MEHRNAZ SABET

ms3662@cornell.edu its-mehrnaz.me

EXECUTIVE SUMMARY

I am a researcher and technical leader building and deploying AI-enabled systems for safe, scalable coordination of autonomous aerial systems. My work focuses on bridging the gap between learning-based autonomy and safety-critical deployment by designing large-scale simulation, training, and validation infrastructures informed by real-world multi-agent drone operations.

I currently serve as Principal Investigator on a NASA-funded project advancing cooperative human-drone teaming and AI-enabled traffic management for Advanced Air Mobility, where I design and deploy city-scale multi-agent simulation systems, develop cooperative learning algorithms under partial observability, and stress-test safety-critical behaviors such as detect-and-avoid and vehicle-to-vehicle coordination. My work has supported government and industry stakeholders in evaluating autonomy under operational constraints, contributing to aviation safety, FAA-aligned evaluation, and national infrastructure readiness.

KEY TECHNICAL CONTRIBUTIONS (SELECTED)

- Architected a city-scale simulation, training, and validation platform for AI-enabled cooperative autonomous airspace operations, incorporating a patent-pending distributed neural simulation engine.
- Enabled decentralized, hardware-in-the-loop autonomy evaluation by designing real-time multi-agent simulation infrastructure resilient to latency, synchronization challenges, and network degradation.
- Applied the platform to deployment-informed validation of learning-based autonomy, supporting safety-case–relevant evaluation for Advanced Air Mobility and public-safety operations.

AWARDS, GRANTS & COMPETITIVE FUNDING

National & Federally Competitive Awards

- **National Artificial Intelligence Research Resource (NAIRR) Award — *Principal Investigator* — 2025**

  Competitive $200,000+ in federally coordinated AI compute resources, administered by the National Science Foundation (NSF), across multiple providers (Hugging Face, Groq, Cerebras, NVIDIA) to support AI-enabled traffic management and autonomous systems research.

- **NASA University Student Research Challenge (USRC) — *Principal Investigator* — 2024**

  Competitive NASA grant ($80,000) awarded by the Aeronautics Research Mission Directorate to advance novel approaches to aviation safety and autonomy.

- **NSF Innovation Corps (I-Corps) National Award — 2023**

  Competitive national award ($50,000) recognizing research with strong potential for real-world impact and commercialization.

Infrastructure, & Strategic Research Support

- **Partnership Expansion for AI-Enabled Traffic Management — 2024**

  Led expansion of my NASA-funded project through industry and government partnerships, supporting FAA-aligned test site initiatives, public safety autonomy research, and deployment-informed validation of cooperative airspace systems; secured 8+ strategic partners and $20,000 in additional external support.

Select Honors & Recognition

- **NVIDIA–NASA Hackathon — Selected Participant — 2024**

  Chosen for an exclusive cohort working on large-scale, NASA-aligned autonomy projects with direct NVIDIA technical mentorship.
- **Cornell Engineering Commercialization Fellowship — 2023**

  Awarded to a small cohort of PhD researchers advancing impactful research-based technologies.
- **NSF Spirit of I-Corps Award — 2023**

  Recognized for leadership, execution, and technical excellence during the national I-Corps program.
- **ACM Best Paper Award — 2022**

  Awarded for outstanding research contribution.
- **Best Undergraduate Thesis Project Awards (Multiple) — University of Tehran — 2020**

  Recipient of six awards from industry and academia recognizing technical innovation and applied impact.

RESEARCH & TECHNICAL LEADERSHIP

Principal Investigator & Technical Lead

NASA | University Student Research Challenge (USRC) | 2024 – Present

AI-enabled traffic management and simulation platform for cooperative autonomous airspace

- Direct a NASA-funded research project advancing learning-based coordination, detect-and-avoid behaviors, and vehicle-to-vehicle (V2V) interaction under safety-critical and partially observable conditions relevant to Advanced Air Mobility (AAM).
- Conceived, designed, and implemented an end-to-end, real-time, distributed, hardware-in-the-loop simulation and data engine enabling decentralized autonomy testing and stress-testing across deployment-informed urban mobility scenarios.
- Developed predictive, decentralized tactical deconfliction and cooperative perception mechanisms that ensure safe separation despite network delay, packet loss, dynamic occlusion, and uncooperative aircraft, including recreation of safety-critical operational scenarios informed by real-world incidents.
- Built and integrated novel V2V communication and coordination pipelines, including previously untested radio technologies, enabling resilient autonomy behaviors under network disruption and degraded communications.
- Deployed the platform as a shared national testing and research infrastructure, supporting FAA-aligned test site initiatives, public safety autonomy research, national workforce development efforts, and multi-sector partnerships with government and industry.

Lead Researcher — Collaborative Aerial Autonomous Systems

Cornell University | 2021 – Present

- Lead independent research on multi-agent learning and human–machine teaming, with a focus on enabling reliable cooperative behaviors between humans and autonomous aerial systems in shared operational environments.
- Developed novel multi-agent training frameworks for learning cooperative behaviors from expert demonstrations in partially observable, multi-agent simulation environments.
- Built a suite of high-fidelity, human-in-the-loop simulation environments to study real-world search-and-rescue and airspace coordination scenarios to support data collection, training, and evaluation.

- Designed and implemented VLM- and LLM-based multi-agent task planning and coordination frameworks enabling zero-shot, decentralized cooperation in complex, partially observable environments without retraining.
- Developed a high-performance multimodal data collection and rendering pipeline enabling large-scale synthetic data generation and reducing deployment risk; the system received multiple competitive awards, including NSF support, and remains actively used for research.

Technical Lead — NVIDIA–NASA Hackathon
NVIDIA | Aug-Sep 2024

- Pretrained and optimized state-of-the-art navigation transformer models on NVIDIA DGX cloud infrastructure, achieving a 55% improvement in training performance and a 40% increase in memory efficiency through accelerated computing techniques.
- Designed and evaluated a compact navigation model architecture optimized for deployment scenarios requiring a balance between performance, generalizability, and computational efficiency.
- Presented results at the Open Accelerated Computing Summit 2024 in a dedicated session on accelerating AI for autonomous navigation at scale.

SWE Intern — Autonomous Systems Group
Microsoft | Jun–Aug 2022

- Designed and implemented a procedural synthetic data generation framework for aerial autonomy, increasing dataset variability by 75% and improving generalization of trained models.
- Developed an adaptive domain randomization approach for type-agnostic, realistic scene augmentation to address sim-to-real transfer challenges.
- Proposed and validated an iterative data collection optimization strategy for efficiently generating synthetic datasets to meet predefined performance targets.
- Conducted experimental evaluations of representation learning methods for localization and vision-based drone navigation using multimodal synthetic data.

SELECTED PUBLICATION 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., & McDonald, D. W. (2021). *Designing telepresence drones to support synchronous, mid-air remote collaboration: An exploratory study*. Proceedings of the ACM CHI Conference on Human Factors in Computing Systems.
- **Sabet, M.,** *Adaptive Neural Engine for Efficient Distributed Simulation and Training*. U.S. Patent Application filed (USPTO), 2025.

PROFESSIONAL LEADERSHIP & NATIONAL SERVICE

Conference & Technical Leadership

- **Technical Discipline Chair,** Human–Machine Teaming | AIAA SciTech 2027
- **Deputy Technical Discipline Chair,** Human–Machine Teaming | AIAA SciTech 2026
- **Session Chair,** Machine Learning & AI/xAI; Human–Machine Interaction | AIAA SciTech 2026
- **Session Chair,** Human–Machine Teaming: Human Performance & Cyber-Physical Systems | AIAA SciTech 2025
- **Session Chair,** Designing Autonomy: Data Foundations | AUVSI XPONENTIAL 2023

- **Founder & Project Director,** *Shaping Autonomy* | 2023–2024
  Led this initiative identifying critical gaps between autonomy research and real-world deployment, informed by 100+ structured interviews with industry, government, and academic experts; translated findings into applied research directions and collaboration frameworks, with results presented at AUVSI XPONENTIAL.

Government & Standards-Adjacent Committees

- Technical Committee Member, Human–Machine Teaming — AIAA — 2024–Present
- Technical Committee Member, Intelligent Systems — AIAA — 2024–Present
- Working Group Member, Multi-Vehicle Control (m:N) — NASA — 2022–Present
  - Sub-Group Lead: *Data for Safety Cases* | Co-Lead: *Queueing Algorithms*

Peer-Review Service

- **Reviewer,** IEEE Transactions on Circuits and Systems II: Express Briefs, ACM/IEEE Human–Robot Interaction (HRI), ACM CHI Conference on Human Factors in Computing Systems, AIAA SciTech, International Journal of Drones, ACM CSCW

INVITED TALKS, PANELS & WORKSHOPS

- **Speaker,** AI-Enabled Traffic Management for Advanced Air Mobility | DFR Working Group | Sept 2025
- **Speaker,** AI-Enabled Traffic Management for Advanced Air Mobility | NASA Tech Talk | Jul 2025
- **Speaker & Workshop Facilitator,** Defining Opportunities on the Bleeding Edge for "DARPA hard" technologies | AIAA SciTech 2025 (Idea Challenge Workshop)
- **Speaker,** Data for Safety Cases in m:N Operations | NASA m:N Working Group | Oct 2024
- **Speaker,** Accelerating AI for Autonomous Navigation | Open Accelerated Computing Summit 2024
- **Speaker,** Towards Adaptive Autonomy for Cooperative Airspace | UAM Working Group | Jul 2023
- **Speaker,** Shaping Autonomy: Enabling New Collaborations | AUVSI XPONENTIAL 2024
- **Speaker,** Advancing the Field Through New Collaborations | Women & Drones Coffee Connection | Oct 2023
- **Panelist,** Generative AI Applications for Human–Machine Teaming | AIAA SciTech 2024
- **Panelist,** From Lab to Launch: Research-Backed Startups | Cornell Entrepreneurship Celebration 2024

MEDIA & INDEPENDENT COVERAGE

- Students win NASA grant to develop AI for safer aerial traffic, By Louis DiPietro, Cornell Chronicle, May 14, 2024
- 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

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

- Designed and prototyped a distributed drone platform supporting first responders in disaster response