Henry Cappel | Aerospace Engineer

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Professional Profile

I have received a masters of science in engineering in aerospace engineering from the University of Texas at Austin. I take pleasure in understanding the fundamental physics and solving the most difficult problems of human machine interaction. I follow my grit until I find a solution, but beyond all else I follow my passion to build and create leading to innovative solutions.

Education

December 2020 **Master of Science, Aerospace Engineering (Controls and Robotics)**
The University of Texas at Austin
Courses: Feedback Control Systems, Optimal Control Theory, Linear Systems Analysis, Statistical Estimation Theory, Attitude Dynamics and Control, Network Control Systems

May 2017 **Bachelor of Arts, Psychology and Physics**
Swarthmore College

Research Experience and Publications

August 2018 - December 2020 **Human Centered Robotics Laboratory, UT Austin**

- Member of the Human Centered Robotics Laboratory at the University of Texas at Austin led by Dr. Luis Sentis

April 2019 - September 2019 ***Adaptive Compliance Shaping with Human Impedance Estimation***

- Used electromyography and stretch sensor data from the human to train and implement an online impedance regressor
- Implemented the online impedance estimation into a strength amplification controller for an exoskeleton and successfully improved the bandwidth through online compliance shaping
- Accepted publication by American Controls Conference (ACC)

June 2019 - September 2019 ***Finding Locomanipulation Plans Quickly in the Locomanipulation Constrained Manifold***

- Worked at NASA Johnson Space Center to develop software for a locomanipulation research project with the Valkyrie humanoid robot
- Wrote software for an A* footstep planner that incorporated manipulation trajectories for the end goal of opening a door and pushing a cart
- Worked with C++ and ROS

- Publication accepted by International Conference on Robotics and Automation (ICRA)

August 2019 - December 2020 ***A Hierarchical Multi-Robot Mapping Architecture Subject to Communication Constraints***

- Master's thesis project
- Developed a full scale hybrid multi-robot SLAM architecture using a hierarchical robot coordination approach
- Software written in C++ using ROS and Rviz

Employment Summary

March 2021 - Present

HYCO Motorcars

- Family run startup for used car sales, rentals, and storage
- Tasks include web development, bookkeeping/accounting, and many miscellaneous tasks

February 2018 - June 2018

Robotics Instructor, Robot City Workshop, Chicago IL

- Led after school programs teaching children about basic level robotics and assisting them to build their own
- Lessons included circuits, batteries, motors and generators, and mechanical assembly
- Led workshops teaching the fundamentals of robotics which included assembling various robots, soldering, and coding

June 2017 - June 2018

Math and Physics Tutor, Varsity Tutors, Chicago IL

- Assisted students from middle school through undergraduate college with homework and test preparation in areas of algebra, trigonometry, calculus, AP physics, statics, dynamics, and college level physics
- Learned how to effectively communicate complex concepts and work with various learning styles

September 2018 - May 2020

Teaching Assistant, the University of Texas at Austin, Austin TX

- Led class review sessions and assisted professors teaching material to undergraduate students
- Classes include Linear Systems Analysis, Spacecraft Design, Feedback Control Systems, Coding in C++

Leadership and Activities

September 2013-January 2016 Varsity Baseball, Swarthmore College

- Successfully managed 30+ hours per week of practice, training and competition while balancing a rigorous full-time course load

September 2016-May 2017 Meditation Club Leader, Swarthmore College

- Organized and led meditation sessions on campus to help students manage daily stressors

Skills and Interests

- Software experience: C++, Python, ROS, Gazebo, Rviz, Matlab, Simulink, HTML5, CSS3, Javascript, Python Django, LaTeX
- Design and Build RC planes and Drones

- Conversationally fluent in spanish