Ali Taghibakhshi

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EDUCATION

University of Illinois at Urbana-Champaign (UIUC) Aug. 2019 – Aug. 2023

Ph.D. in Machine Learning and Iterative Solvers, M.Sc. in Statistics

- **Advisors**: Matthew West (Computational Science and Mechanical Engineering), Luke Olson (Computer Science)
- **Coursework**: Statistical Reinforcement Learning, Iterative and Multigrid Methods, MDP and Reinforcement Learning, Mathematical Methods I, Real Variables, Stochastic Process, Statistics and Probability II, Random Process
- **GPA**: 3.97 out of 4

Sharif University of Technology Sep. 2015 – Jun 2019

B.Sc. in Mechanical Engineering

- **GPA**: 3.91 out of 4 (2nd rank in the class of 2019)

RESEARCH AND INTERNSHIP EXPERIENCE

NVIDIA May 2022 – Aug. 2022

Deep Learning Algorithms Intern

- Developed a new hierarchical GNN for entity resolution for a large cybersecurity dataset. Improved state-of-the-art by 5%, patent submitted. Presented at an NVIDIA main event held by the vice president of deep learning.

John Deere May 2020 – May 2022

Machine Learning Intern

- **2020:** Fully automated John Deere robot mower for local navigation and accurate docking using reinforcement learning and computer vision. Applied the developed method to the John Deere fairway mower for AI-assisted parking.
- **2021:** Developed a computer vision-based precision planting and optimized mowing using dynamic scene shape reconstruction and semantic segmentation.

University of Illinois at Urbana-Champaign Sep. 2019 – Present

Graduate Assistant

- Working on unsupervised and reinforcement learning methods for algebraic multigrid algorithms (iterative partial differential equation solvers) utilizing graph convolutional neural networks.
- Optimization-Based Algebraic Multigrid Coarsening Using Reinforcement Learning (Published at NeurIPS 2021.)
- Learning Interface Conditions in Domain Decomposition Solvers (Published at NeurIPS 2022.)
- Optimized Sparse Matrix Operations for Reverse Mode Automatic Differentiation (submitted to ICML 2023.)
- Learning Multilevel Domain Decomposition using Hierarchical Graph Neural Networks (submitted to ICML 2023.)
  All other research papers available on Google Scholar:
  https://scholar.google.com/citations?user=yT0J-dEAAAAJ&hl=en

Sharif University Jan. 2018 – Jun 2019

Research Assistant

- Simulating molecular systems and analyzing the physical movements of atoms and molecules using Molecular Dynamics and Monte Carlo simulations utilizing MATLAB, TCL, LAMMPS, NAMD, and VMD.
- Developing a partial differential equation model for approximating 3D tumor growth in a microfluidic culture system using COMSOL Multiphisics.

Young Scholars Club Jun. 2013 – Sep. 2014

Mathematical Olympiad

- **2014** Silver medalist at 32nd Iranian National Mathematical Olympiad.
- **2014** Bronze medalist at 1st Geometry Olympiad.
- **2013** Silver medalist at 31st Iranian National Mathematical Olympiad.

HONORS AND AWARDS

- **2020:** Top technical innovation at UIUC research park (top 3 among about 840 interns) for developing fully AI-assisted docking for John Deere robot mower (Link to paper).
- **2019:** UIUC MechSE Distinguished Fellowship Award.
- **2019:** Ranked 2nd among more than 120 bachelor students in the Mechanical Engineering School of Sharif University of Technology, the best engineering school in Iran.
- **2016-2017-2018:** Annual Mechanical Engineering Elite Student Award in three consecutive years among more than 120 mechanical engineering students at Sharif University of Technology.
- **2013-2014:** Silver medalist at 32nd and 31st Iranian National Mathematical Olympiad, Bronze medalist at 1st Geometry Olympiad.
- **2013:** Became a member of the Young Scholars Club (YSC) and Irans National Elite Foundation (INEF) due to exceptional performance at 31st Irans National Mathematical Olympiad.

PROGRAMMING AND SKILLS

Language : Python, Matlab, C++, CUDA, R, LaTex, Git, Shell, YAML
Package : PyTorch, Tensorflow, DGL, PyG, Numpy, Pandas, Scikit-Learn.
Skills : Graph Neural Networks, Iterative Solvers, Reinforcement Learning, Unsupervised Learning, Linear Algebra, Computer Vision (Semantic Segmentation, Object Detection), Parallel Programming, Combinatorial Optimization.