Allen M. Hawkes

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EDUCATION

Robotics Institute, Carnegie Mellon University | *M.S., Robotics* **May 2016**

- Completed: Intro to CV, Geometric Methods in CV, Robotics Math, Kin/Dyn/Control
  - 1st year GPA: 4.0, QPA 4.08 (out of 4.33)
- Current: Machine Learning, Statistical Techniques in Robotics
- Graduate researcher for Dr. Stephen Smith in the Intelligent Coordination and Logistics Laboratory

Duke University | *B.S., Mech Eng; Minor, Elec Eng* **May 2014**

- Graduated *Cum Laude* (major GPA: 3.86, overall GPA: 3.77)
- Coursework includes: Graduate Controls/Sensing, Robotics, Digital Comms, EM Theory

EXPERIENCE

Robotics Institute, CMU | *Graduate Research Assistant* **2014 - 2016**

Research in scheduling and planning for vehicles and traffic infrastructure

- Developed simulation package for SURTAC (Scalable URban TRAffic Control) scheduler (Python/Java).
- Co-lead deployment, testing, and verification of a 23-intersection network with Surtrac in Pittsburgh.
- Currently developing novel methods for scheduling traffic flows by combining smart signals, V2V, and V2I. Following simulation, work will be tested on the 49-intersection Surtrac network in Pittsburgh.

QBotix, Inc. | *Systems/Mechanical Engineering Intern* **2013 – 2014**

Research and development of a robotic system for dual-axis tracking solar panels.

- Wrote C code for new torque-tracking coupler engagement, and other behavior improvements.
- Wrote Python, MATLAB, and Arduino scripts to automate testing of behaviors.
- Designed/built a 3-axis robotic stage system with closed-loop control and system hardware for a test rig.

Duke University | *Undergraduate Researcher* **2011 – 2014**

Research in RF electromagnetic metamaterials and antennas.

- Primary authorship (highlighted by Nature, Popular Science): "A Microwave Metamaterial with Integrated Power Harvesting", *Applied Physics Letters, 103(16), October 14, 2013.* doi:10.1063/1.4824473
- Co-authorship: "RF Limiter Metamaterial Using p-i-n Diodes," along with 2 conference papers.
- Extensive experience in RF circuit and antenna design/simulation/fabrication, RF lab equipment.

PROJECTS

Monocular car-to-car distance estimator (C++)

Designed and built a robust monocular car detection and distance calculation algorithm as part of a 2-person team. Distance from the ego-motion car to all other cars is calculated, with a 5% error determined by ground truth of lane marking lengths.

Fused monocular visual odometry method for vehicles (C++)

Used basic sensor fusion to combine multiple monocular VO algorithms for vehicles on roads, treating each as a separate sensor. This method places second on the Kitti benchmark using a random subset of the test data.

Differential braking control system (Arduino)

Designed/built a new electromechanical braking system that allowed tighter and more controlled cornering for the Duke FSAE car. Was the team lead for our senior capstone project group of four.

Quadruped control with virtual force (Simulink/Matlab)

2D and 3D simulations of a quadruped able to balance and maintain a walking gait using a virtual force model.

Snow machine

Built a fan-gun snow machine that can cover a small yard with 1-3" of snow in 1-2 hours.