

ANDREW J. JENSEN

tel: 941-483-0448
email: contact@ajensen.org

EDUCATION

University of Florida

Ph.D. in Mechanical Engineering

Gainesville, FL

Expected: Spring 2024

Advisor: Dr. Scott Banks

Dissertation: Autonomous Methods of Measuring Native and Implanted Joint Kinematics from Single-Plane Images

Relevant Coursework: Fundamentals of Machine Learning, Computer Vision, Orthopaedic Biomechanics,
Proof-based Linear Algebra, Numerical Linear Algebra, Abstract Algebra

University of Florida

B.S. in Mechanical Engineering; GPA: 3.68/4.0; Magna Cum Laude

Gainesville, FL

December 2019

Honors Thesis: The Effect of Gaussian Blurring on Femoral Implant Segmentation by a Convolutional Neural Network

AWARDS

HAP Paul Award for Best Paper

International Society for Technology in Arthroplasty, Annual Meeting 2022

September 2022

Best Presentation

International Society for Technology in Arthroplasty, Emerging Technologies in Arthroplasty

November 2021

McJunkin Family Charitable Foundation Award Recipient

McJunkin Family Charitable Foundation

August 2020 - Present

Graduate Student Preeminence Award

University of Florida, Department of Mechanical Engineering

August 2020 - Present

PUBLICATIONS, PRESENTATIONS, AND INVITED TALKS

Publications

- [1] W. Burton, I. R. Crespo, T. Andreassen, *et al.*, “Fully automatic tracking of native glenohumeral kinematics from stereo-radiography,” *Computers in Biology and Medicine*, vol. 163, p. 107 189, Sep. 2023.
- [2] A. J. Jensen, P. D. Flood, L. S. Palm-Vlasak, *et al.*, “Joint Track Machine Learning: An Autonomous Method of Measuring Total Knee Arthroplasty Kinematics From Single-Plane X-Ray Images,” *The Journal of Arthroplasty*, May 2023.
- [3] J. S. Broberg, J. Chen, A. Jensen, S. A. Banks, and M. G. Teeter, “Validation of a machine learning technique for segmentation and pose estimation in single plane fluoroscopy,” *Journal of Orthopaedic Research*, Feb. 2023.
- [4] W. Burton, A. Jensen, C. A. Myers, *et al.*, “Automatic tracking of healthy joint kinematics from stereo-radiography sequences.” *Computers in Biology and Medicine*, 2021.

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Presentations

- [1] A. J. Jensen, C. Silva, K. Costello, and S. Banks, “Overcoming Single-Plane Limitations in TKA Kinematics Measurements Using Machine Learning,” Podium, presented at the International Society for Technology in Arthroplasty (New York, NY), Sep. 2023.
- [2] A. J. Jensen, P. Flood, L. Palm-Vlasak, *et al.*, “Joint Track Machine Learning: An Autonomous Method of Measuring Total Knee Arthroplasty Kinematics From Single-Plane X-Ray Images,” Keynote Address, presented at the International Society for Technology in Arthroplasty (Maui, HI), Sep. 2022.
- [3] J. Griffith, A. Jensen, S. Banks, and K. Allen, “Automated Segmentation and Grading of Rodent Knee OA Histology using Convolutional Neural Networks,” Poster, presented at the Orthopaedic Research Society (Tampa, FL), Feb. 2022.
- [4] A. Jensen, L. Palm, and S. Banks, “Autonomous Measurement of 3D TKA Kinematics from Dynamic Single-Plane Fluoroscopic Images,” Podium, presented at the Orthopaedic Research Society (Tampa, FL), Feb. 2022.
- [5] S. Banks, A. J. Jensen, P. D. Flood, and L. Palm-Vlasak, “Deep-Learning Enables Clinically Practical Examination of Knee Arthroplasty Kinematics,” presented at the Knee Society Members Meeting, 2021.
- [6] A. Jensen, P. Flood, L. Palm, and S. Banks, “Accuracy of an autonomous method for extracting joint kinematics from single-plane fluoroscopy,” presented at the International Radiostereometry Society (Oslo, Norway), 2021.
- [7] A. J. Jensen, P. Flood, L. Palm, W. Burton, P. Rullkoetter, and S. Banks, “An Autonomous Method for Extracting 3D Knee Replacement Kinematics from Dynamic Single Plane Fluoroscopic Images,” presented at the International Society for Technology in Arthroplasty: Emerging Technologies (Online), 2021.
- [8] Y. Dai, W. Fan, and A. Jensen, “Comparison Of Two Machine Learning Approaches In The Classification Of Total Knee Arthroplasty Patients,” Podium, presented at the Orthopaedic Research Society (Online), Feb. 2021.
- [9] Y. Dai, A. Jensen, A. Yung, and S. Kusuma, “Variability in Coronal Plane Laxity Measured During Computer-assisted Total Knee Arthroplasty,” Podium, presented at the Orthopaedic Research Society (Online), Feb. 2021.
- [10] Y. Dai, D. Wentz, A. Jensen, and B. Martin, “Impact of Fixation Components on Primary Stability of Cementless TKA during Walking,” Podium, presented at the Orthopaedic Research Society (Online), Feb. 2021.
- [11] Y. Dai, D. Wentz, A. Jensen, and B. Martin, “Comparative Analysis of Fixation Structure Design on the Primary Stability of Cementless TKA during Walking,” Podium, presented at the Orthopaedic Research Society (Online), Feb. 2021.
- [12] A. Jensen, P. Flood, L. Palm, and S. Banks, “Towards Routine Clinical Examination of 3D Joint Kinematics,” presented at the Korean Orthopaedic Association (Korea), 2020.
- [13] A. Jensen, Y. Dai, and A. Gardner, “Impact of Sagittal Resection Variability on Implant Fit during Partial Knee Arthroplasty,” Podium, presented at the Orthopaedic Research Society (Phoenix, AZ), Feb. 2020.
- [14] A. Jensen, Y. Dai, A. Gardner, *et al.*, “Comparison of Clinical and Computational Implant Fit Analysis in Partial Knee Arthroplasty,” Podium, presented at the Orthopaedic Research Society (Phoenix, AZ), Feb. 2020.

- [15] S. Banks, A. J. Jensen, and P. Flood, "In Regione Caecorum Rex Est Luscus - Towards Routine Clinical Examinations of Joint Kinematics," presented at the International Radiostereometry Society Meeting (Oslo, Norway), 2019.
- [16] P. Flood, A. Jensen, and S. Banks, "Towards Practical Clinical Examination of 3D Joint Kinematics Using Machine Learning," Podium, presented at the International Society for Technology in Arthroplasty (Toronto, Ontario), 2019.

Invited Talks

- [1] A. Jensen, "Automating the Measurement of Single Plane Joint Kinematics Measurements," presented at the Wertheim Engineers' Biotechnology Organization (University of Florida), Oct. 2023.
- [2] A. Jensen, "A Primer on Coordinate Transformations in Biomechanics," Guest Lecture, presented at the Biomedical Engineering at UF (University of Florida), Feb. 2023.
- [3] A. Jensen, "Deep Learning for Image Processing in Orthopaedics," Virtual Scientific Session, presented at the Orthopaedic Research Society (Online), Jan. 2023.
- [4] A. Jensen, "An Autonomous Method for Measuring TKA Kinematics Using Single Plane Images," presented at the Orthopaedics and Engineering Biannual Meeting (Gainesville, FL), Oct. 2022.
- [5] A. Jensen, "An Introduction to Biomechanics Research for K-5 Educators," presented at the Engineering for Biology: Multidisciplinary Research Experiences for Teachers in Elementary Grades (Gainesville, FL), Jul. 2021.

EXPERIENCE

Gary J. Miller Ph.D. Orthopaedic Biomechanics Laboratory

Graduate Research Assistant

Gainesville, FL

March 2020 - Present

- Developed and processed cod
- This is another item in this thing

Exactech, Inc

Product Research and Development Intern

Gainesville, FL

April 2019 - March 2020

- Researched the effects of surgical variability on implant coverage for unicompartmental knee arthroplasty using MATLAB for geometric analysis. This research was accepted as a podium presentation for the ORS 2020 annual meeting
- Created custom MATLAB script to extract bony contour from intraoperative surgical photographs; these photographs were then used to determine implant coverage on real-world resection scenarios. This research was accepted as a poster presentation for the ORS 2020 annual meeting.
- Applied data analysis techniques in MATLAB to coordinate a machine learning and principal component algorithm aimed at bolstering an understanding of the impact of surgical kinematics on clinically relevant patient outcomes

Gary J. Miller Ph.D. Orthopaedic Biomechanics Laboratory

Undergraduate Researcher

Gainesville, FL

April 2017 - December 2019

- Tested and coordinated efforts to calibrate a neural network trained to determine segmentations of femoral and tibial total knee arthroplasty implants. This research was accepted as a podium presentation for the ISTA 2019 annual congress

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- Created custom Python script to apply Gaussian blur to fluoroscopic images to methodically determine efficacy of perturbing neural network training data
- Created custom MATLAB program to plot 3D models of shoulder fracture geometry given 2D MRI slices; these plots were geometrically analyzed to extract vital information for classification and categorization

PROJECTS

Joint Track Machine Learning

These are all the projects directly affiliated with Joint Track Machine Learning

Parallelizing Fast-Fourier-Transform Algorithm for Implant Pose Initialization

Computer Science Senior Projects

These are all the projects for which I have mentored a group of computer science seniors during their senior project in the Miller Lab.

End-to-end Statistical Shape Model Framework for Measuring Native Shoulder Kinematics

TEACHING

EEL5840, Fundamentals of Machine Learning

Graduate Teaching Assistant

UF, Electrical and Computer Engineering

Spring 2023, Summer 2023

EML 4314c, Dynamics and Controls Systems Laboratory

Graduate Teaching Assistant

UF, Mechanical Engineering

Spring 2022

EML 4314c, Dynamics and Controls Systems Laboratory

Undergraduate Teaching Assistant

UF, Mechanical Engineering

Fall 2019

- Assisted roughly 170 students in implementing a LabVIEW-based control systems on an inverted Furuta pendulum
- Gained leadership and teaching experience through weekly lab sessions aimed at disseminating lecture topics into actionable knowledge

LEADERSHIP

American Society of Biomechanics

Vice President, UF Chapter

Gainesville, FL

May 2022 - May 2023

Wertheim Engineers' Biotechnology Organization

Vice President

Gainesville, FL

December 2021 - December 2022

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Dance Marathon at the University of Florida

Executive Board

Gainesville, FL

April 2017- April 2019

- Coordinated campus-wide campaign using social media, interaction with the local hospital staff, and patients that raised over \$3,200,000 in the 2019 event. These funds were donated directly to the local hospital and put toward research and equipment for pediatric illness
- Developed and honed leadership skills through management of a 45-person team via weekly meetings with advisors to determine a cohesive and comprehensive plan for execution of team events
- Personally raised over \$3,500 to help children in the local hospital