Rohit Roy

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About

I am a 1st year PhD student at Centre Inria d'UniCA, working on problems in computational geometry. I previously developed a strong interest in probability theory, and my research focus has since shifted toward Topological Data Analysis and exploring topological solutions to data-driven problems.

Education

Centre Inria d'Université Côte d'Azur *Nov 2025 – Oct 2028 (expected)*
PhD in Computer Science and Applied Mathematics

Chennai Mathematical Institute *Aug 2023 – Apr 2025*
Master of Science in Data Science CGPA : 9.00

Chennai Mathematical Institute *Dec 2020 – Apr 2023*
Bachelor of Science (Honours) in Mathematics and Computer Science CGPA : 7.88

Key Courses Undertaken

Mathematics :

- Real and Complex Analysis
- Probability Theory and Stochastic Processes
- Group, Ring and Field Theory
- Linear Algebra
- Topology
- Enumerative Combinatorics
- Statistics
- Ordinary and Partial Differential Equations
- Hilbert Spaces and Quantum Probability
- Measure Theoretic Probability
- Stochastic Integration

Computer Science and Data Science :

- Design and Analysis of Algorithms
- Programming Language Concepts
- Foundations of Machine Learning
- Theory of Computation
- Topological Data Analysis
- Advanced Machine Learning
- Database Concepts
- Simulation Techniques
- Undecidability in Algebra & Topology
- Natural Language Processing
- Applied Data Analytics

Publications/Preprints

2. S. Pritam, **R. Roy**. Collapse and Persistence of Directed Filtered Graphs.
To appear at Algorithm Engineering and Experiments (ALENEX) 2026

1. S. Chowdhury, S. Pritam, **R. Roy**, M.C. Sajeev. Filtration-Based Representation Learning for Temporal Graphs. arXiv
Submitted.

Work Experience

Machine Learning Engineer *Bengaluru, India*
Hewlett-Packard, Printing and PC Systems (PPS) *Jun 2025 – Oct 2025*

- Contributed to the development of an enterprise-scale question–answering system for printing solutions at HP.
- Extended a document-based language model pipeline to support multimodal inputs, incorporating information from images and tabular data.
- Implemented and evaluated models and workflows on the AWS SageMaker platform.
- Investigated and applied prompt engineering techniques to improve model interpretability and response quality.
- Designed mechanisms for structured metadata retrieval and document access from SharePoint to support efficient information retrieval.

Internships

Research Intern *Bordeaux, France*
LaBRI, Universite de Bordeaux *May 2023 – Jul 2023*

- Worked under Prof. Jean-Francois Markert on directed animals in 2D.
- Investigated open combinatorial questions concerning directed animals, a concept representing percolation clusters in directed percolation models and conducted simulations of directed animals on triangular and square lattices.
- More details can be found here, with the complete internship log here.

Data Analysis Intern (Industry Internship) *Chennai, India*
NPTEL, IIT Madras *May 2024 – Aug 2024*

- Classified colleges on their performance in NPTEL courses using clustering and came up with metrics for comparison.
- Created System Dynamic (SD) models using Vensim to mimic NPTEL course enrollment and registration trends across semesters with real world factors in play.

Reading Projects

Branching Processes and Convergence Concepts *May 2022 – Jul 2022*

- This was a reading project under Prof. Ayan Bhattacharya from IIT Bombay.
- Learnt about Galton-Watson process, genealogical trees and the probability of extinction of the same process.
- Discussed about various limit theorems in probability and had a brief overview of branching random walks.

Markov Chains and related concepts *May 2022 – Jul 2022*

- This was a reading project under Prof. Rajeeva Karandikar from Chennai Mathematical Institute.
- Guided reading of the book "An Introduction to Probability Theory and its Applications" by William Feller.
- Learnt about Markov Chains and Stochastic Processes.

Presentations and Activities

- Presented the work on **Classifying Graphs using Persistence Diagrams** at Data Science Summer School 2024, jointly hosted by IIT Madras and CMI. My slides can be found here.
- Part of a research seminar series, headed by Prof. Siddharth Pritam and Prof. Priyavrat Deshpande at Chennai Mathematical Institute, where we discuss about temporal graphs and complexes associated with it.
- Presented a paper Deep Learning with Topological Signatures as part of Topological Data Analysis course at CMI. My slides can be found here.
- Attended a workshop on Applied Topology and Complex Networks. Learnt about the applications of the Borsuk-Ulam Theorem in Geometry and Combinatorics (lectures by Prof. Arijit Ghosh) and analysis of Temporal Networks as generalizations of graphs and algorithms based on them (lectures by Prof. Esteban Bautista).
- Presented the proof of generalized Riesz Representation Theorem as part of Stochastic Integration course at CMI. The slides can be found here.
- Presented some theorems on $\mathcal{L}^p$ spaces and inequalities as part of Measure Theoretic Probability course at CMI. The slides can be found here.

Academic Achievements

- **Olympiad Mathematics :** Qualified for the Indian National Mathematical Olympiad (INMO) in 2018.
- **KVPY-SA 2018 Fellow :** Recipient of the KVPY scholarship given yearly.
- **Mathematics Talent Reward Programme (MTRP)** held in ISI Kolkata : Qualified in 2017 and 2019, and received 3rd prize in 2017.

Teaching Experience

Data Mining and Machine Learning *Jan 2025 - Apr 2025*
- Instructor : Prof. Madhavan Mukund
- Intended for : M.Sc. Data Science 1st Year

Distributed Computing and Big Data *Jan 2025 - Apr 2025*
- Instructor : Prof. Venkatesh Vinayakrao
- Intended for : M.Sc. Data Science 1st Year

Introduction to Martingales *Jan 2025 - Apr 2025*
- Instructor : Prof. Rajeeva Karandikar
- Intended for : B.Sc. 3rd Year and M.Sc.

Natural Language Processing *Aug 2024 - Dec 2024*
- Instructor : Prof. Ramaseshan Ramachandran
- Intended for : M.Sc. Data Sci. & M.Sc. Comp. Sci.

Probability Theory *Jan 2024 - Apr 2024*
- Instructor : Prof. Rajeeva Karandikar
- Intended for : B.Sc. Mathematics 1st Year

Mathematical Methods in Analysis *Aug 2022 - Nov 2022*
- Instructor : Prof. Rajeeva Karandikar
- Intended for : M.Sc. Data Science 1st Year

Technical Skills

Languages : Python, C++, Mathematica, Java, Haskell

Tools : LaTeX

Last updated in December 2025