IJAE KIM

Email: ijk5201@psu.edu | **Website:** ijae.kim | **LinkedIn:** linkedin.com/in/ijae-kim-992411269

Research Interests: Embedded Systems Security · Network Security · Program Analysis

Education

The Pennsylvania State University Aug. 2025 – Expected May 2027
M.S. in Cybersecurity Analytics and Operations University Park, PA, USA
GPA: 4.0/4.0 | Advisor: Taegyu Kim

Hanyang University Mar. 2014 – Feb. 2018
B.S. in Computer Science & Engineering Seoul, South Korea

Research & Publications

All listed venues are top-tier conferences (counted by **CSRankings**).

CINDER: Detecting Stack Overflow Bugs in Microcontroller Firmware via Configuration Fuzzing
Top-Tier Software Engineering Conference | Major Revision
Seongjin Kim*, **Ijae Kim***, Sang-Hoon Choi, Kyungtae Kim, Yuseok Jeon, Arslan Khan, Taegyu Kim
* Co-first authors; equal contribution.

- Engineered a compile-time configuration fuzzer that combines static per-thread stack-usage analysis with SMT-guided configuration mutation.
- Uncovered 31 zero-day stack overflow bugs across 10 microcontroller firmware projects.
- 6 CVEs assigned: CVE-2024-{48519, 51394, 51395, 55045}, CVE-2026-{30362, 30363}

YONDER: Static Analysis of Resource Leaks across 5G Core Network Functions
Top-Tier Software Engineering Conference | Under Review
Ijae Kim, Myeonghun Pak, Yuho Choi, Tianrou Xia, Taegyu Kim

- Designed a specification-guided static analyzer that reconstructs resource lifecycles across 5G network functions, maps API operations to code, and detects missing cleanup and cross-NF release actions.
- Uncovered 64 zero-day resource leaks, including 40 cross-NF bugs, across 3 open-source 5G Core implementations, with 22 developer confirmations and 19 patches.
- 10 CVEs assigned: CVE-2026-{133699, 133700, 133701, 133702, 133703, 134655, 134656, 134657, 134658, 134659}

Static Analysis of Linux Kernel Bugs *Top-Tier Conferences* | 3 Papers Under Review

- **MANTIS** (Software Engineering, 2nd author): resource lifecycle violations in Linux device drivers; 234 zero-day bugs found, 11 CVEs assigned.
- **UNSEEN** (Security, 2nd author): configuration-dependent operation-pairing bugs in the Linux kernel; 93 zero-day bugs found, 2 CVEs assigned.
- **MOSAIC** (Security, 3rd author): callback-driven use-after-free bugs across the Linux kernel; 485 bugs found.

Professional Experience

Samsung Electronics Aug. 2018 – Aug. 2025
Software Engineer Seoul, South Korea

- Developed Android fitness applications featuring real-time pose estimation, motion recognition, and wearable-sensor integration.
- Built performance-feedback and data-visualization pipelines for AI-driven exercise tracking and energy estimation.
- Created a cross-platform DRAM test automation tool for Linux and Windows, improving validation and failure analysis.
- Filed 3 patent applications (published) on exercise data processing and video synchronization.
  KR App. No. 10-2022-0187795, 10-2023-0149294, 10-2022-0188736

Teaching Experience

The Pennsylvania State University Fall 2025 – Fall 2026

Teaching Assistant University Park, PA, USA

- IST 210: Organization of Data Fall 2026
- HCDD 340: HCD for Mobile Computing Spring 2026
- CYBER 221: Overview of Information Security Fall 2025
- IST 256: Programming for the Web Fall 2025

Leadership & Community Service

Graduate and Professional Student Association (GPSA) 2025 – Present

Advocacy and Diversity Committee — College of IST Delegate, The Pennsylvania State University

- Advocate for international and underrepresented students through diversity-related initiatives.

HUHS, Hanyang University 2015 – 2017

- Led programming study sessions and provided volunteer software support for local small businesses.

Honors & Awards

Kang Dream Foundation Scholarship 2026
OTEFE Foundation Scholarship 2026
Special International Grant-in-Aid (SIGIA), The Pennsylvania State University 2026
California Han Family Scholarship 2026
4th Place, PyeongChang Olympic Software Contest 2017
Ministry of Science, ICT and Future Planning, Korea

Technical Skills

Programming Languages C, C++, Python, Java, Kotlin, Bash
Research Tools LLVM/Clang, Z3, Git, Linux
Frameworks & Platforms Android, TensorFlow Lite, Qt