Bongjun Kim

Curriculum Vitae

Contact Information

Computing S/W TU (System Research Center)
Samsung Advanced Institute of Technology
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Education

Pohang University of Science and Technology (POSTECH), Pohang, Republic of Korea
Doctor's Degree in Computer Science and Engineering, March 2016 - August 2021
Thesis: "Semantic-aware Automatic Program Partitioning and Privacy-preserving Selective Encryption for Fog Computing"
Advisor: Prof. Hanjun Kim and Prof. Jong Kim

Pohang University of Science and Technology (POSTECH), Pohang, Republic of Korea
Bachelor's Degree in Computer Science and Engineering, March 2009 to Febrary 2016

Experience

Staff Researcher, September 2021 to Present
Computing S/W TU, *Samsung Advanced Institute of Technology (SAIT)*, Suwon-si, Republic of Korea

- Developing a universal deep learning compiler targeting diverse architectures, with a specific focus on memory-centric systems containing processing-in-memory or processing-near-memory.

Research Assistant, March 2016 to August 2021
Compiler Research Laboratory (Corelab), *POSTECH / Yonsei University*, Republic of Korea

- Developing compiler-runtime framework to improve programmability in IoT programming (IEEE MICRO'16, LCTES'17)
- Developing compiler-runtime framework that automatically partitions cloud-centric IoT services for fog computing (CC'19)
- Designing scheduling algorithms for real-time decision making in IoT systems (RTAS'20)
- Developing composable and flexible resource management IoT framework (IEEE IoT-J'20)
- Developing encryption-based privacy-preserving cloud computing framework (IEEE IoT-J'21)
- Developing correlation extraction for detecting device fault in IoT systems (EMSOFT'21)

Research Intern, September 1, 2019 to January 31, 2020
Samsung Advanced Institute of Technology, Suwon-si, Republic of Korea

- Developing compiler for server-scale many-core NPUs
- Mentor: Jinseong Kim

Undergraduate Research Assistant, March 2014 to February 2016
Compiler Research Laboratory (Corelab), *POSTECH*, Pohang, Republic of Korea

- Developing JavaScript web worker offloading on the Blink web engine and V8 compiler

Recognition

- Silver Medal, Graduate Student Research Competition at International Symposium on Code Generation and Optimization (CGO), February 2020
- Best Oral Presentation Award, Student Workshop at Department of Computer Science and Engineering (POSTECH), September 2016
- Winner of Broadcasting and Press Section, Web Award at Korea Internet Professional Association (KIPFA), 2014

Projects

- Compiler Design for Many-core Data-center NPUs, Samsung Electronics, September 2019 to August 2020
  (Developing compiler for server-scale many-core NPUs based on MLIR)
- Ransomware Attack Detection and Recovery Using Intrinsic Properties, Institute for Information and communications Technology Promotion (IITP), May 2018 to January 2021
  (Developing Ransomware Attack Detection and Recovery on Linux Kernel Driver)
- Compiler Design for Homomorphic Encryption, Samsung SDS, February 2020 to November 2020
  (Developing Homomorphic Encryption Compiler based on MLIR)
- Memory-Centric Accelerator Systems for Scalable and Energy-Efficient Deep Learning, Samsung Research Funding Center of Samsung Electronics, September 2017 to August 2020
  (Developing Compiler for Processor-In-Memory Systems)
- Study on Intermediate Representation-based Execution Environment for Malware Binary Analysis, National Security Research Institute (NSR), April 2018 to October 2018
  (Conducting Comparative Study on Intermediate Representation-based Execution Environment)
- Context-Aware Unified IoT Plaform for Security and Privacy, Samsung Research Funding Center of Samsung Electronics, October 2014 to September 2017
  (Developing Unified Virtual Address System to Improve IoT Programmability)
- Mobile Cloud Infrastructure, Samsung Electronics, July 2013 to December 2015
  (Developing Android Application Profiler for Offloadable Native Code Analysis)

Activities

International Conference Artifact Evaluation

- Artifact Evalution Committee, International Symposium on Code Generation and Optimization (CGO), 2019

International Journal Reviewer

- Reviewer, Cluster Computing, 2024
- Reviewer, IEEE Transactions on Cloud Computing (TCC), 2021

International Journal Sub-reviewer

- Sub-reviewer, IEEE MICRO, 2019

International Conference Sub-reviewer

- Sub-reviewer, The 27th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), 2021
- Sub-reviewer, The International Conference on Code Generation and Optimization (CGO), 2021
- Sub-reviewer, The 26th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA), 2020
- Sub-reviewer, The 37th IEEE International Conference on Computer Design (ICCD), 2020
- Sub-reviewer, IEEE International Symposium on Workload Characterization (IISWC), 2018

Domestic Conference Organizing Assistants

- Local Arrangements Assistant, The KIISE Computer Systems Winter Workshop, January 2019
- Local Arrangements Assistant, The KIISE Computer Systems Winter Workshop, January 2018
- Local Arrangements Assistant, The KIISE Computer Systems Winter Workshop, January 2017

Teaching

- LLVM Compiler Tutorial on Program Analysis and Optimization
  Lecturer, LIG Nex1, 27 Feburary 2018
  (Teaching how to write LLVM passes for program analysis and optimization)

- CSED 423: Compiler Design
  Teaching Assistant, Spring 2017
  (Teaching weekly lab classes about compiler implementation and grading lab assignments)
- CSED 312: Operating System
  Teaching Assistant, Fall 2017
  (Teaching lab classes about operating system implementation and grading lab assignments)

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)

[2] Gyeongmin Lee, Bongjun Kim, Seungbin Song, Seonyeong Heo, and Hanjun Kim, "ComFlex: Composable and Flexible Resource Management for the IoT," in *IEEE Internet of Things Journal (Early Access)*, September 2020.
IF=9.936, Q1 (JCR 2019)

[3] Bongjun Kim, Seonyeong Heo, Gyeongmin Lee, Soyeon Park, Hanjun Kim, and Jong Kim, "Heterogeneous Distributed Shared Memory for Lightweight Internet-of-Things Devices," in *IEEE Micro*, November 2016.
IF=1.933, Q2 (JCR 2016)

Refereed Conference Publications

[4] Jinwoo Choi, Yeonan Ha, Hanna Cha, Seil Lee, Sungchul Lee, Jounghoo Lee, Shin-haeng Kang, Bongjun Kim, Hanwoong Jung, Hanjun Kim, and Youngsok Kim, "MPC-Wrapper: Fully Harnessing the Potential of Samsung Aquabolt-XL HBM2-PIM on FPGAs," to appear in *Proceedings of the 32nd IEEE International Symposium on Field-Programmable Custom Computing Machines (FCCM)*, May 2024.

[5] Hyesun Hong, Lukas Sommer, Bongjun Kim, Mikhail Kashkarov, Kumudha Narasimhan, Ilya Veselov, Mehdi Goli, Jaeyeon Kim, Ruyman Reyes Castro, and Hanwoong Jung, "Programming Model Extensions for General-Purpose Processing-In-Memory," to appear in *Proceedings of the 39th International Conference on High Performance Computing, ISC High Performance 2024 (ISC-HPC)*, May 2024.

[6] Gyeongmin Lee, Bongjun Kim, Seungbin Song, Changsu Kim, Jong Kim, and Hanjun Kim, "Precise Correlation Extraction for IoT Fault Detection with Concurrent Activities," in *Proceedings of the International Conference on Embedded Software (EMSOFT)*, October 2021.

[7] Seonyeong Heo, Seungbin Song, Bongjun Kim, and Hanjun Kim, "Sharing-aware Data Acquisition Scheduling for Multiple Rules in the IoT," in *Proceedings of the IEEE Real-Time And Embedded Technology And Applications Symposium (RTAS)*, April 2020.

[8] Bongjun Kim, Seonyeong Heo, Gyeongmin Lee, Seungbin Song, Jong Kim, and Hanjun Kim, "Spinal Code: Automatic Code Extraction for Near-User Computation in Fogs," in *Proceedings of the 28th International Conference on Compiler Construction (CC)*, February 2019.

[9] Gyeongmin Lee, Seonyeong Heo, Bongjun Kim, Jong Kim, and Hanjun Kim, "Rapid prototyping of IoT applications with Esperanto compiler," in *Proceedings of the 28th International Symposium on Rapid System Prototyping (RSP)*, October 2017. Invited.

[10] Gyeongmin Lee, Seonyeong Heo, Bongjun Kim, Jong Kim, and Hanjun Kim, "Integrated IoT Programming with Selective Abstraction," in *Proceedings of the 18th ACM SIGPLAN/SIGBAD Conference on Languages, Compilers, Tools, and Theory for Embedded Systems (LCTES)*, June 2017.

Patents

[11] Gyeongmin Lee, Bongjun Kim, Seungwon Lee, and Hanwoong Jung, "Near memory processing architecture for efficient execution on reconfigurable dataflow accelerator," US Patent App. US18/456874, August 2023.

[12] Bongjun Kim, Gyeongmin Lee, and Hanwoong Jung, "Method for representing hardware by composing of hardware traits and capability and hierarchically constructing hardware for multi-level abstraction level," KR Patent App. 10-2023-0101276, August 2023.

[13] Hanjun Kim, Seonyeong Heo, Jong Kim, and Bongjun Kim, "Write Control Method and Disk Controller for Automated Backup and Recovery," KR Patent Number 10-21896070000, December 2019.

[14] Bongjun Kim, Jong Kim, Soyeon Park, Hanjun Kim, Seonyeong Heo, and Gyeongmin Lee, "Heterogeneous Distributed Shared Memory For IoT Devices," KR Patent Number 10-18579070000, February 2017.