

Taylor A. Howell

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Education

Stanford University

Ph.D Mechanical Engineering (3.99 GPA)

Sept. 2017 – present

University of Utah

B.S. Mechanical Engineering Summa Cum Laude (3.99 GPA)

Capstone Project: Wireless Power for Aerial Robots

May 2013 – Dec. 2016

Research

Robotic Exploration Lab, Stanford University

I am currently building state-of-the-art trajectory optimization solvers. I have developed higher-order integration extensions, adopted techniques from state estimation to improve ill-conditioning, and devised a routine to enable infeasible trajectory initialization for the iLQR algorithm.

May 2018 – present

Telerobotics Laboratory, University of Utah

I devised and implemented a control policy to sort swarms of microrobots using rotating uniform magnetic fields. This work included: Matlab simulations, optimization, fabrication of a scaled microrobot swarm, and writing a C++ library for a tri-axial Helmholtz-coil system.

Oct. 2015 – Dec. 2016

Utah Center of Excellence for Biomedical Microfluidics, University of Utah

I designed and built a forty-eight-syringe pump for a medical microfluidic system. Additionally, I developed standard operating procedures for a high-throughput drug screening and cytotoxicity evaluation system, and performed statistical analysis for ovarian-cancer cell experiments.

Sept. 2014 – Oct. 2015

Experience

Instructor at GREAT Summer Camp, School of Computing, University of Utah

I taught robotics and programming to elementary school students using LEGO Mindstorms and developed projects and challenges for FLL skills, telerobotics, and kinetic-art themed weeks.

Jun. 2017 – Jul. 2017

Co-founder at Cornaby Howell LLC

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.

Apr. 2015 – Oct. 2015

Twisty Puzzle Designer

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.

Aug. 2007 – Jan. 2011

Skills

Julia, Python, C++, Matlab, Arduino C, R

Solidworks, ROS, Latex, Adobe Premiere Pro, Adobe Illustrator, Microsoft Word, Microsoft Excel
Mill, Lathe, Vacuum Forming, Laser Cutting, Mold Making and Casting, Metal Sheet Fabrication

Coursework at Stanford

Optimal Control AA203, Nonlinear Control AA209, State Estimation AA273, Principles of Robotic
Autonomy AA274, Mechatronics ME210, Introduction to Linear Dynamical Systems EE 263,
Introduction to Robotics ME320, Machine Learning CS229, Decision Making Under Uncertainty
AA228, Control Design Techniques E205

Publications

- 2017* Sorting Rotating Micromachines By Variations in Their Magnetic Properties
T. Howell, B. Osting, J. Abbott
in Physical Review Applied
- Use of a highly parallel Microfluidic Flow Cell Array to determine therapeutic drug dose response curves
J. Arellano, **T. Howell**, J. Gammon, S. Cho, M. Janat-Amsbury, and B. Gale
in Biomedical Microdevices
- 2015* A Continuous Flow Microspotter for the Implementation of a High-Throughput Drug Screening and Cytotoxicity Evaluation System
J. Arellano, J. Gammon, **T. Howell**, M. Janat-Amsbury, and B. Gale
at BMES Annual Meeting 2015

Fellowships and Scholarships

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