



**INDIAN INSTITUTE
OF TECHNOLOGY**
(INDIAN SCHOOL OF MINES)
DHANBAD

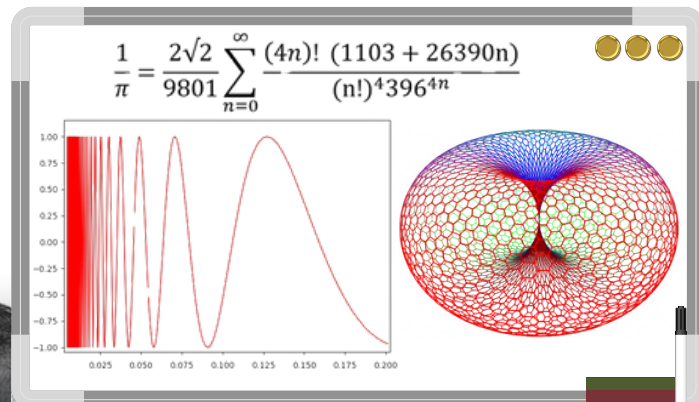
Legacy that inspires the future

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GANANAM

*A Monthly Newsletter of
Department of Mathematics and Computing*



OUTREACH PROGRAM

Prof. Dinabandhu Pradhan organized a Five-Day GIAN Course on New Trends in Coloring in Graphs from March 24 to 28, 2025. The course featured **Prof. Riste Škrekovski** from the Faculty of Mathematics and Physics, University of Ljubljana, Slovenia, as the Foreign Faculty. Graph coloring is a central topic in graph theory, which itself is a significant area of discrete mathematics with broad applications in computer science, biology, social sciences, and many other fields. At its core, graph coloring involves the assignment of labels, traditionally called colors to the vertices, edges, or regions of a graph according to certain rules.

The program aimed to delve into fundamental and advanced concepts in graph coloring, including vertex coloring, edge coloring, face coloring, critical graphs, list coloring, odd coloring, and conflict-free coloring. The course also explored classical theorems such as the Four Color Theorem and Brooks' Theorem, along with modern developments and unsolved problems in the field. With a combination of theoretical exploration and practical problem-solving, this course will provide a comprehensive understanding of graph coloring and its significance in various contexts.



CENTENARY LECTURE

The Department of Mathematics and Computing, IIT (ISM) Dhanbad, had the privilege of hosting an insightful evening talk by **Professor Riste Škrekovski**, a distinguished mathematician from the University of Ljubljana, Slovenia.

The session, held as part of the **series of centenary talks**, focused on Odd Coloring in Graphs, an intriguing and evolving topic in graph theory. He delved into the concept of odd coloring, exploring key conjectures related to planar graphs and shedding light on open problems in the field. With his characteristic wit and deep expertise, he made complex ideas accessible. The session proved to be both intellectually enriching and inspiring, leaving participants with valuable perspectives on advanced topics in graph theory.



Prof. Riste Škrekovski completed his PhD under Professor Bojan Mohar at the University of Ljubljana in 2000, followed by postdoctoral research at Charles University in Prague and Simon Fraser University in Burnaby, Canada. Currently, he is a leading researcher at the Faculty of Information Studies in Novo Mesto, Slovenia, and also teaches discrete mathematics at the University of Ljubljana. Recently, he joined Rudolfovo, a Slovenian research center, where he holds a partial appointment. His research encompasses a broad range of topics in classical graph theory, alongside interdisciplinary fields like chemical graph theory and complex networks.

PUBLICATIONS

- **A. Jayswal** and G. Uniyal, Lagrange duality and saddle point criteria for semi-infinite variational programming problem with Caputo-Fabrizio fractional derivative, Journal of Applied Mathematics and Computing, 2025 (Accepted).
- T. Nuradha, **H. K. Mishra**, Felix Leditzky, and M. M. Wilde, Multivariate Fidelities, Journal of Physics A: Mathematical and Theoretical, 2025. DOI: 10.1088/1751-8121/adc645
- P. Joshi, **A. Kalita**, and M. Gurusamy, Reliable and Efficient Data Collection in UAV based IoT Networks, IEEE Communications Surveys and Tutorials, 2025 (Accepted).
- **A. A. Selvan**, R. Radha and A. Bhandari, Approximation from shift-invariant spaces with smooth generators, Numerical Algorithms, 2025 (Accepted).
- D. Pradhan, **R. K. Upadhyay**, Deciphering the calcium dynamics of a fractional order Alzheimer's disease model in astrocytes and their networks, Expert Systems With Applications. 276, 1-21, 2025.
- **R. K. Upadhyay**, N. M. Tripathi, D. Barman, Wave of chaos and Turing patterns in Rabbit-Lynx dynamics: Impact of fear and its carryover effects, Communications in Nonlinear Science and Numerical Simulation, 145, 1-36, 2025
- **R. K. Upadhyay**, V. Pandey, R. D. Parshad, From multi-scale to non-local models: Comment on "Mathematical models on Alzheimer's disease and its treatment: A review" by M. Maji & S. Khajanchi, Physics of Life Reviews, 53, 125-127, 2025.

SPONSORED PROJECTS

AI-Powered Vision Systems for Low-light and Low-visibility Underground Mining Environments, TEXMiN, **S. Kumawat** (PI), A. Galav (Co-PI), **M. Verma** (Co-PI), **T. Ojha** (Co-PI), 17.35 Lakhs, March 2025

PATENT

A. Kalita, A System and Method for Improving the Performance of IEEE 802.15.4 and IEEE 802.15.4e standardized Internet of Things Networks". [Filed on 28/03/2025; Ref No: 202531029706]

INVITED TALKS

- **Prof. A. Das** delivered an invited talk on “Applications of Monte Carlo Method in Particulate Process Modeling” at International Conference on Statistical Learning – 2025 in Department of Mathematics, IIT Ropar on 06 March, 2025. He also chaired a session at this conference.
- **Prof. G. K. Vishwakarma** delivered an invited talk on “Statistics in Machine Learning, School of Computational And Integrative Sciences”, JNU New Delhi on 24 March 2025.
- **Prof. P S Rao** delivered an invited talk on “Discontinuous Galerkin Methods for Convection Dominated Fluid Flows at Department of mechanical Engineering, IIT (ISM) Dhanbad, on 05 March, 2025.
- **Prof. S.P. Tiwari** delivered an invited talk on “Lattice-valued automata theory: A mathematical perspective” in International Conference on Mathematics and Statistics in the Era of Data Science on March 20, 2025.

MATHEMATICS AND COMPUTING NEWS

Feeling the future: New wearable tech simulates realistic touch:

Most haptic devices only deliver feedback as simple vibrations. New device applies dynamic forces in any direction to simulate a more realistic sense of touch. Small, lightweight device can enhance virtual reality, help individuals with visual impairments, provide tactile feedback for remote health visits and more. [[Read More](#)]

Schrödinger’s cat just got warmer, and quantum physics may never be the same again:

In a significant advance, scientists have created a Schrödinger’s cat-like quantum superposition at higher-than-usual temperatures. This challenges the long-held requirement of near-absolute zero conditions for such states. Schrödinger’s cat, a thought experiment illustrating quantum superposition, describes a cat simultaneously alive and dead due to an atom’s uncertain decay. Previously, real-life analogues required extreme cooling to achieve ground-state energies. The new study, published in Science Advances, demonstrates that quantum systems—such as atoms or resonators—can exhibit superposition even at elevated temperatures, marking a crucial step toward more practical and accessible quantum technologies beyond cryogenic environments. [[Read More](#)]

ALUMNI SPARK



Shravi graduated with Integrated MTech in Mathematics and Computing in 2017. She began her professional journey at Deloitte Advisory, where she worked in the banking sector with a focus on risk programs involving advanced computational models, artificial intelligence and machine learning. Her work spanned both policy and technical aspects, including the ethical use of AI models—laying the groundwork for a career that would blend analytical depth with real-world impact.

Complementing her technical foundation, she pursued a PGP in Management from Indian School of Business. Post which she transitioned to Nomura for a brief period. There she took on the role of technical project manager in the Risk and Finance division, leading advanced computational projects, further honing her expertise in high-stakes, data-driven environments.

She went on to establish her own advisory firm in 2024. In this capacity, she now acts as a strategic advisor to organizations—serving roles akin to Chief Data Officers—to help set up and scale robust data programs.

From consulting on AI ethics at Deloitte to spearheading complex projects at Nomura and now building data strategies as an independent advisor, her career underscores the value of adaptability, technical excellence, and a forward-thinking mindset. She attributes much of this growth to her time at IIT (ISM), where a thoughtfully designed curriculum and the freedom to explore diverse subjects laid a strong foundation. A key formative experience during this period was her tenure as Vice President of SIAM (Society for Industrial and Applied Mathematics), which exposed her to a wide array of opportunities in the world of computational mathematics. This role sparked a lasting passion for data science and continues to inspire her commitment to advancing its applications across industries.

EDITORIAL TEAM

Prof. S P Tiwari (HOD), Prof. P S Rao, Prof. Atul Kumar Verma, Prof. Tamoghna Ojha, Naman Shankar Srivastava, Hima Chowdary Tanikonda.

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