DONGHYUN SOHN

224-204-4582 ◇ Evanston, IL, United States
donghyun.sohn@u.northwestern.edu ◇ linkedin.com/in/bulelion37 ◇ https://donghyun-sohn.github.io

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× 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 Availability & Reproducibility Initiative (ARI) — 2024, 2025

Teaching Assistant, Northwestern University
COMP_SCI 339: Intro to Database Systems — Fall 2023, 2024

SKILLS

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