Jocelyn Hawk

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Summary

- Engineer with 5 years of biomechanics research experience leading NIH-funded research projects, writing scientific publications, and conducting data analysis
- Skilled programmer working mainly in Python and LabView, with experience in image processing and deep learning algorithms

Experience

2020 - present

Research and Development Engineer I | *Hand Research Laboratory*
University of Arizona, Tucson, AZ

- Led research projects focused on hand biomechanics, resulting in publications in peer-reviewed journals and presentations at national conferences
- Created LabView, MATLAB, and Python programs for 3D image reconstruction, statistical analysis, and robot operation
- Developed a deep learning model using U-Net architecture for ultrasound image segmentation in LabView
- Prepared IRB documents and recruited subjects for clinical research
- Was responsible for general lab management: ordered lab supplies, ensured lab was in compliance with biosafety requirements, managed cadaver inventory

2018 – 2020

Undergraduate Research Assistant | *Orthopaedic Robotics Laboratory*
University of Pittsburgh, Pittsburgh, PA

- Conducted research assessing injury to the glenohumeral capsule
- Used marker-based motion tracking system to collect ligament strain data
- Segmented MR Arthrograms and generated 3D models using Mimics
- Generated strain maps of glenohumeral capsule using ABAQUS
- Wrote abstracts, created posters, and gave presentations at lab meetings and conferences

Skills

- Programming Languages: Python (NumPy, Pandas, SciPy, Matplotlib, Keras), LabView (Vision Development Module, Ngene Deep Learning Toolkit), Java, MATLAB, Git
- Lab Equipment/Software: ultrasound imaging, cadaver dissection, DENSO robotic arms, Vicon Motion Capture, force sensors, SolidWorks, Mimics
- Writing: manuscripts, abstracts, grants, IRB protocols

Education

2016 – 2020 **Bachelor of Science, Bioengineering | *University of Pittsburgh***
Pittsburgh, PA
Concentration: Biomechanics
Minor: Mechanical Engineering (Thermo-fluids concentration)

2022 **Certificate in Data Structures & Algorithms | *GTx***
Completed massive open online course (MOOC) offered by Georgia Institute of Technology. Acquired skills in efficiently storing and processing data using Java.

Publications

- Hawk JL, Zhang H, Margolis DS, Li ZM. Robot and ultrasound assisted needle insertion to the transverse carpal ligament. Clin Biomech (Bristol, Avon). 2023 Jan.
- Hawk JL, Daulat SR, Margolis DS, Li ZM. Dose- and time-dependent effects of collagenase clostridium histolyticum injection on transverse carpal ligament elastic modulus and thickness in vitro. PLoS One. 2022 Dec 1.

Abstracts

- Hawk J, Daulat S, Margolis D, Li ZM. Individual thenar muscle size is affected differently in carpal tunnel syndrome patients. Annual Meeting of Orthopaedic Research Society (ORS). February 10-14, 2023. Dallas, TX.
- Hawk J, Daulat S, Margolis D, Li ZM. Ultrasonographic 3D reconstruction of and robot-assisted injection to the transverse carpal ligament. North American Congress on Biomechanics (NACOB). August 21-25, 2022. Ottawa, Canada.
- Hawk J, Daulat S, Margolis D, Li ZM. Dose- and time-dependent effects of collagenase clostridium histolyticum injection on stiffness and thickness of in vitro transverse carpal ligament. Summer Biomechanics, Bioengineering and Biotransport Conference (SB3C). June 20-23, 2022. Chesapeake Bay Resort, Maryland
- Hawk J, Zhang H, Margolis D, Li ZM, In Situ Needle Insertion to the Transverse Carpal Ligament Using Robot-Assisted Ultrasound, Annual Meeting of Orthopaedic Research Society (ORS). February 4-8, 2022. Tampa, FL.
- Hawk J, Tisherman R, Takeuchi S, Musahl V, Lin A, Debski R. Quantifying 3d volume of glenohumeral capsule following a shoulder dislocation from clinical MR arthrogram data. Annual Meeting of Orthopaedic Research Society (ORS). February 8-11, 2020. Phoenix, AZ.
- Hawk J, Chan C, Tisherman R, Takeuchi S, Musahl V, Lin A, Debski R. Using optical tracking to calculate non-recoverable strain in the glenohumeral capsule following a severe dislocation. Summer Bioengineering, Biotransport and Biomechanics Conference (SB3C). June 25-28, 2019. Seven Springs, PA.

Senior Design Project

2019-2020 Worked on a team of four engineering students to develop multiple prototypes of an orthotic to keep the head in an upright position for ALS patients.