

# Hyoungjoo Kim

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<https://hyoungjook.github.io>



## RESEARCH INTERESTS

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I'm interested in designing **Database Systems** for **Novel Hardware**s.

My current research explores the potential of **Processing-in-Memory** on **Transaction Processing** by pushing code towards data. I have also worked on other Databases (Analytical, Vector), Machine Learning Systems, and GPUs.

## EDUCATION

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

## PUBLICATIONS

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- 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
- 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, Seoul National University*, 2023 (Advised by Jangwoo Kim)

## RESEARCH AND WORK EXPERIENCE

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- **Parallel Data Lab & CMU Database Group**, Pittsburgh, Pennsylvania *2023 - Present*  
Graduate Research Assistant
  - OLTPim: Fast and efficient OLTP on Processing-in-Memory (VLDB 2025)
- **Microsoft**, Redmond, Washington *Summer 2024, 2025*  
Research Intern
  - Query processing on GPUs
  - Vector index for GPUs
- **FriendlyAI**, Seoul, Korea *2022 - 2023*  
Research Intern
  - BPipe: Accelerating the training of LLMs by rebalancing memory utilizations (ICML 2023)
  - Optimizing GPU kernels for training LLMs

- **High Performance Computer System Lab**, Seoul, Korea 2021  
Undergraduate Thesis Project Student
  - GPUDiag: Modeling GPU microarchitecture using automated microbenchmarks
  - Extending gem5-APU to support multiple GPUs
- **Geolux**, Seoul, Korea 2017 - 2018  
Software Engineering Intern
  - Training AI models to detect potholes from driveway videos

## HONORS AND AWARDS

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- Northrop Grumman Fellowship - Computer Science 2024 - 2025
- Overseas PhD Scholarship, Korea Foundation for Advanced Studies (KFAS) 2023 - 2028
- 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

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- Query execution engine for OLAP database systems Spring 2024
- Cache simulator for x64 binaries using pintool Fall 2023
- Linux kernel hacking to implelement 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 EXPERIENCE

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

## SKILLS

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- C, C++, Python, CUDA, Verilog, Linux Kernel, SQL, PyTorch, ZSim
- Computer Architecture and Simulation, GPUs, Machine Learning Systems, Memory Systems, Operating Systems, System Programming
- Database Systems: Analytics, Transactions, Vector Indexes