

Kyoungmin Roh

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Republic of Korea

Research Interests

I am interested in the security of complex systems that must operate reliably under evolving threats and broken assumptions. My current research focuses on CPS and system security, with a particular emphasis on learning-based intrusion detection under concept drift and the secure deployment of post-quantum cryptography in CPS and embedded systems. My research goal is to establish principled foundations for designing secure systems that remain trustworthy over time, across various environments, and during the post-quantum transition.

Work Experience

IU SEC Lab, Indiana University Bloomington

Research Intern

Oct 2025-Present
Bloomington, U.S.

Advisor: Prof. Hyungsub Kim

- Analyzing security risks and failure modes in open-source Cyber-Physical System (CPS) software
- Investigating vulnerability patterns and attack surfaces in long-lived CPS and embedded systems
- Systematically surveying CPS-related vulnerabilities using OSV, GitHub Issues, and security forums
- Developing CPS-specific vulnerability characterization to reason about real-world system security

CSOS Lab, Dankook University

Research Intern

Mar 2025-Present
Yongin, South Korea

Advisor: Prof. Seong-je Cho

- Researching learning-based intrusion detection systems (IDS) under severe concept drift without retraining
- Studying graph-based system abstractions for IDS using API co-occurrence graphs and community detection via Social Network Analysis (SNA)
- Investigating Trusted Execution Environment (TEE)-based secure and lightweight deployment of post-quantum cryptography (PQC) with secret isolation on ARM TrustZone
- Collaborative Research on Android Intrusion Detection System with Illinois State University (**advisor: Prof. Hyoil Han, Prof. Kyoungwon Seo**)
- Collaborative Research on Automotive Cyber-Physical System Security with Seoul National University SORLab (**advisor: Prof. Jiwon Seo, Ph.D Martin Kayondo**)

Military Service, US 8th Army, 35th BDE, 2-1 ADA, E Co.

KATUSA (Korean Augmentation to the U.S. Army)

Aug 2023-Feb 2025
Waegwan, South Korea

Leadership: 1LT. John Bieganeck

- Appointed as an Environmental Officer and obtained the Environmental Officer Certificate, entrusted with inspection and compliance responsibilities despite junior rank
- Conducted environmental and operational safety inspections in accordance with military compliance standards
- Awarded the U.S. Army Commendation Medal (ARCOM) by a U.S. Brigadier General and the Best KATUSA Award by an ROK Army Colonel

Education

Dankook University

Bachelor's in Cybersecurity Candidate

Mar 2021-Present
Yongin, South Korea

- Undergraduate (Junior) researcher affiliated with CSOS Lab
- Relevant Coursework: AI Security, CPS Security, Embedded Security, Cryptography

Publications

SCI Journals

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- [1] **Kyoungmin Roh**, Seungmin Lee, Seong-je Cho, Youngsup Hwang, and Dongjae Kim, "SCAN: Structural Clustering with Adaptive Thresholds for Intelligent and Robust Android Malware Detection under Concept Drift," in *Computer Modeling in Engineering & Sciences (CMES)*, 2025. [SCIE Q1] (Accepted)

Domestic Journals

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- [2] **Kyoungmin Roh**, and Seong-je Cho, "Concept Drift-Resilient Android Malware Detection via API Co-occurrence Graphs and Louvain Communities," in *KIISE Transactions on Computing Practices (KTCP)*, 2025. [Invited Paper] (Published)

Conferences

International Conferences

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- [3] **Kyoungmin Roh**, Seungmin Lee, Seong-je Cho, and Youngsup Hwang, "ALARM: Android Malware Detection with Leiden API Communities and Robust Mixture of Experts," in *The 41st ACM/SIGAPP Symposium on Applied Computing (SAC 2026)*, Thessaloniki, Greece, Mar. 2026. (Accepted)

Domestic Conferences

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- [4] **Kyoungmin Roh**, Suhyeon Park, and Seong-je Cho, "Drift-Aware Security Module based on Louvain Communities for Retraining-Free Android Malware Detection," in *Korea Software Congress (KSC 2025)*, Yeosu, Republic of Korea, Dec. 2025 [Best Paper Award]
- [5] **Kyoungmin Roh**, Seungmin Lee, Yudam Kim, Seokhyun Ahn, and Seong-je Cho, "Android Malware Detection using Co-occurrence Graphs of APIs and Louvain Method for Community Detection," in *WDSC 2025: Workshop on Dependable and Secure Computing*, Jeju, Republic of Korea, Aug. 2025 [Best Paper Award]
- [6] Seungmin Lee, **Kyoungmin Roh**, Jiheon Jung, Suhyeon Park, and Seong-je Cho, "Classifying File Fragment Types for IVI System Forensics," in *WDSC 2025: Workshop on Dependable and Secure Computing*, Jeju, Republic of Korea, Aug. 2025

Research Paper Contest

- [7] **Kyoungmin Roh**, Nahee Kwon, Bogyom Kim, and Subin Jeon, "A Lightweight Secret-Isolated Post-Quantum Cryptographic Architecture for ARM TrustZone," in *Cyber Security Contest, Department of Cybersecurity, Dankook University*, Dec. 2025. [1st Place Award]

Thesis

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- [8] **Kyoungmin Roh**, Junhyeong Kim, and Minseok Seong, “Qrust: AI-powered QR Phishing Detection and Secure QR Generation,” in *Dankook Capstone Festival, Department of Cybersecurity, Dankook University*, Dec. 2025 [**Bachelor’s Degree Thesis, Audience Choice Award**]

Patents

- [1] Title: A Malware Detection Method Combining Clustering and Supervised Learning Models
Contributors: **Kyoungmin Roh**, Seungmin Lee, Seong-je Cho, and Yoonho Choi
Korean Patent Application No. 10-2025-0098855 (**Filed**)

Awards & Honors

Specialized Project Scholarship <i>Dankook University, Department of Cybersecurity</i>	<i>Dec 2025</i>
Academic Research Scholarship <i>Dankook University, National Center of Excellence in Software</i>	<i>Dec 2025</i>
Cyber Security Contest 1st Place Award <i>Dankook University, Department of Cybersecurity</i>	<i>Dec 2025</i>
KSC 2025 Best Paper Award <i>Korean Institute of Information Scientists and Engineers (KIISE)</i>	<i>Dec 2025</i>
Capstone Festival Audience Choice Award <i>Dankook University, National Center of Excellence in Software</i>	<i>Dec 2025</i>
Dankook Startup Hackathon Encouragement Award <i>Dankook University, National Center of Excellence in Software</i>	<i>Sep 2025</i>
WDSC 2025 Best Paper Award <i>Korean Institute of Information Scientists and Engineers (KIISE)</i>	<i>Aug 2025</i>
Certificate of Appreciation <i>United States Army Garrison Daegu</i>	<i>Feb 2025</i>
Republic of Korea Army Soldier Award <i>Republic of Korea Army</i>	<i>Feb 2025</i>
The Army Commendation Medal <i>United States Department of the Army</i>	<i>Dec 2024</i>
Best KATUSA Award <i>8th United States Army Republic of Korea Army Support Group</i>	<i>Oct 2024</i>
Turing Cipher Idea Contest 1st Place Award <i>Dankook University, Department of Cybersecurity</i>	<i>Sep 2023</i>

Specialized Project Scholarship*Jun 2022**Dankook University, Department of Cybersecurity***Admission Scholarship***Mar 2021**Dankook University Admissions Office*

Teaching Experiences**Basic Coding Teaching Volunteer for Middle School Students***Aug 2022**Dankook University, Aegis Cybersecurity/Development Club*

Committee Service**Dankook University, Aegis Cybersecurity/Development Club***Mar 2021-Present**Member*

- Participated in the Cybersecurity Team and CTF Team
- Contributed to collaborative security projects and CTF problem-solving

RubiyaLab CTF Team*Jul 2025-Nov 2025**CTF Player*

- Member of a top-ranked international CTF team, engaging in practical security problem-solving
- Contributed to challenges in cryptography, reverse engineering, and web security

OSINT Team*Jul 2025-Present**Contributor*

- Authored and published cybersecurity-related articles for a global OSINT education platform website

References**[1] Prof. Seong-je Cho**

Professor, Department of Software Science, Dankook University

College of Software Convergence

Director, AI Cybersecurity Research Center

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Phone: +82-31-8005-3229

*Relationship: Academic Advisor and Research Supervisor***[2] Prof. Hyungsub Kim**

Assistant Professor, Department of Computer Science, Indiana University Bloomington

Luddy School of Informatics, Computing, and Engineering

Email: hk145@iu.edu*Relationship: Academic Advisor and Internship Supervisor***[3] Prof. Jiwon Seo**

Assistant Professor, Department of Cybersecurity, Dankook University

College of Software Convergence

Email: jwseo@dankook.ac.kr

Relationship: Academic Advisor and Research Supervisor