

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

Publications/Preprints

3. E.W. Chambers, C. Fillmore, S.S. Mukherjee, **R. Roy**, E. Stephenson, M. Wintraecken. Bouquet: A Visualization Tool for Symmetry Sets and Vineyards. [Tool](#) [🔗](#), [HAL](#) [🔗](#)
European Workshop on Computational Geometry (EuroCG 2026)
2. S. Pritam, **R. Roy**. Collapse and Persistence of Directed Filtered Graphs. [DOI](#) [🔗](#)
SIAM Symposium on Algorithm Engineering and Experiments (ALENEX26)
1. S. Chowdhury, S. Pritam, **R. Roy**, M.C. Sajeew. 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)

NPTEL [↗](#), IIT Madras

Chennai, India

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 inner workings and theory of the DeepSeek R1 [↗](#) model as part of GenAI course at CMI. My slides can be found [here](#). [↗](#)
- Presented the work on **Filtration-Based Representation Learning for Temporal Graphs** 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

Probability Theory

◦ Instructor : Prof. Rajeeva Karandikar

Mathematical Methods in Analysis

◦ Instructor : Prof. Rajeeva Karandikar

◦ Intended for : M.Sc. Data Sci. & M.Sc. Comp. Sci.

Jan 2024 - Apr 2024

◦ Intended for : B.Sc. Mathematics 1st Year

Aug 2022 - Nov 2022

◦ Intended for : M.Sc. Data Science 1st Year

Technical Skills

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

Tools : L^AT_EX