Robert Mitchell Jones

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Objectives

I want to work with a community of researchers to put to use my skills in robotics and control systems and build creative solutions in the world of autonomous systems.

Education

M.S. Mechanical Engineering **Sept 2015 - present**
Academic Adviser: Professor Naira Hovakimyan
University of Illinois at Urbana-Champaign, Urbana, IL.

B.S. Mechanical Engineering **Sept 2011 - May 2015**
University of Rhode Island, Kingston, RI.

Relevant Coursework

Robust Adaptive Control, Optimum Control Systems, Advanced Robotics Planning, Analysis of Nonlinear Systems, Control of Complex Systems, Control Systems Theory & Design.

Experience

Advanced Controls Research Laboratory, Urbana, IL. **Aug 2015 - present**
Graduate Research Assistant

- Designed and built a small aerial manipulator for use in indoor environments. Conceptualized and developed the aerial quadrotor platform used in multiple research projects throughout the lab. Designed and prototyped a two-link serial manipulator, with a unique cable actuation system, to be used in aerial manipulation applications. Modeled and simulated the dynamics of both the quadrotor, manipulator, and their coupling using MATLAB and Simulink. Developed a novel control augmentation scheme to stabilize the aerial manipulator in the presence of disturbance and unknown payloads. Implemented control algorithms, using C, on the Crazyflie flight controller. A full outline of this project, and its results, can be found in my master's thesis.
- More things about what I have done in the lab.

NASA Ames Research Center, Moffett Field, CA. **June 2016 - Aug 2016**
Graduate Intern

- Designed and built an aerial manipulator system for use on a small quadrotor.
- Programmed an onboard controller for execution of manipulator commands during flight.
- Modeled manipulator dynamics in Simulink and developed method for stabilizing vehicle during normal operation and highly dynamic maneuvers.

Greensight Agronomics, Boston, MA. **June 2015 - Sept 2015**
Mechanical Engineer & UAV Pilot

- Developed subsystems for an early-stage startup company delivering autonomous plant monitoring solutions to the agricultural and recreational industries.
- Flew contracted on-site missions mapping various farms, golf courses, athletic fields, etc.

Technical Summary

I have extensive experience with robotics development on quadrotors and ground robots in the realms of controller architecture design, motion planning and trajectory generation. I am very interested in computationally efficient solutions to trajectory generation for mobile robots in cluttered environments.

I am adept at writing **C/C++** software for embedded systems, **Python** for rapid prototyping and high-level decision making, **ROS** packages for communication services, and **MATLAB** and **Simulink** models for analysis and design. I have primarily developed software for ARM-based processors running Linux/FreeRTOS environments.

Publications

- **R M. Jones**. Aerial Manipulation for Indoor Applications. Master's thesis, University of Illinois at Urbana-Champaign, May 2017
- A. Lakshmanan, A. Patterson, T. Marinho, **R M. Jones**, and N. Hovakimyan. Bézier Curve Trajectory Generation for Quadrotors in Constrained Environments. In *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, 2017 (under review)
- **R M. Jones**, D. Sun, G. B. Haberfeld, A. Lakshmanan, T. Marinho, and N. Hovakimyan. Design and Control of a Small Aerial Manipulator for Indoor Environments. In *AIAA Guidance, Navigation, and Control Conference*, page 1374, Jan. 2017
- T. Marinho, A. Lakshmanan, V. Cichella, C. Widdowson, H. Cui, **R M. Jones**, B. Sebastian, and C. Goudeseune. VR study of human-multicopter interaction in a residential setting. In *2016 IEEE Virtual Reality (VR)*, pages 331–331, Mar. 2016