

Yousef Emam

ROBOTICS PHD STUDENT

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Education

Georgia Institute of Technology

PH.D. IN ROBOTICS

- Advisors: Profs. Magnus Egerstedt & Zsolt Kira.

Atlanta, GA

Aug 2018 - Est. May 2022

Georgia Institute of Technology

M.S. IN COMPUTER SCIENCE

- Specialization: Machine Learning.

Atlanta, GA

Aug 2018 - Est. May 2021

Georgia Institute of Technology

B.S. IN MECHANICAL ENGINEERING

- Focus on Automation and Robotic Systems.

Atlanta, GA

Aug 2014 - May 2018

Experience

Zoox

SOFTWARE ENGINEER - PLANNING AND CONTROLS

Foster City, CA

June 2022 - Present

GT Institute for Robotics and Intelligent Machines (IRIM)

GRADUATE RESEARCH ASSISTANT

- Developed adaptive task allocation and execution algorithms for heterogeneous robot teams which were tested on real platforms.
- Developed a robust safety framework compatible with model-learning methods for disturbed dynamical systems.
- Incorporated the safety framework as a differentiable layer for safe sample-efficient reinforcement learning.
- Aided in building the Robotarium: the first remotely accessible swarm robotics research platform.
- Currently expanding the Robotarium to include quadcopters for automatic experiment execution and charging.
- Designed and prototyped the SlothBot: a sloth-like solar-powered wire-traversing robot.
- Deployed the SlothBot in the Atlanta Botanical Garden for environmental monitoring purposes.

Atlanta, GA

Aug 2018 - May 2022

Exyn

INTERN - AUTONOMY AND MAPPING

- Automated a black-box tuning procedure in C++ to improve the flight stability of each drone which previously required hours.
- Conducted flight tests demonstrating the automated procedure achieving similar results to its manual counterpart in a 6 minute flight.
- Integrated the procedure into the GUI for easy use by the field engineers and added support for multi-flight tuning.

Philadelphia, PA

May 2021 - Aug 2021

Siemens

GRADUATE INTERN - AUTOMATIC PLANNING AND SCHEDULING FOR AUTONOMOUS SYSTEMS

- Expanded Siemens' Receding Horizon Planner, a scheduling algorithm, to support teaming tasks and heterogeneous teams of agents.
- Created a Search and Rescue simulator where fires are to be extinguished and victims are to be discovered and rescued.
- Improved scheduler by creating an alternative tree-search method in C++.

Princeton, NJ

May 2019 - Aug 2019

European Organization for Nuclear Research (CERN)

SUPERCONDUCTOR AND DEVICES (SCD) INTERN

- Conducted a review surveying thermal sensors for the superconducting lines feeding the Large Hadron Collider's magnets.
- Performed stress-strain and thermal expansion analysis on a variety of superconducting wires in MATLAB.

Geneva, Switzerland

May 2017 - June 2017

GT Capstone Project

TEAM MEMBER

- Won the best Mechanical Engineering Project Award for creating a Compact Active Response Gravity Offload System (CARGOS).
- CARGOS actively offloads low weight payloads to simulate reduced gravity environments for astronaut training.
- System to be mounted in NASA's ARGOS to improve their astronauts' reduced-gravity training experience.

Atlanta, GA

Jan 2018 - May 2018

Skills

Programming	Python, MATLAB, JAVA, C++, ROS, Arduino, LabView, CAD
Manufacturing Skills	3D Printing, Metal & Woodworking, Soldering, Laserjet, Waterjet
Languages	Arabic (Native), French (Native), English (Native)
Relevant Coursework	Linear/Non-Linear Systems & Control, Optimal Estimation, Optimal Control, Network Control, Natural Language Processing, Reinforcement Learning, Deep Learning, Artificial Intelligence, Computer Vision

Publications

JOURNAL ARTICLES

- [J1] S. Wilson, P. Glotfelter, G. Notomista, S. Mayya, **Y. Emam**, X. Cai, M. Egerstedt. "The Robotarium: Automation of a Remotely Accessible, Multi-Robot Testbed". *2021 IEEE Robotics and Automation Letters (RA-L)*.
- [J2] **Y. Emam**, P. Glotfelter, S. Wilson, G. Notomista, M. Egerstedt. "Data-Driven Robust Barrier Functions for Safe, Long-Term Operation". *2021 IEEE Transaction on Robotics (T-RO) - accepted*.
- [J3] G. Notomista, S. Mayya, **Y. Emam**, C. Kroninger, A. Bohannon, S. Hutchinson M. Egerstedt. "A Resilient and Energy-Aware Task Allocation Framework for Heterogeneous Multi-Robot Systems". *2020 IEEE Transaction on Robotics (T-RO)*.
- [J4] G. Notomista, **Y. Emam**, M. Egerstedt. "The SlothBot: A Novel Design for a Wire-Traversing Robot". *2019 IEEE Robotics and Automation Letters (RA-L)*.

CONFERENCE PAPERS

- [C1] **Y. Emam**, G. Notomista, P. Glotfelter, M. Egerstedt. "Data-Driven Adaptive Task Allocation for Heterogeneous Multi-Robot Teams Using Robust Control Barrier Functions". *2021 IEEE International Conference on Robotics and Automation (ICRA)*.
- [C2] **Y. Emam**, S. Wilson, M. Hakenberg, U. Muenz, M. Egerstedt. "A Receding Horizon Scheduling Approach for Search & Rescue Scenarios". *2020 International Federation of Automatic Control (IFAC) World Congress*.
- [C3] **Y. Emam**, S. Mayya, G. Notomista, A. Bohannon, M. Egerstedt. "Adaptive Allocation for Heterogeneous Multi-Robot Teams with Evolving and Unknown Robot Capabilities". *2020 IEEE International Conference on Robotics and Automation (ICRA)*.
- [C4] **Y. Emam**, P. Glotfelter, M. Egerstedt. "Robust Barrier Functions for a Fully Autonomous, Remotely Accessible Swarm-Robotics Testbed". *2019 IEEE Conference on Decision and Control (CDC)*.

Service & Outreach

Peer Reviewer

- IEEE Transaction on Robotics (T-RO)
- IEEE Transactions on Control of Network Systems (TCNS)
- IEEE Control Systems Letters (L-CSS)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE International Conference on Robots and Systems (IROS)
- IEEE Conference on Decision and Control (CDC)
- IEEE Conference on Automation Science and Engineering (CASE)
- IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS)

Session Chair

- 2021 IEEE International Conference on Robotics and Automation (ICRA)

Teaching Praticum

- ME 3017 - System Dynamics at the Georgia Institute of Technology