Sunwoo Kim

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Summary

ECE student focused on innovating computing system design with heterogeneous architecture (graduating Feb 2025).

Education

Seoul National University, BS in Electrical and Computer Engineering, **cum laude** — Mar 2019 to Feb 2025

- **Coursework:** Computer Architecture, Operating System, Electronic Circuits, Algorithms

*18 mo ROK Army

Seoul Science High School, One of the most prestigious STEM high schools in Korea. — Mar 2016 to Feb 2019

Publications

G^3SA: A GPU-Accelerated Gold Standard Genetics Library for End-to-End Sequence Alignment, (submitted to a top-tier systems conference; under review) — Oct 2024

- Co-lead author, anonymous. Reference available upon request.

Awards & Honors

Fulbright Award for Graduate Studies, $40000 to $90000 (confirmed upon admission) — Sep 2024

- US and ROK governments, supporting graduate studies in the US.

Presidential Science Scholarship, Full tuition and stipend each semester — Mar 2019

- ROK government, 160 freshmen each year based on merit nationwide.

Semiconductor Specialization Scholarship, $6000 to $11000 (confirmed upon graduation) — Sep 2023

- SNU, top 20% of 450 applicants from related majors.

Best Project Award, Introduction to Circuit Theory and Laboratory — Jun 2022

- SNU ECE, a top 4 project in the core sophomore course that year.

Teaching & Leadership

Undergraduate Tutor — Mar 2022 to Jun 2024

- **Algorithms**: offered 4 office hours every week for ECE students for a semester.
- **Calculus**: offered 2 office hours every week for STEM students for 3 semesters.

President, College of Engineering Christian Society — Sep 2022 to Dec 2024

- Organized diverse events for students and professors: international religious service, volunteer trip, club fair.

Squad Leader, Capital Corps, ROK Army — 2021

- Supervised the well-being of squad members in the barracks and during training.

Research & Academic Experience

Accelerating Genetics Software with GPUs — Jan 2024 to Dec 2024

- Ported BWA-MEM sequence aligner to CUDA and identified a unique bottleneck caused by random global memory accesses.
- Optimized string matching algorithm, achieving up to 2x speedup. Extended thesis work; under review.

Analog Computing Fourier Series — Apr 2022 to Jun 2022

- Designed, simulated and taped out on PCB an op-amp differentiator based computing unit for inverse Fourier transform.
- Presented as a team project for core sophomore course in electrical circuits, Awarded the top 4 project that year.

Systems and Architecture Course Projects — Sep 2021 to Dec 2024

- Extended the xv6 kernel with features including the ULE scheduler, Linux ZSwap, and full path-indexed file systems.
- Designed and implemented a pipelined MIPS-like CPU and a systolic array-based NPU using Verilog and FPGA.
- Developed compilers: a syntax-directed translator with Bison for a C subset and an interpreter for a simplified Scheme.
- Experienced in parallel programming with CUDA and OpenMP.

Technical Skills & Languages

Hardware Design: Verilog, FPGA, SPICE simulation

System Programming: C/C++, CUDA, Make, Python, Bash

Languages: English (Fluent: TOEFL R30 L29 S24 W26), Korean (Native)