Daniel A. **Hagen**

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EDUCATION

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

Doctor of Philosophy in Biomedical Engineering
May 2016 - Exp. May 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
- CAD (Fusion 360)
- Adobe Illustrator
- Microsoft Office (Excel, Word, PowerPoint)
- LaTeX
- OpenSim
- Computational Analysis of Dynamical Systems
- Linear/Nonlinear Control Theory

EXPERIENCE

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

Graduate Research Assistant
January 2016 - Present

- 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 Biomedical Engineering
Los Angeles, CA

Teaching Assistant - BME 620L: Applied Electrophysiology
August 2019 - Present

- Facilitate weekly lab experiments designed to utilize concepts from biophysics to record physiological phenomena and to stimulate electrically-excitable tissue
- Utilize *Great Lakes NeuroTechnologies* BioRadios and BioCapture software to record and analyze electromyography, electroencephalography, and electrocardiography
- Lead weekly group discussions with 15 students to encourage proficiency in course concepts and lab techniques

4Front Technologies, LLC
Los Angeles, CA

BME Consultant
October 2018 - January 2019

- Research relevant physiology and basic engineering principles related to a novel electroceutical device
- Create collaborations between the company and prospective researchers to address specific project needs
- Provide sound mathematical and biomedical insight and advice on how best to proceed for product development/testing

PROJECTS

Quantifying the Error in Kinematically-Approximated Fascicle Lengths
Los Angeles, CA

Project Leader, First Author (*Publication In Review*)
August 2017 - Present

- Quantify the error from approximating fascicle lengths by the kinematics alone as a function of tendon tension and musculotendon geometry
- Conduct parameter sensitivity analysis to illustrate the need to include *muscle*- and *subject*-specific parameters in computational models of muscle
- Published an online toolkit with visualization software to allow researchers to quantify this error in the context of the specific experiment being conducted

Musculotendon 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 and observe changes across different free throws
- Published an peer-reviewed article in the *Journal of Biomechanics* illustrating how kinematics changes affect neuromuscular requirements, even for similar-looking movements