

KEVIN LAU

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Education

Imperial College London

Oct 2022 – Jun 2026

MEng Electronic and Information Engineering (Computer Engineering) - Predicted 1st class honours

Work Experience

DeepWok Lab (Imperial x Cambridge) 🏆

Jul 2024 – ongoing

3D Gaussian Splatting Quantisation and Acceleration Hardware

- Developing custom quantised hardware for 3D Gaussian Splatting in SystemVerilog with custom cocotb testbenches
- Implemented quantisation-aware training for 3DGS using PyTorch, achieving similar PSNR benchmarks to the official CUDA implementation
- Applied in-house compiler MASE's custom quantisers to evaluate the best quantisation scheme for hardware design

Imperial College London

Jul – Sept 2024

University Course FPGA Module Design

- Redesigned the 2nd year Information Processing module teaching content and lab practicals from scratch
- Introduced concepts of hardware-software codesign and embedded development with Verilog, C++ and Python
- Emphasized on practical skills development with the Xilinx toolchain and edge-computing applications

Imperial College London

Oct 2023 – Mar 2024

Undergraduate Teaching Assistant

- Taught Year 1 students in the EEE department for the Programming for Engineers module
- Guided students on learning fundamental C++ concepts and developing object-oriented programming skills

DiTa Limousine Limited 🏆

Jul – Sept 2023

Full-stack Web Developer

- Developed a responsive and interactive website using ReactJS and Framer Motion for the company website, which enhanced user engagement and contributed to a 50% increase in new limousine service bookings
- Hosted the website on a self-managed Ubuntu Virtual Private Server, gaining experience with the Linux shell and server management using NGINX

Projects

Graphics Processing Unit (TauriGPU) 🏆 | *SystemVerilog, Python, GLSL*

Jul 2024 – ongoing

- Developed an open-source programmable GPU compatible with OpenGL ES2 and Xilinx FPGAs
- In progress of building an LLVM backend for TauriGPU's ISA to enable GLSL compilation

Autonomous Balance Bot with Incident Management Platform 🏆 | *Python, ROS 2*

May – June 2024

- Led development of the autonomous navigation and physical incident detection system using SLAM and ROS 2
- Developed a Frontier-based exploration algorithm to enable autonomous exploration capabilities in completely unknown dynamic environments
- Physically implemented system on a Raspberry Pi 4 with a 2D LiDAR sensor and a camera

C90 to RISC-V Compiler 🏆 | *C++, RISC-V Assembly*

Dec – Mar 2024

- Developed a compiler with advanced features, e.g. N-dimensional array support and efficient memory management
- Placed 1st out of 48 teams, achieving 90% pass rate in seen and unseen test cases

FPGA Computer Vision Acceleration for ESP32 WiFi Car Racing System | *Xilinx, C++*

Feb – Mar 2024

- Built a commercializable hardware racing game with AWS cloud backend and implemented powerups using OpenCV
- Developed hardware IPs for local OpenCV acceleration on the PYNQ-Z1 FPGA using the Xilinx toolchain

Software-Hardware Low Latency Algorithmic Trading System with FPGA | *Xilinx, Python*

Feb 2024

- Utilised FPGA to accelerate moving average indicators to identify market opening convergence opportunities using the Xilinx toolchain
- Top 5 finalist at IC Hack 24's Optiver trading challenge out of 20+ teams, invited to present trading strategy to Optiver representatives

RISC-V CPU 🏆 | *SystemVerilog, C++, RISC-V Assembly*

Nov – Dec 2023

- Developed a single-cycle RISC-V 32I processor that runs all base instructions using SystemVerilog
- Implemented pipelining and direct-mapped cache to improve processing and memory access speed
- Placed 1st out of 24 teams in both quality of verification and codebase documentation

Technical Skills

Programming Languages: C, C++, Python, JavaScript, RISC-V Assembly

Hardware Description Languages: SystemVerilog, Verilog, VHDL

Toolchain: CUDA, OpenGL, PyTorch, Verilator, cocotb, ROS 2, NumPy, OpenCV, ReactJS, NGINX, Git, Conda

FPGA toolchain: Vivado, Vitis, Quartus Prime

Languages: English (native), Cantonese (native), Mandarin Chinese (working proficiency)