Seonyoung Cheon

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Education

Yonsei University, Integrated M.S./Ph.D. in Electrical and Electronic Engineering   September 2021 – present
- Coursework: Compiler Design, System Security, AI Accelerator, Microarchitecture, etc

Yonsei University, Bachelor in Electrical and Electronic Engineering   March 2017 – August 2021
- Coursework: Computer Architecture, Microprocessor, Operating Systems, Information Security, etc

Experience

Research Assistant, Compiler Optimization Research Lab – Advisor: Hanjun Kim   Sept 2021 – Present
- Developing a loop structure for FHE and designing a compiler pass to optimize performance (ASPLOS 2025)
- Designing an automatic bootstrapping management compiler for efficient FHE (USENIX Security 2024)
- designing a rescale placement policy to optimize performance and error using an estimated model (ASPLOS 2024, USENIX Security 2023, CGO 2022)
- Developing a compiler for privacy-aware partitioned programs in cloud-edge environments (IEEE IoT 2024)

Undergraduate Research Assistant, Compiler Optimization Research Lab   Sept 2020 – August 2021
- Developing privacy-preserving machine Learning programs
- Accelerating homomorphic encryption operations using CUDA programming (PACT SRC 2022)

Software Engineer Intern, Security Platform Team, LG CNS – Seoul, Korea   July 2020 – Aug 2020
- Developing security vulnerability diagnosis solution for AWS elastic container service (Part of 'Cloud Assessment Tool' project)

Exchange Student, Sacramento State University – Sacramento, California   June 2019 – Aug 2019
- Participating in various activities such as english discussion and presentation

Publications

Referred International Conference

1. ***Seonyoung Cheon***, Yongwoo Lee, Hoyun Youm, Dongkwan Kim, Sungwoo Yun, Kunmo Jeong, Dongyoon Lee, and Hanjun Kim, "HALO: Loop-aware Bootstrapping Management for Fully Homomorphic Encryption," in Proceedings of the 30th ACM International Conference on Architectural Support for Programming Languages and Operating Systems 2025 (ASPLOS), March 2025.

2. ***Seonyoung Cheon***, Yongwoo Lee, Dongkwan Kim, Ju Min Lee, Sunchul Jung, Taekyung Kim, Dongyoon Lee, and Hanjun Kim, "DaCapo: Automatic Bootstrapping Management for Efficient Fully Homomorphic Encryption," in 33rd USENIX Security Symposium (USENIX Security), August 2024.

3. Yongwoo Lee, ***Seonyoung Cheon***, Dongkwan Kim, Dongyoon Lee, and Hanjun Kim, "Performance-aware Scale Analysis with Reserve for Homomorphic Encryption," in Proceedings of the 29th ACM International Conference on Architectural Support for Programming Languages and Operating Systems 2024 (ASPLOS), April 2024.

4. Yongwoo Lee, ***Seonyoung Cheon***, Dongkwan Kim, Dongyoon Lee, and Hanjun Kim, "ELASM: Error-Latency-Aware Scale Management for Fully Homomorphic Encryption," in 32nd USENIX Security Symposium (USENIX Security), August 2023.

5. Yongwoo Lee, Seonyeong Heo, ***Seonyoung Cheon***, Shinnung Jeong, Changsu Kim, Eunkyung Kim, Dongyoon Lee, and Hanjun Kim, "HECATE: Performance-Aware Scale Optimization for Homomorphic Encryption Compiler," in Proceedings of the 2022 International Symposium on Code Generation and Optimization (CGO), April 2022.

Referred International Journal

1. Dongkwan Kim, Yongwoo Lee, *Seonyoung Cheon*, Heelim Choi, Jaeho Lee, Hoyun Youm, Dongyoon Lee, and Hanjun Kim, "Privacy Set: Privacy Authority-Aware Compiler for Homomorphic Encryption on Edge-Cloud System," in IEEE Internet of Things Journal, August 2024.

Referred International Poster

1. Dongkwan Kim, Yongwoo Lee, *Seonyoung Cheon*, Heelim Choi, Jaeho Lee, Dongyoon Lee, and Hanjun Kim, "Privacy Authority-Aware Compiler for Homomorphic Encryption on Edge-Cloud," in 32nd USENIX Security Symposium - (Poster) (USENIX Security), August 2023.

2. *Seonyoung Cheon*, and Hanjun Kim, "Accelerating Homomorphic Encryption Operations in SEAL with GPU," in Student Research Competition in 32nd International Conference on Parallel Architectures and Compilation Techniques (PACT), October 2022.

Recognition

ASPLOS/EuroSys 2025 Contest Track Award Thrid Place (AWS)   March 2025
    Contest on "Optimized Neuron Kernel Inference (NKI) Implementation of Llama 3.2 1B (Inference)"

Best Poster Award: Silver Prize (ASPLOS'25 Paper)   February 2025
    KIISE Computer System Society Winter Workshop

Merit Academic Paper Award (Security'24 Paper)   January 2025
    Yonsei University, Electrical and Electronic Engineering

Outstanding Graduate Student   January 2025
    Yonsei University, Electrical and Electronic Engineering, 5 Students Selected

The 30th Humantech Paper Awards: Silver Prize (Security'24 Paper)   February 2024
    Samsung Electonics Co., 2nd in Computer Science out of 1,158 submissions

Best Poster Award (Security'24 Paper)   January 2024
    KIISE Computer System Society Winter Workshop, 5 Posters Selected (Top 5)

Grand Prize (FHE Compiler for Privacy-preserving Machine Learning)   September 2023
    ICT Challenge hosted by Ministry of Science and ICT, Republic of Korea, 2nd of 79 teams

Scholarship Student   September 2017 - June 2021
    YUHA PUREUN foundation, Full Scholarship for all 4 years

Honors and Awards - Honors (Academic Excellence Award)
    Yonsei University (Spring 2018, Fall 2017, Spring 2017)

Activities

International Conference Committee
- Artifact Evaluation Committee: Languages, Compilers, Tools and Theory of Embedded Systems (LCTES), June 2023
- Artifact Evaluation Committee: USENIX Security Symposium, 2025

International Journal Reviewer
- Reviewer, IEEE Transactions on Dependable and Secure Computing (TDSC), April 2024

Teaching

Teaching Assistant
- IR Analysis and Transformation with LLVM, SNU Samsung Research Center, September 5-6, 2024
- IR Analysis and Transformation with LLVM, SNU Samsung Research Center, Aug 31 - Sept 1, 2023