

HANZE LI

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EDUCATION

ShanghaiTech University

B.S. Candidate | Computer Science

Sep 2024 - Expected Jun 2028

Shanghai, China

Research & Engineering Profile: I study embedded systems under resource constraints, where power availability, hardware behavior, scheduling, and on-device intelligence must be designed together. As a competition captain and independent developer, I build complete systems spanning *custom PCBs, embedded firmware, FPGA/Linux, computer vision, and on-device inference*.

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RESEARCH & PUBLICATIONS

METAL Lab (Prof. Junrui Liang) | UNDERGRADUATE RESEARCH ASSISTANT

Self-powered systems, energy-aware execution, and embedded TinyML

Resource-constrained embedded

systems

Sep 2025 - Present

- Work on resource-constrained embedded systems spanning power management, intermittent operation, and on-device intelligence.

Battery-Free IoT Energy Management | CO-FIRST AUTHOR

Design framework and prototype optimization for battery-free IoT devices

IEEE ICPS 2026 • Best Paper

Aug 2025 - May 2026

- Proposed a two-dimensional (p, e) supply-demand state model for battery-free IoT systems and turned it into design rules for converter selection, control policy, and storage sizing.
- Built adaptive power-path and task-scheduling logic for PV-powered IoT devices, reducing system power consumption by 60% while preserving latency for critical tasks.
- Published the work at IEEE ICPS 2026 as co-first author (DOI: [10.1109/ICPS70486.2026.11567971](https://doi.org/10.1109/ICPS70486.2026.11567971)); received the **Best Paper Award**.

HONORS

Best Paper Award - IEEE ICPS 2026

Co-first author; battery-free IoT modeling / adaptive power path / task scheduling

May 2026

National Student Computer System Capability Challenge (Loongson Cup) - Second Prize

Captain, GeekPie_; SpinalHDL / LA32R out-of-order CPU / 100 MHz FPGA / Linux

Aug 2026

TI Cup Shanghai Undergraduate Electronic Design Competition - First Prize

Captain and vision/mechanical lead; K230 vision / mechanical design / STM32F407 integration

Aug 2026

NVIDIA DGX Spark Hackathon - Excellence Award

Team Captain; system integration / local deployment; Qwen3.5 / Whisper / FastAPI / React / CUDA

Aug 2026

NCTF 2025 Cybersecurity Challenge - 21st Place (Top 2% / 1046 Teams)

Reverse engineering and embedded security; x86 assembly / firmware analysis

Mar 2025

39th Youth Science and Technology Innovation Contest - First Prize

Sole developer; embedded hardware / sensors / IoT environmental-monitoring prototype

Jan 2024

15th VEX Robotics Asia Open Championship - First Prize

Core hardware/software/control member; C++ / PID / chassis and mechanisms

Feb 2023

SKILLS

Expertise: Resource-constrained embedded systems | Embedded sensing and TinyML | Energy-aware design | Computer architecture | FPGA SoC design | Low-power design | Computer vision

Hardware: Schematic design | Multi-layer PCB layout (JLCEDA) | SMT & board bring-up | Power-path management | Signal conditioning | 3D CAD

Languages: C/C++ | Python | Scala/SpinalHDL | Verilog | Assembly (x86/RISC-V/LA32R)

Platforms: ESP32/STM32/nRF52/nRF54/K230 | Zephyr/TFLM/CanMV | FPGA/Vivado | Linux/Buildroot | BLE/Wi-Fi/MQTT | Git/Docker

RESEARCH & SYSTEMS PROJECTS

PEAK Self-Powered TinyML Sensor Node | SOLE DEVELOPER / RESEARCHER

nRF54L15, TinyML

Battery-free TinyML sensing platform; manuscript in preparation

Dec 2025 - Present

- Independently developed the complete prototype across custom hardware, embedded firmware, TinyML inference, and BLE communication.
- Integrated energy-aware execution, on-device inference, and BLE reporting for intermittent embedded operation.

Anti-Poaching Risk Mapping | SOLE DEVELOPER / RESEARCHER

Carnegie Mellon x WWF

Spatiotemporal patrol-priority prediction with Prof. Fei Fang (CMU) and WWF

2026 - Present

- Independently developing a spatiotemporal decision-support system for wildlife-protection patrol prioritization in collaboration with Prof. Fei Fang at Carnegie Mellon University and WWF.

SYSTEMS & EMBEDDED HARDWARE PROJECTS

MIKU LA32R Out-of-Order SoC | CAPTAIN / CPU & LINUX

Second Prize • 100 MHz

SpinalHDL four-issue CPU and Linux system for the Loongson Cup final

Jul 2026 - Aug 2026

- Captained the four-member GeekPie_ team; optimized SpinalHDL LSQ/L1D, branch-prediction, and ROB timing for the LA32R SoC, achieving 100 MHz timing closure on Artix-7.
- Built a working FPGA Linux system with Linux 5.14, Buildroot, framebuffer/X11, PS/2, USB HID, and networking support.

SparkLive Local Multimodal Streaming System | CAPTAIN / INTEGRATION

Excellence Award • DGX Spark

Live-stream assistance and digital-human platform running on DGX Spark

Jul 2026 - Aug 2026

- Served as team captain and contributed to system integration and local deployment for a DGX Spark platform integrating Qwen3.5, Whisper/VAD, OBS WebSocket, FastAPI/WebSocket, React, TTS/Live2D, and PySide6.

H Problem: Ball-Balancing Vehicle | CAPTAIN / VISION / MECHANICAL

First Prize • K230 / F407

Vision measurement and mechanical integration for a ball-balancing vehicle

Jul 2026 - Aug 2026

- Owned the CanMV K230 vision pipeline: implemented 640x480 grayscale ROI tracking, dark-blob filtering, beam centerline fitting, ball-center projection, and physical-coordinate calibration, reaching approximately 1 mm static error at 88.9 FPS.
- Integrated the grooved beam, hinge, screw-driven actuator, and CSI camera, and connected K230 measurement to STM32F407 closed-loop control.

PEAK Energy-Harvesting Power Management Board | SOLE DEVELOPER

172 nA • Custom PCB

Custom power-management board for battery-free embedded operation

Dec 2025 - Present

- Designed, assembled, and brought up the custom PCB; measured 172 nA quiescent current and integrated it with the battery-free sensing platform.

24-Channel Dual-Spectrum Line Sensor | HARDWARE / FIRMWARE LEAD

PCB, SMT, MCU

High-density custom sensor board for high-speed robotic competitions

Jun 2025

- Independently completed schematic design, PCB layout, SMT soldering, and firmware for the dense dual-spectrum sensor board.
- Implemented cascaded-latch I/O multiplexing for 24-channel quasi-synchronous sampling at 1 kHz, plus infrared / visible-light binarization and ambient-light filtering.

LEADERSHIP

GeekPie Association | PRESIDENT

Leadership

President of Shanghai Tech's student technology society; lead for embedded hardware initiatives

Sep 2025 - Present

- Lead association strategy, budgeting, external collaboration, and campus technology events; built the embedded hardware track around MCU development, PCB design, board bring-up, workshops, shared lab resources, and peer mentoring. Association website: geekpie.club.