

# Chinmaya Kausik

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## Education

- **Ph.D. (Mathematics):** Field – Machine Learning August, 2021 – Present  
*University of Michigan, Ann Arbor*  
Advisors: Prof. Ambuj Tewari and Prof. Martin Strauss. GPA: 4.0/4.0
- **Bachelor of Science (Research):** Major – Mathematics August, 2017 – August, 2021  
*Indian Institute of Science, Bangalore.* GPA: 9.6/10

## Publications and Preprints

- **Learning Mixtures of Markov Chains and MDPs (Markov Decision Processes)**  
C. Kausik, K. Tan, A. Tewari; ICML, 2023 (Oral). [Link](#).
- **Denoising Low-Rank Data Under Distribution Shift: Double Descent and Data Augmentation**  
C. Kausik\*, K. Srivastava\*, R. Sonthalia\*; NeurIPS M3L Workshop, 2023. [ArXiv link](#).
- **Offline Policy Evaluation and Optimization Under Confounding**  
C. Kausik\*, K. Tan\*, Y. Lu\*, Y. Wang, A. Tewari; under review. [ArXiv link](#).
- **An Algorithm for the Generalized Seifert Matrix**  
S. Friedl, C. Kausik, J. Quintanilha (alphabetical order); Journal of Knot Theory and Its Ramifications, 2022. [Link](#).

## Key Skills

- **Languages:** Python, MATLAB, C, Scala, Idris, Lean, Mathematica
- **Packages and Tools:** PyTorch, PyTorch Geometric, Stable Baselines, Gurobi,  $\text{\TeX}$
- **Machine Learning:** Reinforcement Learning, Bandits, Deep Learning, Differential Privacy, Causal Inference, Sequential Decision Making, Control, Graph Neural Networks, Data Science, Data Analysis

## Research Projects

- **Offline Reinforcement Learning and Bandits** April, 2022 - Present  
*Prof. Ambuj Tewari, University of Michigan*  
First author on an ICML oral paper that improved clustering performance over the classical EM algorithm **from 73% to 96%**. Working on offline-to-online transfer, latent bandits, offline linear bandits, sequential decision-making for cryo-EM.
- **Supervised Denoising and Double Descent** May, 2022 - Present  
*Dr. Rishi Sonthalia, UCLA*  
Co-first author on the first paper to show test error results for denoising with no data-distribution assumptions, with **less than 1% error** between theory and experiments on real-life image data. Among the **first** to examine double descent under distribution shift, currently generalizing results to neural network autoencoders.
- **Reinforcement Learning for GNNs and Molecular Prediction** July, 2022 - Present  
*Dr. Eli Meiron, NVIDIA*  
Designing and implementing the first reinforcement learning algorithm to rewire graph neural networks for improving performance, with applications to molecular prediction and chemistry. Continued from LOGML 2022, about 100 other researchers were selected from around the world and matched across 22 projects.
- **Multi-Fidelity Feedback for Bandits and Reinforcement Learning** July, 2023 - Present  
*Dr. Yonathan Efroni, Meta (Responsible AI)*  
Designing novel algorithms for sequential decision making problems under access to feedback at varying accuracies (that is, fidelities) and costs. **First** to study this under the more realistic setting of feedback at different variances instead of biases.

- **Latent-Reward POMDPs** July, 2023 - Present  
*Dr. Aldo Pacchiano, Broad Institute of MIT and Harvard*  
Working on reinforcement learning and bandits under non-classical feedback models. Formulating and studying a new partial-observation model for non-Markovian rewards, generalizing both standard and preferential feedback.
- **Undergraduate Mathematics Researcher** May, 2018 - May, 2021  
*IISc and University of Regensburg*  
Worked on automated and interactive theorem proving, computer-assisted geometry and topology. Designed and implemented **the first algorithm** to compute a class of link invariants, delivering a **polished application with a complete GUI**. [Link here](#).

## Awards and Fellowships

- **DAAD-WISE Scholarship, 2020:** (Programme cancelled later due to COVID-19) Scholarship offered by the German Academic Exchange Service to students in science to spend a summer in Germany.
- **KVPY SA Scholarship, 2017:** Placed 12<sup>th</sup> among around 100,000 candidates. Scholarship offered by Department of Science and Technology, Govt. of India, to undergraduates studying science.
- **Silver Medal, International Olympiad in Linguistics, 2017:** Part of Team India (Saffron). Placed 1<sup>st</sup> at the national linguistics Olympiad (PLO) camp.
- **NTSE Scholarship, 2015:** Scholarship offered by Department of Science and Technology, Govt. of India, to meritorious high school students.

## Other Experiences

- **Co-organizer, Stochastic Differential Equations Reading Group** Fall, 2023  
Co-organizing a reading group on applied stochastic differential equations and diffusion models.
- **Erdos Data Science Bootcamp** Fall, 2023  
Attending a semester-long data science bootcamp, with a concrete data analysis final project.
- **Princeton ML Theory Summer School, 2023** June, 2023  
*Princeton University, NJ, USA*  
80 fully-funded PhD students invited out of 350 applicants. Attended lectures on deep learning and learning dynamics.
- **LOGML Summer School, 2022** July, 2022  
*Virtual*  
Selected along with around 100 other ML/geometry researchers from the world. Project: Using RL for rewiring GNNs.
- **Michigan Research Experience for Graduates, 2022** June, 2022  
*Virtual*  
One of about 41 graduate students selected. Worked on denoising and double descent under Rishi Sonthalia (UCLA).

## Outreach, Mentorship and Service

- **Organizer, SPAM Interdepartmental Tea** January, 2023 - Present  
Founded and organize a social initiative for PhD students in statistics, physics, astronomy and mathematics (SPAM).
- **Member, Grads Out in STEM** September, 2021 - Present  
Organize and attend community-building events for LGBTQIA+ graduate students.
- **Graduate Student Mentor, Laboratory of Geometry** August, 2022 - December, 2022  
Led a team of 6 undergraduate students in a research project at the intersection of model predictive control and deep learning.
- **Co-organizer, Monsoon Math Camp** April, 2020 - Present  
Co-founded and led a free and immersive online experience introducing advanced high school students to higher mathematics. Raised \$20,000 in funding.