Olivia W. Hsu

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Personal Website   Google Scholar

Education

Stanford University (Stanford, CA)   **Expected June 2025**
Ph.D. in Computer Science   GPA: 4.042/4.0
Selected Coursework**:**

> Machine Learning with Graphs (CS 224W), Continuous Mathematical Methods with an Emphasis on Machine Learning (CS 205L), Domain-Specific Programming Models and Compilers (CS 343D), Parallel Processors Beyond Multicore (CS 382A), Engineering Design Optimization (CS 361), Interactive Computer Graphics (CS 248), Machine Learning (CS 229)

University of California, Berkeley (Berkeley, CA)   **May 2019**
B.S. in Electrical Engineering and Computer Science   GPA**:** 3.921/4.0
Selected Coursework:

> Programming Languages and Compilers (CS 164), VLSI Digital Signal Processing Architectures (CS 290C), Computer Architecture (CS 152)**,** Analog Integrated Circuits (EE 140), Operating Systems (CS 162), Digital Integrated Circuits and ASIC Lab (EECS 151), Digital Signal Processing (EE 123)

Thomas Jefferson High School for Science and Technology (Alexandria, VA)   **May 2015**

Experience

Stanford Pervasive Parallelism Lab (Stanford, CA) – *Student Research Assistant*   **Jan 2020 – Present**
- Co-advised by Professor Kunle Olukotun and Professor Fredrik Kjolstad on automatic compilation of sparse tensor algebra to domain-specific architectures, reconfigurable dataflow architectures, and hardware accelerators.
- Also working on sparse array programming—sparse NumPy-like computation used in applications like scientific computing, graph analytics, etc.— and sparse machine learning compilation for CPU and GPU backends.

Stanford University CS Department (Stanford, CA) – *Course Assistant*   **Sept 2021 – Dec 2021**
- Course assistant (CA) for CS 149: Parallel Computing under Professors Kayvon Fatahalian and Kunle Olukotun

UC Berkeley Group Matching Project (Berkeley, CA) – *Student Researcher*   **Aug 2020 – Aug 2021**
- Developing a scalable and inclusive group matching process for student collaboration within EECS education under Professor Gireeja Ranade.
- The group matching technique first launched in the Fall 2020 offering of EECS 16A with 980+ students, with wider adoption presently occurring across the UC Berkeley EECS department in courses: CS 70, CS 61A, CS 168, and more.

Ayar Labs (Emeryville, CA) – *Hardware VLSI Intern*   **June 2020 – Sept 2020**
- Digital VLSI intern working on designing digital circuit blocks in System Verilog to match provided specifications, digital block verification, and pushing blocks through the physical design process be DRC and LVS clean.

Stanford VLSI Research Group (Stanford, CA) – *Rotation Research Assistant*   **Sept 2019 – Jan 2020**
- Researching novel ADC-based high-speed link equalization techniques under Professor Mark Horowitz

Apple Inc. (Cupertino, CA) – *CPU Design Verification Intern*   **June 2019 – Sep 2019,**
- Created instruction set architecture pseudocode for the Apple CPU   **May 2018 – Aug 2018**
- Developed a runtime co-simulation checker and debug features in a software functional model of the Apple CPU using C++

Berkeley Wireless Research Center (Berkeley, CA) – *Undergraduate Researcher*   **Jan 2017 – July 2019**
- Designed photonic devices using the Berkeley Photonic Generator (BPG) and digital circuits for high speed communication in Verilog for an ultrasound receive array system taped out in a Global Foundries 45nm RFSOI process.
- Built a lab setup that tests the sensitivity of silicon photonic devices when disturbed with an ultrasonic wave.

UC Berkeley EECS Department (Berkeley, CA) – *Head Undergraduate Student Instructor*   **Aug 2016 – Jan 2018**
- Head teaching assistant (TA) for an 850+ student introductory EE course, EECS 16A, in charge of 30+ other TAs and various duties including course administration, labs, exam creation, office hours, and grading/reader management.

NASA Jet Propulsion Laboratory (Pasadena, CA) – *Hardware Research Intern*   **June 2016 – Aug 2016**
- Developed a sensor testbed that verified the communication systems on a rad-hard, deep-space CubeSat avionics board.

Relevant Projects and Organizations

Afro Fem Coders – *Founding Instructor and Head Advisor*   **Oct 2020 – Present**
- Helped found Afro Fem Coders, an organization aimed at giving young Sub-Saharan African and African American women a safe space to learn computer programming. Each annual cohort takes a 2 month Python fundamental course and then divide into specialized computer science tracks (e.g. design innovation, data analytics, data science + introduction to machine learning, technical interview preparation, etc.).
- Responsibilities include being head instructor for the introduction to machine learning track, leading Python fundamental discussion and office hours weekly, developing the final project for the Python fundamental course, grading and autograder development, managing other tutors and instructors, mentoring students on US college applications/essays, and more.

Space Technologies at Cal (STAC) – *Co-Founder, Co-President, Lead Electrical Engineer*   **Aug 2016 – Sep 2019**
- Co-founded the first technical, project-based student organization at UC Berkeley for students interested in aerospace. As president, I managed 50+ students per semester across 6 projects and fostered partnerships with NASA, Blue Origin, Stanford University, UC Berkeley Space Sciences Laboratory, and more.
- Designed a PCB Satellite (PCBSat) launched in collaboration aboard the KickSat CubeSat by Professor Zachary Manchester.
- Won a Blue Origin payload launch and developed experiments that test laser ablation and biological effects in microgravity.
- Implemented electronics in a High Altitude Balloon (HAB) with a successful launch in partnership with NASA Ames and JPL.

UC Berkeley EECS Women's History Month – *Founder and Student Liaison*   **Mar 2019**
- Started the first annual EECS Women's History Month celebration at UC Berkeley, which included industry events for underrepresented students, social events, and informative diversity events on the history of women in EECS.

Image Communication Project   **Jan 2018 – May 2018**
- Transmitted JPEG2000-like compressed images via radio using a modified AX25 packetization scheme and an AFSK modulation scheme with a baud rate of 1.6 kHz.

SOC Analog Peripheral Design   **Jan 2018 – May 2018**
- Completed the schematic design for a low voltage bandgap, a temperature sensor, a programmable gain amplifier, analog and digital voltage regulators, a SAR ADC, and a capacitive DAC with two other people

Application Specific Integrated Circuits (ASIC) Processor Design   **Jan 2017 – May 2017**
- Designed the best-performing three-stage pipelined RISC-V processor in Verilog for 28nm CMOS technology with a partner.
- Created a finite state machine that implemented a 64x512 bit direct mapped, write-back cache using SRAM standard cells.

Publications

O. Hsu, M. Strange, J. Won, R. Sharma, K. Olukotun, J. Emer, M. Horowitz, and F. Kjolstad, "The Sparse Abstract Machine," *Arxiv Preprint,* 2022*.*

O. Hsu, A. Rucker, T. Zhao, K. Olukotun, and F. Kjolstad, "Stardust: Compiling Sparse Tensor Algebra to a Reconfigurable Dataflow Architecture," *Arxiv Preprint,* 2022*.*

S. Kohli, N. Ramchandran, A. Tudor, G. Tumushabe, **O. Hsu**, and G. Ranade, "Inclusive Study Group Formation at Scale," *accepted in Special Interest Group on Computer Science Education (SIGCSE) Technical Symposium,* 2023*.*

R. Henry[1], **O. Hsu[1]**, R. Yadav, S. Chou, K. Olukotun, S. Amarasinghe, and F. Kjolstad, "Compilation of Sparse Array Programming Models," *in Object-Oriented Programming, Systems, Languages & Applications (OOPSLA), Proceedings of the ACM on Programming Languages (PACMPL),* 2021*.*

P. Zarkos, S. Buchbinder, C. Adamopoulos, S. Madhvapathy, **O. Hsu**, J. Whinnery, P. Bhargava, and V. Stojanović, "Fully Integrated Electronic-Photonic Ultrasound Receiver Array for Endoscopic Imaging Applications in a Zero-Change 45nm CMOS-SOI Process," *in Symposium on VLSI Circuits (VLSI),* 2021

P. Zarkos, S. Buchbinder, C. Adamopoulos, **O. Hsu**, S. Madhvapathy, J. Whinnery, P. Bhargava, and V. Stojanović, "Monolithically Integrated Electronic-Photonic Ultrasound Receiver Using Microring Resonator," *in Conference on Lasers and Electro-Optics (CLEO),* OSA Technical Digest (Optical Society of America, 2021)

P. Zarkos, **O. Hsu**, and V. Stojanović, "Ring Resonator Based Ultrasound Detection in a Zero-Change Advanced CMOS-SOI Process," in *Conference on Lasers and Electro-Optics (CLEO)*, OSA Technical Digest (Optical Society of America, 2019), 2019

Honors and Awards
- 2019 IEEE-Eta Kappa Nu (HKN) Alton B. Zerby and Carol T. Koerner Outstanding Student Award
- 2019 National Science Foundation Graduate Research Fellow (NSF GRFP)
- 2018-2019 UC Berkeley EECS Arthur M. Hopkin Award Recipient
- 2017-2018 Outstanding Graduate Student Instructor Award UC Berkeley
- IEEE-Eta Kappa Nu (HKN) National Electrical Engineering Honor Society Officer
- Tau Beta Pi (TBP) National Engineering Honor Society Member
- Fall 2015 Cal Alumni Association Leadership Award Recipient

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[1] Both authors contributed equally