412.443.4933
hmm5834@psu.edu

Hamed Mahdavi

LinkedIn:
hamed-mahdavi93

Education

Ph.D. in Computer Science and Engineering **Jan 2022–May 2026 (expected)**
Pennsylvania State University *State College, PA*
Advisor: Prof. Vasant Honavar · Thesis: Solving Contest-Level Math Problems Using LLMs

M.Sc. in Artificial Intelligence **Sep 2017–Dec 2020**
Sharif University of Technology *Tehran, Iran*
Advisor: Prof. Hamid Beygi · Thesis: Approximate Inference in Probabilistic Network Models

B.Sc. in Computer Engineering **Sep 2012–Sep 2017**
Sharif University of Technology *Tehran, Iran*
Advisor: Prof. Hossein Sameti · Thesis: A Survey on Speech Enhancement Algorithms

Professional and Academic Experience

Collaborator, Gemini IMO 2025 Project **Summer 2025**
Google *New York, NY*
- Provided high-quality, verifiable data and evaluations to the Gemini Data team under the supervision of Dr. Vahab Mirrokni, resulting in a gold medal at the International Mathematical Olympiad (IMO).

Research Assistant **Jan 2022–Present**
Pennsylvania State University *State College, PA*
- Designed agentic workflows for math problem solving and data generation; led evaluations of LLM mathematical reasoning; developed GNN models for interatomic potentials in materials science.

Data Scientist Intern **Jun 2023–Aug 2023**
Arconic Technology Center *New Kensington, PA*
- Worked in the Fabrication Technology group under the supervision of Martin Marinack; tackled several data-driven optimization problems to improve Arconic's fabrication processes (welding, rolling, and casting).

Research Intern **Aug 2018–Jan 2019**
Max Planck Institute for Software Systems *Saarbrücken, Germany*
- Worked on fundamental aspects of reinforcement learning, focusing on multi-agent, adversarial, and human-centered reinforcement learning.
- Studied how to design an AI agent that can robustly cooperate with agents of unknown types. The project was inspired by real-world applications in which an AI agent, e.g., a virtual assistant, must cooperate with new agent types/users after deployment.

Software Engineering Intern **Jul 2017–Sep 2017**
Faragostar *Tehran, Iran*
- Developed a compression algorithm that allowed Faragostar to retain its official documentation while minimizing storage requirements.
- Configured infrastructure for Elasticsearch, enabling more efficient and complex searches in the company's app compared to the previous SQL-based search tool.

Mathematical Olympiad Teacher **Oct 2012–Apr 2013**
Allameh Helli High School *Tehran, Iran*
- Taught number theory to academically gifted students at Allameh Helli High School.

Honors and Awards

Received 100k USD unrestricted gift from Google to research synthetic data generation and agentic workflows for math problem solving **May 2025**

Research Funding

- Awarded a 100k USD unrestricted research gift from Google to enhance large language models for mathematics through synthetic data generation and agentic workflows.

Ranked 5th in Artificial Intelligence, 2nd in Networks and Security, and 4th in Information Technology in the M.Sc. entrance exam **Jun 2017**

Nationwide Ranking

- Placed 5th (AI), 2nd (Networks and Security), and 4th (IT) nationwide in a highly competitive M.Sc. entrance exam.

Ranked 217th in Iran's National University Entrance Exam **Jun 2012**

Nationwide Ranking

- Ranked in the top 0.1% among 260,000+ examinees nationwide.

Silver Medal in the 29th Iranian National Mathematical Olympiad **Sep 2011**

National Competition

- Selected as one of 40 participants from 100,000+ candidates; awarded Silver Medal for outstanding performance in the National Olympiad Summer Program.

Selected Publications

- **RefGrader: Automated Grading of Mathematical Competition Proofs using Agentic Workflows** — *Submitted to Math-AI Workshop at NeurIPS* **2025**
  H. Mahdavi, A. Hashemi, M. Daliri, P. Mohammadipour, A. Farhadi, S. Malek, Y. Yazdanifard, N. Mireshghallah, A Khasahmadi, V. Honavar
- **CombiGraph-Vis: A Multimodal Olympiad Benchmark for Discrete Mathematical Reasoning** — *Submitted to Math-AI Workshop at NeurIPS* **2025**
  H. Mahdavi, A. Hashemi, M. Daliri, P. Mohammadipour, A. Farhadi, S. Malek, Y. Yazdanifard, A Khasahmadi, V. Honavar
- **Harnessing Optimization Dynamics for Curvature-Informed Model Merging** — *Submitted to ICLR* **2025**
  P. Mahdavinia, H. Mahdavi, N. Mireshghallah, M. Mahdavi
- **Brains vs. bytes: Evaluating LLM Proficiency In Olympiad Mathematics** — *COLM Conference* **2025**
  H. Mahdavi, A. Hashemi, M. Daliri, P. Mohammadipour, A. Farhadi, S. Malek, Y. Yazdanifard, A Khasahmadi, V. Honavar
- **Beyond Training Data: How Elemental Features Enhance ML-Based Formation Energy Predictions** — *Digital Discovery* **2025**
  H. Mahdavi, V. Honavar, D. Morgan
- **Towards deployment of robust cooperative AI agents: An algorithmic framework for learning adaptive policies** — *AAMAS Conference* **2020**
  A. Ghosh, S. Tschiatschek, H. Mahdavi, A. Singla

Skills

Programming	Python, Java, C#, Scala, LaTeX, C
ML Tools	PyTorch, HuggingFace, vLLM, Verl, Verifiers, scikit-learn, NumPy, SciPy, Pandas
LLM Skills	Evaluation, Agentic Workflows, Synthetic Data Generation
Development	Cursor, Git, Python Django, Play Framework, SQL, Bootstrap
Communication	English (fluent)