

# BENJAMIN RANDOING

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## EDUCATION

**M.S. Mechanical Engineering**, Stanford University (3.92/4.0) September 2022 - June 2024

*Focus: AI, Design Methodologies, & Biomechanics*

**B.S.E Biomedical Engineering**, Duke University (3.98/4.0) August 2018 - May 2022

*Minor: Chemistry & Music*

Relevant Coursework: Machine Learning, Smart Product Design, Deep Learning, NLP with Deep Learning, DL for Computer Vision, Programming Abstractions, Biomechanics of Movement, Simulation of Human Movement

## SKILLS

<b>Software</b>	Python, C++, JavaScript, HTML, CSS, Git, RestAPI, Flask, MATLAB, OOP
<b>Data Science &amp; AI</b>	PyTorch, Tensorflow, CV, NLP, Pandas, SQL, MongoDB, Machine Learning
<b>Electronics</b>	Arduino, MQTT, Kicad, PCB Design, NodeRED, RaspberryPi, Mechatronics
<b>Biomechanics</b>	OpenSim, EMG, IMU, Vicon Nexus, Biodex System 4, Cortex, Motion Capture

## EXPERIENCE

**Human Performance Lab Research Apprentice** January 2023 - Present

Stanford Neuromuscular Biomechanics Lab (NMBL)

*Stanford, CA*

- Led full-stack wearable development which led to **pain reduction in patients with osteoarthritis** using EMG, biological sensing and haptic output circuits, an ios application, signal processing, and CAD
- Evaluated haptic feedback and electrical stimulation as mediums to retrain muscle coordination of the gastrocnemius calf muscle during normal gait to achieve **30% reduction in muscle activations and knee contact force** using motion capture, force plate analysis, EMG, biomechanics simulation, and stimulating circuits

**Computer Vision Engineer** September 2022 - December 2022

Stanford Center for AI in Medicine & Imaging (AIMI)

*Stanford, CA*

- Achieved a **16% increase in recall of a skin lesion neural network classifier** when applied to images with darker skin pigmentations using neural style transfer, an Inception V3 model, contrastive learning, Tensorflow, and AWS to supplement a Stanford AIMI dataset with 30,000 dark-skin toned images of skin lesions

**Wearable Product Designer** August 2021 - May 2022

Duke University Big Ideas Lab

*Durham, NC*

- Developed bicep-worn HR wearable in football pads that improved a proprietary internal temperature predictive algorithm to **reduce 10,000 annual heat-related deaths** using PPG, signal processing, and BLE 5.0

**Sports Biomechanics Research Associate** August 2020 - May 2021 & August 2021-December 2021

Scottish Rite for Children

*Remote*

- Developed MATLAB pipeline that **analyzed** the athletic performance and gait stability of pediatric patients after surgical or non-operative **correction of club foot** through performance metrics generated using ActiGraph accelerometer .csv data aligned with LabView .txt time stamps, FFT, filtering, and convolutional signal analysis

## PROJECTS

**Generative AI Ground Reaction Force (GRF) Pipeline using EMG.** Trained WaveNet and fully-connected neural networks to predict GRFs from bilaterally worn EMG sensors that demonstrated accuracies > **90%**

**Smart Pharmacy Circular Pharmaceutical Packaging with J&J.** Developed UI and functional electronics for pill vending machine capable of **dispensing a single dose** to minimize the 98% of annual wasted expired medication