DONGHYUN SOHN

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EDUCATION

Northwestern University — Evanston, IL, United States
Ph.D. in Computer Science — Sep. 2022 - Aug. 2027

- 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 oblivious query processing, combining traditional optimization techniques with circuit-aware cost modeling. Achieved up to 100× speedups in secure query execution across multiple cryptographic protocols.
- Built a cost-predictive optimizer using gate-based cost models and ML-driven runtime/cost prediction on AWS, enabling instance selection that balances performance and cloud expense for secure SQL workloads.
- Integrated OpenFHE into the database query pipeline and explored HW/SW co-design to accelerate secure query exeuction.

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.

3. **Donghyun Sohn,** Sungwon Jung, "Disk-based BACF Tree for Clustering Massive Datasets," *Korea Software Congress*, 2021.

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)

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, AWS EC2, Ubuntu, Docker