

ABHIJEET MULGUND

mulgund2@uic.edu

abhmul.github.io

RESEARCH INTERESTS

Information Theory, Machine Learning, Probability

EDUCATION

- 05/2027 University of Illinois Chicago, Chicago, IL
PhD in Mathematics
Current GPA: 4.00/4.00
- 05/2022 University of Illinois Chicago, Chicago, IL
Masters of Science in Mathematical Computer Science
Master's Thesis: *Martingales and an Application*
GPA: 4.00/4.00
- 05/2019 Rice University, Houston, TX
Bachelor of Arts in Computer Science and Mathematics
GPA: 3.66/4.00

RESEARCH EXPERIENCE

- 08/2025 to Present Theoretical Analysis of Anti-Distillation Sampling
University of Illinois Chicago, Stanford University
with Chirag Pabbaraju
- 09/2021 to Present Interpreting Deep Learning based Error-Correcting Codes
University of Illinois Chicago
Under Dr. Gyorgy Turán, Dr. Natasha Devroye, and Dr. Miloš Žefran
- 07/2024 to 08/2025 Geometry of Weak-to-Strong Generalization
University of Illinois Chicago, Stanford University
with Chirag Pabbaraju
- 05/2024 to 08/2024 Arithmetic Circuit Complexity of Decoding Error-Correcting Codes
Northwestern University
Under Dr. Aravindan Vijayraghavan
- 08/2018 to 12/2018 Training Binary Neural Networks with Reinforcement Learning
Rice University
Under Dr. Alan Lockett and Dr. Ankit Patel

03/2018 to 05/2018 Data Augmentation for Natural Language Processing
CS Disco
Under Dr. Alan Lockett

WORKSHOPS

01/2024 Mathematics of Data Science and Machine Learning
Advanced Studies Institute
Urgench, Uzbekistan

05/2023 Analysis and Partial Differential Equations
Okinawa Institute of Science and Technology
Okinawa, Japan

TEACHING EXPERIENCES

08/2023 to 05/2025 Directed Reading Program Mentor
University of Illinois Chicago

01/2026 to 05/2025 Teaching Assistant, Finite Mathematics for Business
University of Illinois Chicago

08/2025 to 12/2025 Teaching Assistant, Calculus for Life Sciences
University of Illinois Chicago

01/2019 to 05/2019 Teaching Assistant, Statistical Machine Learning
Rice University

08/2018 to 12/2018 Teaching Assistant, Advanced Algorithms
Rice University

08/2017 to 12/2017 Teaching Assistant, Advanced Algorithms
Rice University

TECHNICAL SKILLS

Python, Scala, Java, C++, TensorFlow, PyTorch, Linux, HTML/CSS, Javascript, React

PREVIOUS PROFESSIONAL POSITIONS

05/2022 to 09/2022 Data Science for Social Good Fellow
University of Warwick, Coventry, United Kingdom

03/2021 to 07/2021	Software Engineer <i>Domino Data Lab, San Francisco, CA</i>
08/2019 to 08/2020	Software Engineer <i>Domino Data Lab, San Francisco, CA</i>
04/2019 to 08/2019	Freelance Data Scientist <i>Belmont Technologies Inc., Houston, TX</i>
05/2018 to 07/2018	Software Engineering Intern <i>Facebook, Seattle, WA</i>
09/2017 to 05/2018	Assistant Data Scientist <i>CS Disco, Houston, TX</i>
05/2017 to 08/2017	Software Engineering Intern <i>Google, Mountain View, CA</i>
05/2016 to 08/2016	Computational Linguist Intern <i>Lexis-Nexis, Dayton, OH</i>

LEADERSHIP AND SERVICE EXPERIENCES

08/2024 to 05/2025	Information Geometry Reading Group Organizer <i>University of Illinois Chicago</i>
08/2024 to 05/2025	Graduate Computer Science Seminar Organizer <i>University of Illinois Chicago</i>
03/2023 to 04/2023	Image of Research Competition Judge <i>University of Illinois Chicago</i>
03/2022 to 04/2022	Image of Research Competition Judge <i>University of Illinois Chicago</i>
02/2020 to 08/2020	Machine Learning Reading Club Founder <i>Domino Data Lab</i>
08/2018 to 05/2019	Computer Science Student Liaison Committee Director <i>Rice University</i>
04/2018 to 04/2019	Rice Datathon (Data-Science Hackathon) Co-Director <i>Rice University</i>

11/2016 to 09/2017 HackRice 7 Co-Director
Rice University

AWARDS & HONORS

05/2024	UIC Dean's Scholar Fellowship (\$30,000)
04/2024	Bernard Kurtin Scholarship
04/2023	Victor Twersky Memorial Scholarship
09/2022	University of Warwick National Data Science & AI Showcase Runner Up
05/2022	Yeuk-Lam Yau-Leung Memorial Scholarship
04/2022	Department of Defense SMART Scholarship Awardee (Declined)
04/2021	Department of Defense SMART Scholarship Semi-Finalist
03/2018	Kaggle.com Toxic Language Classification Competition Silver-Medalist
05/2017	President's Honor Roll
02/2017	Kaggle.com Leaf Species Classification Competition Featured Solution
05/2015	Jeffrey P Mladenik and Andrew Curry-Green Scholarship (\$15,000)

PRESENTATIONS

1. *Various Talks*, High-Dimensional Probability Reading Group, Chicago, June 2026 to Present.
2. "AI Tutorial for Research", University of Illinois Chicago, May 2026.
3. "Optimal Solutions to the Feedback Coding Problem", Graduate Student Colloquium, Chicago, Mar 2026.
4. "Incidence Problems in Discrete Geometry", Graduate Computer Science Seminar, Chicago, February 2026.
5. "An Application of Symmetry Methods to Study Gradient Flows of Error-Correcting Codes", Rice University, Houston, February 2026.
6. "Interpreting Deep-Learned Error-Correcting Codes: Experiments and Theoretical Aspects", EurIPs 2025, Copenhagen, December 2025.
7. "Connectivity in Random Graphs", Graduate Combinatorics and Probability Seminar, Chicago, October 2025.
8. "The Goldreich-Levin Algorithm", Graduate Computer Science Seminar, Chicago, October 2025.
9. "Multiple Recurrence and Szemerédi's theorem", Dynamics, Groups, and Geometry Seminar, Chicago, October 2025.
10. *Various Talks*, Information Geometry Reading Group, Chicago, August 2024 to May 2025.
11. "Converse Results for Spectral Independence", Graduate Computer Science Seminar, Chicago, April 2025.
12. "Weak-to-Strong Generalization from an Information Geometric Perspective", Graduate Colloquium, Chicago, March 2025
13. "Bounding Chromatic Number using the Hardcore Model", Graduate Combinatorics Seminar, Chicago, March 2025.

14. “Local to Global Analysis of Glauber Dynamics via Spectral Independence”, Graduate Computer Science Seminar, Chicago, February 2025.
15. “Intro to Large Deviations and Error-Correcting Codes”, Graduate Computer Science Seminar, Chicago, October 2025.
16. “Why It’s Hard To Communicate With Others and What You Can Do About It”, Graduate Student Colloquium, Chicago, March 2024.
17. “A Large Class of Efficiently Optimally Decodable Codes”, IDEAL Annual Meeting, Chicago, June 2023.
18. “Smoothed Analysis for Beyond Worst-Case Analysis”, Graduate Computer Science Seminar, Chicago, January 2023.
19. “Decomposing the Training of Deep Learned Turbo codes via a Feasible MAP Decoder,” International Symposium on Topics in Coding (ISTC), Brest, September 2023.
20. “Interpreting Deep-Learned Error Correcting Codes”, IDEAL NSF Site Visit, Chicago, August 2023.
21. “Interpreting Training Aspects of Deep-Learned Error-Correcting Codes,” IEEE International Symposium on Information Theory (ISIT), Taipei, June 2023.
22. “Understanding TurboAE via Decomposition of the Cross-Entropy Loss”, IDEAL Seminar, Chicago, June 2023.
23. “Interpreting Deep-Learned Error Correcting Codes”, IDEAL Annual Workshop, Chicago, June 2023.
24. “Tensor Methods for Combinatorics”, Graduate Combinatorics Seminar, Chicago, November 2022.
25. "Method of Hypergraph Containers", Graduate Combinatorics Seminar, Chicago, February 2022.
26. “What is Deep Learning and What Do We Know About it?”, Graduate Computer Science Seminar, Chicago, November 2021.

PUBLICATIONS

1. A. Mulgund, “Stochastic Domination of Gaussian Maxima: A Resolution to the Weak Simplex Conjecture”, *Preprint*, July 2026.
2. A. Mulgund, R. Shekar, “On loss landscapes of error-correcting codes: symmetries, linear codes and stationarity”, *Submitted to Information Theory Workshop (ITW) 2026*, May 2026.
3. A. Mulgund, C. Pabbaraju, “A Principled Analysis of Antidistillation Sampling”, *Under Review*, May 2026.
4. A. Mulgund, C. Pabbaraju, “Relating Misfit to Gain in Weak-to-Strong Generalization Beyond the Squared Loss”, Accepted to International Conference on Machine Learning (ICML), Vancouver, July 2025. [Arxiv](#)
5. A. Mulgund, N. Devroye, G. Turán, M. Žeřfran, “Decomposing the Training of Deep Learned Turbo codes via a Feasible MAP Decoder,” International Symposium on Topics in Coding (ISTC), Brest, September 2023. [PDF](#)

6. N. Devroye, A. Mulgund, R. Shekhar, G. Turán, M. Žefran, Y. Zhou, “Interpreting Training Aspects of Deep-Learned Error-Correcting Codes,” IEEE International Symposium on Information Theory (ISIT), Taipei, June 2023. [Arxiv](#)
7. A. Mulgund, R. Shekhar, N. Devroye, G. Turán, M. Žefran, "Evaluating interpretations of deep-learned error-correcting codes," 2022 58th Annual Allerton Conference on Communication, Control, and Computing (Allerton), September 2022. [DOI](#)
8. N. Devroye, N. Mohammadi, A. Mulgund, H. Naik, R. Shekhar, G. Turán, Y. Wei, M. Žefran, “Interpreting Deep-Learned Error-Correcting Codes,” International Symposium on Information Theory (ISIT), Espoo, June 2022. [DOI](#)