KRISTY SAKANO

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EDUCATION

University of Maryland at College Park College Park, Maryland
Ph.D. Student, Department of Computer Science *August 2023 - In Progress*
Advisor: Dr. Mumu Xu, Department of Aerospace Engineering

Georgia Institute of Technology Atlanta, Georgia
M.S. in Computer Science, Specialization in Computational Perception & Robotics *January 2020 - May 2023*

University of North Carolina at Chapel Hill Chapel Hill, North Carolina
B.S. in Physics, Option Astrophysics *August 2014 - May 2018*

RESEARCH

UMD Department of Aerospace Engineering, Xu Lab College Park, MD

Qualifying Autonomous Systems: Learning from Mario Kart for Robust Safety *July 2024 - Present*

- Developed a framework integrating parametric Signal Temporal Logic (pSTL) to ensure deep reinforcement learning policies comply with human-readable specifications.
- Implemented and tested an autonomous agent in Super Mario Kart using Proximal Policy Optimization (PPO) to evaluate safety constraints in a structured driving environment.
- Incorporated explainable AI techniques and sensitivity analysis to enhance policy transparency, bridging formal methods with data-driven learning for autonomous systems.

WORK & INTERNSHIPS

Graduate Research Intern at START College Park, Maryland
June 2025 - August 2025

Summer 2025 - Conducted an independent research project analyzing the evolving threat landscape of ideologically motivated cyberattacks (hacktivism) as part of a national security internship program at the National Consortium for the Study of Terrorism and Responses to Terrorism (START)

Operations Research Analyst at NAWCAD AI & Autonomy Applications Division
Patuxent River, Maryland *August 2018 - August 2024*

- **FY19-FY24** - project lead for three internal NAWCAD autonomous systems development projects. Topics include multi-agent autonomous decision making (task allocation, cooperative search, etc), multi-domain autonomy, operations in comms denied environments, and more. Information material subject to Distribution C release.

Research Intern at NASA Goddard Science Data Processing Branch, Code 587
Greenbelt, MD *January 2021 - July 2021*

- **FY21** - Collaborated with NASA researchers to develop a unique Linux build and testing platform to evaluate communications-limited deep learning algorithms on Xilinx's Zybo. Performed benchmark analysis to cross-compare the FPGA performance with other development boards and application specific integrated circuits with regards to accuracy, speed, memory usage, and performance. Trained a new classified hyperspectral dataset to develop a TFLite model integrable with the Zybo platform.

Research Intern at NRL Distributed Autonomous Systems Group, Code 5514
Washington, D.C. *September 2019 - December 2019*

- **FY20** - Collaborated with NRL researchers on a cross-organizational project focused on herding of non-cooperative robots in complex environments. Simulated and experimentally validated a previously proposed approach for a pursuer-evader strategy involving navigation around convex obstacles to a goal location.

PUBLICATIONS AND PRESENTATIONS

Publications

- **K. Sakano,** J. Mockler, A. Chen and H. Xu, "A Framework for Black-Box Controller Design to Automatically Satisfy Specifications Using Signal Temporal Logic," 2025 International Conference on Unmanned Aircraft Systems (ICUAS), Charlotte, NC, USA, 2025, pp. 587-594, doi: 10.1109/ICUAS65942.2025.11007815.
- J.S. Goodwill, J.P. MacKinnon, **K. Sakano**, C.M. Wilson (2022). Onboard hyperspectral image classification via transfer learning for communication-limited spacecraft. 2022 IEEE Aerospace Conference (AERO), 1-13
- G. Torres and **K. Sakano**, "η Geminorum: an eclipsing semiregular variable star orbited by a companion surrounded by an extended disc," Monthly Notices of the Royal Astronomical Society, vol. 516, no. 2, pp. 2514–2521, Aug. 2022, doi: 10.1093/mnras/stac2322.
- G. Arreaga, M. Creech, and **K. Sakano** (2021). Performative Analysis of Sensor Limitations in Communication Denied Environments. 2021 Military Sensing Symposium. Refereed.
- K. **Sakano** and V. Edwards. (2020). Pursuit evasion of a swarm using A* path planning. Unclassified, released under Distro A through the Naval Research Laboratory.

Presentations

Oral Presentation, Int'l Conference on Unmanned Aircraft Systems (ICUAS)	May 2025
Oral Presentation, NAWCAD Symposium for Emerging Professionals (NSEP)*	July 2023
Poster Presentation, Naval Applications of Machine Learning (NAML)	February 2023
Oral Presentation, DoD 6.1 Basic Research Conference	September 2022
Oral Virtual Presentation, NSEP	July 2022
Oral Virtual Presentation, NAML	February 2022
Oral Virtual Presentation, NSEP	July 2021
Oral Virtual Presentation, Military Sensing Symposium Joint (BAMS and NSSDF) Conference	December 2021
Virtual Poster Presentation, NSEP*	July 2020
Poster Presentation, NAML	February 2020

* Received Best Presentation Award at NSEP for outstanding DoD research.

TEACHING

UMD Department of Computer Science   College Park, MD
Graduate Teaching Assistant for CMSC 434: Introduction to HCI   *August 2023 - Present*

- Taught the basics of Human-Computer Interaction (HCI) to over 350 students across 3 semesters
- Provided one-on-one iterative feedback to student teams developing an app prototype as part of the course project
- Worked with the instructor to create new problem contexts and questions for in-class exams