

# MAX B. RUDOLPH

mrudolph@cs.utexas.edu  $\diamond$  <http://maxrudolph1.github.io/>

## EDUCATION

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### University of Texas at Austin

PhD in Computer Science

*Advised by Amy Zhang*

*August 2022 - Present*

### Georgia Institute of Technology, GPA: 4.0/4.0

MS in Electrical and Computer Engineering

*Advised by Harish Ravichandar and Sonia Chernova*

*August 2020 - December 2021*

### Georgia Institute of Technology, GPA: 3.86/4.0

BS in Electrical Engineering (Highest Honors), Minor in Robotics

*August 2016 - May 2020*

## PUBLICATIONS

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5. Learning Action-based Representations Using Invariance  
**Rudolph, M.\***, Chuck, C.\*, Black, K.\*, Lvovsky, M., Niekum, S., Zhang, A.  
*Reinforcement Learning Conference (RLC), 2024*
4. Generalization of Heterogeneous Multi-Robot Policies via Awareness and Communication of Capabilities  
**Rudolph, M.\***, Howell, P.\*, Torbati, R., Fu, K., Ravichandar, H.  
*Conference on Robot Learning (CoRL), 2023*
3. Rethinking Sim2Real: Lower Fidelity Simulation Leads to Higher Sim2Real Transfer in Navigation  
Truong, J., **Rudolph, M.**, Yokoyama, N., Chernova, S., Batra, D., Rai, A.  
*Conference on Robot Learning (CoRL), 2022*
2. Desperate Times Call for Desperate Measures: Towards Risk-Adaptive Task Allocation  
**Rudolph, M.**, Chernova, S., Ravichandar, H.  
*IEEE International Conference on Intelligent Robots and Systems (IROS), 2021*
1. Heterogeneous Multi-agent Coverage Control for Range Limited Robots  
**Rudolph, M.**, Wilson, S., Egerstedt, M.  
*IEEE International Conference on Robotics and Automation (ICRA), 2021*

## RESEARCH EXPERIENCE

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### Machine Intelligence through Decision Making and Interaction (MIDI) Lab 2022 - Present

UT Austin *Advisor: Profs. Amy Zhang*

Working on generalizable methods for training reinforcement learning agents.

### Robot Autonomy and Interactive Learning (RAIL) Lab

2020 - 2022

Georgia Tech *Advisors: Profs. Harish Ravichandar and Sonia Chernova*

Researched structured multi-agent learning algorithms for heterogeneous multi-agent teams and studied inefficiencies in sim2real methods

### Robotics and Intelligent Systems Lab

2018 - 2020

Georgia Tech *Advisor: Prof. Magnus Egerstedt*

Designed novel algorithms for performing coverage control using a heterogeneous multi-robot team.

### Georgia Tech Systems Research Lab

2017 - 2018

Georgia Tech *Advisor: Prof. Fumin Zhang*

## AWARDS AND HONORS

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<b>Qualcomm Innovation Finalist</b> , <i>Qualcomm</i>	2024
<b>NSF NRT Ethical AI Fellowship</b> , <i>UT Austin</i>	2022-2024
<b>Dean's Prestigious Graduate Fellowship</b> , <i>UT Austin</i>	2023
<b>Georgia Tech Stand-up Comedy Contest Winner</b> , <i>Georgia Tech Comedy Show</i>	2018
<b>Idea2Prototype Award</b> , <i>Georgia Tech, Create-X</i>	2018
<b>Summer Undergraduate Research Fellowship</b> <i>Jet Propulsion Laboratory, Caltech</i>	2019,2020
<b>Faculty Honors</b> <i>Georgia Tech</i>	2016-2020
<b>Dean's List</b> <i>Georgia Tech</i>	2016-2020

## WORK EXPERIENCE

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**Autonomous Systems Intern** May 2020 – August 2020  
Jet Propulsion Laboratory

- Validated guidance and control algorithms for the Psyche spacecraft
- Developed analysis algorithms for Monte Carlo simulations of spacecraft pointing algorithms
- Built dynamic system to update spacecraft simulation with ever-changing spacecraft properties

**Flight Software Lead** January 2019 – January 2020  
Georgia Tech Yellow Jacket Space Program (YJSP)

- Developed software for state estimation and control of TIAT, YJSP's testbed rocket
- Wrote C++ code to read gyro and accelerometer values for a second order state-estimator
- Designed PID controller to control the attitude canards on the rocket

**Mars 2020 Software System Testbed Intern** May 2019 – August 2019  
Jet Propulsion Laboratory

- Developed test procedures for the Mars 2020 System Testbed
- Wrote automation scripts in Python for the Remote Sensing Mast (RSM) on the Mars 2020 Rover
- Automated image acquisition tests by developing procedures to interface with Ground Data System
- Ran flight software tests on the engineering model of Mars 2020 rover to detect software failures
- Performed range of motion tests for azimuth and elevation actuators for RSM

**Intern in Science and Tech** May 2018 – August 2018  
National Security Agency

- Repaired and operated small Unmanned Aerial Systems (UAS) for antenna elevation
- Analyzed flight data from Pixhawk flight controller using MATLAB to validate Real Time Kinematic (RTK) algorithms
- Built and tested RF-Fiber Optic communication systems
- Performed load analysis on analog RF and fiber optic components

## LEADERSHIP

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<b>IEEE Robotics Club</b> , Controls Team Lead	2017-2020
<b>The Makery @ Georgia Tech</b> , President	2018-2019
<b>Yellow Jacket Fencing Club</b> , Captain	2018, 2021
<b>Yellow Jacket Space Program</b> , Software Lead	2019

## TEACHING EXPERIENCE

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- **ECE 3084: Signals and Systems** Georgia Tech 2020-2021
- **PHYS 2211: Intro to Physics** Georgia Tech 2017-2020

## SKILLS

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**Languages:** Python, Matlab, C++ , Java

**Software:** PyTorch, NumPy, ROS, Tensorflow, git, L<sup>A</sup>T<sub>E</sub>X, Microsoft Office, Robotarium, AutoDesk Inventor, OnShape

## RELEVANT COURSEWORK

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Statistical ML	Mathematical Foundations of ML	Applications of DSP
Linear Systems and Control	Networked Control	Deep Learning
Digital Image Processing	Machine Learning	Modern System Theory
Signals and Systems	Dynamics of Rigid Bodies	Advanced DSP