Hyoungjoo Kim

hyoungjoo@cmu.edu https://hyoungjook.github.io

Research Interests

My research designs **Database Systems** for **Hardware Accelerators** (**PIM**, **GPU**, **CXL**, ...).
In general, I am interested in using the Accelerators to re-design Data-Intensive Software Systems.

Education

- **Carnegie Mellon University**, Pittsburgh, Pennsylvania *2023 - Present*
  Ph.D. Student in Computer Science
  Advisor: Phillip B. Gibbons; closely worked with Andrew Pavlo
- **Seoul National University**, Seoul, Korea *2017 - 2023*
  B.S. in Electrical and Computer Engineering
  Advisor: Jangwoo Kim; closely worked with Byung-Gon Chun
  GPA: 4.28/4.3 (Summa Cum Laude)
  The period includes two years of mandatory military service in South Korea.

Publications

- Hyoungjoo Kim, Yiwei Zhao, Andrew Pavlo, Phillip B. Gibbons
  No Cap, This Memory Slaps: Breaking Through the Memory Wall of Transactional Database Systems with Processing-in-Memory
  Proceedings of the VLDB Endowment, 2025 [Slides] [Poster] [Blog]
- Taebum Kim, Hyoungjoo 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)

Research and Work Experience

- **Microsoft**, Redmond, Washington *Summer 2024, 2025*
  Research Intern
  - Analytic query processing on GPUs
  - Vector index for GPUs
- **Parallel Data Lab** & **CMU Database Group**, Pittsburgh, Pennsylvania *2023 - Present*
  Graduate Research Assistant
  - OLTPim: Fast and efficient OLTP on Processing-in-Memory *(VLDB 2025)*
- **FriendliAI**, Seoul, Korea *2022 - 2023*
  Research Intern
  - BPipe: Accelerating LLM training by rebalancing memory utilizations *(ICML 2023)*
- **High Performance Computer System Lab**, Seoul, Korea *2021*
  Undergraduate Intern
  - GPUDiag: Modeling GPU microarchitecture using automated microbenchmarks [Report]
- **Geolux**, Seoul, Korea *2017 - 2018*
  Software Engineering Intern
  - Training AI models to detect potholes from driveway videos

Honors and Awards

- Northrop Grumman Fellowship - Computer Science *2024 - 2025*
- Overseas PhD Scholarship, Korea Foundation for Advanced Studies (KFAS) *2023 - 2028*
- Summa Cum Laude, College of Engineering at Seoul National University *2023*
- The Presidential Science Scholarship, Korea Student Aid Foundation (KOSAF) *2017 - 2023*
- Gold Medal, International Physics Olympiad (IPhO) *2016*
- Silver Prize, Samsung Humantech Paper Award *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 impelement 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*
- 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 arm that mimics human arm movement *2017*
- Robotic arm using thermally-driven super-coiled-nylon artificial muscles *2015 - 2016*

Teaching Experience

- Teaching Assistant, 15-445 “Intro Database Systems”, Carnegie Mellon University *Spring 2025*
- Teaching Assistant, “Operating Systems”, Seoul National University *Spring 2023*

Skills

- C, C++, Python, CUDA, Verilog, Linux Kernel, SQL, PyTorch, ZSim
- Computer Architecture, Database Systems, High-Performance Computing, Machine Learning Systems, Operating Systems