NIMA DOLATABADI

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EDUCATION

Incoming Ph.D. Student in Computer Science September 2025
University of Waterloo, Cheriton School of Computer Science

- **Advisors:** Sepehr Assadi, Rafael Oliveria

B.Sc In Computer Engineering, Minor in Mathematics November 2020 - September 2025
Sharif University of Technology, Department of Computer Engineering

- **Thesis:** Constructing minimum-cost Markov chains with an iterative algorithm
- **Supervisor:** Mohammad Ali Abaam

Diploma in mathematics and physics August 2020
Allameh Helli 1 Highschool

PUBLICATIONS

- M. J. Golin, R. H. Dolatabadi, A. Zamani - Better Algorithms for Constructing Minimum Cost Markov Chains and AIFV Codes. In *2024 IEEE International Symposium on Information Theory (ISIT)*
- M. J. Golin, R. H. Dolatabadi, A. Zamani - A (Weakly) Polynomial Algorithm for AIVF Coding. In *2024 IEEE International Symposium on Information Theory (ISIT)*
- S. Akbari, R. H. Dolatabadi, M. Jamaali, S. Klavžar, N. Movarraei - On the Δ-edge stability number of graphs. In *European Journal of Combinatorics, vol. 127, p. 104167, 2025.*
- H. Esfandiari, M. Ghaempanah R. H. Dolatabadi, S. Hossein Ghorban - What is the chance of being so unfair? In *In Companion Proceedings of the ACM on Web Conference 2025.*

RESEARCH INTERESTS

Algorithms, Computational Complexity, Coding Theory, Combinatorics, Graph Theory, Algebraic Combinatorics

RESEARCH EXPERIENCE

Research Assistant

- Working with Prof. Mordecai J. Golin (HKUST, Hong Kong) in a two-month internship and solved an optimization problem on min-cost Markov Chains. We have submitted two papers to the ISIT conference in which we used geometric and linear algebraic techniques. Currently working on journal versions of the extended results of them. Here is the certificate of the internship.
  July 2023

- Working with Prof. Saieed Akbari (Sharif, Tehran, Iran), Prof. Sandy Klavzar (Ljubljana, Slovenia) and Dr. Jamaali. In this work, we studied the structural properties of the minimum number of edges that can be removed from the graph such that the resulting graph has a lower maximum degree. We found a strong connection between this quantity and the edge chromatic index of a given graph. The result was published in the European Journal of Combinatorics, which is a respected Q1 Journal.
  May 2023 - March 2025

- Working with Prof. Aaron Bernstein (NYU) on a streaming algorithm problem. We found a $(\frac{2}{3}-\epsilon)$-approximation of the Maximum Weighted Matching problem in the random streaming model which is the best approximation known. I obtained this algorithm by modification of an existing algorithm which had the same approximation ratio in the unweighted setting. We analyzed this modified algorithm and showed it outputs an approximation of the maximum weighted matching with high probability. This result was independently proved by another research group so we did not publish our work.
  July 2024 - Present

- Working with Dr. Samira Hossein Ghorban (IPM, Tehran, Iran) and Dr. Hossein Esfandiari (Google, New York) on a paper related to "Fairness In Ranking" which introduces a new stochastic viewpoint to this concept and algorithms for verifying fairness along with algorithms that output a fair ranking. I implemented the algorithms and proved their correctness. This work includes many experimental results and the paper is published in WWW 2024.

  February 2023 - March 2025

- Working with Prof. Prahladh Harsha (TIFR, Mumbai, India) since August 2024 on a project related to algebraic coding theory. As part of this project, I have been understanding the efficient list-decodability of Reed-Solomon codes beyond the Johnson radius (and the limitations therein). We are trying to do a tighter analysis on the existing algorithms for list decoding multiplicity codes to obtain a better bound for the list size. We also aim to generalize the well-known GM-MDS theorem.

  August 2024 - Present

HONORS

- Ranked 3rd nationwide in the National Master's Entrance Examination (Konkur) in Pure Mathematics 2025
- Bronze medal of International Mathematical Olympiad (IMO) 2020
- Bronze medal of Romanian Masters of Mathematics 2020
- Silver medal of Asian Pacific Mathematical Olympiad 2020
- Silver medal of ELMO [1] 2020
- Silver medal of European Mathematical Cup [1] 2019
- Gold medal of Iranian National Mathematics Olympiad [2] 2019

TEACHING EXPERIENCE

Teaching Assistant
Computer Engineering Department of Sharif University of Technology *Iran, Tehran*

- Theory of Languages and Automata September 2023
- Linear Algebra (Head-TA) January 2023
- Linear Algebra (Head-TA) September 2022
- Probability and Statistics (Head of Exercise) September 2022

Member of Scientific Committee 2020 - Present
Young Scholars Club *Iran, Tehran*

Played a pivotal role in training and mentoring students for the Iranian National Math Olympiad and the IMO. Chaired the Exam Preparation Committee for the final round of the 2024 National Math Olympiad and led the Number Theory group for the 2023 final round and the IMO Team Selection Test (2023–2024). Additionally, headed the Combinatorics group for the second round of the National Math Olympiad (2022–2023) and served as the Head of the Number Theory group for the Iranian IMO Training Camp (2022–2024). Designed and delivered advanced lectures on Linear Algebra, Combinatorics, and Algebraic Number Theory for Olympiad gold medalists and high school students. Actively contributed to organizing and grading Olympiad exams and proposed original problems in Number Theory, Geometry, and Combinatorics.

[1] During COVID, they didn't provide us certificates.
[2] The National Committee did not provide us an English certificate.

RELEVANT COURSES

- Combinatorics And Its Applications - 19.7
- Graph Theory I (Graduate) - 18.5
- Mathematical Analysis - 20
- General Topology - 20
- Advanced Topics In Algorithms (Graduate) - 19.2
- Computational Geometry (Graduate) - 20
- Fourier Analysis - 19.5
- Game Theory - 20

SKILLS

Technical Skills	Python, C#, ASP.Net Core, Java, Oracle, SQL, C, LaTeX
Languages	Persian (native), English (fluent)
Art Skills	Playing Santour (an Iranian instrument)