Fateme Mazdarani

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Education

Clemson University, Ph.D. in Computer Science — Jan 2025 – Present
- **Advisor:** Dr. Carlos Toxtli, Human-AI Empowerment Lab
- **Research:** robust and trustworthy LLM evaluation, mathematical reasoning, representation robustness, and human-centered AI
- GPA: 4.0/4.0

University of Tehran, B.Sc. in Computer Engineering — Aug 2018 – Jun 2023
- GPA: 3.5/4.0
- Bachelor's thesis: A Multi-Platform Voice Recognition System Activator in Persian Language

Research Interests

My research broadly focuses on artificial intelligence and machine learning, particularly the reliability, robustness, and interpretability of intelligent systems. I study large language models and mathematical reasoning, including how models access, evaluate, and verify knowledge across different representations and how retrieval can support more reliable reasoning. My broader interests include human-centered and trustworthy AI, recommender systems, data mining, and scalable machine learning methods for real-world applications.

Publications and Manuscripts

Published

- **F. Mazdarani**, A. C. Hernandez, and C. Toxtli. "Worker-Centered AI: Transparent Explanations for Trustworthy Task Recommendation in Crowd Work." *2026 IEEE Conference on Artificial Intelligence (CAI)*, pp. 295–302, 2026. DOI: 10.1109/CAI68641.2026.11536153.

Accepted for Publication

- **F. Mazdarani** and C. Toxtli. "From Recognition to Reconstruction: Towards Robust Procedural Mathematical Reasoning." *The 2026 Conference on Empirical Methods in Natural Language Processing (EMNLP 2026); Workshop on Mathematical Natural Language Processing.* Accepted for publication.
- **F. Mazdarani** and C. Toxtli. "Beyond the Answer Key: Robustness Evaluation of Large Language Models for Step-Level Mathematical Verification." *2026 IEEE International Conference on Machine Learning and Applications (ICMLA).* Accepted for publication.
- **F. Mazdarani** and C. Toxtli. "Randomized SVD Approximations for Spectral Co-Clustering of Word-Document Matrices." *2026 IEEE International Conference on Machine Learning and Applications (ICMLA).* Accepted for publication.
- **F. Mazdarani** and C. Toxtli. "TREAT: Evaluating Access to Formal Knowledge across Equivalent Mathematical Representations." *2026 International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC).* Accepted for publication.

Under Review

- **F. Mazdarani** and C. Toxtli. "The Shape of Mathematical Creativity: Measuring Mathematical Exploration in Formal Proof Generation." Under review.

Research Experience

Graduate Researcher, Human-AI Empowerment Lab, Clemson University
- Develop benchmarks and evaluation protocols for robust LLM mathematical reasoning, theorem recognition across equivalent representations, and process-level verification.
- Study reliability of LLM evaluators and retrieval-augmented systems for theorem identification, transformation recovery, and procedural reconstruction.
- Design and evaluate human-centered AI systems that support transparency, trust, user agency, and explainable recommendation.

Selected Research Projects, Clemson University 2025 – Present

- **Worker-Centered AI for Crowd Work:** studied how transparent explanations and navigation cues affect perceived fairness, trust, empowerment, usability, and task-selection behavior.
- **LLM Evaluation for Mathematical Reasoning:** built datasets and metrics for valid non-canonical solution traces, theorem variants, answer-key limitations, and LLM-as-a-judge verification.
- **Randomized Spectral Co-Clustering:** investigated scalable randomized techniques for word-document matrix co-clustering and dimensionality reduction.

Teaching and Academic Service

Graduate Teaching Assistant, Clemson University Jan 2025 – Present

- Teaching assistant since 2025 for Design and Analysis of Algorithms and Human-Computer Interaction / Human-Centered Computing courses.
- Support grading, rubric-based feedback, project checkpoints, student questions, and course assessment.

Teaching Assistant, Engineering Probability and Statistics, University of Tehran Fall 2021
Teaching Assistant, Discrete Mathematics, University of Tehran Fall 2019 – Spring 2021

Events Chair, School of Computing Graduate Student Association, Clemson University Current
Peer Reviewer, Academic paper submissions 10+ reviews

Honors and Awards

- Dr. Robert M. Geist III Endowed Fellowship in Computing, Clemson University, 2025–2026
- Ranked 79th in the National University Entrance Exam in Iran among more than 300,000 participants, 2018
- Accepted in the First Round of the Iranian National Mathematics Olympiad, 2015–2016

Selected Presentations

- **Virtual paper presentation:** "Worker-Centered AI: Transparent Explanations for Trustworthy Task Recommendation in Crowd Work," *2026 IEEE Conference on Artificial Intelligence (CAI)*, online, 2026.
- **Poster presentation:** "Worker-Centered AI: Transparent Explanations for Trustworthy Task Recommendation in Crowd Work," *2026 INTEGRATE Symposium*, University of Wisconsin–Madison, 2026.

Skills

- **Programming Languages:** Python, MATLAB, Java, C/C++, R, SQL, Assembly (Intel x86, MIPS)
- **Machine Learning and Data Science:** PyTorch, TensorFlow, Keras, NumPy, pandas, scikit-learn, Matplotlib, statistical analysis, experiment design
- **LLM and AI Evaluation:** prompt engineering, LLM-as-a-judge evaluation, process-level evaluation, benchmark design, Hugging Face Transformers, OpenAI API, Gemini, Claude
- **Web, Scripting, and Tools:** HTML, CSS, JavaScript, React, LaTeX, Bash, Git, Docker, Maven
- **Hardware and Simulation Tools:** Arduino, ModelSim, Intel Quartus Prime, LTspice, Proteus circuit simulator

Additional Projects and Coursework

- **Implementation and Evaluation of Hybrid Quantum Deep Learning and Variational Quantum Classifier-Based Models for Botnet DGA Attack Detection:** explored quantum machine learning approaches for cybersecurity, 2025.
- **Sparse Spectral Clustering:** studied ADMM-based optimization methods for sparse spectral clustering, 2025.
- **A Multi-Platform Voice Recognition System Activator in Persian Language:** trained an RNN model using Keras and TensorFlow for a Persian-language voice activator, Bachelor's thesis, 2022–2023.
- **Launching a Movie Information Management System:** implemented a full-stack course project using Java, React, REST APIs, SQL, Maven, Git, unit testing, and Tomcat, 2022.
- **CNN Acceleration by Removing Zero-Valued Neurons:** research paper for Research and Technical Presentation course, 2022.
- **Launching a Smart Irrigation System:** simulated sensors and electric motors using Arduino IDE and Proteus for a real-time embedded systems project, 2022.
- **Implementation of a Surface Scanner on Android:** developed an Android-based surface scanner using Java and Android Studio, 2022.
- **Use of SIMD Instructions for IP Acceleration:** implemented acceleration techniques using C++ and Intel SIMD instructions, 2021.