRAINING AND LEARNING (ATAL) ACADEMY FACULTY DEVELOPMENT PROGRAM ON ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND DATA SCIENCE: TOOLS, TECHNIQUE, AND TRENDS, FROM 8TH TO 13TH SEPTEMBER, 2025, AT UNIVERSITY INSTITUTE OF TECHNOLOGY.
- MR. SUSANTA KUMAR DAS ATTENDED THE AICTE TRAINING AND LEARNING (ATAL) ACADEMY FACULTY DEVELOPMENT PROGRAM ON ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND DATA SCIENCE: TOOLS, TECHNIQUE, AND TRENDS, FROM 8TH TO 13TH SEPTEMBER, 2025, AT UNIVERSITY INSTITUTE OF TECHNOLOGY.
- MR. SNEHASIS BARMAN ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).
- MS. ESITA DAS ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).
- MS. SHYAMMSHREE JANA ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).
- MR. SUMAN MONDAL ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).
- MS. SATHI PATRA ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL

INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).

- MS. RIYA DAS ATTENDED "NEXT-GEN COMPUTING: FROM MATHEMATICAL MODELS TO AI IN COMPUTER VISION" CONDUCTED AT DEPARTMENT OF MATHEMATICS & SCIENTIFIC COMPUTING IN NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR, HIMACHAL PRADESH-177005, INDIA, FROM 15TH TO 20TH SEPTEMBER, 2025 (ONLINE MODE).

PERCEPTIONS

Working on the mathematical aspects of cosmological inflation, a rapid expansion phase that the universe is believed to have undergone just after the Big Bang, has been a fascinating journey for me. This field provides a window into the universe's earliest moments, when an extremely rapid expansion shaped the seeds of all cosmic structures we observe today. Through mathematical models, one can connect the dynamics of inflation with observational evidence, such as the tiny fluctuations in the cosmic microwave background (CMB) and the large-scale distribution of galaxies across the universe. These imprints serve as remarkable confirmations of theoretical predictions, showing how abstract mathematics can uncover the physical history of the cosmos. Working at this intersection of theory and observation deepens my appreciation of how elegantly mathematics explains the universe's origin and evolution.

Subhajit Sarkar
Junior Research Fellow

Mathematical biology is where theory and nature shake hands. With models like reaction-diffusion systems, simple math can paint the patterns we see all around as-the stripes on a tiger, the spots on a cheetah, or the whorls on a seashell. Behind the beauty lies a quiet order, a hidden rhythm that math teases out, showing how life's structure, variety, and harmony are all part of one elegant design. In a way, equations stop being just numbers and symbols-they become the secret poetry of the natural world.

Sujan Das
Junior Research Fellow

Editorial team

- **Editor-in-chief: HoD, Mathematics (Prof. S. Saha Ray)**
- **Editors: Prof. B. S. Choudhury (Faculty Member)**
  Prof. U. Debnath (Faculty Member)
  Dr. S. Alam (Faculty Member)
  Mr. Subhajit Sarkar (Research Scholar)