

Ryien Hosseini

CONTACT INFORMATION

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RESEARCH INTERESTS

I am a PhD student in the Department of Computer Science at the University of Chicago, where I am advised by Hank Hoffmann and Rebecca Willett. I am broadly interested in developing **adaptive machine learning** algorithms, or algorithms that dynamically adjust their behavior in response to changes in input data distribution or attributes, performance constraints, task requirements, and other evolving factors.

EDUCATION

University of Chicago *September 2023 - Present*
Doctor of Philosophy (**Ph.D.**) in Computer Science (*In Progress*)
Advisors: Hank Hoffmann and Rebecca Willett
Cumulative GPA: 4.00/4.00

University of Michigan, Ann Arbor *September 2021 - December 2022*
Master of Science (**M.S.**) in Electrical and Computer Engineering
Concentration: *Signal & Image Processing and Machine Learning*
Cumulative GPA: 3.98/4.00

University of Michigan, Ann Arbor *September 2017 - August 2021*
Bachelor of Science in Engineering (**B.S.E**) in Computer Engineering
Minor: *Mathematics*
Cumulative GPA: 3.52/4.00
Last 60 credits GPA: 3.95/4.00

University of Michigan, Ann Arbor *September 2017 - August 2021*
Bachelor of Science (**B.S.**) in Cognitive Science
Concentration: *Computation and Cognition*
Minor: *Near East Studies*
Cumulative GPA: 3.52/4.00
Last 60 credits GPA: 3.95/4.00

RESEARCH EXPERIENCE

Predocctoral Researcher *January 2023 - September 2023*
Argonne National Laboratory
Supervisors: Venkatram Vishwanath, Filippo Simini
I was primarily responsible for developing novel graph machine learning architectures for diverse applications such as chemical docking, social networks, molecule dynamics, and financial fraud detection. Additionally, I helped develop a framework for extending existing graph neural network (GNN) models on HPC platforms. This work contributes the research group's overarching goals of rigorously exploring the development and application of GNN models for scientific computing.

Graduate Research Intern *May 2021 - December 2023*
Supervisors: Arvind Ramanathan, Venkatram Vishwanath
I was primarily responsible for the development of novel GNN architectures for protein dynamics simulation and chemical docking applications. I was also responsible for benchmarking and optimizing existing GNN architectures on HPC platforms.

Research Assistant*September 2018 – January 2020*

University of Michigan, Ann Arbor

Miniature Tether Electrodynamics Experiment (MiTEE)

Supervisor: Brian Gilchrist

Joint faculty-student research team. I helped develop a metallic file system for use on ultra-low power satellite that uses only electrostatics for motion. This file system interacts with four asynchronous TI MSP-430 microprocessors. Satellite was launched into low Earth orbit in February 2021.

PUBLICATIONS Peer Reviewed Conference and Workshop Proceedings**5. Exploring the Use of Dataflow Architectures for Graph Neural Network Workloads**

Ryien Hosseini, Filippo Simini, Venkatram Vishwanath, Ramakrishnan Sivakumar, Sanjif Shanmugavelu, Zhengyu Chen, Lev Zlotnik, Mingran Wang, Philip Colangelo, Andrew Deng, Philip Lassen, Hongqian Rong, Shukur Pathan
2023 International Conference on High Performance Computing (ISC), Workshop on HPC on Heterogeneous Hardware

4. Piloting a Flexible Deadline Policy for a First-Year Computer Programming Course

Isha Bhatt, Laura K Alford, Lesa Begley, **Ryien Hosseini**, Deborah A Lichti
2023 American Society for Engineering Education (ASEE) Annual Conference & Exposition

3. Deep Surrogate Docking: Accelerating Automated Drug Discovery with Graph Neural Networks **Ryien Hosseini**, Filippo Simini, Austin Clyde, Arvind Ramanathan *2022 Conference on Neural Information Processing Systems (Neurips), Workshop on AI for Science***2. Turns Out Our Exams Were Pointless, So We Changed Our Assessment Strategy**

Laura K. Alford, Heather Rypkema, Harsh Jhaveri, **Ryien Hosseini**, Megan Beemer
American Society of Engineering Education (ASEE) Annual Conference 2022

1. Operation-Level Performance Benchmarking of Graph Neural Networks for Scientific Applications

Ryien Hosseini, Filippo Simini, Venkatram Vishwanath
Conference on Machine Learning and Systems (MLSys), Workshop on Benchmarking Machine Learning - Workloads on Emerging Hardware 2022

**INDUSTRY
EXPERIENCE****Apple, Inc.***June 2020 – August 2020*

Software Engineering Intern

Cupertino, CA (Remote due to COVID-19)

I was primarily responsible for developing software infrastructure to support development and testing/validation of hardware IP blocks. Additionally, I implemented a library for analysis of hardware IP test coverage, performance, and other metrics. This library is used for analysis of hardware blocks deployed in various company audio products.

Texas Instruments*May 2019 – August 2019*

Hardware Design Intern

Dallas, TX

I was responsible for developing register transfer level (RTL) logic for the development of a battery monitoring microprocessor for mobile devices. Additionally, I

aided in the development of firmware that runs on a metallic filesystem and supports interaction of IP block within a larger system on chip. This led to a 15% runtime performance increase compared to previous firmware iteration.

Benzinga

May 2018 – August 2018

Software Engineering Intern

Detroit, MI

I was responsible for the development of a time-series model that analyzes the effect of analyst ratings and news releases on the performance of financial equities. I designed and implemented an LSTM-based model to achieve this. This model currently serves as a backend to a recommender system on the company's stock trading platform.

**TEACHING
EXPERIENCE**

Graduate Student Instructor

August 2021 – December 2022

University of Michigan, Ann Arbor

I work as graduate student instructor for ENGR 101: Introduction to Computation and Programming. This is the first course in the university's core sequence for computer science students. My responsibilities include teaching multiple weekly lab sessions, working with faculty to develop course curriculum, aiding students during office hours, and grading exams/assignments.

Instructional Aide

August 2020 – May 2021

University of Michigan, Ann Arbor

I worked as an instructional aide for EECS 280: Programming and Introductory Data Structures. This is the second course in the university's core sequence for computer science students. My responsibilities included teaching weekly lab sessions, working with faculty to develop course curriculum, aiding students during office hours, and grading exams/assignments.

SKILLS

Programming: Python, C/C++, Julia, Lisp (Scheme)

Software: PyTorch (inc. PyTorch Geometric, DGL), TensorFlow/Keras, scikit-learn, OpenCV

Spoken Languages: English (native), Persian (native), Spanish (professional)

VOLUNTEERING **Google CS First**

January 2018 – January 2020

Co-founder and vice-President

I collaborated with Google for Education to design curriculum that teaches computer science concepts at a primary school level. I lead lectures and mini-lab modules to fourth and fifth students in order to teach fundamental concepts in an accessible way. I also advise students on pursuing STEM education in secondary school and beyond.

PROFESSIONAL **IEEE University of Michigan Chapter**

AFFILIATIONS

Member (September 2018 – December 2022)

Persian Student Association, University of Michigan

Member (August 2017 – December 2022)

Philanthropy Chair (May 2019-May 2021)