Sukwha Kyung

School of Computing and Augmented Intelligence
Arizona State University
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Research Interest

- Security management and orchestration of virtual network architectures including network slicing, network function virtualization (NFV), and software-defined networking (SDN)
- Security and privacy in LTE/5G networks

Education

Arizona State University – Tempe, AZ
Ph.D. student in Computer Science (Cybersecurity)   Jan 2018 – Present
- Research Topic: Security management in network softwarization
- Advisor: Prof. Gail-Joon Ahn

M.S. in Computer Science   Dec 2017
- Thesis: *HEF: A Hardware-Assisted Security Evaluation Framework*
- Advisor: Prof. Gail-Joon Ahn

B.S. in Computer Science   May 2015

Publication

1. *Unveiling SDN Controller Identity through Timing Side Channel*
   Sukwha Kyung, Jaejong Baek, and Gail-Joon Ahn.
   Proceedings of IEEE 15th International Conference on Network of the Future (NoF), 2024.

2. *Targeted Privacy Attacks by Finerprinting Mobile Apps in LTE Radio Layer*
   Jaejong Baek, PKD Soundrapandian, **Sukwha Kyung**, Ruoyu Wang, Yan Shoshitaishivili, Adam Doupé, Gail-Joon Ahn
   Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2023.

3. *I'm Spartacus, No, I'm Spartacus: Proactively Protecting Users from Phishing by Intentionally Triggering Cloaking Behavior*
   Penghui Zhang, Zhibo Sun, **Sukwha Kyung**, Hans Behrens, Zion Leonahenahe Basque, Haehyun Cho, Adam Oest, Ruoyu Wang, Tiffany Bao, Yan Shoshitaishvili, Gail-Joon Ahn, and Adam Doupé.
   Proceedings of the 29th ACM Conference on Computer and Communications Security (CCS), 2022.

4. *Towards a Reliable Firewall for Software-Defined Networks*
   Hongxin Hu, Wonkyu Han, **Sukwha Kyung**, Juan Wang, Gail-Joon Ahn, Ziming Zhao, and Hongda Li
   Computers & Security, Vol 87, p. 101597, 2019.

5. *Wi Not Calling: Practical Privacy and Availability Attacks in Wi-Fi Calling*
   Jaejong Baek, **Sukwha Kyung**, Haehyun Cho, Ziming Zhao, Yan Shoshitaishvili, Adam Doupé, Gail-Joon Ahn
   Proceedings of the ACM Annual Computer Security Applications Conference (ACSAC), 2018.

6. *Challenges and Preparedness of SDN-based Firewalls*
   Vaibhav Dixit, **Sukwha Kyung**, Ziming Zhao, Adam Doupé, Yan Shoshitaishvili, Gail-Joon Ahn
   Proceedings of the ACM International Workshop on SDN-NFV Sec, 2018.

7. *Science DMZ: SDN-Based Secured Cloud Testbed*
   Ankur Chowdhary, Vaibhav Hemant Dixit, Naveen Tiwari, **Sukwha Kyung**, Dijiang Huang, Gail-Joon Ahn

Proceeding of IEEE NFV-SDN, 2017.

8. *HoneyProxy: Design and Implementation of Next-Generation of Honeynet via SDN*
    Sukwha Kyung, Wonkyu Han, Naveen Tiwari, Vaibhav Hemant Dixit, Lakshmi Srinivas, Ziming Zhao, Adam Doupé, and Gail-Joon Ahn
    Proceedings of IEEE Conference on Communications and Network Security (CNS), 2017.

Patent

- *Systems and methods for blockchain-based automatic key generation*
  Jaejong Baek, **Sukwha Kyung**, Gail-Joon Ahn
  U.S. Patent 11588631, 2023.

Work Experience

- **National Renewable Energy Laboratory (NREL)** – Golden, CO   Jan 2022 – May 2023
  Graduate II – Cyber Security Intern
  Designed, deployed, configured, and maintained 5G radio access network (RAN) and core network (CN) for energy grid. Worked with Kubernetes, Open Air Interface (OAI). I also facilitated security assessment of the RAN and CN components in support of the research initiative.

- **Laboratory of Security Engineering for Future Computing (SEFCOM)**   Aug 2015 – Present
  Graduate Research Assistant at Arizona State University, Tempe, AZ. Conducting research on next-generation network architectures including SDN, NFV, and network slicing.

- **Intel & Arizona State University Collaborative Research**   Aug 2015 – Aug 2016
  Cryptographic performance assessment and verification of Intel QuickAssist Technology (QAT) on Open Network Platform, compatibility and functionality investigation of Intel QAT with HTTP/2, and educational curriculum development for SDN/NFV

- **iOS Application Developer**   Aug 2014 – Aug 2015
  Arizona State University, Tempe, AZ
  iPhone/Android Application Developer for School of Geographical Sciences and Urban Planning (Java, C#, MySQL)

Teaching

- **Guest Lecturer**
  Arizona State University
  Computer and Network Forensics (CSE 469)   Spring 2020
     Topic: Application of Blockchain
  Computer and Network Forensics (CSE 469)   2019, 2020, 2022, 2023
     Topic: Malware Forensics

- **Teaching Assistant**
  Arizona State University
  Computer and Network Forensics (CSE 469)   Spring 2021
  Introduction to Engineering (FSE 100)   Fall 2014, 2015

Talk

- *CDGym: Expandable, Model-Agnostic Cyber Deception Platform*
  Sukwha Kyung, Siyu Liu, Faris Kokulu, Tiffany Bao, Gail-Joon Ahn
  FloCon, 2024.

- *Demystifying Cyber Deception: Measuring Effectiveness of Game-Theoretic Cyber Deception Strategies*
Quarterly Workshop on Security Information Workers (WSIW), 2021.

Honors and Rewards

- **Cybersecurity Fellowship**
School of Computing, Informatics and Decision Systems Engineering
Arizona State University, Aug 2019.
- **Most Innovative Capability Award in Blockchain Innovation Challenge**
Research Enterprise
Arizona State University, Jun 2019.

Academic Service

- Shadow Program Committee
IEEE Symposium on Security and Privacy (S&P)
2021 Winter Session

- External Reviewer
ACM Conference on Data and Application Security and Privacy (CODASPY)
2017, 2020

Skill

- Open Air Interface (OAI), Open5GS, Open Source MANO (OSM), Open Network Operating System (ONOS), RYU, DPDK, Open vSwitch, OpenFlow, OpenStack, Kubernetes, TCP/IP, LTE/5G mobile network architectures (3GPP, 5GPP, NGMN), Software Defined Networking (SDN), Network Function Virtualization (NFV), Network Slicing, 5G SA RAN/CN.
- Language: Python, C, C++, Java, Rust

References

Gail-Joon Ahn (gahn@asu.edu)
Professor of Computer Science and Engineering
Fulton Entrepreneurial Professor
School of Computing and Augmented Intelligence
Co-Director, Laboratory of Security Engineering for Future Computing (SEFCOM)
School of Computing, Informatics and Decision Systems Engineering
Arizona State University
Samsung Research

Jaejong Baek (jbaek7@asu.edu)
Assistant Teaching Professor
School of Computing and Augmented Intelligence
Arizona State University