

# JOHN A. DOUGHERTY

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## EXPERIENCE

**Qualcomm Research Philadelphia** – Philadelphia, PA FEB. 2015 – PRESENT  
ENGINEER

*Developing high performance flight control software for Qualcomm Snapdragon processors.*

**KMel Robotics** — Philadelphia, PA JUNE 2014 – FEB. 2015  
ROBOTICS ENGINEER

*Leading the integration of computer vision algorithms into unmanned aerial vehicle technology for navigation, control, and mapping applications. Duties include designing and implementing custom embedded software in ROS using C++, flight testing hardware and software both indoors and outdoors using manual and autonomous control, and evaluating closed-loop system performance using motion capture technology and GPS.*

**The George Washington University** — Washington, DC  
GRADUATE TEACHING ASSISTANT

- MAE 1004 – Engineering Drawing and Computer Graphics JAN. 2014 – MAY 2014
- MAE 4182 – Electromechanical Controls AUG. 2013 – DEC. 2013

GRADUATE RESEARCHER MAY 2013 – MAY 2014

*Performed research within the Flight Dynamics and Control Laboratory with specific applications in vision-based estimation and control for UAV's. Independently designed, implemented, and tested both hardware and software for a new low-cost on-board laser-based landing assistance system using monocular vision and laser modules. Executed experiments with a custom-built quadrotor. Wrote image processing code in C using OpenCV library.*

UNDERGRADUATE RESEARCH ASSISTANT JAN. 2013 – MAY 2013

*Assisted graduate student in UAV development in the Flight Dynamics and Control Laboratory with specific involvement in embedded electronics and PCB design. Designed and assembled PCB for quadrotor using Cadsoft EAGLE.*

**Naval Research Laboratory** — Washington, DC MAY 2012 – AUG. 2012  
NREIP INTERN

*Performed research on dynamic foam properties within the Combustion Dynamics section under the supervision of a lab mentor. Planned and executed experiments and processed data using MATLAB and Python. Captured micrometer-scale images using a charge-coupled device camera fitted with an objective lens and analyzed images using ImageJ. Assembled results and presented findings to peers and supervisors. Summarized results in a technical paper.*

## EDUCATION

- M.S. in Mechanical and Aerospace Engineering** MAY 2014
- The George Washington University — Washington, DC Cumulative GPA: 3.96 / 4.00
  - Thesis: *Laser-Guided Autonomous Landing of a Quadrotor UAV on an Inclined Surface*
- B.S. in Mechanical Engineering, Aerospace Concentration** MAY 2013
- The George Washington University — Washington, DC Cumulative GPA: 3.99 / 4.00

## AWARDS & HONORS

- 2nd Place, Master's Technical Paper Category** APR. 2014  
AIAA Region I Student Conference, Ithaca, NY  
*Awarded for the paper titled "Laser-Based Onboard Sensing and Estimation for Precise Landing of a Quadrotor UAV on an Inclined Surface."*
- The Alfred Martin Freudenthal Prize** MAY 2013  
*Awarded to the graduating senior in the School of Engineering and Applied Science with the highest grade point average from the previous semester.*
- Pi Tau Sigma Honors Mechanical Engineering Society** DEC. 2011  
George Washington Phi Gamma Chapter  
PRESIDENT (2012-2013)  
*Responsible for organizing events, leading meetings, and attending the National Pi Tau Sigma Convention.*
- Outstanding Academic Achievement Award** 2011, 2012, 2013  
*Awarded to students in the top 2% of the class by GPA.*

## SKILLS & EXPERTISE

Experienced in software development for embedded applications, especially robotics. Experienced in deploying computer vision solutions on embedded aerial platforms for flight control and mapping. Strong background in flight dynamics and control theory. Skilled RC multirotor pilot and experienced in the use of motion capture systems (Vicon and OptiTrack) for autonomous control. Proficient knowledge of MATLAB, C++, and Robot Operating System (ROS); some experience with Python. Comfortable in OS X, Linux, and Windows environments.

## PUBLICATIONS

- (1) J. Dougherty and T. Lee, "Monocular Estimation of Ground Orientation for Autonomous Landing of a Quadrotor," *AIAA Journal of Guidance, Control, and Dynamics* (2015), Accepted.
- (2) M. Kennedy, M. Conroy, J. Dougherty, N. Otto, B. Williams, R. Ananth, J. Fleming, "Bubble coarsening dynamics in fluorinated and non-fluorinated firefighting foams," *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 470 (2015) 268-279.
- (3) J. Dougherty, D. Lee, and T. Lee, "Laser-based guidance of a quadrotor UAV for precise landing on an inclined surface," in *Proceedings of the American Control Conference*, 2014.

*References available upon request.*