

DONGHYUN SOHN

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EDUCATION

Northwestern University

Evanston, IL, United States

Ph.D. in Computer Science

Sep. 2022 - Present

- Advisor: Jennie Rogers

Sogang University

Seoul, Republic of Korea

B.S. in Computer Science and Engineering

Mar. 2016 - Aug. 2021

- Summa Cum Laude (2 years of military service included)

EXPERIENCE

Graduate Research Assistant, Northwestern University

Evanston, IL, United States

Sep. 2022 - Present

- Introduced Alchemy, a protocol-agnostic optimization framework for privacy-preserving query processing, combining traditional optimization techniques with circuit-aware cost modeling. Achieved up to $100\times$ speedups in secure query execution across multiple cryptographic protocols.
- Designed a cost-aware optimizer for secure SQL workloads, cost models with ML-based runtime prediction. Incorporated AWS instance-specific hardware characteristics to guide performance- and cost-efficient instance selection.
- Integrated OpenFHE into the database query pipeline, enabling encrypted SQL execution over real-world queries and applying SW/HW co-optimization strategies to accelerate performance.

Undergraduate Research Intern, Sogang University

Seoul, Republic of Korea

Aug. 2020 - Dec. 2021

- Combined a disk-based Clustering Feature (CF) tree with a buffer, overcoming BIRCH's memory limitations and improving clustering quality for large-scale datasets
- Enhanced clustering performance and consistency by reducing disk I/O through selective buffering, achieving up to 7% improvement in purity and recall across diverse datasets

PUBLICATIONS

1. **Donghyun Sohn**, Kelly Jiang, Nicolas Hammer, Jennie Rogers, "Alchemy: A Query Optimization Framework for Oblivious SQL," *Proceedings of the VLDB Endowment*, 2025.
2. **Donghyun Sohn**, Xiling Li, Jennie Rogers, "Everything You Always Wanted to Know About Secure and Private Database Systems (but were Afraid to Ask)," *Data Engineering Bulletin*, 2023. [Paper]
3. **Donghyun Sohn**, Sungwon Jung, "Disk-based BACF Tree for Clustering Massive Datasets," *Korea Software Congress*, 2021. [Paper] [Code]
4. **Donghyun Sohn**, Jinwon Jung, Hyungjoon Kwon, Donghyuk Jeong, Dayoung Yoon, Myungwan Koo, "A Real-Time Monitoring System Using OpenPose," *Korea Software Congress*, 2021. (Excellence Prize) [Paper]

SERVICES

Program Committee Member: SIGMOD 2024 Availability & Reproducibility Initiative (ARI)

TEACHING EXPERIENCES

Teaching Assistant, Northwestern University

- COMP_SCI 339: Intro to Database Systems

Fall. 2023, 2024

SKILLS

C, C++, Java, Python, SQL, AWS, AWS, Docker, Ubuntu, EMP-Toolkit, OpenFHE