

# 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. DEC 2020

- GPA: 3.97
- Recipient of the Provost Fellowship

### University of Southern California, Viterbi School of Engineering

Los Angeles, CA

MASTER OF SCIENCE IN BIOMEDICAL ENGINEERING

JAN 2015 - MAY 2016

- GPA: 3.95

### University of Arizona

Tucson, AZ

BACHELOR OF SCIENCE IN MATHEMATICS

AUG 2006 - MAY 2010

- GPA: 3.60
- Minors: Chemistry, Biochemistry

## Skills

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

## Work Experience

### University of Southern California, Department of Biomedical Engineering

Los Angeles, CA

TEACHING ASSISTANT - BME 620L: APPLIED ELECTROPHYSIOLOGY

AUG 2018 - PRESENT

- Coordinate laboratory experiments that utilize concepts from biophysics for the recording of physiological electrical phenomena and the stimulating electrically-excitable tissue
- Utilize Great Lakes NeuroTechnologies BioRadios and BioCapture Software to record EMG, EEG, and ECG
- Lead weekly group discussions with students to further their understanding of course concepts and lab techniques while focusing on the relevant engineering principles

### University of Southern California, Division of Biokinesiology and Physical Therapy

Los Angeles, CA

GRADUATE RESEARCH ASSISTANT

JAN 2016 - PRESENT

- Examine the effects of physical and physiological constraints on the neural control of movement from a mathematical perspective
- Construct complex models of limb movement that incorporate physiologically-reasonable neurological and mechanical parameters
- Create Python and MATLAB scripts to either analyze or control the nonlinear dynamics of complex, redundant systems
- Design kinematic and kinetic movement algorithms to investigate the effect of variability on neural constraints

### Hayutin & Associates

Los Angeles, CA

PERSONAL TUTOR

JAN 2015 - JUN 2018

- Educated high school students in the Greater Los Angeles area in Mathematics and Science
- Gained experience working as a freelance tutor with multiple families for extended durations
- Analyzed each student's progress to adjust material presentation as to appeal to various student learning styles
- Obtained invaluable information about communication with respect to learning

### University of Southern California, Department of Aerospace and Mechanical Engineering

Los Angeles, CA

GRADUATE RESEARCH ASSISTANT

JAN 2017 - JUN 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

## ABSTRACTS

- D.A. Hagen, C.M. Laine, S. Chakravarthi Raja, & F.J. Valero-Cuevas. *Small Errors in Movement Paths Can Induce Dramatic Changes in Musculotendon Velocities*. Program No. 401.16.2018 Neuroscience Meeting Planner. San Diego, CA: 48th Annual Meeting of the Society for Neuroscience, 2018.
- D.A. Hagen, S. Caja, S. Chakravarthi Raja, F.J. Valero-Cuevas. *Kinematically Similar Basketball Free Throws Have Surprisingly Different Muscle Contraction Velocity Profiles*. Program No. 57.17.2016 Neuroscience Meeting Planner. San Diego, CA: 46th Annual Meeting of the Society for Neuroscience, 2016. **(Selected as an SfN Hot Topic)**
- D.A. Hagen, S. Caja, S. Chakravarthi Raja, F.J. Valero-Cuevas. *Kinematically Similar Basketball Free Throws Have Surprisingly Different Muscle Contraction Velocity Profiles*. Raleigh, NC: Abstracts of the 40th Annual Meeting of the American Society for Biomechanics, 2016.

## PUBLICATIONS

- D.A. Hagen, and F.J. Valero-Cuevas, 2017. *Similar movements are associated with drastically different muscle contraction velocities*. Journal of Biomechanics 59, 90-100.