



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

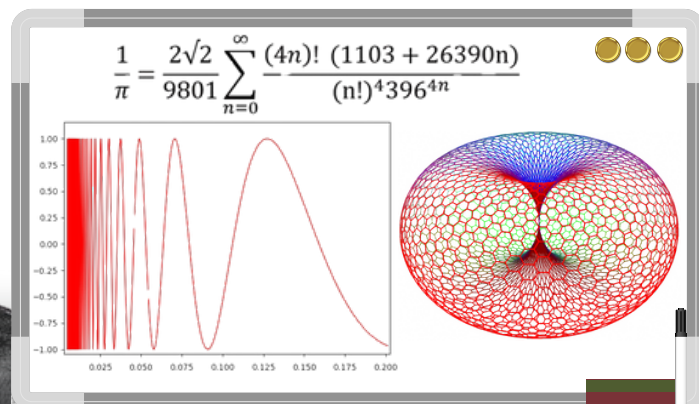
Legacy that inspires the future

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GANANAM

*A Monthly Newsletter of
Department of Mathematics and Computing*



KNOWN INDIAN MATHEMATICIAN BORN IN FEBRUARY

C. S. Seshadri was born on February 29, 1932, in Kanchipuram, Tamil Nadu, India. He was a distinguished Indian mathematician known for his fundamental contributions to algebraic geometry and representation theory. His most notable achievements include the Seshadri constant, a key concept in the study of ample line bundles, and the Narasimhan-Seshadri theorem, which establishes a deep connection between stable vector bundles on a Riemann surface and unitary representations of its fundamental group.



Seshadri completed his early education in Chennai and later earned his undergraduate and master's degrees from the University of Madras. He then pursued research at the Tata Institute of Fundamental Research (TIFR) under the guidance of K. S. Chandrasekharan, which laid the foundation for his lifelong contributions to mathematics. Over the years, he held several prestigious academic positions, including a professorship at TIFR and later at the Chennai Mathematical Institute (CMI), where he played a key role in developing mathematical research in India.

His work was widely recognised, earning him several honours and fellowships. He was a Fellow of the Indian National Science Academy (INSA), the Indian Academy of Sciences (IASc), and the National Academy of Sciences, India (NASI). Internationally, he was elected a Fellow of the Royal Society (FRS, 1988), one of the highest recognitions for a scientist. He also received numerous awards, including the Shanti Swarup Bhatnagar Prize for Science and Technology (1972), the Third World Academy of Sciences Prize (TWAS Prize, 2006), the Padma Bhushan (2009), and the Ramanujan Medal (2000).

Through his pioneering research and dedication to mathematical education, Seshadri left a lasting impact on algebraic geometry and inspired generations of mathematicians. He passed away on July 17, 2020, leaving behind a rich legacy in mathematics.

PUBLICATIONS

- **P. S. Rao** and S. Chowdhury, Numerical Study of Unsteady Biocconvective Transport of Axytactic Microorganism Over a Stretching Cone, Journal of Applied Mathematics and Mechanics, 2025 (Accepted).
- **G. K. Vishwakarma**, P. Kumari, A. Bhattacharjee, and S. H. Ong, Bayesian classifier based on cancer prognostic markers using accelerated failure time model with frailty effect, Quality & Quantity, 2025.
- A. Tarafdar, J. Mahato, **R. K. Upadhyay**, P. Bhattacharya, Exploring the synergy of media awareness and quarantine classes in SiSAQEIHR model for pandemic control: a Deep LSTM-RNN predictions, Physica D-Nonlinear Phenomena, 474, 134563, 2025.
- B.K. Lenka, and **R. K. Upadhyay**, A new way to synchronize memory chaos, Differential Equations and Dynamical Systems, 2025, (Accepted).
- B. Mondal, S. Mandal, P. K. Tiwari, **R. K. Upadhyay**, How predator harvesting affects prey-predator dynamics in deterministic and stochastic environments? Applied Mathematics and Computation, 498, 129380, 2025.
- N. Sriwastav, **A. Das**, O. Shardt, J. Kumar, and M. Singh, A meshfree approach for the rennet-induced coagulation equation: Spline based multistage Bernstein collocation method and its convergence analysis, Applied Mathematical Modelling, 116035, 2025.
- **A. Kalita**, 6TiSCH-Sim: an Efficient Simulator and Cell Scheduling Scheme for 6TiSCH Industrial IoT Networks, IEEE National Conference on Communications, 2025.

SPONSORED PROJECTS

The department has received four research grants under the Prime Minister Early Career Research Grant (PMECRG) scheme of the Anusandhan National Research Foundation (ANRF). The awarded faculty members and their respective research project titles are as follows:

- **Prof. A. Das** - Dynamic Modeling of Wet Granulation Integrating Multi-scale PBM-DEM and Coarse-Graining Approaches to Track Size and Temperature Evolution.
- **Prof. A. Kalita** - Improving the performance of 6TiSCH and DSME-based Internet of Things Networks.
- **Prof. A. K. Verma** - Mathematical Modeling of Intraneuronal Transport in the Human Brain Using Exclusion Processes: Analysis and Simulation
- **Prof. S. Kumawat** - Developing Generalizable AI Models for Drone Imagery in Complex and Varied Indian Landscapes

ALUMNI SPARK

Alwarappan Nakkiran began his career after completing an Integrated M.Sc. (M&C) from IIT(ISM) Dhanbad, joining Mu Sigma Business Solutions in 2011. He specialized in marketing analytics, working with both Indian and U.S. offices, primarily consulting for Dell Technologies. His role evolved from developing statistical models for Dell's product lines to leading strategic marketing discussions during Dell's transition from a public to a private company, working closely with executive teams.



In 2015, Alwarappan transitioned to Amazon as a Data Scientist in the Transaction & Risk Management team, focusing on combating fraud across Amazon's digital and retail platforms. Over two years, he developed machine learning models that earned recognition through three technical white papers presented at Amazon Machine Learning conferences. Later, he shifted to Alexa's Natural Language Understanding team in 2017, where he worked on enhancing user-Alexa interactions by quantifying and improving conversational quality.

Since 2019, Alwarappan has taken on a leadership role as Manager of Applied Sciences at Amazon, leading a team of Data and Applied Scientists. His work includes developing advanced recommendation engines and econometric models, with one of his key achievements being the creation of Amelia, an AI-driven assistant for third-party sellers. Alwarappan also contributes to Amazon's scientific community by serving on review committees, evaluating research across various domains, and staying at the forefront of advancements in machine learning and AI-driven technologies.

STUDENT ACTIVITIES

Anushka Somani, a second-year Integrated Master of Technology student, showcased her talent at **ETHGlobal's Agentic** Ethereum event. She secured 3rd place in the Flow track for Best AI Agents for Consumers and was recognized as the Most Viral Agent in the Gaia and Collab.Land track, winning a team prize worth \$3000.

INVITED TALKS

- **Prof. J. Dasgupta** delivered an invited talk on “Equivariant vector bundles on complexity-one T-varieties and Bruhat-Tits buildings” at the Discussion Meeting in Algebraic Geometry in TIFR Mumbai on 10 February 2025.
- **Prof. P. S. Rao** delivered an invited talk on “Fourier Transform technique for Solution of Partial Differential Equations” at the School of Advanced Sciences, Department of Mathematics, VIT Vellore, on 19 February 2025.
- **Prof. G. K. Vishwakarma** delivered an invited talk on “Bayesian State Space Modeling for Longitudinal Data Analysis” at the National Conference on the Recent Trends in Mathematical Sciences (NCRDMS-2025) held during February 5-7, 2025 in University of Hyderabad.
- **Prof. A. K. Verma** delivered an invited talk on “Mathematical Modelling of Transport Systems through Random Processes” at Bon Secours Art & Science College for Women, Mannargudi, on 13 February 2025.
- **Prof. R. K. Upadhyay** chaired the session in the National Workshop on Modeling of Infectious Disease Dynamics, organized by the Department of Mathematics, Central University of Rajasthan during 24-28 February 2025.

ADDITIONAL RESPONSIBILITY

- **Prof. R. K. Upadhyay** has been appointed as Associate Editor for Franklin Open (Elsevier Journal).
- **Prof. T. Ojha** has been appointed as a TPC member for premier IEEE Conferences – IEEE PIMRC 2025 and IEEE VTC-Spring 2025.

MATHEMATICS AND COMPUTING NEWS

- When molecules collide with surfaces, a complex exchange of energy takes place between the molecule and the atoms composing the surface. But beneath this dizzying complexity, quantum mechanics, which celebrates its 100th anniversary this year, governs the process. Quantum interference, in particular, plays a key role. It occurs when different pathways that a molecule can take overlap, resulting in specific patterns of interaction: some pathways amplify each other, while others cancel out entirely. This "dance of waves" affects how molecules exchange energy and momentum with surfaces, and ultimately how efficiently they react. [\[Read More\]](#)
- Artificial intelligence can scan a chest X-ray and diagnose if an abnormality is fluid in the lungs, an enlarged heart or cancer. But being right is not enough, said Ngan Le, a University of Arkansas assistant professor of computer science and computer engineering. We should understand how the computer makes its diagnosis, yet most AI systems are black boxes whose "thought process" even their creators cannot explain. [\[Read More\]](#)

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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