Matthew Romano

Robotics Researcher · PhD Candidate

Ann Arbor, MI | mmroma@umich.edu | romano-matthew

Summary

Robotics researcher with a focus on planning and control for multi-vehicle systems. Throughout my PhD I have enjoyed researching novel aerospace technologies that can revolutionize industries. My focus has been on autonomy for teams of unmanned aircraft systems (UAS) and in particular planning and control for diverse missions including: deformable formation control, cooperative multilift slung load transportation with haptic guidance, and multi-UAS wildfire mapping. I am an electronics enthusiast, care about embedded systems, and value real-time, efficient algorithms. The majority of my research has been experimentally validated on actual systems with real-world considerations in mind. I want to do epic things, pursue my passions, and help those around me.

Education

University of Michigan (UMich) — *Ann Arbor, MI*

PhD in Robotics — *September 2022*

- Dissertation: Planning, Control, and Estimation for Diverse Multi-UAS Missions

MS in Robotics — *May 2019*

University of Illinois Urbana-Champaign (UIUC) — *Champaign, IL*

BS in Electrical Engineering with a Computer Science Minor — *December 2016*

Work Experience

University of Michigan (UMich) — *Ann Arbor, MI*

Researcher, Software Engineer, Instructor — *September 2017 - September 2022*

- Developed an opensource quadrotor and flight controller that integrates reliable, low-latency motion capture feedback
- Derived and experimentally validated a minimum separation bound to guarantee safety in a formation control method
- Developed a novel haptic guidance interface for multilift slung load transportation with real user experiments
- Explored using team of UAS for wildfire mapping via computationally efficient planning methods in complex 3D terrain
- Added resiliency to a deformable formation via a fluid flow navigation function around pop-up obstacles and vehicle failures
- Researched an autonomous roofing concept via a nailgun-equipped octocopter
- Co-developed and co-taught ROB 103: Robotic Mechanisms, a new first-year, hands-on robotics course

National Security Innovation Network (NSIN) — *Ann Arbor, MI*

Independent Consultant — *January 2020 - June 2020*

- Interviewed DoD personnel and reviewed maintenance workflows to understand maintenance data challenges
- Proposed system to assist DoD maintainers in data collection via audio/video information extraction using CV/NLP

Sprite Robotics — *Champaign, IL*

Robotics Firmware Engineer — *January 2017 - May 2017*

- Researched and implemented autonomous navigation strategies for a robotic cat toy platform
- Developed future product ideas including an immersed experience via a 360 degree camera

Bretl Lab, University of Illinois Urbana-Champaign (UIUC) — *Champaign, IL*

Undergraduate Research Assistant — *October 2015 - December 2016*

- Compared performance of monocular simultaneous localization and mapping (SLAM) algorithms.
- Improved feature tracking algorithms through integration of inertial measurement unit (IMU) data.

Northrop Grumman (Electronic Systems) — *Rolling Meadows, IL*

Test Engineer Intern — *June 2015 - August 2015*

- Designed and built sensor testing cable and worked with technician to update procedure
- Troubleshot and fixed battery charger. Analyzed data to characterize failures. Analyzed test yields.
- Took inventory of lab. Extended test station cable and updated documents. Troubleshot test stations.

Honors & Awards

2019	**AFRL Swarm and Search AI Competition**, First Place	*Dayton, OH*
2019	**Into the Dataverse Hackathon**, First Place	*Ann Arbor, MI*
2019	**Engineering Research Symposium Scientific Visualization Award**, First Place	*Ann Arbor, MI*
2016	**Lextech Senior Design Most Marketable Project Award**, Recipient	*Champaign, IL*

Additional Skills

Computer C/C++, Python, MATLAB, Make, Bash, LaTeX, ROS

Other Proficient in Excel, PowerPoint, and Word. Working knowledge of Windows, MacOS, and Linux based systems.