Jonathan A Diller

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Research Interests

My research interests broadly lie in multi-robot planning and tasking. More specifically, I focus on developing planning and tasking algorithms that account for how a robot's actions affect the state of its own systems, how the environment influences its behavior, and how the actions of individual robots impact their ability to coordinate within a team. A common theme in my work is the integration of realistic systems models into both centralized and decentralized algorithms, with an emphasis on bridging theory and practice. I also have a broader interest in Operations Research and Machine Learning.

Education

Doctor of Philosophy in Robotics *Expected Graduation*: **August 2025**
Colorado School of Mines
Advisor: Dr. Qi Han
Thesis: *"Robust Robot Teams; Making Planning for Multi-Agent Systems Reflective"*

Master of Science in Computer Science **May 2022**
Colorado School of Mines

- GPA: *4.0/4.0*

Bachelor of Science in Computer Science **May 2020**
Pennsylvania State University, Harrisburg

- Minor in Mechatronics Technology
- Minor in Mathematics
- Graduated summa cum laude
- GPA: *3.99/4.0*

Research Experience

Research Assistant *(Advisor: Dr. Qi Han)* **July 2020 - Present**
Pervasive Computing Systems Group, Colorado School of Mines *Golden, CO*

- Studying and implementing multi-robot projects with focus on communication and energy-aware planning.
- Writing proposals (contributed to two white papers)

Journeyman Fellow *(Mentor: Dr. J. Humann and J. Dotterweich)* **June 2024 - August 2024**
Army Research Laboratory *Golden, CO (remote)*

- Researched and developed planning algorithms for mixed drone-UGV teams.

Graduate Research Intern *(Mentor: Dr. John Rogers)* **May 2023 - August 2023**
Army Research Laboratory *Adelphi, MD*

- Researched the topics of task allocation and communication mapping for robot teams.

Research Scholar *(Advisor: Dr. Peter Idowu)* **June 2019 - July 2019**
Penn State Drawdown REU Program *Middletown, PA*

- Designed and evaluated algorithms for controlling microgrids using PLCs.

Research Assistant *(Advisor: Dr. Javad Khazaei)* **March 2019 - June 2019**
Pennsylvania State University *Middletown, PA*

- Researched and developed microcontroller applications for use in renewable energy projects.

Publications

† Student mentees, acceptance rate listed when known

Under Review

[R1] **J. Diller**, Q. Han, and M. Desaulniers†. "*Holistic Framework for Multi-Drone Data Collection in IoT Systems*." Under review at the IEEE Internet of Things Journal.

Journal Papers

[J1] **J. Diller**, J. Rogers, Q. Han, and N. T. Dantam. "*Communication Mapping for Robot Teams*." Accepted for publication at the IEEE Transactions on Field Robotics, 2025.

[J2] **J. Diller**, Q. Han. "*Energy-Aware Drone Path Finding with a Fixed-Trajectory Ground Vehicle*." Published in the ACM Journal on Autonomous Transportation Systems, 2025.

Conference Papers

[C1] **J. Diller**, Y. S. Teoh†, R. Byers†, Q. Han, J. G. Rogers, and N. T. Dantam. "*Failure-Aware Tasking for Teams of Drones*." In proceedings of the International Conference on Distributed Computing Systems (ICDCS), 2025. *Acceptance rate: 19.7%*.

[C2] **J. Diller**, Q. Han, R. Byers†, J. Dotterweich, and J. Humann. "*Hitchhiker's Guide to Patrolling: Path-Finding for Energy-Sharing Drone-UGV Teams*." In proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2025. *Acceptance rate: 24.5%*.

[C3] C. Wang, **J. Diller**, and Q. Han. "*LLM for Generating Simulation Inputs to Evaluate Path Planning Algorithms*." In proceedings of the International Conference on Machine Learning and Applications (ICMLA), 2024. *Acceptance rate: 24.3%.*

[C4] **J. Diller**, P. Hall†, and Q. Han. "*Holistic Path Planning for Multi-Drone Data Collection*." In proceedings of the International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT), 2023. *Acceptance rate: 38.4% (short paper)*.

[C5] **J. Diller** and Q. Han. "*Energy-Aware UAV Path Planning with Adaptive Speed*." In proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2023. *Acceptance rate: 23.3%*.

[C6] **J. Diller**, P. Idowu, J. Khazaei, "*Load-Leveling Trainer for Demand Side Management on a 45kW Cyber-Physical Microgrid*," *Texas Power and Energy Conference 2020 (TPEC)*, 2020

[C7] **J. Diller**, B. Trussell, J. Khazaei, P. Idowu, "*Hardware Development of a Three-Phase 3.5 kW SiC Converter with Sinusoidal PWM*," *Texas Power and Energy Conference 2020 (TPEC)*, 2020

Workshop Papers

[W1] **J. Diller**, N. Dantam, J. Rogers, and Q. Han. "*Communication Jamming-Aware Robot Path Adaptation*." In proceedings of the International Workshop on Distributed Collective Intelligence (DISCOLI), 2023.

[W2] P. Hall†, **J. Diller**, A. Moon†, and Q. Han. "*DroNS-3: Framework for Realistic Drone and Networking Simulators*." In proceedings of the Workshop on Micro Aerial Vehicle Networks, Systems, and Applications (DroNet), 2023.

[W3] **J. Diller**, P. Hall†, C. Schanker†, K. Ung†, P. Belous†, P. Russell†, and Q. Han. "*ICCSwarm: A framework for Integrated Communication and Control in UAV Swarms*." In proceedings of the Workshop on Micro Aerial Vehicle Networks, Systems, and Applications (DroNet), 2022.

Extended Abstracts & Demonstrations

[A1] M. Hatch†, C. Fellinge†, **J. Diller**, and Q. Han. "*ROARQuad: Robust, Open Academic Research Quadcopter*." Accepted for demonstration at the International Conference on Mobile Systems, Applications, and Services (Mobisys), 2025.

[A2] **J. Diller**. "*Self-Aware High-Level Planning for Robot Teams*." Presented at the Cyber-Physical Systems Rising Stars Workshop, 2024. *Acceptance rate: 16.4%*.

[A3] **J. Diller**. "*Planning and Coordination for Unmanned Aerial Vehicles*." Presented at the International Conference on Autonomous Agents and Multiagent Systems' Doctoral Consortium, 2023.

[A4] **J. Diller**, Q. Han, C. Dreyer, F. Rossi, S. Bandopadhyay, J.P. de la Croix, A. Rahmani, P. Clark. "*Integrated Communication and Controls for Swarms of Small Satellites*." Presented at the Inter-Planetary Small Satellite Conference, 2021.

Awards & Recognitions

- 2024 Cyber-Physical Systems Rising Star **May, 2024**
- Best PhD Poster, C-MAPP, *Colorado School of Mines* **Jan, 2024**
- Best PhD Poster, C-MAPP, *Colorado School of Mines* **Jan, 2023**
- Best Elevator Pitch, C-MAPP, *Colorado School of Mines* **Feb, 2022**
- Graduation Student Marshal for School of Sci., Eng. and Tech. **May, 2020**
- Computer Science Outstanding Student, *Pennsylvania State University* **Apr, 2020**

- Evan Pugh Scholar Award - Senior, *Pennsylvania State University* **Apr, 2019**
- Evan Pugh Scholar Award - Junior, *Pennsylvania State University* **Apr, 2018**
- President's Freshman Award, *Pennsylvania State University* **Apr, 2017**
- Dean's List, *Pennsylvania State University* **Spring 2016 - Spring 2020**

Teaching Experience

College Teaching Certificate Program **August 2024 – May 2025**
Colorado School of Mines, Trefny Center *Golden, CO*
- Studied teaching pedagogy and learner-centered teaching practices
- Designed a upper-level undergraduate course to introduce students to robot autonomy

Primary Instructor **August 2024 – May 2025**
Colorado School of Mines *Golden, CO*
- CSCI 128: Computer Science for STEM (Fall 2024, Spring 2025)
- Typical class size: 50-70 students

Teaching Assistant **August 2020 – December 2022**
Colorado School of Mines *Golden, CO*
- CSCI 565: Distributed Systems (Fall 2022)
- CSCI 406: Algorithms (Spr 2021)
- CSCI 261: Programming Concepts (Fall 2020)

Peer Tutor **August 2017 – May 2020**
Pennsylvania State University *Middletown, PA*
- Tutor students in Computer Science, Mathematics, Physics and Engineering classes.
- Earned CRLA Certified Tutor, Level I Certification.

Mentoring Experience

Graduate Students *degree (year conferred)*
Matthew Desaulniers, *publications*: [R1] *PhD in Robotics*
Robert Byers, *publications*: [C1, C2] *MS in Computer Science*
Yee Shen Teoh, *publications*: [C1] *MS in Robotics (2025)*
Priestly Barigala *MS in Robotics (2024)*

Undergraduate Students
Cody Fellinge*, *publications*: [A1] *BS in Electrical Engineering (2025)*
Matthew Hatch*, *publications*: [A1] *BS in Electrical Engineering (2025)*
Jack Sigler *BS in Computer Science (2025)*
Ava Moon, *publications*: [W2] *BS in Computer Science*
Corey Schanker, *publications*: [W3] *Combined BS in CS + EE*
Peter Hall*, *publications*: [C4, W2, W3] *BS in Computer Science (2023)*
Kristen Ung*, *publications*: [W3] *BS in Electrical Engineering (2022)*
Philip Belous, *publications*: [W3] *BS in Computer Science (2022)*
Zachary Smeton* *BS in Computer Science (2021)*

* Graduated with Undergraduate Research Scholar Distinction

Work Experience

Robert Bosch GmbH **May 2018 – July 2020**

Embedded Software Developer & Test Intern *Lancaster, PA*

- Develop firmware for embedded real-time environments.
- New product prototyping.
- Design and implement automated tests for moving cameras.
- Write documentation for internal procedures.

United States Marine Corps **November 2010 - November 2015**

KC-130J Crewmaster, Plane Captain *San Diego, CA & Okinawa, Japan*

- Last held rank/pay grade: Sergeant/E-5
- Supervised small teams in pre and post flight inspections on C-130J aircraft.

Service

Technical Reviewer

- IEEE Robotics and Automation Letters
- Pervasive and Mobile Computing Journal
- ACM Journal on Autonomous Transportation Systems
- IEEE International Conference on Pervasive Computing and Communications
- IEEE International Conference on Robotics and Automation
- IEEE/RSJ International Conference on Intelligent Robots and Systems
- ACM/IEEE International Conference on Cyber-Physical Systems
- International Conference on Unmanned Aircraft Systems

Committees

- Graduate Research and Discovery Symposium, Program Chair *2025*
- Graduate Research and Discovery Symposium, Poster Chair *2024*
- Mines Research Integrity and Security Committee, Grad. Rep. *Fall 2023 - Spring 2024*
- Mines Research Council, Graduate Representative *Spring 2023*
- CS@Mines Research Committee, Student Advocate *Spring 2022 - Spring 2023*

Other Service

- Graduate Student Government, CS Representative *Fall 2022 - Spring 2024*
- Graduate Student Seminar Organizer:
  - 6 seminars in 2023
  - 4 seminars and 1 workshop in 2024
  - 2 seminars in 2025