

EDUCATION

UC Berkeley, UCSF | Ph.D. Candidate | Bioengineering | 2021 – Present

The University of Utah | Bachelor of Science, Master of Science | Biomedical Engineering, Neural Interfaces | May 2020

RESEARCH EXPERIENCE

Graduate Researcher | Musculoskeletal Quantitative Imaging Research (MQIR) Group | 2022 – Present

Thesis research: Self-Supervised Representation Learning of Knee MRI – Optimization of the Clinical Radiology Workflow

- Exploring methods to efficiently extract robust medical image feature representations, leveraging the learned features to enhance performance in downstream tasks in a limited medical label paradigm.

Non-thesis research: qMRI 100-D Interpretable Feature Space of Knee Osteoarthritis

- Spearheaded a comprehensive analysis of Knee Osteoarthritis using qMRI 100-D Interpretable Feature Space, integrating advanced machine learning techniques with the OAI dataset to uncover key morphological biomarkers and their impact on disease progression.
- Developed an open-source application for research dissemination, presented findings at ISMRM 2023, and contributed significantly to the understanding and future management of osteoarthritis.

Non-thesis research: Advanced Deep Learning Techniques in MRI Labeling

- Conducted Focused on the development and enhancement of deep learning-based object detection and segmentation pipelines, involving fine-tuning of foundational models and innovative data engineering strategies to automate MRI labeling and improve analysis efficiency.

Graduate Researcher | Computer Vision in Anesthesiology Lab | 2018 – 2021

- Designed software to create an augmented reality view of the endotracheal tube placement to improve clinician success rate of patient intubation.
- Utilized the deep learning architecture of YOLO for the development of clinically-applied real-time object detection.
- Awarded NSF I-Corps Seed Grant in an attempt to bring this device from bench to bedside.

Undergraduate Research Asst. | Mechanisms of Synaptic Functions Lab | 2016 – 2018

- Investigated the calcium control of vesicle fusion at neuromuscular junctions.
- Utilized TEM to image worm genotypes involving complexin and calcium-sensing synaptotagmin proteins to determine the accuracy of current synaptic neurotransmission models.
- Developed proficient skills with handling *C. elegans*, and Transmission Electron Microscopy (TEM) – Hitachi 7100 and JEOL JEM-1400.

Undergraduate Research Asst. | Neural Information Lab | 2014 – 2017

- Examined the relationship between behavioral movement and cortical oscillations associated with Parkinsonism.
- Gathered daily behavioral and electrophysiological recordings and wrote MATLAB script to analyze data.
- Discovered new motor patterns that differentiate rodent behavior across healthy and parkinsonian conditions.
- Developed proficient skills with rodent EEG electrode implantation surgery, Microinjections, Transcardial perfusions, and cryostat sectioning.

WORK EXPERIENCE

Software Development Intern | Compassion International | 2020

- Developed user interfaces and chat apps with React JS and RESTful APIs with AWS Lambda.
- Designed and coded application components in an Agile environment.

Data Science Impact Fellow | Sorenson Impact Center | 2018

- Provided customized data diagnostics for clients Using R and Python.
- Created data visualizations and dashboards.
- Developed code with best practices of data sharing and security in mind.
- Determined impact measurement for both public and private sector projects.

Product Development Engineering Intern | Ortho Development | 2017 – 2018

- Utilized SEM imaging to understand the morphological changes of Direct Metal Laser Sintering (DMLS) Printed Titanium to quantify different heat treatment effects.
- Defined, quantified, and differentiated between residual stress-induced cracking versus incomplete build defects of DMLS printed Titanium bone ingrowth porous super structure using SEM imaging.
- Utilized Image Analysis software to characterize SEM and photographic images of 3D-printed titanium and histological cross-sections of bone implants.
- Maintained FDA-compliant writing protocols, as well as engineering drawings via Creo Parametric CAD software.

LEADERSHIP & SERVICE

Chief Development Officer | Project Embrace nonprofit | 2018 – 2022

- Generated an operational model that efficiently delivered medical devices to more than 1000 people in 9 countries.
- Managed Patient Impact and Patient Resources teams to create educational and impact-driven initiatives to ensure consistent and efficient throughput of medical resources to community partners.
- Developed customized inventory system for medical resources and community partners using Python, SQL, Django.
- Spearheaded successful acquisition of grants from prominent organizations including Intermountain Healthcare, Utah Division of Multicultural Affairs, SelectHealth, and more, bolstering the non-profit organization's funding initiatives.

Technical Lead, A.I. Healthcare Venture | NSF National I-Corps Program | 2021

- Conducted a market analysis on A.I. integration into the clinical workflow and the potential strategic and tactical uses of video airway data.
- Interviewed 100+ industry stakeholders – including hospital administration, insurance groups, I.T., supply chain, end-users, and competitors.
- Acquired hands-on experience with the chaos and uncertainty of commercializing innovations and creating ventures.

Director of Research + Project Development | Project Embrace nonprofit | 2016 – 2018

- Researched, organized, and executed medical resource campaigns to the Navajo Nation of Utah, Arizona, and New Mexico, as well as to Tijuana, Mexico, Seattle, Washington, redirecting 500+ medical devices to vulnerable communities.
- Established sustainable partnerships with clinics and community distribution centers in the Navajo Nation of Utah through the Navajo Health System Inc.

Volunteer Lab Technician | Shriners Hospital for Children | 2014 – 2016

- Engaged actively with various prosthetic and orthotic-based services inclusive of upper and lower extremity prosthetic care, scoliosis bracing and muscular dystrophy bracing.
- Utilized 3-D scanning technology incorporated computer-aided design (CAD) and computer-aided manufacturing (CAM) to assist the design and fabrication of devices.
- Aided clinical staff in their appointments with patients and fit orthotic and/or prosthetics to patients for measurements.

PUBLICATIONS & PRESENTATIONS

Hoyer et al. | qMRI 100-D Interpretable Feature Space of Knee Osteoarthritis | Oral Presentation | ISMRM, Toronto | 2023
Runnels, Hoyer, Kuck | AI to augment or AI to replace? That is the question | Peer-reviewed publication | 2021
Hoyer et al. | Comparison of Procedural Distancing of Primary and Advanced Intubation Techniques | DAS | 2020
Hoyer et al. | Automatic Video Laryngoscope Archiving System, First Pass Rates in Archived Intubations | STA, TX | 2020
9th International IEEE/EMBS Conference on Neural Engineering | San Francisco, CA | 2019
Utah Biomedical Engineering Conference | University of Utah | 2018
Oral Presentation | International Health Conference | Oxford University | 2017

AWARDS & SCHOLARSHIPS

UCSF Discovery Fellowship | 2023 – Present
NIH T32 BioE Training Grant | 2021 – 2022
NSF National I-Corps Program Grant | 2021 - 2021
NASA Space Grant Fellowship | 2019 – 2021
Chevron Scholarship for Women in Stem | 2018 – 2019
Bioscience Undergraduate Research Scholar | 2015 – 2017
NSF Research Experiences for Undergraduates Grant | 2015 – 2016
ACCESS Program for Women in STEM Scholar | 2014 – 2015