

# Minh Nguyen Curriculum Vitae

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## Research Objective

I am a first year MS student interested in domain specific acceleration for robotics. I'm developing and utilizing efficient algorithms, custom computer architecture, and machine learning techniques to enable the energy-efficient and safe operation of highly complex robotic workloads.

## Education

### University of California, Berkeley

Major: Electrical Engineering and Computer Science

Berkeley, CA

Expected Graduation: May 2026

### University of California, Berkeley

Major: Computer Science. GPA: 3.9

Berkeley, CA

August 2020 – May 2024

- EE194 Tapeout Course: Took a chip from RTL to a physical design in one semester. I was part of the DSP Chip team and implemented a convolution accelerator for audio processing applications.

## Publications

**M. Nguyen, M. Suntup, et al.,** "Trajectory Optimization Methods for Energy Efficient Gait Transitions on Multi-Modal Robots," *2024 IEEE Aerospace Conference*, Big Sky, MT, USA, 2024.

## Experience

### SLICE Lab

#### Graduate Researcher

Berkeley, CA

September 2023 – Present

- Research into accelerating robotic control algorithms with hardware-software co-optimization
  - Hardware implementation and pre-silicon evaluation of Linear Quadratic Regulator and Model Predictive Control algorithm accelerators
  - Architectural changes to Berkeley systolic array generator for increased utilization in domain specific workloads
  - Using High Level Synthesis to transform robotics C++ code to FPGA & ASIC high performance implementations
  - Exploring using Diffusion Models to perform fast and performant VLSI global placement

### NASA Jet Propulsion Laboratory

#### Robotics Intern

Pasadena, CA

January 2023 – August 2023

- Research and development towards an articulated suspension lunar rover
  - Designed and built two power distribution boards for power management
  - Started preliminary simulation work for control algorithms
- Lead author for research into energetically optimal gait transitions for multi-modal robots
- Designed and implemented novel trajectory optimization algorithms in C++ using nonlinear solvers
  - Ran experiments to validate algorithms in the JPL Mini Mars Yard
  - Trajectory Optimization Methods for Energy Efficient Gait Transitions on Multi-Modal Robots presented at the 2024 IEEE Aerospace Conference

**Hybrid Robotics Lab**  
**Graduate Researcher**

Berkeley, CA  
August 2022 – Present

- Research into developing multi-agent reinforcement learning policies for cooperative quadruped systems
  - Multi-Agent Reinforcement Learning with a team of quadrupeds cooperatively towing a box
  - Utilizing diffusion models in cooperative manipulation tasks with safety guarantees
  - Designing controllers and communication protocols for decentralized agent experiments

**Wainamics**

**Engineering Intern**

Berkeley, CA  
May 2022 – August 2022

- Research and development of microfluidic systems
  - Designing flow cells and testing different methods of controlling fluid flow
- Development of a general-purpose microfluidic device controller
  - Assembling and reworking PCB boards and components
  - Tuning Peltier machine with closed loop control for temperature-dependent reactions

**Space Enterprise at Berkeley**

**Lead Firmware Developer**

Berkeley, CA  
August 2021 – January 2023

- Responsible for the software and integration of rockets' avionics systems
  - Redesigned existing firmware in C++ to be more reliable, readable, and modular
- Developed a motor-powered pressure regulating engine system with closed loop control and a feedforward model for greater thrust output
  - Programmed system in C++, designed electronics, modeled system, and tuned PID controllers for propellant flow rate

**Teaching Experience**

**EECS151, Introduction to Digital Design and Integrated Circuits**

**Graduate Student Instructor**

Berkeley, CA  
August 2024 – Present

- Handle lab infrastructure and hold lab sections for both FPGA and ASIC design tracks

**CS61C, Great Ideas in Computer Architecture**

**Teaching Assistant**

Berkeley, CA  
January 2022 – May 2022

- Ran 30 student lab sessions, created course content, and led review sessions for 100+ students

**Computer Science Mentors**

**Tutor**

Berkeley, CA  
August 2021 – December 2021

- Tutored a group of 6 students over a semester of CS61A, Structure and Interpretation of Computer Programs

**Skills**

8+ years of experience in C, C++, Java, and Python

Extensive Experience in:

- ROS, Robotic Control, Digital Signal Processing, Multi-Agent Systems, Machine Learning, and Reinforcement Learning
- ASIC Design, VLSI, FPGA Design, PCB Design, PCB Fabrication, High Level Synthesis, Hardware Acceleration, and Power Distribution Systems