

HAMIDREZA KAMKARI

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<https://hamidrezakmk.github.io/>

EDUCATION

Massachusetts Institute of Technology (MIT)

2025 - Ongoing

Doctor of Philosophy Student

Deep generative modelling of geometrically constrained data, and characterizing the properties of high-dimensional distributions learned by diffusion-based generative models.

University of Toronto

Master of Science

2022 - 2024

Department of Computer Science

Mitacs Accelerate Fellowship

Cumulative GPA (4.0/4)

Courses: (*CSC2421*) Graphs, Matrices, and Optimization, (*CSC2541*) Topics in Machine Learning: Introduction to Causality

Sharif University of Technology

2018 - 2022

Bachelor of Science

Overall GPA 19.22/20

Department of Computer Engineering

Ranked Among the Top 10

Courses: (*CE695*) Stochastic Processes, (*CE242*) Signals & Systems, (*CE282*) Linear Algebra, (*CE181*) Probability and Statistics, (*CSC384*) Artificial Intelligence, (*CE354*) Algorithm Design, (*CE415*) Formal Languages, (*MAT034*) Differential Equations

PUBLICATIONS

- CausalPFN: Amortized Causal Effect Estimation via In-Context Learning

Vahid Balazadeh*, **Hamidreza Kamkari***, Valentin Thomas, Benson Li, Junwei Ma, Jesse C. Cresswell, Rahul G. Krishnan
NeurIPS 2025 (Spotlight): [arXiv: 2506.07918](https://arxiv.org/abs/2506.07918)

Accepted for an *oral* presentation at the SIM workshop at ICML 2025

- A Geometric View of Data Complexity: Efficient Local Intrinsic Dimension Estimation with Diffusion Models

Hamidreza Kamkari, Brendan Ross, Rasa Hosseinzadeh, Jesse Cresswell, Gabriel Loaiza-Ganem

NeurIPS 2024 (Spotlight): [arXiv: 2406.03537](https://arxiv.org/abs/2406.03537)

Also accepted to three ICML 2024 workshops with two contributed talks and spotlight presentations

- A Geometric Explanation of the Likelihood OOD Detection Paradox

Hamidreza Kamkari, Brendan Ross, Jesse Cresswell, Anthony Caterini, Rahul Krishnan, Gabriel Loaiza-Ganem
ICML 2024 (Poster): [arXiv: 2403.18910](https://arxiv.org/abs/2403.18910)

- A Geometric Framework for Understanding Memorization in Generative Models

Brendan Ross, **Hamidreza Kamkari**, Zhaoyan Liu, Tongzi Wu, George Stein, Gabriel Loaiza-Ganem, Jesse C. Cresswell
ICLR 2025 (Spotlight): [arXiv: 2411.00113](https://arxiv.org/abs/2411.00113)

Also accepted to two ICML 2024 workshops

- TabDPT: Scaling Tabular Foundation Models

Junwei Ma*, Valentin Thomas*, Rasa Hosseinzadeh, **Hamidreza Kamkari**, Alex Labach, Jesse C. Cresswell, Keyvan Golestan, Guangwei Yu, Maksims Volkovs, Anthony L. Caterini

NeurIPS 2025: [arXiv: 2410.18164](https://arxiv.org/abs/2410.18164)

- Order-based Structure Learning with Normalizing Flows

Hamidreza Kamkari*, Vahid Balazadeh*, Vahid Zehtab, Aidan Li, Rahul Krishnan

In Submission: [arXiv: 2308.07480](https://arxiv.org/abs/2308.07480)

WORK EXPERIENCE

- Layer 6 AI Lab at Toronto Dominion (TD) Bank** Toronto, Canada
February 2024 - June 2025
Research Machine Learning Scientist (Full Time)
- Led multiple publications in top-tier conferences on topics such as deep generative modeling and geometric deep learning.
 - Developed a tabular foundation model for Canada's largest bank utilizing prior fitted networks and a Bayesian approach
- Layer 6 AI Lab at Toronto Dominion (TD) Bank** Toronto, Canada
May 2023 - December 2023
Machine Learning Research Internship
- Developed novel out-of-distribution detection methods using deep generative models, leading a first-author publication at a top-tier machine learning conference.
- Aalto University** Espoo, Finland
July 2021 - September 2021
Undergraduate Research Intern
- Designed a reinforcement learning pipeline to design complex RNA structures, including previously underexplored pseudo-knotted structures

HONOURS & AWARDS

- Secured **30,000 CAD** in funding for graduate research through the Mitacs Accelerate Scholarship May 2023
- **Gold Medal** in regional ACM-ICPC contests December 2018

TEACHING & SUPERVISION

- Vector Institute** Toronto, Canada
July 2024 - Ongoing
Research Mentoring
- Started as a researcher at the Vector Institute under the supervision of Prof. Rahul Krishnan, and currently helping mentor undergraduate students Aidan Li and Benson Li, both of whom are affiliated with his lab
- University of Toronto** Toronto, Canada
September 2022 - May 2023
Teaching Assistance
- **CSC384:** Introduction to Artificial Intelligence — **CSC236:** Introduction to the Theory of Computation
- Sharif University of Technology** Tehran, Iran
September 2019 - July 2022
Teaching Assistance
- **CE40254:** Data Structure and Algorithms (*Head TA*) — **CE40181:** Probability and Statistics — **CE40417:** Artificial Intelligence

PEER-REVIEW & TALKS

- Invited Talk at Visual Computing (VC) Seminar MIT 2025
- Advancements in Neural Information Processing Systems Reviewer NeurIPS 2023-2025
- Talk on Generative Modelling through the Lens of Manifold Hypothesis (Remote) Imperial College London
- Association for the Advancement of Artificial Intelligence Program Committee AAAI 2025
- International Conference on Learning Representations Reviewer ICLR 2024/2025
- International Conference in Machine Learning Reviewer ICML 2024
- Transactions on Machine Learning Research (TMLR) Reviewer Annual (Ongoing)
- **Contributed Talk** for workshop: Differentiable Almost Everything ICML 2024
- **Contributed Talk** for workshop: Structured Probabilistic Inference and Generative Modelling ICML 2024

ADDITIONAL RESEARCH EXPERIENCE

- Sharif University of Technology** Tehran, Iran
January 2022 - September 2022
Bachelor Thesis (In Persian)
- Predicting Drug Combination Dose Responses Using Graph Neural Networks and Attention Mechanisms
- Max Planck Institute for Informatics** Saarbrücken, Germany
January 2022 - March 2022
Undergraduate Research Intern
- Physarum Inspired Dynamics to Solve Semi-Definite Programs
Yuan Gao, Hamidreza Kamkari, Andreas Karrenbauer, Kurt Mehlhorn, Mohammadamin Sharifi
Pre-print from the internship: [arXiv: 2111.02291](https://arxiv.org/abs/2111.02291)