

Yufeng Chi

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Research Interest

Computer architecture: Domain-Specific Hardware, Accelerator for Physical AI, Design Methodology, FPGA Deployment

Robotics: Robot Learning, Reinforcement Learning, Whole-body Control, Robotic System Architecture

Education

University of California, Berkeley

Ph.D. Electrical Engineering and Computer Science

May 2023 – Present

GPA: 3.937/4.0

Advisor: Yakun Sophia Shao, Borivoje Nikolic, Koushil Sreenath

Relevant Coursework:

CS285 Deep Reinforcement Learning, **EE221A** Linear System Theory, **CS252A** Computer Architecture and Engineering,

EECS251B Advanced Digital Integrated Circuits and Systems

University of California, Berkeley

B.S. Electrical Engineering and Computer Science

May 2019 – Dec 2022

GPA: 3.783/4.0

Relevant Coursework:

EE194/290C IC Design Project: 16nm SoC for AI and IoT, **EECS151/EECS151LB** Digital Design and Integrated Circuits, **CS162**

Operating Systems, **EECS106A** Robotics

Publications

- 2025 **Cygnus: A 1 GHz Heterogeneous Octa-Core RISC-V Vector Processor for DSP**
V Jain, D Grubb, J Zhao, K Anderson, K Ho, [Y Chi](#), E Schwarz, K Ansanovic, S Shao, B Nikolic
Symposium on VLSI Technology and Circuits (VLSI Technology and Circuits)
- 2025 **MAVERIC: A 16nm 72 FPS, 10 mJ/Frame Heterogeneous Robotics SoC with 4 Cores and 13 INT8/FP32 Accelerators**
S Kim, J Zhao, R Hsiao, [Y Chi](#), V Iyer, V Jain, X Huang, B Nikolic, S Shao
Symposium on VLSI Technology and Circuits (VLSI Technology and Circuits)
- 2025 **Demonstrating Berkeley Humanoid Lite: An Open-source, Accessible, and Customizable 3D-printed Humanoid Robot**
[Y Chi](#), Q Liao, J Long, X Huang, S Shao, B Nikolic, Z Li, K Sreenath
Robotics: Science and Systems (RSS)
[[Paper](#)][[Website](#)][Featured by [FOX News](#), [TechXplore](#), [量子位](#)]
- 2025 **LangWBC: Language-directed Humanoid Whole-Body Control via End-to-end Learning**
Y Shao, X Huang, B Zhang, Q Liao, Y Gao, [Y Chi](#), Z Li, S Shao, K Sreenath
Robotics: Science and Systems (RSS)
[[Paper](#)][[Website](#)]
- 2024 **NeCTAr and RASoC: Tale of Two Class SoCs for Language Model Interference and Robotics in Intel 16**
V Schmulbach, J Kim, E Gao, N Jha, E Wu, O Yu, B Oliveau, X Kong, B Roberts, C McMahon, L Yin, V Yang, B Brenner, G Moujaes, B Hao, L Revina, K Anderson, B Ngo, [Y Chi](#), H Huang, R Sajadiany, R Gupta, E Schwarz, J Zhou, K Ho, J Zhao, A Flynn, B Nikolic
IEEE Hot Chips 36 Symposium (HCS)
- 2024 **DiffuseLoco: Real-Time Legged Locomotion Control with Diffusion from Offline Datasets**
X Huang*, [Y Chi](#)*, R Wang*, Z Li, XB Peng, S Shao, B Nikolic, K Sreenath
Conference on Robot Learning (CoRL)
[[Paper](#)][[Website](#)]
- 2023 **Creating a Dynamic Quadrupedal Robotic Goalkeeper with Reinforcement Learning**
X Huang, Z Li, Y Xiang, Y Ni, [Y Chi](#), Y Li, L Yang, XB Peng, K Sreenath
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
[[Paper](#)][[Video](#)][Featured by [IEEE Spectrum](#), [TechXplore](#), [TechCrunch](#)]

2022 **Collaborative Navigation and Manipulation of a Cable-towed Load by Multiple Quadrupedal Robots**
C Yang, GN Sue, Z Li, L Yang, H Shen, Y Chi, A Rai, J Zeng, K Sreenath
IEEE Robotics and Automation Letters 7 (4), 10041-10048 (RAL)
[Paper][Video][Spotlighted by IEEE Spectrum]

Experience



Research Assistant

Aug 2022 – May 2023

Berkeley Wireless Research Center, UC Berkeley

Advisor: Prof. Kristofer Pister, Prof. Borivoje Nikolic

Working with Prof. Kristofer Pister on bringing up the research chips OsciBear, BearlyML, and SCuM-V.

- Experimented with JTAG, QSPI, and serialized-TileLink communication to the chip, and successfully established communication with OsciBear using an STM32 microcontroller running software emulated serialized-TileLink over UART interface
- Wrote driver libraries and tested the on-chip RISC-V core, RF Baseband, Advanced Encryption Standard (AES) accelerator, and sparse-dense matrix multiplication accelerator
- Designed the digital and RF layout of the 6-layer PCB for the chips in Intel BGA package

Working with Prof. Borivoje Nikolic on improving the Chipyard System-on-Chip (SoC) framework.

- Writing detailed documentation and tutorials for the generator components inside the testchipip and sifive-block repo
- Working on automated C driver code generation from the source Chisel code
- Porting Chipyard to Arty Cmod board to serve as a UART to serialized-TileLink adapter



Bringup Engineer

June 2022 – Aug 2022

NeuralAccel Corporation – Internship

Worked on designing a sparse-sparse matrix multiplication accelerator.

- Implemented the serialized TileLink communication over UART for communication between host computer and the accelerator memory on Arty FPGA
- Implemented a small single stage RISC-V core with MMIO devices as the controller of the accelerator
- Worked on implementing an Ethernet controller supporting UDP protocol on Arty FPGA for streaming data between host computer and accelerator



Independent Undergraduate Researcher

Jan 2022 – May 2023

Hybrid Robotics Lab, UC Berkeley

Advisor: Prof. Koushil Sreenath

Working on developing a human-sized high degrees of freedom humanoid robot with 3D printed cycloidal gear actuator and proprioceptive motor driver from scratch.

- Researched and designed a 15:1 proprioceptive cycloidal actuator with Autodesk Fusion 360
- Researched and designed the body of the robot with two 7 degrees of freedom legs and two 4 degrees of freedom arms.
- Designed and manufactured a field-oriented control (FOC) motor controller which supports up to 90V and 50Amps driving capability
- Designing Controller Area Network control system as the communication system on the robot

Participated in developing a model-based reinforcement learning control algorithm in Mujoco and OpenAI Gym environment for training the robot dog to learn a specific set of motions.



Research Assistant

Sep 2021 – Jun 2022

Ma Lab, UC Berkeley

Advisor: Prof. Eric Y. Ma

Assisted and worked with Prof. Eric Y. Ma in setting up the newly established Ma Lab.

Built a real-time cloud-synced lab environment monitoring and inventory management system.

- Implemented Bluetooth Low Energy (BLE) communication between sensor nodes and host computer
- Designed and implemented QR Code-based inventory logging system
- Integrated Python backend server to real-time updating PlotlyJS frontend data visualization



System Engineer

Jan 2021 – Dec 2023

Formula Electric at Berkeley – Student Club

In charge of the electrical control and communication system on the formula racing car.

- Implemented firmware code for multiple modules on the car with GPIO, ADC, DAC, SPI, I2C, USB, and Ethernet functionalities
- Designed and implemented the Controller Area Network Flexible Data-Rate (CAN-FD) communication system on the car
- Designed and manufactured the steering wheel PCB and implemented the graphical display functionalities with Raspberry Pi Compute Module
- Prototyped the data streaming system between car and pit station with WiFi and 900MHz XBee connectivity



Ecosystem Technical Supporting

Intel Corporation – Internship

Jun 2020 - Dec 2020

Worked as technical consultant to analyze strength and weakness of Intel's potential technical partners.
Contributed to designing the Intel Nanjing Smart Technology Business Park.

Selected Projects

Designing and manufacturing a 3-phase field-oriented control brushless DC motor controller

Aug 2022 – Feb 2024

Independent project

- STM32 controller with 1Mbps Controller Area Network (CAN) 2.0 bus communication
 - 3-phase shunt current sampling with IIR filter
 - Absolute magnetic encoder for position feedback with All-digital Phase Locked Loop (ADPLL) filter
 - Coordinate Rotation Digital Computer (CORDIC) processor for Field-Oriented Control (FOC) computation
 - 10 kHz current and position loop control with configurable operation modes
 - PCB design and assembling
- [\[Assembly Video\]](#)[\[Testing Video\]](#)

Designing and building a 1/2 scale humanoid robot to play xylophone

Aug 2021 – Nov 2021

Group project for EECS 106A

Designed the mechanical structure and actuator integration of the robot.
Implemented the control system first on Arduino, and then ported to the RISC-V Red-V development board.
Integrated inverse kinematics and animation control of the robot with Blender.
Awarded as Showcase Winner in the class final presentation.

Educational RISC-V Processor Video Series

Apr 2020 – June 2020

Independent personal project

Published a series of videos introducing RISC-V processor ISA and logic design to viewers on Bilibili and YouTube.
Gained 800k views on both video platforms and inspired many to start learning RISC-V ISA.
[\[Project Video\]](#)[\[Education Video \(Chinese\)\]](#)

Skills

Programming / Scripting (ordered by proficiency): Python, JavaScript, C, RISC-V ASM, Verilog, Scala/Chisel, C++

Robotics: Isaac Lab and MuJoCo simulation, Sim2Real transfer, Onshape mechanical design, PCB design

Prototyping: STM32 Programming, Embedded system protocols (UART, SPI, I2C, CAN, EtherCAT), 3D printing, FPGA prototyping

Multimedia: Audio/Video Editing, 3D Modeling and Production with Blender and Unreal Engine

Honors and Awards

- 2022 UC Berkeley Dean's List of College of Engineering
- 2021 UC Berkeley EECS C106A Final Project Showcase Winner
- 2021 "Hack To The Moon" Winner at CalHacks hello:world (CalHacks 8.0)
- 2019 UC Berkeley Honors to Date

Teaching

- 2022 **ELENG 194 Bringup Class: Test Integrated Circuit Chips Designed in Previous Tapeout Classes**
Teaching Assistant, UC Berkeley