LARRY HUI

Phone: +1(650) 207-1271 ◇ Email: larryhui7@berkeley.edu
LinkedIn ◇ GitHub ◇ Porfolio

EDUCATION

University of California, Berkeley *May 2026 (expected)*
B.S in Mechanical Engineering, focus on Electrical Engineering and Computer Science (EECS)
Cumulative GPA: 3.551/4.0; Major GPA: 3.659/4.0; Two Year GPA: 3.84/4.0

Relevant Coursework: Control for Bipedal Robots; Convex Optimization; FEA; Machine Learning; Dynamics; Convective Transport; Dynamical Systems & Feedback; Robotics; Electronics; Signals and Systems; Materials; Microfabrication

Graduate Coursework: Continuum Mechanics; Deep RL for Controls; Nonlinear Systems; Advanced Control Theory II

Imperial College London *August 2023 — June 2024*
B.S in Mechanical Engineering (UCEAP Study Abroad)

Relevant Coursework: Manufacturing and Design Communication; Vibrations; Fluid Mechanics 2; Heat Transfer; Stress Analysis 2; Thermodynamics 2; Statistics A; EDI in Engineering A

RESEARCH INTERESTS

Learning, stochastic, and optimization-based control, grounded in physical modeling from robotics, continuum mechanics, and finance, to build safe, uncertainty-aware multi-agent systems

RESEARCH EXPERIENCE

Undergraduate Researcher, University of California Berkeley December 2024 – Current
Gu Research Group *Berkeley, CA*

- Formulated and solved PDEs in linear elasticity using a custom MATLAB/PyTorch PINN and MGN solver for MathWorks; reduced computational time by $\sim 30\%$ compared to baseline FEA for Timoshenko beam and a 2D central hole in plate using ensemble methods, a training pool with mesh metadata, and cosine annealing.
- Benchmarked PINN predictions against FEA data for several geometries and different BCs and tractions, achieving $< 5\%$ error in displacement fields preserving stability across 10k+ collocation points.
- Explored differentiable GNN-based solvers for fluid-solid interaction PDEs; implemented and normalized input and output features. Added a warm start for gradual training as well as batchnorm and layernorm.
- **Point-of-Contact:** Grace X. Gu (ggu@berkeley.edu)

Undergraduate Researcher, University of California Berkeley January 2023 – May 2023
FLOW Lab *Berkeley, CA*

- Incorporated principles of fluid–structure interaction and continuum mechanics into CAD modeling and experimental verification and testing of a Flow Loop Exhibit for the SF Sailing Science Centre.
- Served as a primary machinist, producing aluminum adapter plates to securely integrate 8 casters with 8020 framing using CNC mills; Engineered custom pump-support to enhance stiffness and dynamic stability.
- Optimized fixture assembly and applied DFMA principles, increasing fabrication efficiency by 30% while maintaining part clearances within 0.02" in tight assembly spaces for a splash proof & chilled X-ray detector.
- **Point-of-Contact:** Simo A. Mäkiharju (makiharju@berkeley.edu)

TECHNICAL EXPERIENCE AND PROJECTS

Constrained RL for Safe Legged Locomotion over Transient Terrain August 2025 – Current
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Developed a reinforcement learning framework for planar bipedal locomotion in OpenAI Gym, integrating Control Barrier/Lyapunov Functions (CBFs/CLFs) to ensure safety and prevent the agent from entering unstable configurations.
- Implemented multi-step look-ahead control to improve long-horizon decision-making on time-varying, stochastic discrete terrains, avoiding greedy one-step actions that compromise gait stability.
- Modeled hybrid locomotion dynamics with impact events and trained policies to generalize across terrains.
- **Point-of-Contact:** Koushil Sreenath (koushils@berkeley.edu).

Autonomous Charger Insertion using the UR7e Robotic Arm August 2025 – Current
Department of Electrical Engineering and Computer Science, UC Berkeley *Berkeley, CA*

- Designed and implemented an autonomous cable-insertion system using the UR7e robotic arm with a custom 3D-printed end-effector and Intel RealSense depth sensing for precise cable and port localization
- Developed computer vision pipelines using OpenCV for multi-variant connector detection (USB-C, USB-A, Magsafe, Lightning) and inverse-kinematics motion planning for alignment and insertion in ROS2.
- Integrated sensing, planning, and actuation within a full perception–control stack to achieve centimeter accuracy and reliable insertion across randomized trials.
- Tuned force limits and implemented retry/re-grasp logic for compliance-based insertion and recovery from misalignment.

Finite Element Modeling and Simulation of Laser Processing April 2025 – May 2025
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Implemented a 3D transient heat conduction solver in MATLAB to simulate laser heating on a cubic metallic block, modeling energy absorption via the Beer–Lambert law.
- Built a full FEM pipeline: mesh generation, numerical integration via Gaussian quadrature, shape function evaluation, and assembly of global stiffness and mass matrices with boundary-condition enforcement using the penalty method.
- Implemented Forward and Backward Euler schemes with both lumped and consistent mass matrices to advance temperature fields over time.
- Visualized transient temperature profiles at the top, mid, and bottom planes of the domain and analyzed timestep-dependent stability and accuracy effects.

PINNs for Fully Developed Heat Transfer in Non-Circular Cross-Sections April 2025 – May 2025
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Developed and trained a PINN for fully developed laminar flow and convective heat transfer in rectangular channels.
- Designed a custom loss function combining physical residuals (Navier–Stokes and energy equations), boundary conditions, and target solutions to enforce physical consistency during training.
- Implemented network architecture and training in TensorFlow/Keras, tuning optimizers (Adam, SGD, AdamW) for convergence to loss < 0.3 over 10000 epochs.
- Quantified and visualized velocity and temperature fields; evaluated wall heat flux and compared to finite-difference benchmarks, revealing PINN overestimation due to coarse collocation sampling near boundary layers.
- Demonstrated that corner rounding in channels redistributes local heat flux, enhancing local cooling but reducing mean flux by $\sim 2\%$ and identified adaptive wall sampling as key to quantitative PINN accuracy.

Characterizing Thin Carbon Fibre Laminates under Quasi-Static Tension August 2024 – December 2024
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Conducted quasi-static tensile testing on K13C2U carbon-fibre laminates for the Electron–Ion Collider detector project.
- Designed and fabricated stainless-steel and plywood wedge fixtures to enable ASTM D3039-compliant testing of sub-0.1 mm laminates using an Instron 6800 load frame.
- Applied Weibull and Kruskal–Wallis statistical analyses to quantify orientation-dependent tensile strength variability. Established Weibull moduli of 5.89 (transverse) and 4.39 (longitudinal), yielding composite moduli of 2.26 GPa and 3.33 GPa respectively.
- Demonstrated significant orientation effects on strength; validated through bootstrapped Monte Carlo sampling.

Hardware/Mechanical Engineering Intern July 2024 – December 2024
Outer Rim Exploration Inc. *Tokyo, Japan*

- Designed plastic CAD assembly for a drone-mounted muon hodoscope, integrating PCB layouts and validation systems for muon flux detection.
- Performed topology review, achieving a 10% mass reduction while increasing stiffness through geometric optimization and FEA verification via a custom MATLAB solver to analyze buckling and deflection under arbitrary conditions.
- Researched and compared deployable mechanism alternatives to linear slides—including pantographic, elastically deformable, and inflatable structures—to improve compactness and alignment stability.
- Designed a precision rotation stage using solenoid locking pins to control the hodoscope's zenith angle with degree-level accuracy and geared bidirectional actuation.
- **Point-of-Contact:** Jeremiah Anderson (jeremiah.anderson@ore.green).

Compressed-Gas Car Prototype October 2023 – December 2023
Department of Mechanical Engineering, Imperial College London *London, UK*

- Co-designed and manufactured a compressed-gas–powered vehicle prototype using mills, lathes, 3D printers, CNCs, rollers, and laser cutters, applying Pugh's Total Design methodology for concept evaluation.
- Engineered an encased Pelton turbine and shaft–pulley drivetrain optimized for high-torque energy transfer and minimal leakage losses.
- Produced toleranced engineering drawings and measurement reports; performed FEA to evaluate chassis stress, leading to the selection of Tensol-12 DCM and improving the factor of safety from 1.1 to 3.4.
- Managed the Gantt chart and design workflow, coordinating iterative testing and material selection across the team.

Financial Analyst Research Intern June 2022 – September 2022
RBC Dominion Securities Wealth Management *Toronto, ON*

- Assigned by the portfolio manager to research and evaluate the AI and technology sector for long-term investment potential, conducting industry and company-level financial analyses to forecast 5–10 year growth trends.
- Developed predictive analytics tools using LSTM neural networks and Plotly Dash dashboards to visualize performance trends and automate insight generation.
- Applied Modern Portfolio Theory (MPT) and quantitative risk models to evaluate asset performance, achieving a Sharpe Ratio of 3.1 for the optimized portfolio.

TEACHING

Lead Teaching Assistant, ME103: Experimentation and Measurements August 2025 – Current
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Led teaching operations for 180+ for Junior and Senior students, coordinating 3 TAs and 3 Tutors/Readers and managing the Ed Forum with 30k+ interactions.
- Designed, graded, and implemented laboratory experiments and exams on signal processing, statistics, measurements, and experimental design using LabVIEW, MATLAB.
- Created/conducted labs, discussion sections, and office hours, supporting students in practical measurement and data analysis skills.
- **Point-of-Contact:** George Anwar (ganwar@berkeley.edu).

ME 375: Teaching of Mechanical Engineering at the University Level August 2025 – Current
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Pedagogical seminar on educational theory, course design, inclusive learning, and lab instruction.
- Completed curriculum-development workshop reviewing the Mechanical Engineering undergraduate curriculum.
- Designed and presented syllabus improvements for ME 103 (Measurements & Experimentation), ME 132 (Dynamic Systems & Feedback), and ME 100 (Electronics for IoT) focusing on clear learning objectives, scaffolded lab progression, and integration of Gen AI and Guided-Discovery methods.
- Developed and led a Guided Discovery/Flipped Classroom activity for engineering instruction.
- **Point-of-Contact:** Hayden Taylor (hkt@berkeley.edu).

Lead Teaching Assistant, ME132: Dynamical Systems and Feedback Control May 2025 – August 2025
Department of Mechanical Engineering, UC Berkeley *Berkeley, CA*

- Led teaching operations for 80+ Dynamic Systems and Feedback Control for Juniors and Seniors, coordinating 1 TA and 2 Readers and managing the Ed Forum with 23.8k+ interactions.
- Developed and graded labs and exams, including Root Locus, Bode, Nyquist, controller design, and state-space problems emphasizing real-world applications.
- Led discussion sessions and office hours to clarify theoretical and computational concepts in MATLAB and Simulink.
- **Point-of-Contact:** George Anwar (ganwar@berkeley.edu).

Reader, MATH 52/1B: Calculus II January 2025 – May 2025
Department of Mathematics, UC Berkeley *Berkeley, CA*

- Managed Gradescope for 1000+ students and 2 discussion sections of 150 students. Graded weekly problem sets, quizzes, and exams with consistency and technical accuracy.
- **Point-of-Contact:** Alexander Paulin (apaulin@berkeley.edu).

JOURNAL PUBLICATIONS (IN PREPARATION)[1]

1. L. Hui, M. Tan, S Eleanor-Heiles, A. Kakde, A. Panggabean, K. Eyvazi, H. K. Taylor "*Evaluation of Measurement Reliability and Statistical Characterization of Thin Carbon Fibre Laminates under Quasi-Static Tension.*" Measurement Science and Technology (IOP Publishing), in preparation, 2025

TECHNICAL SKILLS

Applications	SOLIDWORKS (CAD/FEA/CAM), Fusion360, OnShape, ANSYS, Simulink, GitHub AutoCAD, LabVIEW, ABAQUS, MS Office, Gmsh, Adobe Creative Cloud
Design	GD&T, Design for Manufacturing, Product Development, Design of Experiments Controller Design, Rapid Prototyping
Programming Languages	MATLAB, Python, Java, C++, Git, Linux, LaTeX
Frameworks/Libraries	ROS2, NumPy, SciPy, Pandas, TF, Matplotlib, Seaborn, PyTorch, OpenAI Gym NVIDIA Isaac Sim, CVX Matlab
Certifications	FAA/TC Private Pilot's Licence (High-performance and Complex endorsements) ARCT Piano RCM, DELF B2

LANGUAGE SKILLS

Native Proficiency: English, Mandarin
Full Professional Proficiency: French (B2)
Elementary Proficiency: German (A1)

REFERENCES

George Anwar, Lecturer
Department of Mechanical Engineering
University of California at Berkeley
+1 (510) 205-4839, ganwar@berkeley.edu

Hayden K. Taylor, Associate Professor and Vice Chair of Instruction
Department of Mechanical Engineering
University of California at Berkeley
+1 (510) 642-4901, hkt@berkeley.edu

Robert O. Ritchie, H. T. & Jessie Chua Distinguished Professor
Department of Mechanical and Materials Science Engineering
University of California at Berkeley
+1 (510) 642-3803, ritchie@berkeley.edu

Jeremiah Anderson, CEO
Outer Rim Exploration LLC
Tokyo, Japan and Wilmington, DE
jeremy@ore.space

[1] I would be happy to provide a working draft of any manuscript currently in preparation.