

ANDREW D. WILSON

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PERSONAL PROFILE

As a Ph.D. graduate of the Neuroscience and Robotics Lab at Northwestern University, I have 7+ years of experience in the robotics field, specializing in the research and implementation of parametric learning algorithms for dynamical and multi-body systems. I am seeking a position which leverages my technical and management skills to develop innovative solutions for the robotics and automation industries.

EDUCATION

Northwestern University, Evanston, IL *December 2015*
Ph.D. in Mechanical Engineering
Dissertation Title: Information-based Trajectory Optimization for Active Estimation in Mechanical Systems

Kellogg School of Management, Northwestern University, Evanston, IL *August 2014*
Certificate in Management for Scientists and Engineers

The Pennsylvania State University, University Park, PA *May 2010*
B.S. in Mechanical Engineering
Honors in Aerospace Engineering
Thesis Title: "A Control Allocation Method for a Helicopter with On-Blade Control"
Minors in Engineering Entrepreneurship and Mathematics

PROFESSIONAL EXPERIENCE

Neuroscience and Robotics Lab (NxR) - Murphey Group September 2010 - December 2015
Graduate Student *Evanston, IL*

- Developed new parametric learning algorithms using iterative optimization for dynamic systems
- Carried out experiments validating theoretical findings on the Baxter Research Robot platform and a kinematic car platform written in custom Python and C++ code
- Experienced in developing algorithms and maintaining packages using ROS (Robot Operating System)
- Implemented several algorithms using projection-based optimal control, variational integration, and LQR control
- Current maintainer of `trep` - a Python C-extension module for rigid body simulation developed in the Murphey group
- Redesigned embedded systems for research platforms including quadrotors and brachiating robot including component selection and PCB design with custom written PIC32 firmware.

NASA Ames Research Center*Research Intern*

June 2009 - August 2009

Moffett Field, CA

- Analyzed parametric effects on a model of a helicopter utilizing trailing-edge flaps for primary control
- Studied the modes of vibration of the helicopter blades and stability of the helicopter system

Technische Universität München*Research Intern*

May 2008 - August 2008

Munich, Germany

- Implemented a server-client interface between a KUKA robot controller and a QNX real-time operating system using Simulink and xPC target
- Collaborated with German doctoral students on industrial robot telepresence research

NASA Robotics Academy - Goddard Space Flight Center*Research Intern*

June 2007 - August 2007

Greenbelt, MD

- Researched and developed simulations for innovative methods for robotic locomotion
- Analyzed mechanical and electrical characteristics of a new stepper motor design

PUBLICATIONS

Journal Articles

- J4. A. D. Wilson, J. A. Schultz, A. R. Ansari, and T. D. Murphey, "Dynamic Task Execution using Active Parameter Identification with the Baxter Research Robot," *IEEE Transactions on Automation Science and Engineering*, Under review.
- J3. E. Tzorakoleftherakis, A. R. Ansari, A. D. Wilson, J. A. Schultz, and T. D. Murphey, "Model-Based Reactive Control for Hybrid and High-Dimensional Robotic Systems," *IEEE Robotics and Automation Letters*, vol. 1, pp. 431-438, Jan. 2016.
- J2. A. D. Wilson, J. A. Schultz, and T. D. Murphey, "Trajectory Optimization for Well-Conditioned Parameter Estimation," *IEEE Transactions on Automation Science and Engineering*, vol. 12, pp. 28-36, Jan. 2015.
- J1. A. D. Wilson, J. A. Schultz, and T. D. Murphey, "Trajectory Synthesis for Fisher Information Maximization," *IEEE Transactions on Robotics*, vol. 30, pp. 1358-1370, Dec. 2014.

Refereed Conference Papers

- C4. A. D. Wilson, J. A. Schultz, A. R. Ansari, and T. D. Murphey, "Real-time Trajectory Synthesis for Information Maximization using Sequential Action Control and Least-Squares Estimation," *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 4935-4940, Oct. 2015.
- C3. A. D. Wilson and T. D. Murphey, "Maximizing Fisher Information Using Discrete Mechanics and Projection-Based Trajectory Optimization," *IEEE International Conference on Robotics and Automation*, pp. 2403-2409, May 2015.
- C2. A. D. Wilson and T. D. Murphey, "Local E-optimality Conditions for Trajectory Design to Estimate Parameters in Nonlinear Systems," *American Control Conference*, pp. 443-450, June 2014.
- C1. A. D. Wilson and T. D. Murphey, "Optimal Trajectory Design for Well-Conditioned Parameter Estimation," in *2013 IEEE International Conference on Automation Science and Engineering*, pp. 13-19, Aug. 2013. Best Conference Paper Award Finalist.

Patents Issued

- P3. Walk and Roll Robot. U.S. Patent 8030873, Issued Oct. 4, 2011.
- P2. Directed Flux Motor. U.S. Patent 7919891, Issued Apr. 5, 2011.
- P1. Joint Assembly. U.S. Patent 7735385, Issued Jun. 15, 2010.

HONORS

- Best Conference Paper Finalist, 2013 IEEE Conference on Automation Science and Engineering
- NDSEG Fellowship Recipient, 2010-2013
- NASA Aeronautics Scholarship Recipient, 2008-2010
- 2007 NASA Robotics Academy Audience Award for Best Presentation to a Non-Technical Audience
- Harding Louis Memorial Scholarship Recipient, 2008-2009
- Penn State President's Freshman Award, 2007
- PPG Industries Merit Scholarship, 2006
- Eagle Scout, Boy Scouts of America, 2006

TEACHING EXPERIENCE

Everything is the Same: Modeling Engineered Systems

Fall 2013

Teaching Assistant

- Created and filmed lab demonstration and monitored online forums for the Northwestern Massive Open On-line Course (MOOC).

PROFESSIONAL AFFILIATIONS

- IEEE Robotics & Automation Society, Member
- ASME, Member