Jeremiah M. Coholich

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EDUCATION

PhD in Robotics, Georgia Institute of Technology — Expected 2025
Advisor: Zsolt Kira

MS in Computer Science, Georgia Institute of Technology — Expected Summer 2020
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

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

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 program fast vectorized implementation of 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

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 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

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

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

- 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

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