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Engineering & Scientific Consulting

Eli Raeker-Jordan, Ph.D.

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Professional Profile

Dr. Raeker-Jordan is a biomechanics consultant with a multidisciplinary background in biomedical and mechanical engineering, specializing in wrist fracture orthopaedic mechanics and surgical repair. His research leverages additive manufacturing of biomimetic structures to produce phantoms that mimic the tactile and fluoroscopic responses of live persons to reduce cadaveric sample waste. His academic training directly applies to the quantification and simulation of biological tissue properties as well as the investigation of multiplanar joint mechanics.

Prior to joining Exponent, Dr. Raeker-Jordan was a Post-doctoral Research Associate in the Orthopaedic Biomechanics Research Laboratory at the University of Illinois at Chicago. His research focused on comparing interjoint reaction forces between pre- and post-op joints. His work included the development and validation of non-invasive strain measurement techniques using digital image correlation (DIC) and linear variable displacement transducers (LVDT). He also has extensive experience designing novel devices and test controls to secure large irregular biological samples and ensure accurate data measurements.

Additional works of interest include: managed CAD controls, avionic component selection, and regolith traversal testing for IRIS lunar rover prototypes; developed a portable non-invasive vascular location device to facilitate remote medical ventures; and created a software pipeline to automate DICOM registration and segmentation for FEA and additive manufacturing purposes.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, Carnegie Mellon University, 2024

M.S., Biomedical Engineering, Carnegie Mellon University, 2019

B.S., Biomedical Engineering, Bucknell University, 2017

Laboratory Achievement Award, Department of Biomedical Engineering, Bucknell University, 2017

Dean’s Scholarship Award, Bucknell University, 2013-2017

Prior Experience

Post-doctoral Research Associate, University of Illinois at Chicago, 2024-2025

Graduate Research Assistant, Carnegie Mellon University, 2017-2024

MakerSpace Lab Technician, Bucknell University, 2014-2017

Research Assistant, Bucknell University, 2014-2017

Professional Affiliations

Orthopaedic Research Society, Member

Publications

Raeker-Jordan, Elisha, et al. “3D printing of Customizable Phantoms to replace Cadaveric models in upper extremity surgical residency training.” Materials, vol. 15, no. 2, 17 Jan. 2022, p. 694, https://doi.org/10.3390/ma15020694.

Raeker-Jordan, Elisha A., et al. “High-fidelity wrist fracture phantom as a training tool to develop competency in Orthopaedic Surgical Trainees.” JAAOS: Global Research and Reviews, vol. 5, no. 5, 18 May 2021, https://doi.org/10.5435/jaaosglobal-d-20-00224.

Presentations

Raeker-Jordan, Elisha, et. al. “Investigating Stress-Pain Effects of Gripping at the Bottom of Thumb During Meniscus Removal Surgery” Orthopaedic Research Society. Phoenix Conference Center, Phoenix. 9 Feb. 2025. Poster presentation.

Nguyen, Kristi, et. al. “Exploring Strain Dynamics: Digital Image Correlation in Cyclic and Failure Testing of Porcine ACLs”. Orthopaedic Research Society. Phoenix Conference Center, Phoenix. 9 Feb. 2025. Poster presentation.

Mzeihem, Majd, et. al. “Enhancing Pediatric Distal Radius Fracture Detection: Optimizing YOLOv8 with Advanced AI and Machine Learning.” University of Illinois College of Medicine. UIC Student Center West, Chicago. 24 Jan. 2025. Poster presentation.

Raeker-Jordan, Elisha, et. al. “Movement Detection with Smart Phone Accelerometers.” Biomedical Engineering Society. Tampa Convention Center, Tampa. 8 Oct. 2015. Poster presentation.