Zikai Liu

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Education

2023–Present
ETH Zürich, PhD Student in Computer Science
- Supervised by Prof. Timothy Roscoe. Systems Group.

2021–2023
ETH Zürich, MSc in Computer Science
- Major in Data Management Systems. GPA 5.67/6.00.

2017–2021
University of Illinois at Urbana-Champaign, BSc in Computer Engineering
Zhejiang University, BEng in Electronics and Computer Engineering
- Dual Bachelor's degrees. GPA 3.93/4.00. Highest Honor.

Selected Courses
Computer System Engineering, Microarchitecture, Operating Systems, Compiler, Automated Software Testing, Machine Learning, Cloud Computing Architecture.

Experience

2018–2021
ZJU-UIUC Robotics Team, Control Group Lead & Project Manager/Vision Group Lead
- Led the development of embedded control programs, parameter tuning utilities, and a vision-assisted automatic aiming system for combat robots, in C/C++ and Python.
- Scheduled development timeline and arranged meetings as the project manager.

Fall 2020
ZJU-UIUC Joint Institute, Teaching Assistant
- Organized lab sessions and assignments, and deployed an automatic feedback system (KLC3 below) for sophomore students of the ECE220 Fall 2020 ZJUI session.

2020.6–2020.8
NetEase Games, Platform Engineer Intern
- Developed a driver module and GUI to manage various joysticks through a unified interface, providing plug-and-play user experience on the NetEase android emulator.

Projects

Fall 2022
End-to-End In-Hand 3D Scanning System on Mixed Reality Headsets
- Developed a system for near-real-time 3D scanning and reconstruction for irregular geometries, using the depth camera on Microsoft HoloLens 2.

Summer 2022
Virtualize Linux on seL4 for Enzian System
- Developed Linux VM on seL4 (a formally verified microkernel) for Enzian, a research server-class CPU/FPGA computer developed at the ETH Systems Group.

2020–2021
KLC3 Symbolic Execution Engine
- A symbolic execution engine for LC-3 (an educational assembly) based on KLEE for automatic bug detection and test case generation, written in C/C++.
- Used to provide automatic end-to-end feedback to 100+ sophomore students for their LC-3 assignments in Fall 2020. Got uniformly positive survey responses.

Spring 2021 **Wireless Charging Desk with Vision-Assisted Automatic Alignment**

- Designed and implemented a desk that automatically aligns wireless charging coils with devices using a mechanical system and computer vision.
- Senior design team project. We got the Most Interdisciplinary Project Award.

Fall 2020 **Pipelined RISC-V Processor Design Project**

- Designed and simulated a 5-stage pipelined RV32I processor with parameterized caches, tournament branch predictions, and a prefetcher, written in SystemVerilog.

Spring 2020 **BoxHead Video Game on FPGA**

- Developed a game on FPGA combining hardware and software. Wrote VGA driver, SRAM controller, hardware graphic engine in SystemVerilog, and game logic in C.

Fall 2019 **x86 Operating System Development Project**

- Designed and simulated an i386 OS with kernel functions, a scheduler with waitlists, SVGA driver with hardware acceleration, and GUI, written in C and assembly.
- Our team got a prize at the UIUC ECE391 design competition :)

Fall 2019 **UWB Indoor Positioning System Project**

- Designed and analyzed a high-accuracy (~20cm) indoor positioning system using Decawave UWB development boards. CS498IoT team project.

Publications

Zikai Liu, Tingkai Liu, Qi Li, Wenqing Luo, Steven S. Lumetta, "End-to-End Automation of Feedback on Student Assembly Programs," *36th ACM/IEEE International Conference on Automated Software Engineering (ASE),* November 2021.

Zikai Liu, "Using Concolic Execution to Provide Automatic Feedback on LC-3 Programs," Senior Thesis, University of Illinois at Urbana-Champaign, June 2021.

Presentations

Zikai Liu, Steven S. Lumetta, "Caching Results from KLEE's Independent Solver," *2nd KLEE Workshop*, June 2021.

Zikai Liu, Tingkai Liu, Qi Li, Wenqing Luo, Steven S. Lumetta, "Timely Feedback on Assembly Assignments Using KLEE," *2nd KLEE Workshop*, June 2021.

Activities

2018–2019 **Campus New Media Center**, Vice Minister of Vision Department

- Organized department recruitment, training and photography activities.

2019-2020 **Campus Art and Creative Studio**, Founding Member

- Participated in designing, manufacturing and selling of art products.