

# Dongkeun Lee

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## Education

### Korea University

PH.D. STUDENT IN CYBERSECURITY, SCHOOL OF CYBERSECURITY (SCS)

- Academic advisor: Prof. Wonjun Lee

Seoul, Republic of Korea

Sept. 2023 - Present

### Korea University

B.ENG. IN DEPT. OF CYBER DEFENSE (CYDF), DIVISION OF INFORMATION SECURITY

- Overall GPA: 4.29/4.50

Seoul, Republic of Korea

Mar. 2018 - Feb. 2022

### National University of Singapore

EXCHANGE STUDENT

Singapore

Aug. 2019 - Dec. 2019

## Research Interests

### Cyber Security

- web security, data privacy, third-party tracking, encrypted traffic classification

### User Experience

- video streaming, enhancing quality of experience (QoE), analyzing and modeling user behavior

## Publications

### CONFERENCE PROCEEDINGS

- [1] **Dongkeun Lee**, Minwoo Joo, and Wonjun Lee, "Net-track: Generic Web Tracking Detection Using Packet Metadata," in *Proceedings of the ACM Web Conference 2023 (WWW '23)*, Austin, TX, USA, April-May 2023.

### JOURNAL PUBLICATIONS

- [1] **Dongkeun Lee**, Minwoo Joo, and Wonjun Lee, "Qrator: An Interest-aware Approach to ABR Streaming Based on User Engagement," *IEEE Systems Journal*, Vol. 16, No. 4, pp. 6581 – 6589, December 2022.

## Work Experience

Aug. 2022 -  
Present

**Cyber Officer**, Cyber Operations Command, Republic of Korea Armed Forces

- Developed techniques for advanced cyberspace operations
- Managed cyber threats against military assets via malicious code analysis and traffic anomaly detection

Aug. 2020 -  
Mar. 2022

**Research Intern**, Network and Security Research Lab at Korea University, Seoul, Republic of Korea

- Supervisor: Prof. Wonjun Lee
- Topic: Multimedia networking, Network security and privacy

## Teaching Experience

Spring 2021 **Computer Networks**, Teaching Assistant, Korea University, Seoul, Republic of Korea

## Research Projects

### Understanding the potentials and benefits of serverless computing

ADVISOR: PROF. WONJUN LEE

Korea University  
Seoul, Republic of Korea  
Jan. 2023 - Jun. 2023

**Keywords:** serverless computing, function configuration optimization, AWS Lambda

- Conducted an in-depth study about serverless computing in the context of function configuration optimization and its potential to provide architectural support for AI
- Proposed a novel mechanism that can perform accurate execution time prediction for each function in a serverless function chain by modeling their dependency as a DAG and applying Graph Neural Network

### Discovering unknown third-party trackers in the wild

ADVISOR: PROF. WONJUN LEE

Korea University  
Seoul, Republic of Korea  
Mar. 2021 - Jan. 2023

**Keywords:** web security, third-party tracking, encrypted traffic analysis, machine learning

- Built a high accuracy web tracking detection system, "Net-track"
- Implemented Net-track using diverse machine learning models with **Scikit-learn** and **Tensorflow**
- Collected 350k traffic traces by visiting top-20k Alexa websites using **Selenium**

### Understanding the impact of user engagement on QoE in video streaming

ADVISOR: PROF. WONJUN LEE

Korea University  
Seoul, Republic of Korea  
Oct. 2020 - Nov. 2021

**Keywords:** QoE, multimedia, ABR streaming, user modeling

- Collected and analyzed user comments in real YouTube videos with **Selenium**
- Validated the feasibility of obtaining user interest information from user engagement data
- Proposed "Qrator", the first ABR streaming system that leverages *timestamps* and *likes* in video comments

## Publications (Domestic)

- [1] **Dongkeun Lee**, Minwoo Joo, and Wonjun Lee, "Network-level Tracker Detection Using Features of Encrypted Traffic (암호화된 트래픽의 특성을 활용한 네트워크 단위 트래커 탐지 기법)," *Journal of KIISE: Information Networking*, Vol. 49. No. 4, pp. 314-320, April 2022. (**Selected as an Outstanding Paper Award**)
- [2] **Dongkeun Lee**, Minwoo Joo, and Wonjun Lee, "Feature Analysis of Encrypted Traffic for Network-level Tracker Detection (네트워크 단위 트래커 탐지를 위한 암호화된 트래픽의 특성 분석)," in *Proceedings of the KIISE Korea Computer Congress 2021 (KIISE KCC2021)*, Jeju, Republic of Korea, June 2021, pp. 1-3. (**Selected as an Outstanding Paper Award**)
- [3] **Dongkeun Lee**, Minwoo Joo, and Wonjun Lee, "User Engagement Based Adaptive Streaming Using Timestamps in Video Comments (비디오 댓글의 타임스탬프를 활용한 사용자 참여 기반 적응적 스트리밍 기법 연구)," in *Proceedings of the KIISE Korea Software Congress 2020 (KIISE KSC2020)*, Pyeongchang, Republic of Korea, December 2020, pp. 1-3.

## Honors and Awards

### SCHOLARSHIPS

Mar. 2018 - Feb. 2022	<b>The National Scholarship for Science and Engineering</b> , Korea Student Aid Foundation	\$ 10k/year in total
Mar. 2018 - Feb. 2022	<b>Military Scholarship</b> , Ministry of National Defense, Republic of Korea	\$ 10k/year in total

### AWARDS

June 2023	<b>Outstanding Paper Award</b> , Journal of KIISE: Information Networking, KIISE
June 2021	<b>Outstanding Paper Award</b> , Korea Computer Congress 2021, KIISE

## Languages

**English** (Fluent, TOEFL: 102/120), **Korean** (Native)