

Ryien Hosseini

CONTACT INFORMATION

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OBJECTIVE

I am a first year PhD student in the Computer Science Department at the University of Chicago, where I am advised by Hank Hoffmann and Rebecca Willett. I am broadly interested in developing machine learning algorithms to accelerate scientific progress and deploying such algorithms in the form of AI Systems.

RESEARCH INTERESTS

General deep learning, graph neural networks, machine learning and systems, machine learning and high-performance computing, AI for science, large language models.

EDUCATION

University of Chicago

September 2023 - Present

Doctor of Philosophy (Ph.D.) in Computer Science
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

Graduate Research Aide

August 2021 – September 2023

Argonne National Laboratory

Supervisors: Dr. Venkatram Vishwanath, Dr. Filippo Simini.

I was primarily responsible for developing novel Graph Neural Network (GNN) 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 GNN models on HPC platforms. This work will contribute the research group's overarching goals of rigorously exploring the development and application of GNN models for scientific computing.

Graduate Research Intern

May 2021 – August 2021

Argonne National Laboratory

Supervisors: Dr. Arvind Ramanathan, Dr. Venkatram Vishwanath

I was primarily responsible for the development of novel Graph Neural Networks (GNN) architectures for protein dynamics simulation and chemical docking applications. I was also responsible for benchmarking and optimizing existing GNN architectures on various HPC platforms, as well as some miscellaneous work in areas such as GAN-based chemical discovery.

Student Research Assistant

September 2018 – January 2020

University of Michigan, Ann Arbor

Miniature Tether Electrodynamics Experiment (MiTEE)

Supervisor: Prof. 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

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

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

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

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

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.

HONORS &
AWARDS

University Honors

Dean's List

James B. Angell Scholar

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 AFFILIATIONS

IEEE University of Michigan Chapter

Member (September 2018 – December 2022)

Persian Student Association, University of Michigan

Member (August 2017 – December 2022)

Philanthropy Chair (May 2019-May 2021)