YIKE SHI

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Education

University of California, Los Angeles (UCLA), B.S. Computer Engineering   Sept 2023 - June 2026
- GPA: **3.93**/4.0, Dean's Honors List ×5, CUM LAUDE Honor, Samueli Research Scholar (2025)
- John DeGroff Haller Memorial Merit Scholarship, Kalosworks Centennial ECE Merit Scholarship, Dr. Peter F. Mason Fund Merit Research Scholarship
- Coursework: Robotics, Deep Learning, Machine Learning, Computer Vision, Feedback Control, Computational Imaging (Graduate-level), Algorithm, Software Construction, IoT, Computer Architecture, Operating Systems

Research Experiences

Robotics Researcher, UCLA Robot Intelligence Lab (URIL)   Jan 2025 – Current
- Assembled the URIL ACT ALOHA bimanual teleoperation hardware system. Created a ROS+OpenCV-based real-time data pipeline for arm and camera data, and a Python API that calls ROS for inference
- Adapted ALOHA's ACT Architecture. Benchmarked SOTA IL policies: Vanilla BC, Diffusion Policy, and ACT

Learning where to look: Gaze-Guided Active Perception for Long-Horizon Imitation Learning
- Utilized Meta Aria as a gaze tracking system and collaborated on the development of homography-based and LightGlue+KNN transformer methods for translating human perspective to machine perspective
- Architected a probabilistic gaze prediction model using a combination of MDN, GMM, and a UNet to infer human visual intent, enabling dynamic decomposition and execution of complex, long-horizon tasks
- Trained a gaze-centric skill selector using an LSTM that dynamically chooses robot skills at inference time by leveraging a foveated vision model, which applies Gaussian noise and reduces intensity to visual data outside the human gaze point to simulate gaze attention. Improved long-horizon tasks' success rates by **16%**
- Presented research on Meta's Research Summit for Egocentric Perception 2025 and UCLA Research Symposium

Multi-sensory Electronics-integrated Robotic Limb for INtelligent manipulation (MERLIN)
- Co-initiated MERLIN as a collaboration between URIL and RoMeLa (Robotics Mechanism Laboratory); co-designed a high-quality dexterous-hand data-collection glove with joint sensors, cameras, and tactile sensing
- Integrated and extended Python APIs on ROHand platform to replay and visualize data from the prototype glove
- Collecting dexterous hand demonstrations with MERLIN and DexUMI and training imitation policies to compare performance across data-collection modalities

Assistant Researcher, UCLA Security and Privacy Lab, AI Security   Dec 2023 – Current
Adversarial Attack and Defense on Images
- Tested the gradient matching & ascent algorithms to introduce unwanted results for image classification models
- Researched the effects of Encoder and Diffusion Attack on text-to-image generation models. Trained a protection model adding 1.6% perturbation to an image and prevented malicious generation on the targeted image

Security Flaws in Translation: A Study of Prompt Injection in LLM Translators
- Conducted a security evaluation of prompt injection vulnerabilities in RedNote's LLM-based translation mode
- Engineered automated data collection scrapers to gather injection prompts from comments on test posts
- Developed a Gemini-based analysis pipeline utilizing 3/4 of manual data for few-shot prompt analysis
- Investigated detection and defense mechanisms by performing attention analysis on malicious prompts

Teaching Experiences

Lab Mentor, UCLA Samueli School of Engineering   Sept 2024 – Now
- Mentored ECE 3: Intro to EE. Tutored students on basic circuits, electronic components, signals, PID control algorithms, embedded programming(C++), and the use of lab equipment (e.g., multimeters, oscilloscopes)
- Conducted 4-hour weekly lab sessions, providing hands-on guidance to 180+ undergraduate students
- Organized the Real Lab Tools Assignment, including writing the lab manual, recording instructional content, hosting office hours, and grading all student submissions

Workshops Chair and ECE Tutor, IEEE-HKN Honor Society   April 2025 – Now
- Provided weekly 2-hour tutoring sessions for UCLA ECE students, covering a broad range of core EE/CS coursework. Offered mentorship on career planning and course selection
- Led and organized the chapter's inaugural Robotics Workshop focusing on FastSLAM and EKF-SLAM
- Designed an interactive Jupyter notebook to guide students through update and prediction steps in SLAM

Publications

Shi, Y. (2023, April). A robust and novel semantic segmentation deep neural network for robotic surgery vision with a single RGB camera. In Third International Conference on Artificial Intelligence and Computer Engineering (ICAICE 2022) (Vol. 12610, pp. 73-77). SPIE.

Technical Skills

Languages/Packages: Python, C++/C, JavaScript, HTML/CSS, Matlab, Verilog; PyTorch, Numpy, Pandas
Framework/Developer Tools: Node, React, Express; Git, Docker, Unix/Linux, ROS, MuJoCo

Robotics Projects

Reinforcement Learning for Robot Trajectory Planning
Feb 2025 - March 2025

- Applied PPO to train an RL policy network for end-to-end trajectory planning, navigating a robotic arm through a complex workspace. Incorporated physical constraints and collision avoidance to ensure safe and valid output
- Engineered a deep learning-based Inverse Kinematics solver for a redundant robotic arm, improving end-effector position prediction accuracy by 4.7% over traditional Jacobian-based methods in complex configurations

Dynamic Movement Primitives for Robot Motion Generation
Feb 2025

- Developed a Python-based framework to model and generate robot arm trajectories using Dynamic Movement Primitives (DMPs), enabling robust generalization from demonstrations to novel tasks
- Designed and implemented trajectory learning (IL) algorithms with adjustable parameters for compliance and adaptability, facilitating smooth, collision-free movements in cluttered environments
- Integrated simulation tools to visualize DMP-generated paths and benchmark performance against classical planning methods, demonstrating improved accuracy and scalability for complex robot tasks

Control Project

Non-linear Control System Design and Stabilization for DC-DC Converter
Feb 2025 - March 2025

- Designed and implemented a robust PID controller in MATLAB Simulink to stabilize and regulate an inherently unstable non-linear DC-DC converter system
- Validated system instability via linearization and Routh-Hurwitz analysis of the state-space model, confirming the need for non-linear control. Achieved optimal performance, resulting in zero overshoot and fast convergence (settling time $< 0.1s$) to the $20V$ reference in the full non-linear environment

Software Experiences

Software Engineer, The EduHive Inc.
Sept 2024 – Jan 2025

- Led a team to develop EduHive's websites using the MERN stack (MongoDB, Express, React, Node.js)
- Designed a recommendation algorithm that computes user-project matching scores, enabling smart sorting
- Implemented the private messaging system, including its MongoDB data structure and JavaScript-based REST APIs; achieved $\mathcal{O}(1)$ time complexity for retrieving chat histories and improving overall platform responsiveness
- Spearheaded front-end development, redesigning the user flow to enhance UI/UX on the React platform; this improved user navigation efficiency by 20% and ensured a consistent, responsive experience across devices
- Streamlined the CI/CD pipeline by containerizing the entire application stack (MongoDB and Node.js services) using Docker, which reduced setup time for new developers by 40%

Find Your Clubs, Software Engineering Project
Apr 2024 - Aug 2024

- Led a 6-person team to develop a React.js + Express.js + MongoDB platform aggregating 200+ UCLA clubs
- Key Tech Features: Secure JWT authentication; Dynamic search/filter (tags, popularity); Application pipeline (form customization, submission, and admin review); User favorites system with Firebase real-time updates
- Architected a full suite of REST APIs for CRUD operations and optimized MongoDB queries, resulting in a 30% reduction in data retrieval latency for over 200 club profiles

Hardware Design Projects

Digital Design, Architecture, and Verification
Sept 2024 - May 2025

- Architected and implemented a 16-bit Fast Fourier Transform (FFT) Visualizer on an FPGA, utilizing VHDL/Verilog for RTL design and prototyping
- Designed and optimized the internal FFT butterfly computational unit to handle complex number arithmetic, minimizing resource utilization while adhering to high-speed timing constraints
- Developed a custom VGA synchronization module to interface the FPGA with an external monitor, converting the parallel FFT output data into a serial communication protocol for real-time spectral display

Out-of-Order RISC-V Processor Design, Honors Content
Sept 2025 - Current

- Designed and integrated key OoO execution structures, including the Reorder Buffer (ROB), Physical Register File (PRF), Free List, and Map Table to enable register renaming and precise exception handling
- Engineered the Dispatch Stage to manage instruction issuance by leveraging a Priority Decoder for slot selection in the three dedicated Reservation Stations (ALU, Branch, LSU)
- Utilized hardware design concepts such as Synchronous FIFOs and Skid Buffers for robust data transfer between asynchronous pipeline stages (Fetch, Decode, Rename, Dispatch)
- Managed the entire verification flow within Xilinx Vivado, including writing comprehensive behavioral testbenches for all RTL modules and performing post-synthesis timing simulation