

Zikai Liu

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🌐 zikailiu.com/about

🌐 zikai-liu

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Education

- 2023–Present **ETH Zurich, PhD Student in Computer Science**
- Supervised by Prof. Timothy Roscoe. Systems Group. Anticipated graduation date: 11/2027.
- 2021–2023 **ETH Zurich, MSc in Computer Science**
- Major in Data Management Systems. GPA 5.67/6.00.
 - Thesis: Generating Trustworthy I²C Stacks Across Software and Hardware.
- 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.
 - Thesis: Using Concolic Execution to Provide Automatic Feedback on LC-3 Programs.
- Selected Courses **Operating Systems, Computer architecture, Compiler, Software Testing, Cloud Computing.**

Experience

- 2018–2021 **ZJU-UIUC Robotics Team, Control/Vision Group Lead and Project Manager**
- Led the development of embedded control programs and a vision system for robots.
 - Managed the development process for 30+ team members as the Project Manager.
- Summer 2020 **NetEase Games, Platform Engineer Intern**
- Developed a driver module with GUI to manage various joysticks through a unified interface, providing plug-and-play user experience on the NetEase android emulator.

Projects

- Present **The Enzian Project**
- Enzian: a research computer built at the ETH Systems Group with a cache coherence interconnect (similar to CXL) between a server-class CPU and an FPGA.
 - Investigating accelerating applications by exploiting coherence protocols at the message level.
- Present **The Trustworthy Board Management Controller (BMC) Project**
- BMCs: exist in every modern computer to manage critical low-level functionalities.
 - Worked on securing BMCs by adopting a formally verified OS kernel and generating hybrid software/hardware drivers using model checking, code generation, and high-level synthesis.
- Present **The Sockeye Project**
- The project: formally models increasingly complicated hardware to build better OS.
 - Worked on integrating seL4 microkernel as one of the CPU drivers.

- Fall 2022 **In-Hand 3D Scanning System on a Mixed Reality Headset**
- Developed a system for near-real-time 3D scanning and reconstruction of irregular geometries, using the depth camera on Microsoft HoloLens 2.
- 2018–2021 **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.
- More on my website [🌐 zikailiu.com/projects](https://zikailiu.com/projects)

Publications

- *Equal contributors
- Daniel Schwyn*, **Zikai Liu***, Timothy Roscoe, “Efeu: generating efficient, verified, hybrid hardware/software drivers for I2C devices,” *20th European Conference on Computer Systems*, March–April 2025.
- Ben Fiedler, **Zikai Liu**, David Cock, Timothy Roscoe, “Verified fault handling for modern board management controllers,” *20th Formal Aspects of Component Software*, September 2024.
- 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*, November 2021.

Skills

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| Programming | C/C++, Python, SystemVerilog/VHDL, OCaml, C#, JavaScript, HTML/CSS, SQL, Rust, assembly. |
| Operating Systems | Unix/Linux commands, shell scripts, kernel development; Windows drivers. |
| Tools and Frameworks | Build systems (e.g. CMake), version controls (e.g. Git), compiler frameworks (e.g. LLVM), FPGA toolchains (e.g. Vivado), debuggers and profilers (e.g. GDB), GUI frameworks (e.g. Qt). |
| Miscellaneous | Adobe Photoshop/Illustrator/Lightroom, photography, Unity engine. |