Pouya Hamadanian

MIT CSAIL PHD STUDENT

50 Vassar Street, 32-G918, Cambridge, MA

(+1) 617 949 0392 | pouyah@mit.edu | people.csail.mit.edu/pouyah/ | pouyahmdn | pouya.hmdn@outlook.com

Research Interests

- Automated Decision Making: Non-stationary Reinforcement Learning & Data-driven Simulation
- Streaming Applications: Cloud Gaming, Live and VoD Streaming and Adaptive Bitrate Algorithms
- Machine Learning Training/Inference Frameworks

Education

Massachusetts Institute of Technology — *Cambridge, USA*

PhD Student — *Feb. 2022 - PRESENT*

- Advised by Prof. Mohammad Alizadeh
- GPA: 5.0/5.0

Massachusetts Institute of Technology — *Cambridge, USA*

M.Sc. in Electrical Engineering and Computer Science — *Sep. 2019 - Feb. 2022*

- *Thesis Title*: Reinforcement Learning in Time-varying Systems: an Empirical Study
- *Thesis Advisor*: Prof. Mohammad Alizadeh

Sharif University of Technology — *Tehran, Iran*

B.Sc. in Electrical Engineering — *Sep. 2015 - 2019*

- GPA: 19.58/20.00 (3.98 out of 4.0)

Honors & Awards

2023	**Recipient**, of the Best Paper Award at the 20th USENIX NSDI Conference.	*Boston, USA*
2022	**Recipient**, of the Neekeyfar Award	*Cambridge, USA*
2019	**Recipient**, of the Jacobs family MIT Presidential Fellowship	*Cambridge, USA*
2017-2019	**Recipient**, of the EE Educational Award, 3 consecutive years, Given to the top 5% students	*Tehran, Iran*
2018	**1st Rank**, Among nearly 200 EE students, Entry year 2015 Graduating 2019	*Tehran, Iran*
2015	**8th among 180000+ Students**, National University Entrance Exam - Math and Physics	*Tehran, Iran*
2015	**1st among 110000+ Students**, National University Entrance Exam - Foreign Linguistics	*Tehran, Iran*
2015-2019	**Member**, of the National Elite Foundation of Iran	*Tehran, Iran*
2014	**Bronze Medal**, National Mathematics Olympiad	*Tehran, Iran*

Publications

A Holistic View of AI-driven Network Incident Management — *Proceedings of ACM HotNets '23*

Pouya Hamadanian, Behnaz Arzani, Sadjad Fouladi, Siva Kesava Reddy Kakarla, Rodrigo Fonseca, Denizcan Billor, Ahmad Cheema, Edet Nkposong, Ranveer Chandra

[Paper]

Ekho: Synchronizing cloud gaming media across multiple endpoints — *Proceedings of ACM SIGCOMM '23*

Pouya Hamadanian, Doug Gallatin, Mohammad Alizadeh, Krishna Chintalapudi

[Website] [Paper]

Locally Constrained Policy Optimization for Online Reinforcement Learning in Non-Stationary Input-Driven Environments — *arXiv Submission*

Pouya Hamadanian, Arash Nasr-Esfahany, Malte Schwarzkopf, Siddartha Sen, Mohammad Alizadeh

[Paper] [Code]

CausalSim: Toward a Causal Data-Driven Simulator for Network Protocols — *Proceedings of NSDI '23*

Abdullah Alomar*, **Pouya Hamadanian***, Arash Nasr-Esfahany*, Anish Agarwal, Mohammad Alizadeh, Devavrat Shah

[Best Paper Award] [Website] [Paper] [Code]

*Equal contribution

How Reinforcement Learning Systems Fail and What to do About It *EuroMLSys Workshop '22*

Pouya Hamadanian, Malte Schwarzkopf, Siddartha Sen, Mohammad Alizadeh

[Paper]

Real-Time Video Inference on Edge Devices via Adaptive Model Streaming *Proceedings of ICCV '21*

Mehrdad Khani, **Pouya Hamadanian**, Arash Nasr-Esfahany, Mohammad Alizadeh

[Paper] [Code]

Demistifying Reinforcement Learning in Time-varying Systems *arXiv Submission*

Pouya Hamadanian, Malte Schwarzkopf, Siddartha Sen, Mohammad Alizadeh

[Paper]

Research Experience

Microsoft Research *Seattle, USA*

Research Intern in the Network Research Group (NRG) *May 2023 - Aug. 2023*

- Working on the interplay of networks and Large Language Models (LLMs)

Microsoft Research *Seattle, USA*

Research Intern in the Network Research Group (NRG) *May 2022 - Aug. 2022*

- Working on the Next Generation of Cloud Gaming Services

MIT - Computer Science and Artificial Intelligence Lab (CSAIL) *Cambridge, USA*

Research Assistant in the Networks and Mobile Systems (NMS) group *Sep. 2019 - PRESENT*

- Robust Reinforcement Learning
- Machine Learning for Systems
- Causal Simulation

Cloud Native Telecommunications Network Lab *Tehran, Iran*

Research Assistant Under Supervision of Prof. Babak Khalaj *Jul. 2018 - Nov. 2018*

- Prototyping the **N**ext-**G**eneration-**F**ronthaul-**I**nterface (NGFI) on UP, UP^2 and Odroid XU4 using LimeSDR and USRP B210 as RF front-end devices, as a step towards producing a commercial small cell

Rastak Media Sepehr Co. *Tehran, Iran*

Intern Under Supervision of Prof. Mohammad Ali Maddah-Ali *Jul. 2018 - Sep. 2018*

- Cryptocurrencies, Blockchains and Distributed Ledger Technologies
- Researching the most novel types of Blockchain Platforms and their technological and technical advances

Talks

Nov 2023	**ACM HotNets '23**, A Holistic View of AI-driven Network Incident Managemen	*[Slides]*
Sep 2023	**ACM SIGCOMM '23**, Ekho: Synchronizing Cloud Gaming Media Across Multiple Endpoints	*[Slides]*
Oct 2022	**MIT DSAIL**, CausalSim: A Causal Framework for Unbiased Trace-Driven Simulation	*[Slides]*
April 2022	**EuroMLsys '22**, How Reinforcement Learning Systems Fail and What to do About It	*[Slides]*
June 2020	**Microsoft Research TRAC**, Towards Safe Online Reinforcement Learning in Computer Systems	*[Slides]*

Service

EuroMLSys '24 *Athens, Greece*

Technical Program Committee *April 2024*

Reviewer

EuroMLSys '23 *Rome, Italy*

Technical Program Committee *May 2023*

Reviewer

Edgerton House *Cambridge, USA*

Environmental Chair *March 2021 - March 2023*

Organizing and leading events for a greener community and striving to improve recycling efforts

3rd Modern Wireless Telecommunication Systems (MWTS) Conference *Tehran, Iran*

Assistant Scientific Secretary *2018*

With supervision of Prof. Babak Khalaj, chose and invited speakers, organized talks and finalized the agenda

Technical Skills

Deep Learning and Machine Learning API: PyTorch, Tensorflow, Tensorboard, Pandas, TFLite, SciKit-Learn

Programming Languages and Platforms: Python, C/C++/C#, Java, LaTeX, Javascript, CUDA, Verilog HDL, Solidity, PIC32 Assembly and C, AVR Assembly and C, MatLab, BASH Script, Arduino

Simulation and Design Software: OrCAD PSpice, Synopsys HSpice, Altera Quartus, Xilinx ISE Design Suite, Altium Designer, Labcenter Electronics Proteus, MPLAB

Press Coverage

Ekho: Synchronizing cloud gaming media across multiple endpoints

Proceedings of ACM SIGCOMM '23

- MIT News, Adam Zewe, "A system to keep cloud-based gamers in sync", Aug 31st, 2023
- OpenGov Asia, Azizah Saffa, "Synchronisation for Seamless Cloud Gaming", Sep 1st, 2023
- TechTimes, Jace Dela Cruz, "MIT, Microsoft Introduce 'Ekho' System to Sync Cloud-Based Games", Sep 1st, 2023
- HiddenWires UK, "MIT research syncs cloud gaming", Sep 4th, 2023
- NewAtlas, Paul McClure, "New cloud gaming tech from MIT and Microsoft keeps video and audio in sync", Aug 31st, 2023
- Mint Lounge, Team Lounge, "How white noise can keep cloud gamers in sync", Sep 4th, 2023
- HeadTopics, "A system to keep cloud-based gamers in sync", Aug 31st, 2023
- Wonderful Engineering, Jannat Un Nisa, "This New Cloud Gaming Tech From MIT And Microsoft Can Keep Video And Audio In Sync", Sep 1st, 2023
- CityLife, Vicky Stavropoulou, "Improving Interdevice Synchronization in Cloud Gaming with Ekho", Aug 31st, 2023

CausalSim: Toward a Causal Data-Driven Simulator for Network Protocols

Proceedings of NSDI '23

- MIT News, Adam Zewe, "Researchers create a tool for accurately simulating complex systems", May 4th, 2023
- SciTechDaily, "CausalSim: MIT's New Tool for Accurately Simulating Complex Systems", May 29th, 2023
- Tech Explorist, Amit Malewar, "MIT's new technique could accurately simulate complex systems", May 4th, 2023
- EEDesignIt, Carolyn Mathas, "A New Tool to Accurately Simulate Complex Systems", May 11th, 2023

Select Teaching Experience

Fall 2021	**6.887: Machine Learning for Systems (Graduate course)**, Lab design, Group project supervision	*Prof. Mohammad Alizadeh, Prof. Tim Kraska*
Spring 2019	**Advanced Programming**, Designing, supporting and grading homework and projects	*Prof. Hashemi*
Fall 2018	**Foundations of Blockchain Technology and Cryptocurrencies (Graduate course)**, Lecture note and slide preparation, Homework designing and grading	*Prof. Maddah-Ali*
Spring 2018	**Probability and Statistics**, Homework design	*Prof. Maddah-Ali, Prof. Mirmohseni*