

# Kunlin Han

kunlinha@usc.edu | www.linkedin.com/in/kunlinhan/ | Github (Karl-Han) | Personal Website

## EDUCATION

- 
- |   |                                     |
|---|-------------------------------------|
| • <b>University of Southern California (USC)</b><br>Master of Electrical Engineering; GPA: 4.0/4.0          | Los Angeles, CA<br>12/2021-12/2023  |
| • <b>South China Normal University (SCNU)</b><br>Bachelor of Network Engineering; GPA: 3.78/4.0; Rank: 1/72 | Guangzhou, China<br>09/2017-06/2021 |

## SKILLS

---

**Programming Languages:** Python, C/C++, Verilog, VHDL, SystemVerilog, Java, Rust, SQL, x86 ASM

**Libraries:** Scrapy, BeautifulSoup, Requests, Pyrogram, Django

**EDA Tools:** Virtuoso, Spectre, QuestaSim, Calibre, Intel Quartus, Xilinx Vivado

**Protocols:** AXI, PCIe, MOESI

**Tools:** UNIX, Linux, VIM, Git, Docker, Makefile

## EXPERIENCE

- 
- |  |                                    |
|--|------------------------------------|
| • <b>CS Department, USC</b><br>Graduate Teaching Assistant | Los Angeles, CA<br>05/2022-08/2022 |
|--|------------------------------------|

## PROJECTS

- 
- |  |                 |
|--|-----------------|
| • <b>Tomasulo Out-of-order CPU</b>   | 06/2023-08/2023 |
| ◦ Implemented Issue Unit, 2-stage Dispatch Unit, Re-Order Buffer and FPGA-friendly Copy-Free Check Pointing, which restores FRAT with RRAT.  |                 |
| ◦ Integrated, synthesized and programmed the overall system on Xilinx Artix-7 FPGA board.  |                 |
| ◦ Validated the correctness of design with both simulation and on-ship logic analyzer (Chipscope).   |                 |
| • <b>512-bit 6T SRAM Array Design</b>  | 01/2023-05/2023 |
| ◦ Designed and drew layout of 1-bit SRAM cell, row/column decoders, sense amplifier, write driver, precharge circuit, latch and flip-flop with Cadence Virtuoso and GPDK 45nm.                                     |                 |
| ◦ Achieved the Read SNM of 210 mV and Write SNM of 395 mV by proper sizing with VDD=1V while minimizing the size of 1-bit SRAM cell.   |                 |
| ◦ Integrated components into 4 8x16-bit SRAM banks to construct a 512-bit SRAM Array with the area of 2208 nm <sup>2</sup> in 2.6 Ghz (cycle time=0.4 ns).   |                 |
| ◦ Measured the power consumption with Spectre, in which the average consumption for reading is 21.2 fJ, the average consumption for writing is 342 fJ and leakage is around 20 fJ.                                 |                 |
| ◦ Validate the functionality of all aforementioned components with vector in Spectre and clear DRC and LVS errors.   |                 |
| • <b>Extensible Asynchronous SNN Accelerator</b>   | 01/2023-05/2023 |
| ◦ Designed extensible asynchronous SNN accelerator in SystemVerilog with SystemVerilogCSP library on a 5x5 filter and 25x25 ifmap with stride=1.   |                 |
| ◦ Implemented fork-join computation module that can calculate part of the overall computation with pre-configured parameter for extensibility.   |                 |
| ◦ Integrated computation modules with two memory modules, which contain filter map and ifmap respectively, on a mesh network.  |                 |
| ◦ Verified correctness of computation module and the accelerator separately with timestep=2 in QuestaSim.  |                 |
| • <b>Full-Custom Design Layout of Arbiter System with Multiplier and Divider</b>   | 11/2022-12/2022 |
| ◦ Designed, implemented and drew layout of a ALU supporting 5-bit multiplication and 10-bit division and a 2-1 Round-Robin-based Arbiter with multiply and divide request with the Cadence Virtuoso and GPDK 45nm. |                 |
| ◦ Planned, routed and simulated all aforementioned components with Cadence Virtuoso and Spectre and clear DRC and LVS errors with Mentor Graphics Calibre.   |                 |

## LEADERSHIP AND INVOLVEMENT

- 
- |   |                                     |
|---|-------------------------------------|
| • <b>Hope Center, Reality L.A.</b><br>Volunteer                       | Los Angeles, CA<br>03/2022-08/2022  |
| • <b>Network Club, SCNU</b><br>Vice President of Technical Department | Guangzhou, China<br>09/2017-06/2019 |