

# MEHRNAZ SABET

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## Research Focus

My research aims to enable machines to learn how to coordinate with humans and other machines as a team towards shared goals. I believe learning effective cooperative behaviors can ultimately enable reliable autonomous systems. I build on emerging techniques in Multi-Agent Machine Learning and apply them to new training environments that are informed by real-world application scenarios involving drones.

## Education

**Ph.D. Information Science** — Computer Science minor

**Cornell University, College of Computing and Information Science**

Jan 2021 – Present

*Concentrations:* Artificial Intelligence, Robotics, Human Computer Interaction

*Committee:* Susan Fussell, Sanjiban Choudhury, Malte Jung, Qian Yang

**MSc. Information Science**

**Cornell University, College of Computing and Information Science**

May 2023

Awarded upon completion of PhD Candidacy Exam (A-Exam)

**BSc. Computer Engineering**

**University of Tehran, Department of Electrical and Computer Eng.**

Sep 2014 – Jul 2020

*Thesis:* Integrating quadcopter drones to ad-hoc operations during disaster response

## Achievements and Awards

**National Artificial Intelligence Resource Reward**

2025

Won \$200,000 worth of compute from 4 different providers (HuggingFace, Groq, Cerebras, Nvidia) for my project on AI-enabled traffic management for advanced air mobility

**Partnerships for AI-enabled Traffic Management for Advanced Air Mobility**

2024

Led industry engagement for my NASA-funded project and secured more than 8 key partnerships with leading stakeholders and industry players for the project's execution. Raised an additional \$20,000 in funds

**Nvidia-NASA Hackathon**

2024

Selected as part of an exclusive cohort of teams working on large-scale NASA-funded projects and collaborated with Nvidia mentors to accelerate training for VLA navigation models.

**NASA University Student Research Challenge – Grant: \$80k**

2024

Awarded to student research projects with novel approaches to solving some of the biggest technical challenges facing aviation as identified by NASA Aeronautics Research Mission Directorate

**Global Advanced Air Mobility Academic Paper Competition Finalist**

2024

**NSF Innovation Corps National Award – Grant: \$50k**

2023

Awarded to top researchers in science and engineering fields with promising lab inventions

|                                                                                            |      |
|--------------------------------------------------------------------------------------------|------|
| <b>Cornell Engineering Commercialization Fellowship</b>                                    | 2023 |
| Awarded to three PhD candidates with research-based impactful technology innovations       |      |
| <b>NSF Spirit of I-Corps Award</b>                                                         | 2023 |
| Awarded for demonstrating excellence in leadership & execution during the national program |      |
| <b>ACM Best Paper Award</b>                                                                | 2022 |
| <b>Best ECE Undergraduate Thesis Project for Fundamental Design and Innovation</b>         | 2020 |
| Awarded by University of Tehran                                                            |      |
| <b>Best Computer Eng. Undergraduate Thesis Project</b>                                     | 2020 |
| Awarded by University of Tehran                                                            |      |
| <b>(4 x) Best Undergraduate Thesis Project by Industry</b>                                 | 2020 |
| Awarded by 4 different commercial companies                                                |      |

## Selected Publications and Patents

- **Sabet, M.**, Palanisamy, P., & Mishra, S. (2023). Scalable modular synthetic data generation for advancing aerial autonomy. *Robotics and Autonomous Systems*, 166, 104464.
- **Sabet, M.**, Orand, M., & W. McDonald, D. (2021). Designing Telepresence Drones to Support Synchronous, Mid-air Remote Collaboration: An Exploratory Study. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*.
- **Sabet, M.** 2025. Adaptive Neural Engine for Efficient Distributed Simulation and Training. Submitted to The United States Patent and Trademark Office.
- **Sabet, M.** 2025. Multi-Agent Human-in-the-Loop Simulation System for Human-Autonomy Teaming Evaluation and Training. Submitted to The United States Patent and Trademark Office.

## Research Experience

### **Cornell University — Lead Researcher on Human-Drone Systems** Jan 2021 – Present

- Working on implementing a new multi-agent imitation learning algorithm for learning cooperative policies from humans in partially observable multi-agent simulation environments
- Implemented a suite of multi-agent human-in-the-loop cooperative simulation training environments informed by real-world search and rescue drone operations
- Created an optimized training pipeline for on-policy MARL baseline finetuning in high-fidelity simulation environments
- Conducted studies on a new system for human-machine teaming data collection using a multi-person human-drone platform [paper submission underway]

### **NASA University Student Research Challenge — PI/Team Lead** Feb 2024 – Present

*Title: **Learning cooperative policies for adaptive human-drone teaming in shared airspace***

*website: [projectorion.info](http://projectorion.info)*

- Building on my PhD research to develop new cooperative models for airspace coordination (leading to AI-enabled Traffic Management software for Advanced Air Mobility)
- Implementing end-to-end data engine for training and testing multi-agent learning baselines in new simulation configurations that represent challenges faced in urban air mobility scenarios

- Implemented a patent-pending city-scale advanced simulation system for multi-agent operations to train and test AI models and study V2V links
- Leading a multi-disciplinary team of undergraduate and master students across CS, IS, and ECE

### **Nvidia-NASA Hackathon**

Aug 2024 - Sep 2024

- Pretrained and optimized two state-of-the-art navigation transformer models on DGX cloud. By leveraging accelerated computing, we achieved a 55% improvement in training performance and a 40% increase in memory efficiency
- Developed a more compact navigation model to accelerate deployment in scenarios where balancing performance and generalizability is crucial
- Created reusable pipelines for mixed precision, kernel fusion and distributed training for our ongoing work in the project to increase compute utilization
- Results were shared as part of Open Accelerated Computing (OAC) Summit'24 under dedicated session: Accelerating AI for Autonomous Navigation: Optimizing Navigation Transformers for Large-Scale Use Cases

### **Microsoft — Autonomous Systems Group Intern**

Jun 2022 – Aug 2022

- Designed, developed and studied a new procedural generative aerial synthetic training data augmentation framework that increases end data variants by 75% and contributes to generalizability of trained models
- Designed and implemented an adaptive Domain Randomization approach for type-agnostic realistic scene augmentation to address sim-to-real
- Proposed a new iterative data collection optimization approach for efficiently generating synthetic aerial datasets to meet a performance target
- Ran experiments on representation learning methods for localization towards improving vision-based drone navigation using multi-modal synthetic data

## **Projects**

### **Advanced simulation system for validating autonomous robots**

Feb 2021 – May 2023

- Implemented an advanced modular simulation system to validate the autonomy behaviors in autonomous robots providing scalable testbeds through a modular data-driven environment
- Implemented a novel approach in multi-modal data collection, through a performant rendering mechanism to generate large-scale test data thus mitigating risk of deployment
- This system won 2 major awards including an NSF grant and is actively being used for research

### **Integrating quadcopter drones to ad-hoc operations during disaster response**

#### **B.Sc. Thesis – Department of Electrical and Computer Engineering**

Jan 2018 – Feb 2020

- Studied first responders' collaboration during natural disasters and designed a platform prototype using quadcopter drones, advanced cloud computing, machine learning and data visualization techniques to support distributed drone operations for effective response.
- This project won 6 awards from industry and academia in total

## **Professional activities**

### **Project Director, Shaping Autonomy**

2023 – 2024

- Conducted more than 100 interviews with industry experts for inspiring applied projects that address critical gaps and empower research and engineering community

- Initiative backed by NSF and supported by 3 leading industry associations

**Technical Committee Member, Human-Machine Teaming, AIAA** 2024 – Present

**Friend of the Technical Committee, Intelligent Systems, AIAA** 2024 – Present

**Multi-Vehicle Control (m:N) Working Group member, NASA** 2022 – Present

Data for Safety Cases sub-group lead, Queueing algorithms sub-group co-lead

**Associate member**, Association for Uncrewed Vehicle Systems International (AUVSI) 2022 – Present

**Speaker**, Open Accelerated Computing (OAC) Summit'24, Accelerating AI for Autonomous Navigation: Optimizing Navigation Transformers for Large-Scale Use Cases

**Speaker**, AUVSI '24, Shaping Autonomy: Enabling New Generation of Collaborations Towards Desired Outcomes

**Speaker**, Women & Drones Coffee Connection, Advancing the field through new collaborations, Oct 2023

**Deputy Technical Discipline Chair**, AIAA SciTech '26, Human-Machine Teaming

**Session Chair**, AIAA SciTech '25, Human-Machine Teaming: Human Performance and Cyber-Physical Systems

**Session Chair**, AUVSI '23, Designing Autonomy: Data Foundations

**Workshop Facilitator**, AIAA SciTech '25, Idea Challenge Workshop: Defining Opportunities on the Bleeding Edge. The workshop focuses on technologies and opportunities that are more than 10 years away from being feasible, innately “DARPA hard”.

**Reviewer**, IEEE Transactions on Circuits and Systems II: Express Briefs, ACM Human Factors in Computing Systems (CHI), International Journal of Drones, ACM CSCW, SciTech'25, SciTech'26

## Coverage

NASA Selects University Teams to Explore Innovative Aeronautical Research, By Jim Banke, nasa.gov, Feb 21, 2024

Ph.D. student Mehrnaz Sabet advances autonomous drone systems with industry partners, Cornell Graduate Student Spotlight, Oct 26, 2023

Commercialization Fellows assess innovations' potential, By Bridget Hagen, Cornell Chronicle, May 8, 2023

From ideas to impact, By Wpengine, Oct 4, 2023