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Legacy that inspires the future

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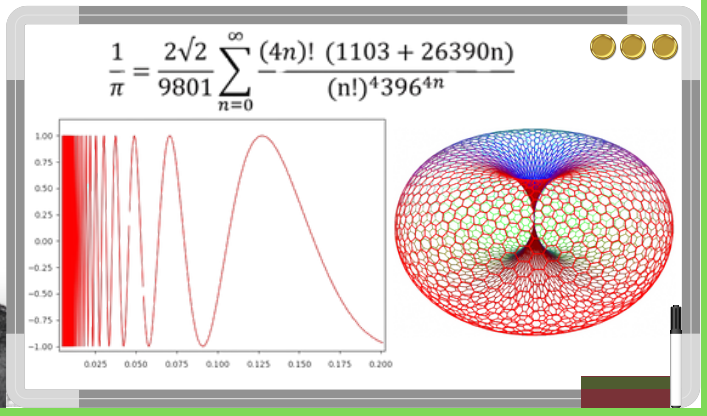

KNOWN INDIAN MATHEMATICIAN BORN IN DECEMBER

Srinivasa Ramanujan (born December 22, 1887 – died April 26, 1920) was an Indian mathematician whose work has had a lasting impact on various fields, particularly number theory, continued fractions, and infinite series. Born in Erode, Tamil Nadu, Ramanujan displayed extraordinary mathematical talent from an early age, teaching himself advanced mathematics, much of which was later recognized as groundbreaking. He had little formal education in mathematics, but his intuitive grasp of the subject allowed him to develop a wealth of original results.

Ramanujan's most notable contribution was to number theory, where he made significant discoveries about the properties of prime numbers, the partition function, and modular forms. For instance, his work on the partition function provided a formula that approximated the number of ways a number can be expressed as a sum of integers. His formula for the number of partitions of a number (the Ramanujan-Hardy asymptotic formula) remains a key result in modern number theory. Another major achievement was his development of a series for pi, known today as the Ramanujan series, which contributed to the fast convergence of pi computations.

Despite his limited formal training, Ramanujan was not deterred by the lack of resources or academic support in colonial India. In 1913, he sent a letter with original mathematical results to G.H. Hardy, a prominent British mathematician at Trinity College, Cambridge. Hardy was initially sceptical, but upon reviewing the letter, he quickly recognized Ramanujan's extraordinary genius. This led to a collaboration between the two, and Ramanujan moved to England in 1914 to work with Hardy at Cambridge.

In England, Ramanujan faced numerous challenges, not least the cold climate and a harsh diet, which affected his health. Nevertheless, he produced some of his most celebrated work during this period, including results on highly composite numbers, mock theta functions, and further contributions to infinite series and continued fractions. His work laid the foundation for much of modern analytic number theory.

However, Ramanujan's health deteriorated in the harsh English climate, and he returned to India in 1919. Unfortunately, his health continued to worsen, and he died the following year at the age of 32. Despite his brief life, Ramanujan's contributions to mathematics were immense. His work continues to inspire mathematicians and is central to various areas of study, including quantum physics, string theory, and cryptography.

Ramanujan's story is not only a testament to his intellectual brilliance but also a powerful reminder of the importance of perseverance, intuition, and the ability to think outside the conventional academic structures. His legacy remains a shining example of what can be achieved through raw mathematical creativity and passion.

PUBLICATIONS

- B.K. Lenka, **R. K. Upadhyay**, Controlling memory chaos and synchronization in real order nonlinear systems, Journal of the Franklin Institute, Dec 2024 (Accepted).
- **R.K. Upadhyay,** S. Kumari, B. Mondal, S. K. Tiwari, Cross-diffusive Pattern formation and Hopf-bifurcation analysis of two species plankton interaction model, Indian Journal of Pure and Applied Mathematics, Dec 2024 (Accepted).
- **R. K. Upadhyay,** A. Berman, P. S. Das, B. Panda, On investigation of complexity in extracellular matrix-induced cancer dynamics under deterministic and stochastic framework, Nonlinear Dynamics, Dec 2024, (Accepted).
- **M. K. Singh,** P. Bharti, Linear and Nonlinear Stability Analysis of Double-Diffusion Convection in an Inclined Brinkman Porous Media with a Concentration-Based Internal Heat Source, Physics of Fluids, 36 (12), 2024.
- Y. Liu, **S. Kumawat,** H. Nagahara. Deep Hardware Modality Fusion for Image Segmentation, Proceedings of International Conference on Pattern Recognition, 439-454, Springer, 2025.
- **S. Kumawat**, H. Nagahara, LoHoSC: Low Order High Order Style Consistency for Syn-to-Real Domain Generalized Semantic Segmentation, Proceedings of International Conference on Pattern Recognition, 243-258, Springer, 2025.
- S. Reddy, N. Choudhury, A. Hazarika, **T. Ojha**, DyHSARW: A Dynamic GTS Scheduling Mechanism for Large IEEE 802.15.4 DSME-Based IoT Networks, Proceedings of IEEE Wireless Communications and Networking Conference, Milan, Italy, March 2025.
- **A. K. Singh**, H. Q. Dinh, M. Thakur, On Symbol-Pair Distance Distributions of Repeated-root Constacyclic Codes of Length 4p^s and MDS Codes, Advances in Mathematics of Communications, Dec 2024, (Accepted).

THESIS DEFENCE

Ms. Ekta Bindal received a PhD degree in the research area of **Post Quantum Cryptography** under the guidance of **Prof. Abhay Kumar Singh.** Ekta's PhD thesis focuses on the design and analysis of post-quantum secure protocols using code-based cryptography. Her research addresses the challenge of reducing the public key size in code-based cryptosystems, particularly within the McEliece and Niederreiter frameworks. The proposed schemes utilize specific cases of matrix-product codes, integrating binary Goppa and generalized Reed-Solomon (GRS) codes to achieve key size reduction while ensuring strong security against both classical and quantum attacks. Her work further involves constructing efficient hard-decision and soft-decision decoding algorithms for matrix-product codes. The study contributes to advancing post-quantum cryptography by optimizing the trade-off between practical efficiency and robust security guarantees.

INVITED TALKS

- **Prof. Gajendra K. Vishwakarma** delivered an invited talk on "Gene expression data analysis using Bayesian state-space modelling" at the Center for Applied Mathematics, International Institute of Information Technology Naya Raipur on Dec. 19, 2024.
- **Prof. Gajendra K. Vishwakarma** delivered an invited talk on "Resampling approach for feature selection on predicting outcome using micro-array data" at the Department of Statistics & OR, Kurukshetra University, Kurukshetra on Dec. 23, 2024.
- **Prof. Akhilesh Prasad** delivered an invited talk on "An Operational calculus of μth order Mehler-Fock transform" at 90th Annual Conference of Indian Mathematical Society, Dr. Vishwanath Karad, MIT World Peace University, Pune on Dec. 26, 2024.
- **Prof. Jyoti Dasgupta** delivered an invited talk on "Equivariant Vector Bundles on complexity-one T-varieties and Bruhat-Tits buildings" at the 39th Annual Conference of Ramanujan Mathematical Society, Christ University on Dec. 28, 2024.
- **Prof. Pentyala Srinivasa Rao** delivered an invited talk on "Numerical Investigation Of Thermo-Bioconvection Of Oxitactic Microorganism In A Tilted Square Cavity Heated Sinusoidally" at the Department of Mathematics, Christ University, Bangalore, in the 69th Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM), during Dec. 19-21, 2024.
- **Prof. Pentyala Srinivasa Rao** delivered an invited talk on "Numerics of DGM Method for Convective Heat Transfer Models" at the Department of Mathematics, Kalasalingam University, Tamilnadu, in the 6th International Conference on Applications of Fluid Dynamics (ICAFD) during Dec. 5-7, 2024.
- **Prof. Abhay Kumar Singh** delivered an invited talk on "Quantum Computing: A Journey from Bits to Qubits" at the Department of Mathematics, University of Allahabad, Prayagraj on the occasion of National Mathematics Day on Dec. 22, 2024.
- **Prof. Abhay Kumar Singh** delivered an invited talk on "Impact of Numbers in the current Digital Era" at the Department of Mathematics, CSJM University Kanpur on the occasion of National Mathematics Day on Dec. 23, 2024.

EVENTS

Prof. Jyoti Dasgupta and **Prof. Neeru Bala** organized the National Mathematics Day, a special 2-day program to celebrate the **137th birth anniversary of one of the greatest mathematicians in history**, Srinivasa Ramanujan. The program took place over two days—22nd and 23rd December—each filled with insightful talks from distinguished speakers. On 22nd December, **Prof. Gadadhar Misra from IIT Gandhinagar** and **ISI Bangalore** delivered a talk on **"Euler's product formula** and **the Ramanujan sum**", while **Prof. Jaydeb Sarkar from ISI Bangalore** presented on **"How Google googles?"**. On 23rd December, the second day of the event, the program featured two online talks: **Prof. Anoop Singh from IIT (BHU)** spoke on **"On the moduli space of Lie algebroid connections over a compact Riemann Surface"**, and **Prof. Amartya Kumar Dutta from ISI Kolkata** discussed **"Emergence of Algebra in Ancient India"**. The program was a fitting tribute to Ramanujan's legacy, fostering enriching discussions and inspiring future advancements in mathematics.

Prof. Tamoghna Ojha organized the **1st edition** of "**Distributed Computing in 6G IoT Networks**" workshop along with 18th IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS) 2024, a premier conference in India, at IIT Guwahati from December 15-18, 2024. The event hosted a keynote talk on "Three technologies that will define 6G" by Prof. Vivek Bohara, IIIT Delhi and 9 research paper oral presentations by researchers from India and abroad. Prof. Ojha also presented his work in this conference.

Prof. Manisha Verma was part of the organizing team as Publicity Chair for the 9th International **Conference on Computer Vision and Image Processing (CVIP)**, held from December 19th to 21st at IIITDM Kancheepuram. She also served as a publicity chair and meta-reviewer. Additionally, she chaired a conference session where researchers from renowned institutions presented papers on various topics in computer vision.

CONVOCATION 2024

- In the 44th Convocation concluded in December 2024, Ayan Vishwakarma (Int. M. Tech), Bhakti Singhal (M. Sc), and Shama Perween (M. Tech) received the Gold medal, while Bhavya Jain (Int. M. Tech) and Subhojit Chakrabarty (M. Sc.) received the Silver Medal.
- Smt. Renuka Rajhans Memorial Gold Medal for Best Girl Student of 5 Year Integrated Programme was awarded to Srashti Agrawal (Int. M. Tech).

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Bhavya Jain
19JE0236

Shama Perween
22MT0361

Subhojit Chakrabarty
22MS0153

Bhakti Singhal
22MS0038

ALUMNI SPARK

Dr. Aritra Dutta is an Assistant Professor at the Artificial Intelligence Initiative at the University of Central Florida (UCF). He holds a primary affiliation with the Department of Mathematics and a secondary joint appointment with the Department of Computer Science. Prior to his role at UCF, Dr. Dutta served as an Assistant Professor in the Department of Mathematics and Computer Science at the University of Southern Denmark (SDU). He is also affiliated with SDU's Centre for AI Science and Applications (CASA) and the Pioneer Centre for AI (P1) in Denmark.

Dr. Dutta earned his M.Sc. in Mathematics and Computing from the Indian Institute of Technology (ISM) Dhanbad in 2008. He went on to receive both an M.S. and Ph.D. in Mathematics from UCF, with his doctoral degree awarded in 2016. His dissertation earned him the Outstanding Dissertation Award from the Mathematics Department at UCF. In 2017, Dr. Dutta was honored with the prestigious Lee H. Armstrong Award for excellence in Graduate Teaching, the highest recognition for graduate-level teaching at UCF. Before joining SDU, Dr. Dutta was a Postdoctoral Fellow at the Extreme Computing Research Center and the Visual Computing Center at King Abdullah University of Science and Technology (KAUST).

Dr. Dutta reflects on his time at IIT (ISM) with deep gratitude, stating, "I cannot explain how much I am indebted to the Department of Mathematics & Computing, IIT (ISM) for helping shape my career and making me a better person. I am thankful to all the faculty members who educated me. While day-to-day memories may fade, the extraordinary kindness, inspiration, and wisdom I received from the entire institute have left a lasting impression."

MATHEMATICS & COMPUTING NEWS

- Mathematicians have applied statistical mechanics to climate change detection and attribution for the first time: Mathematicians have applied statistical mechanics to climate change detection and attribution for the first time. They have shown how to separate the 'signal' of human-made climate change from the 'noise' of natural climate fluctuations. This allows for a dramatic improvement in the ability to detect climate change and early warnings of climatic tipping points. Read More

- First demonstration of quantum teleportation over busy Internet cables: Quantum teleportation could provide near-instant communication over long distances. But, inside Internet cables, photons needed for teleportation are lost within the millions of light particles required for classical communications. A new study quantified light scattering to find exact areas to place photons to keep them safe from other particles. The approach successfully worked in experiments carrying regular Internet traffic. Read More

Innovation:

Prof. Gajendra K. Vishwakarma developed **open-source R packages for data analysis**. The codes are openly available on CRAN, which people may use for their research and cite them as:

- Bhattacharjee, A., Vishwakarma, G.K. and Kumar, N. (2024). MIGEE: Impute Missing Values and Fitting Linear Mixed Effect Model. R package, version 0.1.0, https://CRAN.R-project.org/package=MIGEE
- Bhattacharjee, A., Rajbongshi, B. and Vishwakarma, G.K.,(2024). dscoreMSM: Survival Proximity Score Matching in Multi-State Survival Model. R package version 0.1.0, https://CRAN.R-project.org/package=dscoreMSM

ADDITIONAL RESPONSIBILITY

- **Prof. M. K. Singh** has been appointed an Expert Committee Member in AICTE.
- **Prof. S. P. Tiwari** has been appointed as Associate Editor, Soft Computing (Springer).
- **Prof. A. Kalita** served as a Session Chair for the IEEE ANTS Workshop on Distributed Computing in 6G IoT Networks (6-DCIoT), IIT Guwahati, India.

AWARDS

- **Prof. Gajendra K. Vishwakarma** received the Prof. B.G. Prasad Award from the Indian Society for Medical Statistics (ISMS).
- **Ms. Riya Ghosh (PhD. Guide Prof. A. Selvan)** received the Best Thesis Award at Department level.
- **Mr. Souvik Banerjee (PhD. Guide Prof. G. K. Vishwakarma)** received the Inder Mohan Thapar Research (IMTR) Award.

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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