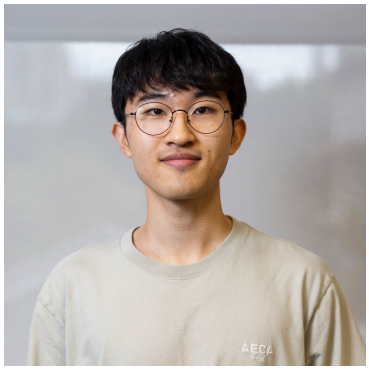

Hyoungjoo Kim

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https://hyoungjook.github.io

Research Interests

I'm currently working on designing Databases for Processing-in-Memory Systems.
In general, I'm interested in **Software Systems & Architecture** for **Heterogeneous Devices**; e.g.

- Database Systems for Processing-in-Memory
- Machine Learning Systems for 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.

Honors and Awards

- Overseas PhD Scholarship, Korea Foundation for Advanced Studies (KFAS) *2023 - 2028*
- The Presidential Science Scholarship, Korea Student Aid Foundation (KOSAF) *2017 - 2023*
  - Tuition + 20M KRW (∼20K USD), 4 years
- Gold Medal, International Physics Olympiad *2016*
- Silver Prize, Samsung Humantech Paper Award (for high school students) *2016*
  - 5M KRW (∼5K USD)

Publications

- 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)*
- **Hyoungjoo Kim**
  Modeling the GPU Instruction Scheduling Performance using Microbenchmarks
  Bachelor's Thesis, Advised by Jangwoo Kim, *Seoul National University*, 2023 [Paper]

Research and Work Experiences

- **Parallel Data Lab**, Pittsburgh, Pennsylvania *2023 - Present*
  Graduate Research Assistant
  - (In Progress) *PIM-Friendly Database*: Designing fast and efficient DBMS for Processing-in-Memory Systems

- **FriendliAI**, Seoul, Korea *2022 - 2023*
  Research Intern, Part-time
  - *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, Full-time, Only on summer/winter breaks
  - *Pothole Detector*: Trained AI models to detect potholes from driveway videos

Intra- and Extracurricular Projects

- *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*
- Some Javascript games that runs on browser-only PCs in the Korean Army ;-) *2019 - 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
- Computer Architecture, Databases, GPUs, Machine Learning Systems, Operating Systems, Simulation
- English: TOEFL (R30/L28/S23/W28), GRE (V164/Q170/A4.0)