Jiwon Kim

🏛 Ph.D. Candidate in Computer Science at Purdue University
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Research Interests

Security for next-generation networks, software-defined networking, intent-based networking, programmable networking, P4, and 5G

Education

Aug 2020 - *Current*	**Purdue University**, West Lafayette, IN, USA Ph.D in Computer Science Major: *Security for Next-Generation Networks* | Advisor: Prof. Dave (Jing) Tian
Mar 2015 - Aug 2016	**Sungkyunkwan University**, Suwon, Republic of Korea Master of Science in Platform Software Major: *System Software for Non-Volatile Memory* | Advisor: Prof. Hwansoo Han
Mar 2011 - Feb 2015	**Sungkyunkwan University**, Suwon, Republic of Korea Bachelor of Science in Software Engineering

Publications

[1] **"Exploiting Temporal Vulnerabilities for Unauthorized Access in Intent-based Networking"**
Ben Weintraub, **Jiwon Kim**, Ran Tao, Cristina Nita-Rotaru, Hamed Okhravi, Dave (Jing) Tian, Benjamin E. Ujcich.
To appear in *ACM Conference on Computer and Communications Security (CCS '24)*

[2] **"Security Challenges of Intent-Based Networking"**
Jiwon Kim, Dave (Jing) Tian, Hamed Okhravi, Benjamin E. Ujcich.
To appear in *Communications of the ACM*, 2024.

[3] **"Intender: Fuzzing Intent-Based Networking with Intent-State Transition Guidance"**
Jiwon Kim, Benjamin E. Ujcich, Dave (Jing) Tian.
USENIX Security Symposium (Security '23), Aug 2023.

[4] **"Efficient Memory Mapped File I/O for In-Memory File Systems"**
Jungsik Choi, **Jiwon Kim**, Hwansoo Han.
USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '17), Jul 2017.

[5] **"In-Memory File System with Efficient Swap Support for Mobile Smart Devices"**
Jungsik Choi, Joonwook Ahn, **Jiwon Kim**, Sungtae Ryu, Hwansoo Han.
IEEE Transactions on Consumer Electronics, vol. 62(3), pp. 275-282, Aug 2016.

Research Experience

Aug 2020 - *Current*	PurSec Lab, **Purdue University**, West Lafayette, IN, USA *Research Assistant* - Advisor: Prof. Dave (Jing) Tian • Participated in projects on system security for P4 networks • Designed and developed fuzzing intent-based networking [3] • Participated in projects on securing software-defined networking and intent-based networking [1][2]
Mar 2014 - Oct 2016	ARCS Lab, **Sungkyunkwan University**, Suwon, Republic of Korea *Research Assistant* - Advisor: Prof. Hwansoo Han • Participated in projects on system software for non-volatile memory [4][5]
Aug 2013 - Feb 2014	M2M Lab, **Purdue University**, West Lafayette, IN, USA *Research Intern* - NIPA-Purdue Capstone Project - Advisor: Prof. Eric Matson • Designed and developed road guidance system for visually impaired

Professional Experience

Sep 2016 - Jul 2020	**ATTO Research**, Seoul, Republic of Korea
	Research Engineer

- Created flow-specific database for concurrent and consistent software-defined network updates
- Designed and developed SDN applications to manage underlay/overlay networks in private cloud
- Developed secure SDN controller cluster with TLS, RBAC, and flow monitoring
- Implemented domain-specific language and command-line interface for SDN controller

Jan 2013 - Feb 2013	**Acryl Inc.**, Seoul, Republic of Korea
	Intern

- Developed prototype of Android messenger application

Feb 2012	**Hancom corp.**, Seongnam, Republic of Korea
	Intern

- Participated in quality assurance team

Patents

US Patents

[U1] "Memory mapping management method for nonvolatile main memory system"
Jungsik Choi, Hwansoo Han, **Jiwon Kim**.
US Patent 10,185,654, 2019.

Korean Patents

[K1] "Method, apparatus and computer program for processing flow rule transactions in software defined network"
Jiwon Kim, Jaekyun Shim, Hyunwoo Park, Yongjoo Song.
KR 10-2275765, 2021.

[K2] "Method, apparatus and computer program for operating the flow rules database in software defined network"
Jiwon Kim, Jaekyun Shim, Yongjoo Song, Jonghyun Kwon.
KR 10-2226915, 2021.

[K3] "Method, apparatus and computer program for supporting distributed snat in a cloud environment in a software defined network"
Jiwon Kim, Yongjoo Song.
KR 10-2200402, 2021.

[K4] "Methods, apparatus and computer programs for providing high availability and reliability in software defined network"
Jiwon Kim, Jaekyun Shim, Yongjoo Song.
KR 10-2092091, 2020.

[K5] "Method, apparatus and computer program for tracking traffic using software defined networking"
Yongjoo Song, **Jiwon Kim**.
KR 10-2066555, 2020.

[K6] "Method and computer program for handling trouble using packet-out message in software defined networking environment"
Hyunwoo Park, **Jiwon Kim**, Inwook Hwang, Jaeho Kim, Beomsoo Park, Yongjoo Song.
KR 10-1969304, 2019.

[K7] "Method, apparatus and computer program for defending software defined network"
Jiwon Kim, Hyunwoo Park, Inwook Hwang, Jaewoong Chung.
KR 10-1932656, 2018.

[K8] "Method and computer program for handling trouble using flow-mod message in software defined networking environment"
Hyunwoo Park, **Jiwon Kim**, Inwook Hwang, Jaeho Kim, Beomsoo Park, Yongjoo Song.
KR 10-1931543, 2018.

[K9] "Method, apparatus, and computer program for verifying host status information in a software defined network,"
Jiwon Kim, Inwook Hwang, Yongjoo Song.
KR 10-1931139, 2018.

[K10] "Method for atomic update of memory mapped files stored in non-volatile memory and control apparatus thereof"
Hwansoo Han, Jungsik Choi, **Jiwon Kim**.
KR 10-1881038, 2018.

Academic Services

Technical Program Committee

- IEEE Workshop on the Internet of Safe Things (**SafeThings**): 2023

External Reviewer

- ACM ASIA Conference on Computer and Communications Security (**ASIACCS**): 2024

- Network and Distributed System Security Symposium (**NDSS**): 2024

- International Symposium on Research in Attacks, Intrusions, and Defenses (**RAID**): 2023

Guest Lecture

- Intent-Based Network Security, CS 528, Network Security, Purdue University, Spring 2024

Teaching Assistant

Mar 2015 - Oct 2016 | **Sungkyunkwan University**, Suwon, Republic of Korea
- SWE2013 - Software Creative Project (Spring 2016)
- SWE3010 - Compiler Design (Fall 2015)
- ICE2002 - Data Structures (Fall 2015)
- GEDB029 - Basis and Practice in Programming (Spring 2015)

Awards

Aug 2023	College of Science Graduate Student Travel Grant, Purdue University
Aug 2020 - Aug 2024	Ross Fellowship, Purdue University
Aug 2018	Hall of Fame, Atto Research
Mar 2016 - Aug 2016	Simsan Scholarship, Sungkyunkwan University
Dec 2015	Outstanding Paper Award, Korea Institute of Information Scientists and Engineers
Mar 2015 - Aug 2016	Masters and Doctors Connected Track Scholarship, Sungkyunkwan University
Apr 2013	Dean's List, Sungkyunkwan University
Oct 2012	Dean's List, Sungkyunkwan University
Mar 2011 - Feb 2015	National Science & Technology Scholarship, Korea Student Aid Foundation