

Donghyun Kwon

ASSOCIATE PROFESSOR

School of Computer Science and Engineering
Pusan National University

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Education

Seoul National University

PH.D IN DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

- Thesis: Hardware-assisted Isolation for System Framework to Ensure Kernel Integrity
- Advisor: Yunheung Paek
- Distinguished Ph.D. Dissertation Award

Seoul, Korea

Mar 2012 - Feb 2019

Seoul National University

B.S IN DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Seoul, Korea

Mar 2008 - Feb 2012

Professional Experience

Associate Professor

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING, PUSAN NATIONAL UNIVERSITY

Pusan, South Korea

Mar 2023 - Present

Assistant Professor

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING, PUSAN NATIONAL UNIVERSITY

Pusan, South Korea

Mar 2020 - Feb 2023

Senior Researcher

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE

Daejeon, South Korea

Mar 2019 - Feb 2020

Publications

* corresponding author

2026

▪ Mind the Gap: In-Process Isolation for Safe Rust in WebAssembly

Suhyeon Song, Chaewon Shin, and Donghyun Kwon*

European Symposium on Research in Computer Security (ESORICS), 2026

CORE A KIISE A BK21 IF2

▪ XCFI: Comprehensive Control-Flow Integrity for Arm TrustZone-M

Yunju Gu, Jaeyeol Park, and Donghyun Kwon*

USENIX Security Symposium, 2026

CSRankings CORE A* KIISE S BK21 IF3

▪ TzPy: Python Runtime for Edge Code Deployment on TrustZone

Suhyeon Song, Jaeyeol Park, Chaewon Shin, and Donghyun Kwon*

ACM Transactions on Embedded Computing Systems (TECS), 2026

JCR Q2

▪ SERA: Secure Micro XRCE-DDS Establishment with Remote Attestation for micro-ROS

Jeonghwan Kang, Seungmin Kang, Euijun Kim, Jaeseon Park, Kyoungwan Kim, and Donghyun Kwon*

IEEE Access, 2026

JCR Q2

▪ WARD: Efficient Memory Protection for WebAssembly on Tiny Embedded Systems

Chaewon Shin, Gowon Han, Suhyeon Song, Jinsun Park, Yoon-ho Choi, and Donghyun Kwon*

IEEE Access, 2026

JCR Q2

- **Beyond Address Spaces: In-process Memory Isolation for RISC-V**

Seonghwan Park, Hayoung Kang, and Donghyun Kwon*
Computers & Security, 2026

JCR Q1

2025

- **SMORE: Practical Redzone-Based Stack Memory Error Detection Mechanism for Embedded Systems**

Jaeyeol Park, Yunju Gu, and Donghyun Kwon*
Annual Computer Security Applications Conference (ACSAC), 2025

CORE A KIISE A BK21 IF2

- **ELK: Effective Lock-and-Key Technique for Temporal Memory Safety on Embedded Devices in ARMv8-M**

Jeonghwan Kang, Kyoungwan Kim, and Donghyun Kwon*
Annual Computer Security Applications Conference (ACSAC), 2025

CORE A KIISE A BK21 IF2

- **Watch Your Callback: Offline Anomaly Detection using Machine Learning in ROS 2**

Jeonghwan Kang, Kyoungwan Kim, and Donghyun Kwon*
IEEE Access, 2025

JCR Q2

- **WasDom: An Efficient Write Protection for Wasm JITed Code With ARM Domain**

Suhyeon Song, Chaewon Shin, and Donghyun Kwon*
IEEE Access, 2025

JCR Q2

- **ROSec: Intra-Process Isolation for ROS Composition with Memory Protection Keys**

Jiwon Seo, Kayondo Martin, Jeonghwan Kang, Donghyun Kwon*, and Yunheung Paek*
IEEE Transactions on Automation Science and Engineering (T-ASE), 2025

JCR Q1

2024

- **Non-volatile flip-flop with soft error tolerant capability using DICE and C-element**

Shogo Takahashi, Donghyun Kwon, and Kazuteru Namba*
IEICE Nonlinear Theory and Its Applications (NOLTA), 2024

- **Look Before You Access: Efficient Heap Memory Safety for Embedded Systems on ARMv8-M**

Jeonghwan Kang, Jaeyeol Park, Jiwon Seo, and Donghyun Kwon*
Design Automation Conference (DAC), 2024

CSRankings CORE A* KIISE S BK21 IF3

- **MECAT: Memory-Safe Smart Contracts in ARM TrustZone**

Seonghwan Park, Hayoung Kang, Sanghun Han, Jonghee M. Youn*, and Donghyun Kwon*
IEEE Access, 2024

JCR Q2

2023

- **Enhancing a Lock-and-key Scheme with MTE to Mitigate Use-After-Frees**

Inyoung Bang, Martin Kayondo, Junseung Yu, Donghyun Kwon, Yeongpil Cho*, and Yunheung Paek*
IEEE Access, 2023

JCR Q2

- **metaSafer: A Technique to Detect Heap Metadata Corruption in WebAssembly**

Suhyeon Song, Seonghwan Park, and Donghyun Kwon*
IEEE Access, 2023

JCR Q2

- **ZOMETAG: Zone-based Memory Tagging for Fast, Deterministic Detection of Spatial Memory Violations on ARM**

Jiwon Seo, Junseung You, Donghyun Kwon, Yeongpil Cho*, and Yunheung Paek*
IEEE Transactions on Information Forensics and Security (TIFS), 2023

JCR Q1

- **SFITAG: Efficient Software Fault Isolation with Memory Tagging for ARM Kernel Extensions**

Jiwon Seo, Junseung You, Yungi Cho, Yeongpil Cho, **Donghyun Kwon***, Yunheung Paek*
ACM ASIA Conference on Computer and Communications Security (ASIACCS), 2023

CORE A KIISE A BK21 IF1

- **DEMIX: Domain-Enforced Memory Isolation for Embedded System**

Haeyoung Kim, Harashta Tatimma Larasati, Jonguk Park, Howon Kim, and **Donghyun Kwon***
Sensors, 2023

JCR Q2

2022

- **Exploring Effective Uses of the Tagged Memory for Reducing Bounds Checking Overheads**

Jiwon Seo, Inyoung Bang, Yungi Cho, Jangseop Shin, Dongil Hwang, **Donghyun Kwon**, Yeongpil Cho, Yunheung Paek
The Journal of Supercomputing, 2022

JCR Q2

- **Efficient CFI Enforcement for Embedded Systems Using ARM TrustZone-M**

Gisu Yeo, Yeryeong Kim, Suhyeon Song, and **Donghyun Kwon***
IEEE Access, 2022

JCR Q2

- **Bratter: An Instruction Set Extension for Forward Control-Flow Integrity in RISC-V**

Seonghwan Park, Dongwook Kang, Jeonghwan Kang, and **Donghyun Kwon***
Sensors, 2022

JCR Q2

2021

- **CoMeT: Configurable Tagged Memory Extension**

Jinjaee Lee, Derry Pratama, Minjae Kim, Howon Kim, and **Donghyun Kwon***
Sensors, 2021

JCR Q2

- **A Hardware Platform for Ensuring OS Kernel Integrity on RISC-V**

Donghyun Kwon, Dongil Hwang, and Yunheung Paek
Electronics, 2021

JCR Q3

2020

- **RI-MI: Instruction-level Memory Isolation for Embedded Systems on RISC-V**

Haeyoung Kim, Jinjae Lee, Derry Pratama, Asep Muhammad Awaludin, Howon Kim, and **Donghyun Kwon***
International Conference on Computer-Aided Design (ICCAD), 2020

CSRankings CORE A KIISE A BK21 IF3

- **ProOS: Light-weight Privatized Secure OSes in ARM TrustZone**

Donghyun Kwon, Jiwon Seo, Yeongpil Cho, Byoungyoung Lee, and Yunheung Paek
IEEE Transactions on Mobile Computing (TMC), 2020

JCR Q1

2019

- **RiskIM: Toward Complete Kernel Protection with Hardware Support**

Dongil Hwang, Myunghoon Yang, Seongil Jeon, Younghwan Lee, **Donghyun Kwon***, and Yunheung Paek
Design, Automation and Test in Europe (DATE), 2019

CORE A KIISE A BK21 IF2

- **Safe and Efficient Implementation of a Security System on ARM using Intra-Level Privilege Separation**

Donghyun Kwon, Hayoon Yi, Yeongpil Cho, and Yunheung Paek
ACM Transactions on Privacy and Security (TOPS), 2019

JCR Q2

- **CRCount: Pointer Invalidation with Reference Counting to Mitigate Use-After-Free in Legacy C/C++**

Jangseop Shin, **Donghyun Kwon**, Jiwon Seo, Yeongpil Cho, and Yunheung Paek
Network and Distributed System Security Symposium (NDSS), 2019

CSRankings CORE A* KIISE S BK21 IF2

- **uXOM: Efficient eXecute-Only Memory on ARM Cortex-M**

Donghyun Kwon, Jangseop Shin, Giyeol Kim, Byoungyoung Lee, Yeongpil Cho, and Yunheung Paek
USENIX Security Symposium, 2019

CSRankings CORE A* KIISE S BK21 IF3

2018

- **Hypernel: A Hardware-Assisted Framework for Kernel Protection without Nested Paging**

Donghyun Kwon**, Kuenwhee Oh**, Junmo Park, Seungyong Yang, Yeongpil Cho, Brent Byunghoon Kang, and Yunheung Paek
Design Automation Conference (DAC), 2018 (** joint first authors)

CSRankings CORE A* KIISE S BK21 IF3

- **VM-CFI: Control-Flow Integrity for Virtual Machine Kernel Using Intel PT**

Donghyun Kwon, Jiwon Seo, Sehyun Baek, Giyeol Kim, Sunwoo Ahn, and Yunheung Paek
International Conference on Computational Science and Its Applications (ICCSA), 2018

CORE C

2017

- **Instruction-Level Data Isolation for the Kernel on ARM**

Yeongpil Cho, Donghyun Kwon, and Yunheung Paek
Design Automation Conference (DAC), 2017

CSRankings CORE A* KIISE S BK21 IF3

- **Optimization Techniques to Enable Execution Offloading for 3D Video Games**

Donghyun Kwon, Seungjun Yang, Yunheung Paek, and Kwangman Ko
Multimedia Tools and Applications (MTAP), 2017

JCR Q2

- **Dynamic Virtual Address Range Adjustment for Intra-Level Privilege Separation on ARM**

Yeongpil Cho, Donghyun Kwon, Hayoon Yi, and Yunheung Paek
Network and Distributed System Security Symposium (NDSS), 2017

CSRankings CORE A* KIISE S BK21 IF2

2016

- **Precise Execution Offloading for Applications with Dynamic Behavior in Mobile Cloud Computing**

Yongin Kwon, Hayoon Yi, Donghyun Kwon, Seungjun Yang, Yeongpil Cho, and Yunheung Paek
Pervasive and Mobile Computing (PMC), 2016

JCR Q2

- **Hardware-Assisted On-Demand Hypervisor Activation for Efficient Security Critical Code Execution on Mobile Devices**

Yeongpil Cho, Jun-Bum Shin, Donghyun Kwon, MyungJoo Ham, Yuna Kim, and Yunheung Paek
USENIX Annual Technical Conference (ATC), 2016

CSRankings CORE A KIISE S BK21 IF3

2015

- **Mantis: Efficient Predictions of Execution Time, Energy Usage, Memory Usage and Network Usage on Smart Mobile Devices**

Yongin Kwon, Sangmin Lee, Hayoon Yi, Donghyun Kwon, Seungjun Yang, Byung-gon Chun, Ling Huang, Petros Maniatis, Mayur Naik, and Yunheung Paek
IEEE Transactions on Mobile Computing (TMC), 2015

JCR Q1

2014

- **Techniques to Minimize State Transfer Costs for Dynamic Execution Offloading in Mobile Cloud Computing**

Seungjun Yang, Donghyun Kwon, Hayoon Yi, Yeongpil Cho, Yongin Kwon, and Yunheung Paek
IEEE Transactions on Mobile Computing (TMC), 2014

JCR Q1

2013

- **Fast Dynamic Execution Offloading for Efficient Mobile Cloud Computing**

Seungjun Yang, Yongin Kwon, Yeongpil Cho, Hayoon Yi, Donghyun Kwon, Jonghee Youn, and Yunheung Paek
IEEE International Conference on Pervasive Computing and Communications (PerCom), 2013

▪ **Mantis: Automatic Performance Prediction for Smartphone Applications**

Yongin Kwon, Sangmin Lee, Hayoon Yi, **Donghyun Kwon**, Seungjun Yang, Byung-Gon Chun, Ling Huang, Petros Maniatis, Mayur Naik, and Yunheung Paek

USENIX Annual Technical Conference (ATC), 2013

Academic Service

- (Reviewer) ACM Transactions on Privacy and Security (TOPS)
- (Reviewer) ACM Transactions on Architecture and Code Optimization (TACO)
- (Reviewer) IEEE Transactions on Information Forensics & Security (TIFS)
- (Reviewer) IEEE Transactions on Computers (TC)
- (Reviewer) IEEE Access
- (Reviewer) Journal of Supercomputing
- (Associate Editor) Journal of Information Processing Systems (JIPS)

Teaching

GRADUATE

- **System Vulnerabilities and Countermeasures** F21, F22, F23, F24, F25
- **Introduction to System and Software Security** S21, S22, S23, S24, S25, S26

UNDERGRADUATE

- **Web Application Programming** F21, F22, F23
- **Logic Circuit Design & LAB.** F23, F24
- **Compiler** F22
- **Computer Architecture** F24, F25
- **Blockchain** S24, S25, S26
- **Programming Principles and Practice** F20, F21
- **Adventure Design** F20
- **Introduction to Internet and Web** S20, S21, S22, S23
- **System Software** S20, S21, S22, S23, S24, S25, S26
- **Discrete Mathematics 1** S20