CASSIE MEEKER

PhD Candidate
Department of Mechanical Engineering
Columbia University, New York, NY 10027

Telephone: 703-867-2414
E-mail: meeker.cassie@gmail.com
Website: https://cassiemeeker.github.io/

EDUCATION

Columbia University, New York, NY
- *Ph.D in Mechanical Engineering* — Expected 2020
  - Advisor: Matei Ciocarlie
- *M.S. in Mechanical Engineering* — February 2017

University of North Carolina, Chapel Hill, NC
- *B.S. in Applied Sciences (Biomedical Engineering)* — May 2014

PRINCIPAL FIELDS OF INTEREST

- Intuitive human-machine interfaces using natural human motions as control inputs
- Human in the loop robotics, teleoperation, robotic manipulation in unstructured environments, shared autonomy
- Wearable, assistive, and rehabilitation robotic controls, particularly those using biological signals (EMG, EEG) as control inputs

WORK EXPERIENCE

ROAM Laboratory, Department of Mechanical Engineering, Columbia University
- *Graduate Research Assistant* — 09/2015 – Present
  - Creating control algorithms for a rehabilitation exoskeleton for stroke subject, leveraging classification and regression algorithms to predict human intent based on forearm EMG
  - Using data reduction and linear algebra to create teleoperation control algorithms which can generalize to many non-anthropomorphic robotic hands
  - Wrote and currently maintain the open source repository for the aforementioned teleoperation control (https://github.com/roamlab/subspace_teleop)
  - Using large grasping datasets to automate teleoperation mapping between human hands and various robotic hands
  - Created a real-time teleoperation framework for both a UR5 and Sawyer arm for testing teleoperation of robotic hands with novice users

University of North Carolina, Chapel Hill, NC
- *Lab Manager – UNC Neuroscience Research center* — 05/2014 – 07/2015
  - Hepatocyte and cortical neuron isolations, cell culture and drug testing
  - Placing orders, inventory and other administrative lab maintenance tasks
- *Research Assistant – Anne Taylor Lab* — 06/2013 – 12/2013
  - Designed, manufactured and tested nanotechnology and fluid mechanical devices
  - Drafted recommendations on potential improvements of existing topics/devices/products

Banner and Witcoff, LTD, Washington D.C
- *Summer intern* — 05/2012 – 08/2012
  - Prepared drawings and drafted specification for arthroplasty patent (Pub.No. US 2014/0013565 A1)

MENTORING/TEACHING

Teaching Assistant – Introduction to Robotics Fall 2018
MECEE4602 *taught by Dr. Ciocarlie at Columbia University*

- The class is a graduate level introduction to robotics, topics include forward and inverse kinematics, cartesian control, stochastic motion planning and Bayesian state estimation
- Responsibilities include holding office hours, creating coding homeworks (both solutions and starter code), and creating autograding scripts which allow students to test their code before submission and enable efficient grading, and maintaining SVN repositories for the students to submit their code
- Homeworks and autograding scripts created for the class all involved simulated robots, robot visualization in RViz, ROS (topics, tf, publishers, subscribers, services, etc)

Mentored a NSF REU Summer Scholar Summer 2018
Abigail Herschman, University of South Carolina

- Provided guidance in data analysis of EMG, migrating datasets, and composing abstracts

Teaching Assistant – Applied Robotics: Algorithms and Software Fall 2017
MECEE4603 *taught by Dr. Ciocarlie at Columbia University*

- The class introduces the students to the programming techniques, algorithms, and theories behind robotic controls
- Responsibilities include holding office hours, creating solutions to involved coding homeworks, writing autograding scripts which allow for efficient grading, moderating online forums, and helping students debug their code
- Homeworks for the class involved simulated robots, RViz, and various aspects of ROS

PUBLICATIONS

Peer Reviewed Journal Publications

- Park, S., **Meeker, C.**, Weber, L. M., Bishop, L., Stein, J., & Ciocarlie, M. (2018). Multimodal Sensing and Interaction for a Robotic Hand Orthosis. *arXiv preprint arXiv:1808.00092*. *In press, RA-L RAS Special Issue.*

Peer Reviewed Conference Publications

- **Meeker, C.**, & Ciocarlie, M. (2018). EMG-Controlled Hand Teleoperation Using a Continuous Teleoperation Subspace. *arXiv preprint arXiv: 1809.09730. Under review.*
- **Meeker, C.**, Rasmussen, T., & Ciocarlie, M. (2018). Intuitive Hand Teleoperation by Novice Operators Using a Continuous Teleoperation Subspace. In *Rehabilitation Robotics (ICORR), 2018 International Conference on*. IEEE.
- **Meeker, C.**, Park, S., Bishop, L., Stein, J., & Ciocarlie, M. (2017, July). EMG pattern classification to control a hand orthosis for functional grasp assistance after stroke. In *Rehabilitation Robotics (ICORR), 2017 International Conference on* (pp. 1203-1210). IEEE.

Conference Abstracts/Posters

- Park, S., **Meeker, C.**, Weber, L. M., Bishop, L., Stein, J., & Ciocarlie, M. (2018, October). Multimodal Intent Inferral with a Wearable Hand Orthosis. *Intelligent Robots and Systems, 2018 IEEE/RSJ International Conference on.*
- **Meeker, C.**, Park, S., Bishop, L., Stein, J., & Ciocarlie, M. (2017, July). EMG Control for a Hand Orthosis: from Standalone Training to Device Integration and Task Execution. In *Rehabilitation Robotics (ICORR), 2017 International Conference on*. IEEE.

LEADERSHIP

Women in Science at Columbia

- *Head of Digital Content/Social Media* 09/2018-Present
  - Maintain the association's social media presence and website
- *Saturday Science Starters Chair* 09/2017 – 09/2018
  - Organized workshops for middle schoolers to perform supervised science experiments

Phi Sigma Pi Honors Fraternity

- *Secretary* 09/2013 – 09/2014

SERVICE/OUTREACH

- Speaker for the IDEAL School's Robotics Club "Inside Engineering" Columbia SEAS visit, *Spring 2018.*
- Invited speaker at the Family Astronomy Night Series hosted by the Intrepid Sea, Air and Space Museum, part of a team presenting our work on rehabilitation robotics to audience of children and their families, *July 2017.*
- Speaker for the Columbia Inside Engineering program, hosting women high school students for hands-on demos of engineering projects, *Spring 2017.*
- Group leader at Girls Science Day, led middle school girls during science camp experiments, Fall 2017
- After-school teacher at Robogals, teaching 4th grade girls robotics, *Fall 2015-Fall 2016*

COMPUTING AND COMMUNICATION SKILLS

- Strong object-oriented programming skills in python
- ROS, SVN, scipy, sklearn, MATLAB, Solidworks
- Proficient using Windows, Linux and Unix environments
- Proficient using Microsoft Office, excellent written and verbal communication