# Kyoungmin Roh

+82-010-2506-3409 | kyoungminroh01@gmail.com | https://medium.com/@kyoungminroh01

Kyoungmin Roh | rohkyoungmin | Kyoungmin Roh

Seongnam-si, Gyeonggi-do - 13639, Republic of Korea

## Objective

To pursue an academic career in cybersecurity as a professor, contributing to society through impactful research and education. I aim to develop technologies that improve security and improve people's lives, while fostering the next generation of scholars and practitioners who will continue to advance the field beyond my own contributions.

## Research Interests

- Android Malware Analysis
- Artificial Intelligence for Cybersecurity
- Cyber-Physical System Security
- Post-Quantum and Quantum Cryptography

## Research Experience

- **IU SEC Lab, Department of Computer Science, Indiana University Bloomington [🌐]** — *Oct 2025 – Present*
  *Research Intern* — Bloomington, U.S.
  - Supervisor: Prof. Hyungsub Kim.
  - Researching open-source CPS (Cyber-Physical System) software security
- **CSOS Lab, Department of Software Science, Dankook University [🌐]** — *Mar 2025 – Present*
  *Research Intern* — Yongin, South Korea
  - Supervisor: Prof. Seongje Cho
  - Developing an Android malware detection AI models using static analysis and Machine Learning

## Education

- **Dankook University** — *Mar 2021 – Expected Jan 2027*
  *B.E. in Cybersecurity* — Yongin, Republic of Korea
  - GPA: 3.0 / 4.5 (approximately 2.7 / 4.0 Scale in U.S.)

## Publications, Conferences, and Patents

C=Conference, J=Journal, P=Patent, T=Thesis

**[C.1]** [Under Review] **[Top-tier]** **Kyoungmin Roh**, Seungmin Lee, Seongje Cho, and Youngsup Hwang, **"ALARM: Android Malware Detection with Leiden API Communities and Robust Mixture of Experts"**. Submitted to *The 41st ACM/SIGAPP Symposium on Applied Computing (SAC 2026)*, Thessaloniki, Greece (Mar. 2026).

**[J.1]** [Under Review] **[Q1] [IF: 2.5]** **Kyoungmin Roh**, Seungmin Lee, Seongje Cho, Youngsup Hwang, and Dongjae Kim, **"SCAN: Structural Clustering with Adaptive Thresholds for Intelligent and Robust Android Malware Detection under Concept Drift"**. Submitted to *Computer Modeling in Engineering & Sciences (CMES)*, (2025).

**[C.2]** **[Best Paper Award]** **Kyoungmin Roh**, Seungmin Lee, Yudam Kim, Seokhyun Ahn, and Seongje 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*, pp. 340–345, Jeju, Republic of Korea (Aug. 2025).

**[J.2]** [Under Review] **[Invited]** **Kyoungmin Roh**, and Seongje Cho, **"Concept Drift-Resilient Android Malware Detection via API Co-occurrence Graphs and Louvain Communities"**. Submitted to *KIISE Transactions on Computing Practices (KTCP)*, (2025).

**[C.3]** [Under Review] **Kyoungmin Roh**, and Seongje Cho, **"Drift-Aware Security Module based on Louvain Communities for Retraining-Free Android Malware Detection"**. Submitted to *Korea Software Congress (KSC 2025)*, Yeosu, Republic of Korea (Dec. 2025).

**[C.4]** Seungmin Lee, **Kyoungmin Roh**, Jiheon Jung, and Seongje Cho, **"Classifying File Fragment Types for IVI System Forensics"**, In *WDSC 2025: Workshop on Dependable and Secure Computing*, pp. 334–339, Jeju, Republic of Korea (Aug. 2025).

**[P.1]** **Kyoungmin Roh**, Seungmin Lee, Seongje Cho, and Yoonho Choi, **"A Malware Detection Method Combining Clustering and Supervised Learning Models"**, KR Application No. 10-2025-0098855.

**[T.1]** [In Preparation] **Kyoungmin Roh**, Junhyeong Kim, and Minseok Seong, **"AI-powered QR Phishing Detection and Secure QR Generation"**. In preparation at *Department of Cybersecurity, Dankook University*, (2025).

## Security Projects

- **LV.0: LLM Vulnerability Zero – LLM-powered Security Vulnerability Reporter** *Jul 2025*
  *Tools: React, TailwindCSS, Electron, Python, Flask, FastAPI* [] []
  - Engineered an LLM-based tool that identifies and reports vulnerabilities in open-source repositories.
  - Integrated GitHub workflow automation for security triage and NLP-based risk summarization.
  - Led development of the AI-powered static analysis and reporting framework.
- **Automatic Analysis Digital Forensic Tool for Hyundai Avante (CN7)** *Jun 2025*
  *Tools: C#, Wintools* []
  - Developed a digital forensic toolkit for Android-based IVI systems.
  - Implemented automated log parsing for event reconstruction and user interaction tracking.
- **ASX: Android API Sequence Extractor** *Jun 2025*
  *Tools: Electron, Python* []
  - Created a static analysis pipeline to extract API call sequences from DEX files.
  - Designed preprocessing to filter non-informative methods, enhancing model interpretability.
- **Post-Quantum Signature System: Lamport + Merkle Tree** *Aug 2023 – Sep 2023*
  *Tools: Python* []
  - Designed and implemented a hash-based post-quantum signature combining Lamport one-time signatures with Merkle tree authentication.
  - Built a functional prototype demonstrating signing and verification processes.

## Development Projects

- **LLM-based Mobile Application for Speech and Hearing Disorders ("Ddobak")** *Sep 2025*
  *Tools: Notion, Figma, Canva, Android Studio, Flutter* [] [] []
  - Proposed an **LLM-based pronunciation correction app** supporting users with hearing impairments.
  - Designed and implemented a functional prototype integrating real-time speech analysis and feedback.
  - Led the ideation and user-interface design process during the Dankook Startup Hackathon.
- **AIRO: LLM-based Parenting Assistance App** *May 2025 – Jun 2025*
  *Tools: LLaMA 3, Python*
  - Developed a conversational AI assistant to guide parents through early childcare routines and emergency responses.
  - Integrated LLaMA 3 to provide contextual parenting advice and behavioral feedback.
- **Selenium-based Web Crawling Script** *Apr 2025*
  *Tools: Python, Selenium* []
  - Created a web crawler to collect and preprocess product reviews from "Today's House."
  - Supported an external research project by supplying labeled text datasets for LLM training.
- **Deep Learning-based Agricultural Pest Detection Model** *Nov 2024*
  *Tools: Python, Google Colab* []
  - Trained a CNN-based image classifier to detect crop pest damage from camera-captured images.
  - Applied augmentation (rotation, cropping, brightness scaling) to improve model generalization.

## Awards & Scholarships

- **WDSC 2025 Best Paper Award** *Aug 2025*
  *Korean Institute of Information Scientists and Engineers (KIISE)* []
  - Received the **Best Paper Award** at the Workshop on Dependable and Secure Computing for excellence in Android malware detection research.
- **Turing Cipher Idea Contest First Place Award** *Sep 2023*
  *Department of Cybersecurity, Dankook University* []
  - Awarded **First Place** for proposing a post-quantum signature combining Lamport signatures and Merkle trees, sponsored by NIS (National Intelligence Service).
- **2025 Dankook Startup Hackathon Participation Prize** *Sep 2025*
  *Dankook University, National Center of Excellence in Software* []
  - Achieved **3rd place in the software track**, proposing an LLM-based app improving speech articulation for hearing-impaired users.
- **Specialized Project Scholarship** *Jun 2022*
  *Dankook University*
  - Received departmental scholarship for excellence in academic research and project execution.
- **Admission Scholarship** *Mar 2021*
  *Dankook University*
  - Awarded upon university admission for outstanding academic performance.

## Security-related Experiences

- **Member, RubiyaLab CTF Team** *Jul 2025 – Present*
  *RubiyaLab* [🌐]
  - Member of South Korea's No.1 and globally top 11 CTF team.
  - Competed in national and international cybersecurity competitions.
- **Publication Contributor, OSINT TEAM** *Jul 2025 – Present*
  *OSINTTeam.com* [🌐]
  - Authored and published cybersecurity articles for a global OSINT education platform.
- **Member, Aegis Cybersecurity Club** *Mar 2021 – Present*
  *Dankook University* [🌐]
  - Participated in software development and CTF competitions as part of the Aegis security team.
  - Contributed to cybersecurity awareness and collaborative technical projects.

## CTF Experiences

- **Cyber Conflict Exercise (CCE) 2025 Preliminaries** *Aug 2025*
  *Team Leader* [M]
  - Ranked **45th overall (Top 10%)** among all participating teams.
  - Solved a **cryptography challenge**, contributing to the team's overall qualification score.
  - Published post-event writeups and technical analysis on Medium.
- **HACKSIUM BUSAN 2025 Preliminaries** *Jun 2025*
  *Team Leader* [M]
  - Ranked **31st overall**, solving three **web exploitation and cryptography** challenges.
  - Directed team strategy and resource allocation throughout the competition.
- **BYUCTF 2025** *May 2025*
  *Team Member* [M]
  - Ranked **270th out of 1,074 teams**.
  - Solved six challenges in **reverse engineering, cryptography, and miscellaneous** categories.
  - Authored detailed writeups on exploitation methodology and lessons learned.
- **HacktheOn Sejong CTF 2025 Preliminaries** *Apr 2025*
  *Team Member* [M]
  - Ranked **42nd out of 401 teams (Top 10%)**.
  - Solved two challenges in **reverse engineering and digital forensics**.
  - Published comprehensive writeups summarizing approach and solution.
- **squ1rrer CTF 2025** *Apr 2025*
  *Team Member*
  - Ranked **75th out of 528 teams**.
  - Contributed to solving **web and miscellaneous** problems.

## Extracurricular Experiences

- **LG Aimers AI Bootcamp & Hackathon** *Jan 2023 – Feb 2023*
  *LG AI Research, South Korea* [🌐]
  - Completed an intensive AI training program focused on **industrial-scale machine learning applications**.
  - Developed a **defect classification model** for smart factory products, ranking in the **top 30%** of participants.
  - Led a team of four members, coordinating data preprocessing, model tuning, and presentation phases.

## Volunteer Experience

- **Rural Volunteer Activity** *Sep 2025*
  *Korea Federation of Volunteer Centers*
  - Participated in national rural volunteering, assisting with strawberry greenhouse maintenance and chestnut harvest activities in Buyeo County.
  - Completed 21 volunteer hours over three days.
- **Coding Education Volunteer** *Aug 2022*
  *Aegis, Dankook University*
  - Conducted introductory coding workshops in Python and C for middle school students.
  - Promoted creative problem-solving through project-based learning.

## Military Service

- **KATUSA (Korean Augmentation to the U.S. Army)** *Aug 2023 – Feb 2025*
  *U.S. 8th Army, Camp Carroll, South Korea*
  - Served in the 35th Air Defense Artillery Brigade, 2-1 ADA Battalion, Echo Company.
  - Acted as interpreter and liaison for joint U.S.–ROK operations.
  - Earned **Army Commendation Medal (ARCOM)** from a U.S. Brigadier General for outstanding performance.
  - Won the **Best Warrior Squad Competition** and received the **Best KATUSA Award**.

## Languages

- Korean — Native
- English — Professional proficiency (academic writing, fluent speaking and listening)
- Japanese — Conversational (daily communication and listening comprehension)
- Chinese — Conversational Reading and writing proficiency; limited listening
- Arabic — Basic communication; familiar with alphabet and simple words

## Hard Skills

- **Programming Languages:** Python, C, C++, Java, JavaScript, C#, Dart (Flutter), LaTeX
- **Security:** Android Malware Analysis, Digital Forensics, Cyber-Physical System (CPS) Security, Cryptography, Web Hacking, Mobile Hacking
- **Artificial Intelligence:** ML, DL, LLM, PyTorch, TensorFlow, scikit-learn, pandas
- **Frontend Development:** React, TailwindCSS, HTML5, CSS3, Electron, Wintools
- **Backend Development:** Flask, FastAPI, Node.js, Firebase
- **Operating System:** Linux/Ubuntu, Windows
- **Development Tools:** Git, GitHub, VS Code, Android Studio, Google Colab, Jupyter Notebook
- **Mathematical & Statistical Tools:** MATLAB, R
- **Collaborative Tools:** Notion, Slack, Overleaf
- **Design Tools:** Figma, Canva, Adobe Illustrator

## Soft Skills

- **Communication:** Strong interpersonal and cross-cultural communication skills; able to build rapport quickly and resolve conflicts through open discussion. Skilled in academic writing, technical documentation, and bilingual (English/Korean) collaboration.
- **Leadership & Team Management:** Experienced team leader with the ability to identify and leverage each member's strengths to maximize performance. Adept at motivating teams, coordinating multi-stage research projects, and maintaining accountability throughout.
- **Problem-Solving & Creativity:** Combines strong analytical thinking with artistic creativity from an early background in fine arts. Generates original ideas and translates them into practical research or engineering implementations with speed and precision.
- **Adaptability & Responsibility:** Highly adaptive to new environments and challenges; demonstrates strong sense of responsibility and persistence in completing assigned work to high standards. Approaches every task with a continuous learning mindset.
- **Innovation & Experimental Design:** Proficient in designing and executing experiments from concept to implementation. Rapidly iterates prototypes and validates ideas through coding, evaluation, and analysis.

## References

1. **Prof. Seong-je Cho**
   Professor, Department of Software Science
   College of Software Convergence, Dankook University
   Director, Smart City Strategy Research Center
   Email: sjcho@dankook.ac.kr
   Phone: +82-31-8005-3239
   *Relationship: Academic Advisor and Research Supervisor*

2. **Prof. Hyungsub Kim**
   Assistant Professor, Department of Computer Science
   Luddy School of Informatics, Computing, and Engineering
   Indiana University Bloomington
   Email: hk145@iu.edu
   Office: Luddy Hall 2046, 700 N. Woodlawn Avenue, Bloomington, IN 47408, USA
   *Relationship: Research Collaborator and Internship Supervisor*