

CONTACT INFORMATION	Durand 032 Stanford University CA, 94305 USA	thowell@stanford.edu thowell.github.io +1 801 300 9431
EDUCATION	Ph.D. Candidate, Mechanical Engineering , Stanford University	Sept. 2017 - present
	Qualifying Exams: Automatic Controls, Robotics	
	Advisor: Zachary Manchester	
	M.S., Mechanical Engineering , Stanford University	June 2019
RESEARCH	Automatic Controls, Robotics	
	B.S., Mechanical Engineering , University of Utah	Dec. 2016
	Summa Cum Laude	
	Research Assistant , Robotic Exploration Lab, Stanford University	May 2018–Present
EXPERIENCE	My research is focused on developing fast optimization tools for motion planning of robotic systems. Currently, I'm working on robust feedback motion planning and a fast solver for contact-implicit trajectory optimization. Previously, I was co-leading development of <code>TrajectoryOptimization.jl</code> , an open-source Julia package for solving constrained trajectory optimization problems.	
	Research Assistant , Telerobotics Laboratory, University of Utah	Oct. 2015 - Dec. 2016
	I devised and implemented a control scheme to sort swarms of microrobots using rotating uniform magnetic fields for minimally invasive medical applications. This work included: applied physics, simulation, nonlinear optimization, fabrication of a scaled microrobot swarm, and writing C++ code to control a tri-axial Helmholtz-coil system.	
	Research Assistant , Utah Center of Excellence for Biomedical Microfluidics, University of Utah	Sept. 2014 - Oct. 2015
EDUCATION	I designed and built a forty-eight-syringe pump for a medical microfluidic system, developed standard operating procedures for a high-throughput drug screening and cytotoxicity evaluation system, and performed statistical analysis for ovarian-cancer cell experiments.	
	Instructor , GREAT Summer Camp, University of Utah	Jun. 2017 – Jul. 2017
	Taught practical robotics and programming skills to elementary school students using the LEGO Mindstorm platform and developed projects and challenges for FLL skills, telerobotics, and kinetic-art themed weeks.	
	Co-founder , Cornaby-Howell LLC	Apr. 2015 – Oct. 2015
RESEARCH	I prototyped systems including: a touch display module with GUI, Arduino C code, a lead-screw system, and syringe attachment modules for precision high-throughput syringe pumps.	
	Twisty Puzzle Designer	Aug. 2007 – Jan. 2011
	I designed and built twisty puzzles with selling prices ranging from \$25 - \$850. I exhibited my work at the community's premier international event, Dutch Cube Day, in 2008.	

PUBLICATIONS

1. **T. Howell**, Z. Manchester. Direct Policy Optimization. *In preparation*.
2. B. Jackson*, **T. Howell***, K. Shah, M. Schwager, Z. Manchester. Scalable Cooperative Transport of Cable-Suspended Loads with UAVs using Distributed Trajectory Optimization. 2020. Robotics and Automation Letters.
3. **T. Howell***, B. Jackson*, Z. Manchester. ALTRO: A Fast Solver for Constrained Trajectory Optimization. 2019. International Conference on Intelligent Robots and Systems. Macao, China.
4. **T. Howell**, B. Osting, J. Abbott. Sorting Rotating Micromachines By Variations in Their Magnetic Properties. 2018. Physical Review Applied.
5. J. Arellano, **T. Howell**, J. Gammon, S. Cho, M. Janat Amsbury, B. Gale. Use of a highly parallel Microfluidic Flow Cell Array to determine therapeutic drug dose response curves. 2017. Biomedical Microdevices.

SKILLS

Julia, C++, Python, Matlab, R
 L^AT_EX, Git, Linux, Solidworks, ROS, Adobe Premiere Pro, Adobe Illustrator
 Mill, Lathe, Vacuum Forming, Laser Cutting, Mold Making and Casting, Metal Sheet Fabrication

COURSEWORK AT
STANFORD

Convex Optimization EE364a, Convex Optimization II EE364b, Optimal Control AA203, Nonlinear Control AA209, Adv. Software Development CME212, Engineering Design Optimization AA222, State Estimation AA273, Principles of Robotic Autonomy AA274, Mechatronics ME210, Linear Dynamical Systems EE263, Introduction to Robotics ME320, Machine Learning CS229, Decision Making Under Uncertainty AA228, Control Design Techniques E205, Adv. Robotic Manipulation CS326, Adv. Feedback Control AA212, Optimization MS&E 211X, Experimental Robotics CS225a, Multi-robot Systems A277

FELLOWSHIPS AND
SCHOLARSHIPS

Stanford Graduate Fellowship	2017 – 2018
University of Utah Undergraduate Research Opportunities Program Fellowship	2016
The Boeing Company Scholarship	2016
Shirley L. & Kathelyne O. Evans Endowed Scholarship	2016
Big Ten+ Grad Expo travel scholarship	2016
University of Utah Presidential Scholarship	2013 – 2016