Daniel A. **Hagen**

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OBJECTIVE

Seeking a position where I can integrate my fundamental understanding of dynamical systems, computer simulations, and control theory with the development of robotic systems, prosthetics, and orthotics.

EDUCATION

University of Southern California, Viterbi School of Engineering — *Los Angeles, CA*

Doctor of Philosophy in Biomedical Engineering — *May 2016 - Exp. December 2020*

- GPA: 3.97 • Recipient of the Provost Fellowship
- Relevant Coursework: Linear Systems Theory, Nonlinear and Adaptive Control

University of Southern California, Viterbi School of Engineering — *Los Angeles, CA*

Master of Science in Biomedical Engineering — *January 2015 - May 2016*

- GPA: 3.95
- Relative Coursework: Neuromuscular Systems, Applied Electrophysiology, Physiological Control Systems

University of Arizona — *Tucson, AZ*

Bachelor of Science in Mathematics — *August 2006 - May 2010*

- GPA: 3.60 • Minors: Chemistry, Biochemistry

SKILLS

- English (Native)
- Python
- MATLAB & Simulink
- Adobe Illustrator
- Microsoft Office (Excel, Word, PowerPoint)
- LaTeX
- Computational Analysis of Dynamical Systems
- Linear/Nonlinear Control Theory

EXPERIENCE

University of Southern California, Department of Biomedical Engineering — *Los Angeles, CA*

Teaching Assistant - BME 620L: Applied Electrophysiology — *August 2018 - September 2018*

- Coordinate weekly laboratory experiments designed to utilize concepts from biophysics to record physiological electrical phenomena and to stimulate electrically-excitable tissue
- Utilize *Great Lakes NeuroTechnologies* BioRadios and BioCapture software to record electromyography, electroencephalography, and electrocardiography
- Lead weekly group discussions with 15 students to encourage student proficiency in course concepts and lab techniques while focusing on relevant engineering principles

University of Southern California, Division of Biokinesiology and Physical Therapy — *Los Angeles, CA*

Graduate Research Assistant — *January 2016 - September 2018*

- Examine and quantify the effects of physical and physiological constraints on the neural control of movement from a mathematical perspective
- Incorporate physiologically-reasonable neurological and mechanical parameters to construct complex models of limb movement
- Create Python and MATLAB scripts to either analyze or control complex, redundant, dynamical systems

University of Southern California, Department of Aerospace and Mechanical Engineering — *Los Angeles, CA*

Graduate Research Assistant — *January 2017 - June 2017*

- Applied differential geometry and group theory principles to the control of a physical limb system under holonomic and nonholonomic constraints
- Characterized the configuration space of tendon-driven mobile articulated systems to better understand constrained movement across the manifold
- Gathered fundamental information regarding the applications and limitations of nonlinear, time-varying analysis and differential topology and presented findings during weekly progress reports

PROJECTS

Muscle Kinematics During a Basketball Free Throw — *Los Angeles, CA*

Project Leader, First Author — *August 2015 - June 2017*

- Co-authored MATLAB code that generated 100,000 random, feasible basketball free throws from clamped cubic spline algorithms and simplified movement mechanics
- Utilized posture-dependent moment arms to calculate musculotendon velocities associated with each free throw and observe changes across different free throws
- Published an peer-reviewed article in the *Journal of Biomechanics* illustrating how kinematics changes effect neuromuscular requirements, even for similar-looking movements