

Hyounghoo Kim

hyounghoo@cmu.edu

<https://hyounghook.github.io>



RESEARCH INTERESTS

I'm interested in designing **Software Systems** for **Heterogeneous Devices**.
My current research is designing **Databases** for **Processing-in-Memory**. Previously, I have worked on Machine Learning Systems and GPU clusters.

EDUCATION

- **Carnegie Mellon University**, Pittsburgh, Pennsylvania 2023 - Present
Ph.D. Student in Computer Science
Advisor: Phillip B. Gibbons
- **Seoul National University**, Seoul, Korea 2017 - 2023
B.S. in Electrical and Computer Engineering
Advisor: Jangwoo Kim
GPA: 4.28/4.3 (2nd/148)
The period includes two years of mandatory military service in South Korea.

PUBLICATIONS

- Taebum Kim, **Hyounghoo Kim**, Gyeong-In Yu, Byung-Gon Chun
BPIPE: Memory-Balanced Pipeline Parallelism for Training Large Language Models
International Conference on Machine Learning (ICML), 2023 (Oral Presentation)
- **Hyounghoo Kim**
Modeling the GPU Instruction Scheduling Performance using Microbenchmarks
Bachelor's Thesis, Seoul National University, 2023 (Advised by Jangwoo Kim)

RESEARCH AND WORK EXPERIENCES

- **Parallel Data Lab**, Pittsburgh, Pennsylvania 2023 - Present
Graduate Research Assistant
 - *PIM-Friendly Database*: (In Progress) Designing fast and efficient DBMS for Processing-in-Memory Systems
- **FriendliAI**, Seoul, Korea 2022 - 2023
Research Intern
 - *BPIPE*: Accelerating the training of LLMs by rebalancing memory utilizations
 - *GPU Kernel Optimization*: Optimized CUDA kernels for training LLMs
- **High Performance Computer System Lab**, Seoul, Korea 2021
Undergraduate Thesis Project Student
 - *GPUDiag*: Modeling GPGPU microarchitecture using automated microbenchmarks
 - *Multi-GPU gem5*: Extend gem5-APU to support multiple GPUs
- **Geolux**, Seoul, Korea 2017 - 2018
Software Engineering Intern
 - *Pothole Detector*: Trained AI models to detect potholes from driveway videos

HONORS AND AWARDS

- Overseas PhD Scholarship, Korea Foundation for Advanced Studies (KFAS) *2023 - 2028*
- The Presidential Science Scholarship, Korea Student Aid Foundation *2017 - 2023*
- Gold Medal, International Physics Olympiad (IPhO) *2016*
- Silver Prize, Samsung Humantech Paper Award (for high school students) *2016*

INTRA- AND EXTRACURRICULAR PROJECTS

- *Query Execution Engine* for OLAP Database Systems *Spring 2024*
- *Cache Simulator* for x64 binaries using pintool *Fall 2023*
- *Linux Kernel Hacking* to implemenent custom scheduler, lock, and file system *Spring 2022*
- *Compiler Frontend* for custom grammar rules using lex and yacc *Fall 2021*
- *CNN Accelerator* that can process conv, fc, and maxpool using Verilog and FPGA *Fall 2021*
- *CPU Simulator* for pipelined CPU with branch predictor and cache using Verilog *Spring 2019*
- *IoT System* on the car fender that alarms the driver of safety incidents *2019*
- *IoT System* in the billiards ball that evaluates the cueing accuracy *2018*
- *3D Territory Game* that adds 3D graphics to the given game logic *Spring 2018*
- *Robotic Car* that follows the path and escape from the maze *Fall 2017*
- *Robotic Arm* that mimics human arm movement *2017*
- *Robotic Arm* using thermally-driven super-coiled-nylon artificial muscles *2015 - 2016*

TEACHING EXPERIENCES

- Teaching Assistant - Seoul National University, “Operating Systems” *Spring 2023*

SKILLS

- C, C++, Python, CUDA, Verilog, Java, Linux Kernel, PostgreSQL, PyTorch, ZSim
- Computer Architecture and Simulation, Databases, GPUs, Machine Learning Systems, Operating Systems, Processing-in-Memory
- TOEFL (R30/L28/S23/W28), GRE (V164/Q170/A4.0)