

# Jeremiah M. Coholich

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## EDUCATION

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**PhD in Robotics**, Georgia Institute of Technology

Expected 2025

Advisor: Zsolt Kira

**MS in Computer Science**, Georgia Institute of Technology

Expected Summer 2022

Concentration: Computational Perception/Robotics

Thesis: Learning High-Value Footstep Placements for Quadruped Robots

GPA: 3.88 / 4.0

**BS in Mechanical Engineering**, The University of Texas at Austin, Highest Honors

2019

GPA: 3.98 / 4.0

## SKILLS

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### Software Engineering

**Languages** Python, MATLAB, Shell script

**Frameworks** PyTorch, TensorFlow, NumPy

**Tools** Docker, Slurm, LaTeX, Anaconda, Git, Linux, Matplotlib, Weights & Biases

### Mechanical Engineering

**CAD** Solidworks and Solidworks Simulation, Siemens NX with Teamcenter, some NASTRAN

**Manufacturing** Manual and CNC machining with Mastercam and Fusion 360 CAM

## RESEARCH EXPERIENCE

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**Graduate Researcher**, Robot Perception and Learning Lab

June 2020 - Present

- Develop and implement novel learning-based planning and control algorithms for quadruped robots in simulation
- Reproduce results from academic papers in the field of reinforcement learning (RL) and robotics
- Create robot environments in NVIDIA IsaacGym and PyBullet simulation with procedurally-generated terrain
- Implement pipeline for reproducible training of RL policies, multi-GPU policy evaluation, and data collection
- Derive and implement vectorized analytical inverse kinematics for quadruped robot

**Graduate Researcher**, Laboratory for Intelligent Decision and Autonomous Robots

August 2019 - May 2020

- Studied nonlinear optimization of biped walking gaits on Cassie robot from Agility Robotics
- Wrote program for hybrid trajectory optimization of five-link walker on soft terrain using MATLAB, FROST, IPOPT, and Wolfram Mathematica
- Operate Cassie robot and tune PD controller gains
- Advise undergraduate team in creating upper-body robot and building Cassie test hardware

**Undergraduate Research Assistant**, Human Centered Robotics Lab

February 2018 - May 2019

- Implemented and debugged a model-based, multi-input controller with a disturbance observer and discrete-time filters for a series-elastic augmentation exoskeleton with a flexible cuff under the mentorship of a PhD student
- Designed and ran system ID experiments for arm exoskeleton
- Designed and fabricated an adjustable-stiffness flexure for exoskeleton
- Modeled a 3-axis robotic joint in order to aid in placement of actuators and prevent issues with gimbal lock
- Selected as one of 15 finalists out of 250 students at the Longhorn Research Poster Session for undergraduates

**Undergraduate Research Assistant**, Laboratory for Freeform Fabrication

Summer 2016

- Conducted study on relationship between SLS machine laser energy density and part density and tensile strength

**INDUSTRY EXPERIENCE**

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**Associate Mechanical Engineer**, SpaceX

Summer 2019

- Ran lifecycle and environmental testing for three different seals on the Dragon 2 Capsule
- Redesigned and procured seals

**Mechanical Engineering Intern**, Harmonic Bionics

Summer 2018

- Automated the creation of the company CAD fastener library with Python
- Finalized design for six robotics linkages, including FEA, safety, aesthetics, wiring, drawings, and procurement
- Designed spring counterbalance mechanism for 30 Nm robotic joint
- Designed and machined stand for upper-body exoskeleton
- Assisted with branding, shipping, and design of sales demo kits for proprietary EtherCAT devices

**Mechanical Engineering Co-op**, NASA Jet Propulsion Laboratory (JPL)

May 2017 - December 2017

- Ran hardware testing campaign for percussive coring drill in Mars 2020 Perseverance Rover
- Designed and procured ground support equipment and testing fixtures
- Analyzed data collected from actuators, springs, and piezoelectric force sensors on percussion mechanism

**OTHER EXPERIENCE**

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**Engineering Boot Camp**, Bell Helicopter

January 2017

- Competed in mechanical design challenge and presented solution to Bell executives

**Team Captain and Co-founder**, Longhorn Racing Electric FSAE Team

August 2015 - June 2017

- Ran a team of 46 members to build an electric, single-seater, formula-style racecar for 2017 competition
- Personally secured over \$7,000 worth of material and monetary donations
- Designed and manufactured electric powertrain with single motor, chain drive, and spool

**PUBLICATIONS**

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Xiaofeng Guo, Bryan Blaise, Jennifer Molnar, Jeremiah Coholich, Shantanu Padte, Ye Zhao, and Frank L. Hammond III. "Soft Foot Sensor Design and Terrain Classification for Dynamic Legged Locomotion". Accepted at *IEEE International Conference on Soft Robotics* 2020.

G. C. Thomas, J. M. Coholich, and L. Sentis, "Compliance Shaping for Control of Strength Amplification Exoskeletons with Elastic Cuffs," presented at *The IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Hong Kong, China, 2019

David Bourell, Jeremiah Coholich, Antoine Chalancon, Abhimanyu Bhat. "Evaluation of energy density measures and validation for powder bed fusion of polyamide." *CIRP Annals Manufacturing Technology Vol. 1, 66* (Aug. 2017), pp. 217-220.

**AWARDS**

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- National Defense Science and Engineering Graduate (NDSEG) Fellowship, 2020
- NASA Space Technology Graduate Research Opportunities (NSTGRO) Fellowship, 2020 (declined)
- Georgia Tech President's Fellowship, 2019
- George W. Bean Endowed Presidential Scholarship, 2016 - 2019

## **VOLUNTEER WORK**

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Graduate Student Mentor, Create-X Capstone Projects

Spring 2020

- Advise three teams of undergraduate students on their startup-orientated capstone projects

FIRST Robotics Mentor, Cristo Rey Jesuit High School

Fall 2019 - Spring 2020

- Assist students during build days and at competition
- Organize and host Computer Aided Design workshop