James Svacha

PERSONAL DETAILS

Birth	March 7, 1991
Phone	(864) 901-5768
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EDUCATION

Ph.D., Electrical and Systems Engineering **Ongoing**
University of Pennsylvania 3.48 GPA

Doctoral student and Research Assistant in Vijay Kumar's lab. Performed research in micro unmanned aircraft systems (UAVs), taken 11 courses that are relevant to my research, served as a Teaching Assistant for two courses, and mentored an undergraduate student in research.

B.S., Mechanical Engineering **2009-2014**
Clemson University 3.97 GPA, Suma Cum Laude

As an honors undergraduate research assistant, I worked on software development for aerial robot control using Robot Operating System (ROS). My senior project was on the design of an embedded system used to classify BMW Automotive components as damaged/undamaged using audio digital signal processing techniques.

RESEARCH EXPERIENCE

Graduate Research Assistant **2014-present**
University of Pennsylvania Philadelphia, PA

Developed a model for the forces on quadrotors as a function of velocity and motor speeds. Demonstrated that control based on this model would significantly reduce trajectory tracking error. Designed and experimentally verified the effectiveness of a UKF used to estimate the velocity and model parameters given only a known rotation and an onboard accelerometer.

Research Intern **May-Aug 2013**
Air Force Research Laboratory Kirtland AFB, Albuquerque, NM

Research on system identification, state estimation and control for wheeled mobile robots emulating satellite motion. Designed an implemented an extended Kalman filter and an unscented Kalman filter for estimating the position and orientation of the robot. Also implemented a closed-loop nonlinear control law to get the robot to orbit a fixed point.

Undergraduate Research Assistant **2013-2014**
Clemson University Clemson, SC

Used C++ and Robot Operating System (ROS) to control different types of robots inside and outside of simulation. Built a quadrotor simulator in Python and used it to study control of robots from across the country over a computer network.

SKILLS

Programming	C++, Python, Java, Matlab
Applications	Git, Robot Operating System, Mathematica, LaTeX, SolidWorks

JOURNAL PUBLICATIONS

1. James Svacha, Giuseppe Loianno, and Vijay Kumar. "Inertial Yaw-Independent Velocity and Attitude Estimation for High Speed Quadrotor Flight". To appear in *IEEE Robotics and Automation Letters (RA-L)*. Accepted January 2019.

CONFERENCE PROCEEDINGS

1. James Svacha, Kartik Mohta, Michael Watterson, Giuseppe Loianno, and Vijay Kumar. "Inertial Velocity and Attitude Estimation for Quadrotors". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Madrid, Spain. October 2018.

2. James Svacha, Kartik Mohta, and Vijay Kumar. "Improving Quadrotor Trajectory Tracking By Compensating for Aerodynamic Effects". *IEEE International Conference on Unmanned Aircraft Systems (ICUAS)*. Miami, FL. June 2017.

3. Sergio Pequito, James Svacha, George J. Pappas, and Vijay Kumar. "Sparsest Minimum Multiple-Cost Structural Leader Selection". *5th IFAC Workshop on Distributed Estimation and Control in Network Systems*. Philadelphia, PA. September 2015.

4. Sekou L. Remy, James Svacha, and Aisha Walcott-Bryant. "Design Implications for Networked Controllers Using Web Standards in Cloud Robotics". *IEE 4th Annual International Conference on Cyber Technology in Automation, Control, and Intelligent Systems (CYBER)*. Hong Kong, China. June 2014.

5. Kartik Mohta, Ke Sun, Sikang Liu, Michael Watterson, Bernd Pfommer, James Svacha, Yash Mulgaonkar, C. J. Taylor, and Vijay Kumar. "Experiments in Fast, Autonomous, GPS-Denied Quadrotor Flight". To appear in Proc. of *International Conference on Robotics and Automation (ICRA)* 2018.

ADVISORY ROLES

Yifan Xu **Summer 2015-Spring 2016**
Undergraduate Researcher University of Pennsylvania
Provided guidance, design and programming assistance as he designed an "Autonomous and Self-Sustained Recharging Station for Pelican Quadrotors."

D. Carillo, T. Das, T. Ramadoss, D. Vaske **Fall 2017 - Spring 2018**
Senior Design Team University of Pennsylvania
Met regularly with these students to provide guidance for their project, which was to implement an autonomous recharging quadrotor platform to charge smaller quadrotors.

TEACHING EXPERIENCE

MEAM 620 - Advanced Robotics **Spring 2017, Spring 2018**
Teaching Assistant University of Pennsylvania
Held office hours to help students with programming and homework assignments. Wrote assignment solutions. Graded homeworks and exams.

EAS 205 - Applications of Scientific Computation **Fall 2016**

Teaching Assistant University of Pennsylvania

Designed an autograder for projects which I had solved prior. Held office hours where I answered student questions and explained class concepts

Aerial Robotics **Spring 2016**

Teaching Staff Coursera (University of Pennsylvania)

Answered questions on forums, dealt with technical issues and bugs in our autograder, and developed lecture material for inertial measurement units in quadrotor UAVs