

Yongwoo Lee

Curriculum Vitae

CONTACT INFORMATION

School of Electrical and Electronic Engineering
Yonsei University
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EDUCATION

Yonsei University, Seoul, Republic of Korea
M.S./Ph.D. Student, March 2019 to Present
Advisor: Prof. Hanjun Kim
Co-advisor: Prof. Dongyoon Lee

Pohang University of Science and Technology (POSTECH), Pohang, Republic of Korea
Bachelor of Science in Computer Science and Engineering, February 2019
Research Project: "Control-flow obfuscation to mitigate cache-based side channel attack"
Advisor: Prof. Hanjun Kim
Research Project: "Modified Mask R-CNN"
Advisor: Prof. Suha Kwak

Seoul Science High School (SSHS), Seoul, Republic of Korea
Graduate, February 2015

EXPERIENCE

Research Assistant, March 2019 to Present
Compiler Research Laboratory (Corelab), *Yonsei University*, Seoul, Republic of Korea

- Parameter optimization for homomorphic encryption compiler (CGO'22)
- Usable homomorphic encryption compiler (IoT-J'21)
- High Level Synthesis for cryptography accelerator (FPGA'20, DAC'20(Poster))

Undergraduate Research Assistant, July 2017 to June 2018
Compiler Research Laboratory (Corelab), *POSTECH*, Pohang, Republic of Korea

- Compiler-based mitigation for architectural side channel attack
- Data lifetime management in mobile cloud computing.

Student Mentor, Spring 2017, Fall 2017, Spring 2018, and Fall 2018
Computer Science and Engineering, *Pohang University of Science and Technology (POSTECH)*, Republic of Korea

- Programming and Problem solving
- Microprocessor Application and Assembly Programming
- Programming Languages
- Operating Systems

Undergraduate Student Intern, July to August 2016
Center for Imaging Media Research, *Korea Institute of Science and Technology (KIST)*, Seoul, Republic of Korea

- Developing a program for collecting, analyzing, and visualizing real estate informations.

Research and Education, March to December 2013
Department of Mechanical Engineering, *Korea University*, Seoul, Republic of Korea

- Studying the structural characteristic of polymorphic hIAPP fibrils via constant force steered molecular dynamics simulations.
- Lee, Myeongsang and Chang, Hyun Joon and Kim, Donghoi and Lee, Yongwoo and Suh, Heesu and Ahn, Namjo and Yoon, Gwonchan and Na, Sungsoo. "Relationship between structural composition and material properties of polymorphic hIAPP fibrils" in *Biophysical Chemistry*, April 2015.
IF=2.57, SCI-E, Q2(JCR 2015)

RECOGNITION

- The National Scholarship for Science and Engineering, 2015 to 2019

ACTIVITIES

DOMESTIC CONFERENCE ORGANIZING ASSISTANT

- Local Arrangements Assistant, KIISE Computer System Society Winter Workshop, January 2019
- Local Arrangements Assistant, KIISE Computer System Society Winter Workshop, January 2018

UNDERGRADUATE EXPERIENCE IN EXTRACURRICULAR ACTIVITIES

- Member of the Booth Management Team, POSTECH Festival Arrangement Committee, April to May 2015

TEACHING

- EEE 2020: Data Structure and Algorithms
Teaching Assistant, Yonsei University, Spring 2021
Teaching Assistant, Yonsei University, Spring 2019
- EEE 3540: Microprocessor
Teaching Assistant, Yonsei University, Fall 2020
- IR Optimization with LLVM
Teaching Assistant, Samsung Electronics, November 15, 2021
Teaching Assistant, SNU Samsung Research Center, July 22-23, 2021
Teaching Assistant, SNU Samsung Research Center, August 21, 2020
(Teaching how to write LLVM passes for program analysis and optimization)

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

- [1] Bongjun Kim, Seonyeong Heo, Jaeho Lee, Shinnung Jeong, Yongwoo Lee, and Hanjun Kim, "Compiler-assisted Semantic-aware Encryption for Efficient and Secure Serverless Computing," in *IEEE Internet of Things Journal*, April 2021.
IF=9.936, Q1 (JCR 2019)

REFEREED CONFERENCE PUBLICATIONS

- [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," to appear 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," to appear in *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] Shinnung Jeong, Yongwoo Lee, Jaeho Lee, Heelim Choi, Seungbin Song, Jinho Lee, Youngsok Kim, and Hanjun Kim, “Decoupling Schedule, Topology Layout, and Algorithm to Easily Enlarge the Tuning Space of GPU Graph Processing,” in *31st International Conference on Parallel Architectures and Compilation Techniques (PACT)*, October 2022.
- [6] 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.
- [7] Changsu Kim, Shinnung Jeong, Sungjun Cho, Yongwoo Lee, William Song, Youngsok Kim, and Hanjun Kim, “Thread-Aware Area-Efficient High-Level Synthesis Compiler for Embedded Devices,” in *Proceedings of the 2021 International Symposium on Code Generation and Optimization (CGO)*, March 2021.

REFEREED POSTER PUBLICATIONS

- [8] 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.
- [9] Changsu Kim, Yongwoo Lee, Shinnung Jeong, and Hanjun Kim, “Logic Deduplication with Decentralized Pointer Analysis in HLS for Post-Quantum Cryptography Algorithms,” in *Proceedings of the 57th Annual Design Automation Conference 2020 - (Poster) (DAC)*, July 2020.
- [10] Changsu Kim, Yongwoo Lee, Shinnung Jeong, Wen Wang, Jakub Szefer, and Hanjun Kim, “Pipeline-aware Logic Deduplication in High-Level Synthesis for Post-Quantum Cryptography Algorithms,” in *Proceedings of the 2020 ACM/SIGDA International Symposium on Field-Programmable Gate Arrays (FPGA)*, February 2020.

PATENTS

- [11] Hanjun Kim, Bongjun Kim, Jaeho Lee, Seonyeong Heo, Shinnung Jeong, and Yongwoo Lee, “IoT Service Providing Method Based on Adaptive Encryption and IoT Apparatus,” KR Patent Number 10-2508448-0000, March 2024.
- [12] Hanjun Kim, Yongwoo Lee, Seonyoung Cheon, and Dongkwan Kim, “System and Method of Homomorphic Encryption Based on Scale Optimization,” KR Patent App. 10-2024-0008916, January 2024.
- [13] Hanjun Kim, Youngsok Kim, Changsu Kim, Shinnung Jeong, Yongwoo Lee, Sungjun Cho, and William Song, “High-Level Synthesis Method and Apparatus for Hardware Optimization,” KR Patent App. 10-2022-0023420, February 2022.