Arash Nasr-Esfahany

PhD Student@MIT, Cofounder@Glia AI

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Education

Massachusetts Institute of Technology (MIT) — *Cambridge, Massachusetts*

PhD in Computer Science — *Feb. 2022 - Present*

- Advisor: Mohammad Alizadeh
- GPA: 5.0/5.0

Massachusetts Institute of Technology (MIT) — *Cambridge, Massachusetts*

MSc in Computer Science — *Sep. 2019 - Feb. 2022*

- Advisor: Mohammad Alizadeh
- GPA: 5.0/5.0
- [Thesis] CausalSim: Towards a Causal Data-Driven Simulator for Network Protocols

Sharif University of Technology — *Tehran, Iran*

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

- GPA: 19.25/20.00

Research Interest

Computer Networks and Systems, Computer Architecture, Causal Inference, Machine Learning, AI Alignment

Honors & Awards

2025	**Dr. Sudhakar Yalamanchili Award**, for an outstanding contribution to modeling and simulation	*Seattle, WA*
2025	**ICLR Spotlight**, Online Reinforcement Learning in Non-Stationary Context-Driven Environments	*Singapore*
2024	**Recipient**, MIT Neekeyfar Fund Award	*Cambridge, MA*
2023	**Travel Grant**, ACM Special Interest Group on Data Communication (SIGCOMM)	*New York, NY*
2023	**Best Paper Award**, USENIX Symposium on Networked Systems Design and Implementation (NSDI)	*Boston, MA*
2019	**Recipient**, MIT Jacobs Presidential Fellowship	*Cambridge, MA*
2019	**Recipient**, Stanford Electrical Engineering (EE) department Fellowship	*Stanford, CA*
2018	**Ranked 2nd by GPA**, Among nearly 200 EE students, Entry year 2015, Graduation year 2019	*Tehran, Iran*
2016-2018	**Recipient**, Educational Award, Given to the top 5% of EE students	*Tehran, Iran*
2015	**9th Among 180000+ Students**, National University Entrance Exam - Math and Physics	*Tehran, Iran*
2015	**30th among 7000 Students**, National University Entrance Exam - Specialized Foreign Linguistics	*Tehran, Iran*
2015 - 2019	**Member**, National Elite Foundation of Iran	*Tehran, Iran*
2015 - 2019	**Recipient**, Fellowship for undergraduate students, courtesy of the National Elite Foundation	*Tehran, Iran*

Research and Work Experience

Glia AI, Inc. — *Boston, Massachusetts*

Cofounder and Member of Technical Staff — *Aug. 2025 - Present*

MIT, Computer Science and Artificial Intelligence Lab (CSAIL) — *Cambridge, Massachusetts*

Research Assistant — *Sep. 2019 - Aug. 2025*

- Machine Learning and Causality for Computer Systems

Google — *Cambridge, MA*

Student Researcher with Victor Lee — *Jun. 2023 - Dec. 2024*

- Accelerating Computer Architecture Simulation with Machine Learning

Microsoft Research, Causality and Machine Learning Group — *Redmond, WA*

Research Intern with Emre Kiciman — *Jun. 2022 - Aug. 2022*

- Learning Structural Causal Models for Counterfactual Inference [Preprint]

Cloud Native Telecommunications Network Lab — *Tehran, Iran*

Research Assistant with Babak Khalaj — *Jul. 2018 - Sep. 2018*

- Designing a low-cost small-cell based on **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

Publications

Predict, Prune, Play: Efficient Video Playback Optimization Under Device Diversity and Drift — *NSDI 2026*

Harsha Sharma*, Pouya Hamadanian*, **Arash Nasr-Esfahany**, Zahaib Akhtar, Mohammad Alizadeh — *Deployed at Amazon Prime Video*

Concorde: Fast and Accurate CPU Performance Modeling with Compositional Analytical-ML Fusion — *ISCA 2025*

Arash Nasr-Esfahany, Mohammad Alizadeh, Victor Lee
Hanna Alam, Brett W. Coon, David Culler, Vidushi Dadu, Martin Dixon — *Work done at Google*
Henry M. Levy, Santosh Pandey, Parthasarathy Ranganathan, Amir Yazdanbakhsh

[Paper][Slides][Poster]

Direct Alignment with Heterogeneous Preferences — *Under Review for NeurIPS 2025*

Ali Shirali*, **Arash Nasr-Esfahany***, Abdullah Alomar, Parsa Mirtaheri
Rediet Abebe, Ariel Procaccia

[Paper] [Code]

m4: A Learned Flow-level Network Simulator — *Preprint 2025*

Chenning Li, Anton A. Zabreyko, **Arash Nasr-Esfahany**, Kevin Zhao
Prateesh Goyal, Mohammad Alizadeh, Thomas Anderson

[Paper] [Code]

Online Reinforcement Learning in Non-Stationary Context-Driven Environments — *ICLR 2025*

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

[Paper][Code]

m3: Accurate Flow-Level Performance Estimation using Machine Learning — *SIGCOMM 2024*

Chenning Li*, **Arash Nasr-Esfahany***, Kevin Zhao, Kimia Noorbakhsh
Prateesh Goyal, Mohammad Alizadeh, Thomas Anderson

[Paper][Code]

OS Pre-trained Transformer: Predicting Query Latencies across Changing System Contexts — *Preprint 2024*

Parimarjan Negi, Ziniu Wu, **Arash Nasr-Esfahany**, Harsha Sharma
Mohammad Alizadeh, Tim Kraska, Samuel Madden

[Paper][Code]

Counterfactual Identifiability of Bijective Causal Models — *ICML 2023*

Arash Nasr-Esfahany, Mohammad Alizadeh, Devavrat Shah

[Paper][Code][Presentation][Website]

Counterfactual (Non)-identifiability of Learned Structural Causal Models — *Preprint 2023*

Arash Nasr-Esfahany, Emre Kiciman — *Work done at Microsoft Research*

[Paper]

CausalSim: A Causal Framework for Unbiased Trace-driven Simulation — *NSDI 2023*

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

[Paper][Code][Presentation][MIT News][Website]

*Equal contribution

Real-time Video Inference on Edge Devices via Adaptive Model Streaming *ICCV 2021*

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

[Paper] [Code]

Talks

Aug. 2025 **ModSim**, Concorde: Fast and Accurate CPU Performance Modeling with Compositional Analytical-ML Fusion *[Slides]*

Nov. 2023 **MSR**, Counterfactual Identifiability of Bijective Causal Models: Theory, Algorithms, and Applications *[Slides]*

Jul. 2023 **ICML**, Counterfactual Identifiability of Bijective Causal Models *[Slides][Recording]*

Apr. 2023 **NSDI**, CausalSim: A Causal Framework for Unbiased Trace-Driven Simulation *[Slides] [Recording]*

Dec. 2022 **Causality@MIT**, A Causal Framework for Trace-Driven Simulation *[Slides]*

Oct. 2022 **DSAIL Meeting**, CausalSim: A Causal Framework for Unbiased Trace-Driven Simulation *[Slides]*

Skills

Python, TensorFlow, PyTorch, Jax, C/C++/C#, Java, CUDA, MatLab, BASH Script

Professional Service

Reviewer **ML for Computer Architecture and Systems Workshop (MLArchSys@ISCA)**, *2024*

Reviewer **Neural Information Processing Systems (NeurIPS)**, *2022, 2023*

Reviewer **International Conference on Machine Learning (ICML)**, *2023, 2024*

Reviewer **Uncertainty in Artificial Intelligence (UAI)**, *2023*

Reviewer **International Conference on Learning Representations (ICLR)**, *2022, 2024*

Mentorship

Feb. 23-Apr. 24 **Harsha Sharma**, Predicting job runtime in heterogeneous data centers using causal ML *MIT PhD Student*

Mar. 23-Jan. 25 **Chenning Li**, Fast data center network modeling with machine learning [m3][m4] *MIT PhD Student*

Nov. 23-May. 24 **Zi Yan Wu**, How would client devices affect their video streaming experience? *[MIT UROP]*

Sep. 22-May 23 **Sol Rodriguez**, Enabling trace-driven simulation for data processing clusters [Thesis] *[MIT MEng]*

Sep. 22-Dec. 22 **Asaad Mohammedsaleh**, Normalizing Flows for accelerating generation speed of diffusion models *[MIT UROP]*

Sep. 15 - Jun. 16 **Koosha Jaferian**, Mentoring high school students preparing for Iran's National University Entrance Exam *[Kanoon]*

Sep. 15 - Jun. 16 **Emad Dehkordy**, Mentoring high school students preparing for Iran's National University Entrance Exam *[Kanoon]*

Sep. 15 - Jun. 16 **Mohammad Sadeghi**, Mentoring high school students preparing for Iran's National University Entrance Exam *[Kanoon]*

Volunteering

Graduate Application Assistance Program (GAAP) *Cambridge, MA*

Mentor *Sep. 2020 - Sep. 2024*

Assisting EECS PhD applicants from underrepresented groups, including students from groups underrepresented in STEM and students with non-traditional academic backgrounds

MIT Edgerton House Executive Board Member *Cambridge, Massachusetts*

Officer *July 2020 - March 2025*

Secretary

Twenty-Second ACM Workshop on Hot Topics in Networks (HotNets) *Cambridge, MA*

Lead Volunteer *Nov. 2023*

Organizing student volunteers to help run the workshop

International Olympiad in Informatics *Tehran, Iran*

Team Guide *Aug. 2017*

France Team Guide

Teaching

Fall 2023	**Computer Networks 6.5820**,	*MIT*
Spring 2018	**Communication Systems**,	*Sharif Univ. of Tech.*
Spring 2018	**Probability and Statistics**,	*Sharif Univ. of Tech.*
Spring 2018	**Analog Circuits**,	*Sharif Univ. of Tech.*
Spring 2018	**Advanced Programming**,	*Sharif Univ. of Tech.*
Spring 2018	**Computer Architecture**,	*Sharif Univ. of Tech.*
Fall 2018	**Electrical Engineering Principles**,	*Sharif Univ. of Tech.*
Fall 2018	**Theory of Electrical Circuits**,	*Sharif Univ. of Tech.*
Fall 2018	**Logic circuits**,	*Sharif Univ. of Tech.*
Fall 2018	**Foundations of Blockchain Technology and Cryptocurrencies**,	*Sharif Univ. of Tech.*
Fall 2018	**Advanced Programming**,	*Sharif Univ. of Tech.*
Fall 2017	**Logic Circuits**,	*Sharif Univ. of Tech.*
Fall 2017	**Electrical Engineering Principles**,	*Sharif Univ. of Tech.*