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. August 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

- Computational Analysis of Dynamical Systems
- Linear/Nonlinear Control Theory
- Machine Learning
- Python
- MATLAB & Simulink
- CAD (Fusion 360)
- HTML & Javascript
- Adobe Illustrator
- Microsoft Office (Excel, Word, PowerPoint)
- LaTeX

EXPERIENCE

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

Graduate Research Assistant
January 2016 - Present

- Utilize artificial neural networks to infer posture in tendon-driven robots from non-collocated sensors
- Create Python and MATLAB programs to analyze and control complex, redundant, dynamical systems
- Develop useful tools that automatically format and save data visualizations to increase lab productivity and streamline research sharing

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

Teaching Assistant - BME 620L: Applied Electrophysiology
August 2019 - January 2020

- Facilitated weekly experiments that utilize concepts from biophysics to record physiological phenomena and to stimulate electrically-excitable tissue
- Utilized *Great Lakes NeuroTechnologies* BioRadios and BioCapture software to record and analyze EMG, EEG, and EKG
- Lead weekly group discussions with 15 students to encourage proficiency in course concepts and lab techniques

iCue Catering
Los Angeles, CA

Owner/Head Chef
August 2011 - January 2015

- Established a new catering company, grown from a passion project to a stable business
- Curated private events by developing new menus, managing event staff, and by coordinating closely with clientele to meet their needs

PROJECTS

insideOut: A Machine Learning Algorithm to Predict Posture in Tendon-Driven Robots
Los Angeles, CA

Project Leader, First Author, Thesis Work
May 2019 - Present

- Develop python and MATLAB scripts to train artificial neural networks to predict posture in tendon-driven robots from sensory information
- Utilize basic concepts from control theory like feedback linearization to control joint angle and joint stiffness independently

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

Project Leader, First Author (*Publication In Review*)
August 2017 - May 2019

- Quantified the error from approximating fascicle lengths by the kinematics alone as a function of tendon tension and musculotendon geometry
- Conducted sensitivity analysis to illustrate the need to include *muscle*- and *subject*-specific parameters in computational models of muscle
- Published an online visualization toolkit 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 using clamped cubic splines and simplified 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