Mahshid Ghasemi

Co-founder & CTO, Cyrus Technology | Ph.D. in Electrical Engineering, Columbia University

San Francisco, CA · mahshid@cyrussafety.tech · cyrustech.ai · Homepage · LinkedIn

RESEARCH INTERESTS

Real-time video analytics, distributed edge/cloud computing, multimodal AI and vision-language models, real-time system design, online optimization, and wireless/wired networks.

EDUCATION

Ph.D. in Electrical Engineering **Sept. 2019 – Feb. 2026**

Columbia University, New York, NY | Advisor: Prof. Gil Zussman *GPA: 4.05/4*

- Thesis: *Scalable Edge-Cloud Architectures for Real-Time Video Analytics Applications: Design and Deployment*
- M.Phil. (May 2024, GPA: 4.05/4); M.S. (Feb. 2021, GPA: 4.12/4)

B.Sc. in Electrical Engineering (Electronics), Minor in Computer Science **2014 – 2019**

Sharif University of Technology, Tehran, Iran | Advisor: Prof. Amin Rezaeizadeh *GPA: 19.38/20, ranked first*

- Minor in Computer Science: 27 credits, GPA: 19.6/20 (2016 – 2019)

PROFESSIONAL EXPERIENCE

Co-founder & CTO **Mar. 2026 – Present**

Cyrus Technology Inc. *San Francisco, CA*

- Lead an AI video analytics company that builds an orchestration layer over frontier vision-language models (VLMs) for real-time analysis of camera feeds.
- Led development of a generative AI copilot for real-time video surveillance.
- Won the NSF-sponsored CS3 lab-to-market accelerator.

PhD Founder Track Summer Program **Jun. 2024 – Aug. 2024**

Participant

- Completed a 6-week program for PhD founders on commercializing research, scaling projects, and raising first capital.

Electrical Engineer **Feb. 2019 – Sept. 2019**

NOVE *Tehran, Iran*

- Designed and implemented a C/C++ algorithm that de-interleaves radar signals and identifies pulse repetition frequency (PRF).
- Classified radar signals (constant, jittered, staggered) from time-of-arrival (TOA) analysis, combining an improved sequential difference histogram (SDIF) with an improved PRI transform.
- Grouped received pulses by emitter and determined each emitter's PRI, pattern, type, and source location.
- Built a Qt user interface that visualizes de-interleaved radar signals and their parameters in real time.

RESEARCH EXPERIENCE

Wireless & Mobile Networking (WiMNet) Lab, Columbia University

Distributed Video Analytics Systems over Edge and Cloud Fall 2024 – Dec. 2025

- Designed distributed architectures that integrate CNNs and large vision-language models for high-performance video analysis.
- Built an asynchronous, event-driven, ultra-low-latency framework in C/C++ with NVIDIA GStreamer plugins.

ASTRA: Online Edge-Cloud Video Analytics Adaptation Fall 2019 – Dec. 2025

- Developed ASTRA, a low-overhead runtime architecture that adapts camera stream configurations in real time to maintain analytics performance under unknown environment changes.
- Designed a controller that selects near-optimal configurations for multi-camera pipelines, extending GP-UCB to constrained settings.
- Presented ASTRA at ACM/IEEE SEC'26 and filed a US patent application (Pub. No. US 2026/0163998 A1).

Real-Time Multi-Camera Analytics for Traffic and Crowd Information Fall 2022 – Dec. 2025

- Developed real-time pipelines that extract and fuse traffic and crowd information from a bird's-eye-view camera and a street-level camera (C/C++, GStreamer, YOLOv4–v8, NVIDIA DCF tracker).

Digital Twin of New York City, Smart City Project Fall 2022 – 2026

- Developed a hierarchical, distributed hybrid twin for urban traffic management using AI, edge-cloud computing, and next-generation networks.
- The project received IDC's 2023 Smart Cities North America Award (transportation category).

Video-Based Social Distancing Evaluation, COSMOS Testbed Pilot Site Spring 2020 – Spring 2021

- Designed an automated C/C++ and GStreamer pipeline (YOLOv4, NVIDIA DCF tracker) that detects non-compliance with social distancing guidelines.
- Finalist, ACM SIGMETRICS Student Research Competition (SRC) 2021.

Fast QP Solver for Model Predictive Control *(Sharif University of Technology)* Fall 2018

- Combined ADMM and interior-point methods into a fast quadratic programming solver for large-scale problems, implemented in C++ with Armadillo.

HONORS AND AWARDS

Best Paper Award, ACM/IEEE Symposium on Edge Computing (SEC'25) Dec. 2025
CS3 Accelerator Program Ignition Award, Center for Smart Streetscapes: $10,000 seed funding for a next-generation camera-based security system Spring 2024
Edwin Howard Armstrong Memorial Award, Columbia University: awarded to one outstanding M.S. candidate 2021
Finalist, ACM SIGMETRICS'21 Student Research Competition (SRC) 2021
Presidential Fellowship, Columbia University 2019
Iranian National Elites Foundation Grant, for outstanding undergraduate achievement 2014 – 2018
Outstanding Student Award, Sharif University of Technology, Faculty of EE (top 5%) 2016, 2017, 2018

PUBLICATIONS

Conference and Journal Papers

[1] **M. Ghasemi**, Z. Kostic, J. Ghaderi, and G. Zussman, "Short Paper: ASTRA: Low-overhead runtime Architecture for STReam Adaptation in video analytics," in *Proc. ACM/IEEE Symposium on Edge Computing (SEC'26)*, Oct. 2026.

[2] M. Turkcan, C. Zang, S. Narasimhan, G. H. Je, B. Yu, **M. Ghasemi**, J. Ghaderi, G. Zussman, and Z. Kostic, "Constellation dataset: Benchmarking high-altitude object detection for an urban intersection," *Int. J. of Computer Vision*, vol. 134, p. 429, Sept. 2026.

[3] Y. Fu, M. K. Turkcan, **M. Ghasemi**, Z. Mo, C. Zang, A. Adhikari, Z. Kostic, G. Zussman, and X. Di, "AI-powered CPS-enabled vulnerable-user-aware urban transportation digital twin: Methods and applications," *IEEE Transactions on Intelligent Transportation Systems*, Sept. 2026.

[4] Y. Fu, Q. Gao, **M. Ghasemi**, G. Zussman, and X. Di, "Multi-pedestrian safety warning at urban intersections: Use case of digital twin," in *Proc. IEEE Int. Conf. on Intelligent Transportation Systems (ITSC'26)* (to appear), 2026.

[5] **M. Ghasemi**, Y. Fu, X. Ouyang, P. Wang, M. Turkcan, J. Tavori, S. Kleisarchaki, T. Calmant, L. Gürgen, Z. Kostic, X. Di, G. Zussman, and J. Ghaderi, "Real-time video analytics for urban safety: Deployment over edge and end devices," in *Proc. ACM/IEEE Symposium on Edge Computing (SEC)*, Dec. 2025. **Best Paper Award**

[6] N. S. Pargoo, **M. Ghasemi**, S. Xia, M. K. Turkcan, T. Ehsan, C. Zang, Y. Sun, J. Ghaderi, G. Zussman, Z. Kostic, and J. Ortiz, "Urban sensing for human-centered systems: A modular edge framework for real-time interaction," in *Proc. 3rd Int. Workshop on Human-Centered Sensing, Modeling, and Intelligent Systems (HumanSys)*, May 2025. **CS3 Impactors Award 2025**

[7] G. Jain, B. Hindi, Z. Zhang, K. Srinivasula, M. Xie, **M. Ghasemi**, D. Weiner, S. A. Paris, X. Xu, M. Malcolm, M. Turkcan, J. Ghaderi, Z. Kostic, G. Zussman, and B. Smith, "StreetNav: Leveraging street cameras to support precise outdoor navigation for blind pedestrians," in *Proc. ACM UIST'24*, Oct. 2024.

[8] **M. Ghasemi**, Z. Yang, M. Sun, H. Ye, Z. Xiong, J. Ghaderi, Z. Kostic, and G. Zussman, "Video-based social distancing: Evaluation in the COSMOS testbed," *IEEE Internet of Things Journal*, vol. 11, no. 3, pp. 4987–4997, Feb. 2024.

[9] **M. Ghasemi**, Z. Kostic, J. Ghaderi, and G. Zussman, "Auto-SDA: Automated video-based social distancing analyzer," in *Proc. 3rd Workshop on Hot Topics in Video Analytics and Intelligent Edges (HotEdgeVideo'21)*, 2021.

[10] **M. Ghasemi**, "Auto-SDA: Automated video-based social distancing analyzer," *ACM SIGMETRICS Performance Evaluation Review*, vol. 49, no. 2, pp. 69–71, Sept. 2021. **ACM SIGMETRICS'21 SRC Finalist**

Demos and Posters

[11] **M. Ghasemi**, Y. Fu, X. Ouyang, P. Wang, M. Turkcan, J. Tavori, S. Kleisarchaki, T. Calmant, L. Gürgen, Z. Kostic, X. Di, G. Zussman, and J. Ghaderi, "Demo: Real-time video analytics for urban safety, deployment over edge and end devices," in *Proc. ACM/IEEE Symposium on Edge Computing (SEC)*, Dec. 2025.

[12] **M. Ghasemi**, Z. Kostic, J. Ghaderi, and G. Zussman, "EdgeCloudAI: Edge-cloud distributed video analytics," Demo description in *Proc. ACM MobiCom'24*, Nov. 2024.

[13] G. Jain, B. Hindi, M. Xie, Z. Zhang, K. Srinivasula, **M. Ghasemi**, D. Weiner, X. Xu, S. A. Paris, C. Tedjo, J. Bassin, M. Malcolm, M. Turkcan, J. Ghaderi, Z. Kostic, G. Zussman, and B. Smith, "Towards street camera-based outdoor navigation for blind pedestrians," Poster description in *Proc. ACM ASSETS'23*, Oct. 2023.

[14] **M. Ghasemi**, S. Kleisarchaki, T. Calmant, J. Lu, S. Ojha, Z. Kostic, L. Gürgen, G. Zussman, and J. Ghaderi, "Demo: Real-time multi-camera analytics for traffic information extraction and visualization," in *Proc. IEEE PerCom'23*, Mar. 2023.

[15] **M. Ghasemi**, S. Kleisarchaki, T. Calmant, L. Gürgen, J. Ghaderi, Z. Kostic, and G. Zussman, "Demo: Real-time camera analytics

for enhancing traffic intersection safety," in *Proc. ACM MobiSys'22*, June 2022.

[16] **M. Ghasemi**, Z. Yang, M. Sun, H. Ye, Z. Xiong, J. Ghaderi, Z. Kostic, and G. Zussman, "Demo: Video-based social distancing evaluation in the COSMOS testbed pilot site," in *Proc. ACM MobiCom'21*, 2021.

Preprints and Thesis

[17] **M. Ghasemi**, Z. Kostic, J. Ghaderi, and G. Zussman, "ASTRA: Low-overhead runtime architecture for STReam adaptation in video analytics," arXiv:2609.07020v2 [cs.NI], Sept. 2026.

[18] **M. Ghasemi**, "Scalable edge-cloud architectures for real-time video analytics applications: Design and deployment," Ph.D. Thesis, Columbia University, June 2026.

[19] N. S. Pargoo, **M. Ghasemi**, S. Xia, M. K. Turkcan, T. Ehsan, C. Zang, Y. Sun, J. Ghaderi, G. Zussman, Z. Kostic, and J. Ortiz, "The Streetscape Application Services Stack (SASS): Towards a distributed sensing architecture for urban applications," arXiv:2411.19714 [cs.NI], Nov. 2024.

PATENTS

- **M. Ghasemi**, Z. Kostic, G. Zussman, and J. Ghaderi, "Systems and methods for adaptive streaming for real-time video analytics (ASTRA)," US Patent Application Publication 2026/0163998 A1 (Appl. No. 19/179,836), June 2026. US Provisional Patent Application No. 63/633,989, Apr. 2024.

TALKS, DEMOS, AND POSTER PRESENTATIONS

ASTRA: Low-Overhead Runtime Architecture for STReam Adaptation in Video Analytics, *ACM/IEEE SEC'26*	Oct. 2026
Deploying Real-Time Video Analytics for Urban Mobility Monitoring, *NSF MERIF Workshop*	Sept. 2024
ASTRA: Adaptive Streaming System for Real-Time Video Analytics, *ACM SIGCOMM N2Women Workshop*	Sept. 2023
Hybrid Twins for Urban Transportation: From Intersections to Citywide Management, *Columbia Data Science Day*	Apr. 2023
Real-Time Multi-Camera Analytics for Traffic Information Extraction and Visualization, *Columbia Data Science Day*	Apr. 2023
Video-Based Social Distancing Evaluation in the COSMOS Testbed Pilot Site, *Columbia Data Science Day*	Apr. 2022
Auto-SDA: Automated Video-Based Social Distancing Analyzer, *ACM S3 Workshop at MobiCom'21* (invited)	Feb. 2022
Auto-SDA: Fully Automated Video-Based Social Distancing Analyzer Pipeline, *Columbia DSI Smart Cities Center*	Nov. 2021
Video-Based Social Distancing Evaluation in the COSMOS Testbed Pilot Site, *ACM SIGMETRICS SRC Finalists Session*	June 2021
ASTRA and Auto-SDA, *Columbia Data Science Day Poster Session*	Apr. 2021
Video-Based Social Distancing Evaluation in the COSMOS Testbed Pilot Site, *Columbia DSI Smart Cities Center*	Nov. 2020

TEACHING EXPERIENCE

Teaching Assistant, 5G Programmable Networks (ELEN E6771), Columbia University	Spring 2021 – 2026
Teaching Assistant, Computer Networks (CSEE 4119), Columbia University	Summer 2021
Teaching Assistant, Sharif University of Technology: Principles of Electronics (+ Lab), Principles of Electrical Engineering, Analog Circuits (+ Lab)	2017 – 2018

MENTORSHIP

Xinyu Ouyang (M.S., 2025), Peiran Wang (M.S., 2025; now at Siemens), Jiawei Lu (M.S., 2022), Shivam Ojha (M.S., 2022), Owen Nuckolls (B.S., 2022), Tushar Gupta (M.S., 2021), Jason Tianyi Dai (B.S./M.S., 2021; now at Google), Minghan Zhu (B.S., 2021), Mohith Manohar (M.S., 2021).

PROFESSIONAL SERVICE

Conference Reviewer: ACM MobiHoc 2020, 2021; ACM MobiCom 2025; IEEE INFOCOM 2026
Journal Reviewer: IEEE TNSE 2021; IEEE Wireless Communications 2023; IEEE Internet of Things Journal 2025; Int. J. of Computer Vision 2025
Outreach: Kids Week at Intrepid: Full STEAM Ahead (2020); Columbia Girls' Science Day (2019)

TECHNICAL SKILLS

Programming: C/C++, Python, Shell, MATLAB | **Spoken Languages:** English, Persian
Video & AI Systems: NVIDIA DeepStream SDK, GStreamer (C), TensorRT, NVIDIA Jetson, OpenCV, vision-language models
Libraries & Tools: Qt / Qt Creator, Armadillo, Eigen, Visual Studio | **Cloud:** Google Cloud Platform (incl. BigQuery), AWS