Reece D. **Huff**

COMPUTER VISION · MACHINE LEARNING · OPTIMIZATION

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Summary

I am an Electrical Engineering and Computer Science Ph.D. student with a passion for open-source software development. My drive lies in harnessing the power of parallel computing and deep learning to synergize medical imaging techniques, such as ultrasound, with motion capture systems in order to unravel the underlying mechanisms contributing to musculoskeletal disorders. My expertise in handling large, noisy datasets allow me to effectively develop innovative solutions for complex biomedical challenges.

Education

University of California, Berkeley — *Berkeley, CA*

PH.D. IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE — *May 2023 - May 2027*

- Advisor: Preeya Khanna
- Major: Machine Learning, Minors: Computer Vision & Statistics
- Awards: NSF GRFP, Graduate Division Block Grant

University of California, Berkeley — *Berkeley, CA*

M.S. IN MECHANICAL ENGINEERING (GPA: 3.97/4.00) — *Aug. 2021 - May 2023*

- Major: Biomechanical Engineering, Minors: Computer Science & Statistics
- Thesis: Deep learning enables accurate soft tissue deformation estimation *in vivo*

Boston University — *Boston, MA*

B.S. IN BIOMEDICAL ENGINEERING (GPA: 3.99/4.00) — *Aug. 2018 - May 2021*

- Advisors: Elise Morgan & Paul Barbone
- Awards: Goldwater Scholarship, Distinguished Summer Research Fellowship

Skills

Programming	C/C++ • Rust • Python • Julia • HTML+CSS • SQL • Bash • LaTeX • Git • Metal • Swift • MATLAB • Mathematica
Software	PyTorch • TensorFlow • Tensorboard • CUDA • CVXPY • pandas • sklearn • OpenMP • MPI • OpenCL • OpenGL
Techniques	parallel computing • deep learning • computer vision • markerless motion capture • finite element modeling
General	Google Suite • Adobe Creative Cloud • Microsoft Office

Publications

2023	**Deep learning enables accurate *in vivo* deformation prediction**, in preparation	code • project page
2023	**Relating *in vivo* strain of the FDS tendon with grip force**, Proc. Hum. Factors Ergon. Soc.	paper • project page
2022	**Comparing intervertebral disc geometry measurement method**, JOR Spine	paper • project page
2022	**Finite-element modeling of lumbar disc herniation**, JBME	paper • project page

Experience

University of California, Berkeley — *Berkeley, CA*

GRADUATE RESEARCH ASSISTANT — *Aug. 2021 - present*

- Designed a custom printed circuit board for a inertial measurement unit system
- Developed a novel deep-learning approach for measuring *in vivo* tissue deformation
- Physics-based and statistical modeling of muscle- and torque-driven flexion to the intervertebral disc

Boston University — *Boston, MA*

UNDERGRADUATE RESEARCH ASSISTANT — *Mar. 2019 - Aug. 2021*

- Optimized bone tracking algorithm that measures the displacement field in a fracturing vertebra

Coursework

Computational	Machine Learning, Deep Learning, Computer Vision and Computational Photography, Parallel Computing, Deep Reinforcement Learning, Computational Linear Algebra, Computational Numerical Methods, Convex Optimization
Mechanics	Orthopedic Biomechanics, Biomaterials, Finite Element Modeling, Continuum Mechanics, Elasticity, Fluid Mechanics, Thermodynamics, Statics, Dynamics, Statistical Mechanics
Mathematics	Applied Mathematics, Linear Algebra, Probability, Statistics, Advanced Calculus, Differential Equations
General	Physics, Chemistry, Molecular Biology, Engineering Design, Circuits, Physiology