

## Ross Brancati

### PhD Candidate

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### Technical and Research Skills

#### Biomechanics and Human

##### Performance Research:

- Wearable tech (IMUs, EMG)
- Human subjects research
- Motion capture (Qualysis, V3D)
- Computer vision
- Medical imaging (MRI, CT)
- Image processing
- Motion capture (Qualysis, V3D)
- Electromyography (Delsys, BioPac)
- Force Plates (AMTI, Bertec)
- Instrumented treadmills
- Qualitative methods

##### Programming Languages:

- Python (advanced – 5+ years)
- Matlab (advanced – 5+ years)
- R (advanced – 3+ years)
- SQL (beginner – 1+ years)
- HTML (beginner – 1+ years)
- Labview (intermediate – 2 years)

##### Data Science:

- Data cleaning and preprocessing
- Data analysis (Pandas, NumPy)
- Signal processing
- Feature extraction and engineering
- Dimensionality reduction (PCA)
- Hypothesis testing
- Regression modeling
- Data visualization (ggplot2, matplotlib)
- Machine learning (scikit-learn)
- Deep learning (pytorch, tensorflow)
- ML operations (MLflow, W&B)
- Version control (Git)
- Microsoft Excel

### Soft Skills

- Communication and presentation
- Teamwork and collaboration
- Adaptable and flexible
- Time management
- Leadership
- Problem-solving
- Interpersonal

### Grants and Awards

- IALS Grad Student Fellowship (UMass)
- SPHHS Research Day Award (UMass)
- Outstanding TA Award (UConn)

## Summary

Experienced and passionate PhD candidate specializing in biomechanics, human performance, wearable tech, and data science with over six years of experience. Interested in leveraging biomechanical and physiological performance measures coupled with advanced statistical and computation data science techniques to optimize human performance.

## Education

### University of Massachusetts Amherst

Amherst, MA | August 2020 – Current

GPA: 3.93/4.0

Doctor of Philosophy – Biomechanics and Data Science

### University of Massachusetts Amherst

Amherst, MA | August 2020 – December 2022

GPA: 3.80/4.0

Graduate Certificate in Statistical and Computational Data Science

### University of Connecticut

Storrs, CT | August 2018 – May 2019

GPA: 3.87/4.0

Master of Science in Biomedical Engineering (*Biomechanics*)

### University of Connecticut

Storrs, CT | August 2014 – May 2018

GPA: 3.50/4.0

Bachelor of Science in Biomedical Engineering (*Biomechanics*)

## Experience

### Musculoskeletal & Orthopedic Biomechanics Laboratory

University of Massachusetts Amherst | Amherst, MA | August 2020 - Present

*Research Assistant* | Director: Katherine Boyer, PhD

- Exploring biomechanical adaptations in those with orthopedic running injuries and the aging population with rigorous research and statistical approaches.
- Leverage clustering models, domain knowledge, and traditional statistical approaches to identify biomechanical mechanisms of joint injury.
- Developing a system to classify individuals with knee injury into specific phenotypes using wearable sensors available outside of a lab environment.

### Warfighter Systems Integration Lab

Galvion | Portsmouth, NH | March 2024 - Present

*Data Science Intern* | Lab Manager: Martin Fultot

- Leveraging hardware and software capabilities to optimize soldier training and performance in immersive, virtual environments.
- Developing and implementing algorithms to improve object pose and location in virtual/augmented reality with sensor fusion and SLAM.

### Center for Health and Human Performance

University of Massachusetts Amherst | Amherst, MA | May 2023 - February 2024

*Data Science Intern* | Director: Michael Busa, PhD

- Developed a gait event detection algorithm for a novel smart wearable insole that records signals from pressure and movement sensors.
- Utilized techniques such as data windowing, data reduction, statistical modeling, and machine learning to optimize algorithms and end results.
- Created high quality visualizations and presentations to translate findings to key stakeholders including startup founders.

### UMass Men's Varsity Ice Hockey Team

University of Massachusetts Amherst | Amherst, MA | May 2022 – January 2023

*Sports and Data Science Intern* | Supervisor: Brandon Wickett, MS

- Leveraged wearable sensors (Catapult Sports) to assess movement of elite athletes informing coaches and staff of player load and exertion.
- Collected, processed, and analyzed IMU data through various statistical techniques such as regression models and hypothesis testing.

### Orthopedic Rehabilitation and Biomechanics Lab

University of Michigan | Ann Arbor, MI | May 2019 – August 2022

*Research Associate 1* | Director: Lindsey Lepley, PhD

- Investigated biomechanical and physiological implications of anterior cruciate ligament injury through human and animal models.
- Implemented hardware and software for measuring human performance such as motion capture, processing pipelines, force plates, and ultrasound.