

Hyeonmin Lee

Network Security Researcher

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I am a postdoctoral researcher at Seoul National University. My research interests lie in network security, especially, DNS and Email security. I have published five papers, three of which were published in top-tier conferences including USENIX Security and The Web Conference (formerly WWW). Also, I have participated in (or led) more than ten research projects with institutions such as Virginia Tech, Rochester Institute of Technology, University of Twente, KAIST, SIDN Labs, NLnet Labs, etc. I have covered a variety of techniques in my research, such as DNS, DNS security (e.g., DNSSEC, DoT, DoH), SMTP, Email security (e.g., STARTTLS), PKI, DANE, TLS, IoT, and edge computing.

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, Network Convergence and Security Lab
Seoul National University

Apr 2022 — Present
Seoul, South Korea

Visiting Student, The Center for Cybersecurity
Rochester Institute of Technology

May 2019 — Aug 2019
Rochester, NY, United States

EDUCATION

Ph.D., Computer Science and Engineering, Seoul National University, (Seoul, South Korea)

Mar 2016 — Feb 2022

- [Dissertation] “Understanding the DANE Ecosystem in Email: How Is It Deployed and Managed?”
- [Advisors] *Prof. Taekyoung “Ted” Kwon (Seoul National University)* and *Prof. Taejoong “Tijay” Chung (Virginia Tech)*

B.S., Computer Science and Engineering, Seoul National University, (Seoul, South Korea)

Mar 2011 — Feb 2016

Visiting Student, Information Technology, Uppsala University, (Uppsala, Sweden)

Fall 2014

PUBLICATIONS (SELECTED)

[C3] **ZTLS: A DNS-based Approach to Zero Round Trip in TLS handshake** (To appear)

TheWebConf’23

- Sangwon Lim, **Hyeonmin Lee**, Hyunsoo Kim, Hyunwoo Lee, Ted “Taekyoung” Kwon
- In Proceedings of the ACM Web Conference 2023, Austin, United States, Apr 2023

[C2] **Under the Hood of DANE mismanagement in SMTP**

USENIX Security’22

- **Hyeonmin Lee**, Md. Ishtiaq Ashiq, Moritz Müller, Roland van Rijswijk-Deij, Taekyoung “Ted” Kwon, Taejoong Chung
- In Proceedings of the 31st USENIX Security Symposium, Boston, United States, Aug 2022

[C1] **A Longitudinal and Comprehensive Study of the DANE Ecosystem in Email**

USENIX Security’20

- **Hyeonmin Lee**, Aniketh Gireesh, Roland van Rijswijk-Deij, Taekyoung “Ted” Kwon, Taejoong Chung
- In Proceedings of the 29th USENIX Security Symposium, Boston, United States, Aug 2020

[I-D] **DNSSEC Extension by Using PKIX Certificates**

Internet-Draft

- **Hyeonmin Lee**, Taekyoung Kwon
- Active Internet-Draft, Mar 2023

RESEARCH PROJECT EXPERIENCE (SELECTED)

A Study for the Future-oriented DANE-based Web Architecture to Solve Problems in the Current TLS-based Web Ecosystem

Primary Investigator

Sep 2022 – Present

(Funded by *Post-Doctoral Domestic and Overseas Training Program - National Research Foundation of Korea (NRF)*)

- [Role] Analyze how the Web ecosystem will be changed if it adopts the DANE protocol for communication peer authentication.
- [Keywords] Web, Transport Layer Security (TLS), Authentication, DANE

Research on Secure DNS and Privacy aware Packet Filtering Technology

System Designer, Programmer

Aug 2022 — Present

(Funded by *Samsung Electronics*)

- [Role] Investigate a way to filter packets using the information in DNS messages and implement it on BIND9.
- [Keywords] Domain Name System, DNS over TLS (DoT), DNS over HTTPS (DoH), Packet filtering.

Abnormal Detection and Forensic Techniques using IoT Network Traffic Analysis

Project Manager, System Designer, Programmer

Mar 2021 — Nov 2021

(Funded by *Korea Institute of Information Security & Cryptology (KIISC)*)

- [Role] Analyzed IoT network traffic to distinguish abnormal traffic from normal ones using an autoencoder.
- [Keywords] Internet of Things (IoT), Machine learning, Abnormal detection.

SKILLS

Tools and Languages

Python (proficient), C/C++, Java, Go, Spark, Hadoop, Git, \LaTeX , Linux OS

Knowledge Background

DNS, DNS Security (i.e., DNSSEC, DoT, DoH), SMTP, Email Security (i.e., STARTTLS), PKI, DANE, TLS, IoT, Edge computing

Communication

English, Korean (native)