

Yousef Emam

ROBOTICS PHD STUDENT

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Education

Georgia Institute of Technology

PHD IN ROBOTICS

- Advisors: Profs. Magnus Egerstedt & Zsolt Kira.

Atlanta, GA

Aug 2018 - Est. May 2022

Georgia Institute of Technology

MASTERS IN COMPUTER SCIENCE

- Specialization: Machine Learning.

Atlanta, GA

Aug 2018 - Est. May 2021

Georgia Institute of Technology

B.S. IN MECHANICAL ENGINEERING

- Honors: *summa cum laude*.
- Focus on Automation and Robotic Systems.

Atlanta, GA

Aug 2014 - May 2018

Experience

Siemens

GRADUATE INTERN - AUTOMATIC PLANNING & SCHEDULING FOR AUTONOMOUS SYSTEMS

- Extended Siemens' Receding Horizon Planner (RHP), a scheduling algorithm, to teaming tasks & heterogeneous teams of agents.
- Created a simulator inspired by a Search & Rescue scenario where fires are to be extinguished & victims are to be discovered & 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 & DEVICES (SCD) INTERN

- Conducted a review surveying options for the superconducting MgB_2 lines' thermal sensor feeding the Large Hadron Collider's (LHC's) new magnets.
- Performed stress-strain & thermal expansion analysis on a variety of Nb_3Sn superconducting wires.

Geneva, Switzerland

May 2017 - June 2017

Exposure Controlled Projection Lithography (ECPL) Systems Lab

RESEARCH ASSISTANT

- Designed lenses using Exposure Controlled Projection Lithography.
- Formulated an automated post-curing process to improve lens-curing.
- Improved the process-planning & simulation processes.

Atlanta, GA

Jan 2016 - May 2016

Projects

The SlothBot

TEAM MEMBER

- Designed and prototyped a sloth-like solar-powered wire-traversing robot.
- Deployed the SlothBot in the Atlanta Botanical Garden for environmental monitoring purposes.

Atlanta, GA

Jan 2018 - Present

The Robotarium

TEAM MEMBER

- Expanding the Robotarium to include quadcopters for automatic experiment execution and charging.
- Developed safety framework compatible with learning methods for disturbed systems.
- Built wireless charging stations for the first remotely accessible swarm robotics research platform.

Atlanta, GA

Jan 2018 - Present

Capstone Project

TEAM MEMBER

- Won the best Mechanical Engineering Project Award for creating a Compact Active Response Gravity Offload System (CARGOS).
- System to be mounted on NASA's ARGOS to improve their astronauts' reduced-gravity training experience.
- Implemented the GUI & the feedback loop using a PID controller.

Atlanta, GA

Jan 2018 - May 2018

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". *2020 IEEE Transaction on Robotics (T-RO)* - submitted.
- [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)* - conditionally accepted.
- [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)* - submitted.
- [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)*.

Skills

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

Leadership & Outreach

2015-2016 University Lab Instructor , GT Invention Studio	<i>Atlanta, GA</i>
2015-2016 Vice-President , GT Arab Student Organization	<i>Atlanta, GA</i>
2015-2015 I-Natural Team , GT Vertically Integrated Projects	<i>Atlanta, GA</i>
2014-2015 Nicaragua Technical Committee , GT Engineers without Borders	<i>Atlanta, GA</i>