Reece D. **Huff**

Optimization · Numerical Methods · High Performance Computing

(+1) 651-402-0037 | rdhuff@berkeley.edu | reecehuff.com | reecehuff | reece-huff

Education

University of California, Berkeley — *Berkeley, CA*

Ph.D. in Computational Engineering — *May 2023 - May 2026*

- Advisor: Tarek Zohdi and Manolis Vlatakis-Gkaragkounis
- Designated Emphasis in Computational and Data Science and Engineering
- Awards: NSF GRFP, Graduate Division Block Grant

University of California, Berkeley — *Berkeley, CA*

M.S. in Computational Engineering (GPA: 3.97/4.00) — *Aug. 2021 - May 2023*

- Advisor: Grace D. O'Connell
- 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	Python • C/C++ • Rust • 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

2024	**Mixed Entropy Distributionally Robust Optimization for Routing Problems**, in progress	submitting to ICLR 2025
2023	**Deep learning enables accurate soft tissue tendon deformation estimation *in vivo* via ultrasound imaging**, Sci. Rep.	paper • 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

Research Experience

University of California, Berkeley — *Berkeley, CA*

Graduate Student Researcher — *Aug. 2021 - present*

Advanced Solutions Sampler for NP-complete Problems

- Engaged in a collaborative project under the mentorship of Prof. Manolis Vlatakis and Prof. Michael I. Jordan.
- Focused on developing a solution sampler for NP-complete problems that models a distributional robust uncertainties.
- Utilized techniques such as policy gradient optimization, Langevin dynamics, simulated annealing, and Markov Chain Monte Carlo (MCMC) methods.

Wearable Technology Development for Stroke Rehabilitation

- Rotated in Dr. Preeya Khanna's lab to develop a custom printed circuit board for an inertial measurement unit system.
- Future work would focus on e-skins and IMU integration for kinematic measurement.

StrainNet: Deep-Learning for Tissue Deformation Analysis

- Spearheaded the development of `StrainNet`, a deep-learning framework for measuring *in vivo* tissue deformation.
- Achieved significant improvements in measuring deformation, outperforming traditional techniques by 90%.
- Designed a user-friendly website with documentation to make `StrainNet` accessible to the broader research community.

Coursework

Computational	Machine Learning, Parallel Computing, Reinforcement Learning, Computational Linear Algebra & Numerical Methods, Convex Optimization, Natural Language Processing, Randomness and Computation, Combinatorial Algorithms and Data Structures
Mathematics	High-dimensional Statistics, Applied Mathematics, Linear Algebra, Probability, Statistics, Advanced Calculus, Differential Equations
Physics	Finite Element Modeling, Continuum Mechanics, Elasticity, Thermodynamics, Statics, Dynamics, Fluids, Statistical Mechanics
General	Chemistry, Molecular Biology, Engineering Design, Circuits, Physiology, Biomechanics, Biomaterials