Sean Mason

9618 Exposition Blvd, Apt 114
Los Angeles, CA, 90034
302.437.6181
sean.mason@usc.edu
www.masonrobotics.com

Education

Current August 2012	Ph.D. and M.S. in *Computer Science*, **University of Southern California** Computation Learning and Motor Control Lab (CLMC) Adviser: Prof. Stefan Schaal	*Los Angeles, CA*
June 2012 August 2007	M.S. and B.S. in *Mechanical Engineering and Mechanics*, **Drexel University** Drexel Autonomous Systems Lab (DASL) Adviser: Prof. Paul Oh	*Philadelphia, PA*

Research Interest

Over the course of my PhD, my research has focused on developing optimal control based methods to allow legged robots to balance, locomote, and interact with the environment. Because of my dual background in Mechanical Engineering and Computer Science, I have focused on real world experiments on the hydraulically actuated torque controlled Sarcos humanoid at USC. In addition to writing software, I have also been lead in maintaining, fixing, and upgrading the humanoid platform over the last five years.

Computer Skills

Programming:	**C++**, **Matlab**, Python, Java, ROS
Design:	**Inventor**, Solidworks, MasterCAM, Photoshop, Illustrator

Conferences and Publications

S. Mason, N. Rotella, S. Schaal, and L. Righetti "**A MPC Walking Framework With External Contact Forces**", *Accepte to International Conference on Robotics and Automation (ICRA), 2018*

J. Rebula, **S. Mason**, S. Schaal, L. Righetti "**Inverse Optimal Control for a Simple Stepping Task**", *In Proceedings of Dynamic Walking, 2017*

S. Mason, N. Rotella, S. Schaal, and L. Righetti "**Balancing and Walking Using Full Dynamics LQR Control with Contact Constraints**", *In IEEE-RAS International Conference on Humanoid Robots (Humanoids), 2016*

N. Rotella, **S. Mason**, S. Schaal, and L. Righetti "**Inertial Sensor-Based Humanoid Joint State Estimation**", *In IEEE International Conference on Robotics and Automation (ICRA), 2016*

A. Herzog, N. Rotella, **S. Mason**, F. Grimminger, S. Schaal, and L. Righetti "**Momentum Control with Hierarchical Inverse Dynamics on a Torque-controlled Humanoid**", *In Autonomous Robots Journal, 2016*

N. Rotella, **S. Mason**, S. Schaal, L. Righetti "**IMU-based Joint State Estimation for Humanoid Control**", *In Proceedings of Dynamic Walking, 2016*

S. Mason, S. Schaal, L. Righetti "**Full Dynamics LQR Control With Multi Contact Phases For Bipedal Walking**", *In Workshop of IEEE-RAS International Conference on Humanoid Robots (Humanoids), 2015*

S. Mason, S. Schaal, and L. Righetti "**Full Dynamics LQR Control for Walking**", *In Proceedings of Dynamic Walking, 2015*

A. Herzog, N. Rotella, **S. Mason**, F. Grimminger, S. Schaal, L. Righetti "**Multi-Contact Interaction with Hierarchical Inverse Dynamics and Momentum Trajectory Generation**", *In Proceedings of Dynamic Walking, 2015*

S. Mason, L. Righetti, and S. Schaal "**Full Dynamics LQR Control of a Humanoid Robot: An Experimental Study on Balancing and Squatting**", *In IEEE-RAS International Conference on Humanoid Robots (Humanoids), 2014*

S. Mason and L. Righetti and S. Schaal , "**Towards Full System Linear Quadratic Regulators for Humanoid Control**", *In Proceedings of Dynamic Walking, 2014*

S. Mason "**Bipedal Walking Trajectory Energy Minimization Through Learned Hip Height Trajectory**", *Drexel University Masters Thesis, 2012*

Work Experience

March 2017 – August 2017 | **Max Planck Institute**, Freelance Roboticist | *Tuebingen, Germany*

- Developed of a walking control system for bipedal locomotion
- Programmed low-level torque control firmware for humanoid robots

Oct. 2016 – June 2016 | **Walt Disney Imagineering R&D**, Advanced Development Intern | *Glendale, CA*

- Developed planning, control, and state estimation algorithms for autonomous quadruped robot
- Tested and validated software on state of the art robot system

April 2012 | **Czech Technical University**, Exchange Researcher | *Prague, Czech Republic*

- Implemented Smooth Nearness Diagram (SND) navigation algorithm on mobile robot
- Documented challenges and features to develop an internet accessible robotics testbed

March 2011 – Sept. 2010 | **KAIST Humanoid Robotics (Hubo) Lab**, Robotics Researcher | *Daejeon, South Korea*

- Created 3D CAD drawings of humanoid robot HUBO
- Created full body assembly/disassembly wiki and videos for HUBO robot
- Built Force-Torque Sensor and microcontrollers with LED display

March 2010 – Sept. 2009 | **Navsea**, Mechanical Engineer Internship | *Philadelphia, PA*

- Provided technical feedback regarding Control Pitch Propeller (CPP) related issues for active navy ships specifically regarding part configuration, part availability, maintenance procedures, and maintenance scheduling.

March 2009 – Sept. 2008 | **ARL Navigation Lab Penn State**, Mechanical Engineer Internship, | *Warminster, PA*

- Testing and development of a MEMs gyro sensor.
- Recorded resonance scans of chips using LabVIEW and Matlab
- Designed, modeled, and evaluated gyro casing using Solidworks

June 2012 – March 2008 | **Drexel Autonomous Systems Lab** Robotics Researcher | *Philadelphia, PA*

- Built 3 degree of freedom gantry for a miniature humanoid test environment
- Built motor test fixture using CNC machine and lathe
- Implemented path planning and walking pattern generation for a 21 DoF humanoid
- Lectured C programming course for summer interns