Seunghoon Woo

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Open-source Software Security; Software Composition Analysis;
Software Vulnerability Detection; Code Clone Detection.

Earned Degrees

M.S. & Ph.D. in Computer Science and Engineering, Korea University — Sep 2016 - Aug 2022

B.S. in Computer Science and Engineering, Korea University — Mar 2010 - Feb 2016

Working Experiences

Center for Software Security and Assurance, Research Professor — Sep 2022 - Present
Researching open-source software security — *Seoul, Korea*

IOTCUBE Inc., Chief Scientist — May 2022 - Present
Developed open-source security techniques (https://iotcube.com) — *Seoul, Korea*

Center for Software Security and Assurance, Researcher & Developer — Mar 2016 - Present
Developed automated software security analysis tools (https://iotcube.net) — *Seoul, Korea*

National University of Singapore, Research Intern — Jan 2017 - Feb 2017
Developed a DDoS attack simulation tool (advisor: Prof. Minsuk Kang) — *Singapore*

Samsung Electronics, Employee — Dec 2015 - Jan 2016
Developed a multi-platformed application for supporting Smart TVs — *Suwon, Korea*

DoDotDo (startup), Core Developer — Jan 2015 - Sep 2015
Developed a smart watch-based hotel management system — *Seoul, Korea*

Samsung Electronics, Student Intern — Jun 2014 - Aug 2014
Developed a multi-platformed application for supporting Smart TVs — *Suwon, Korea*

Publications

[1] Hyunji Hong, **Seunghoon Woo**, Eunjin Choi, Jihyun Choi, and Heejo Lee, "xVDB: A High-Coverage Approach for Constructing a Vulnerability Database," **IEEE ACCESS (IF: 3.476)**, 2022.

[2] **Seunghoon Woo** (advisor: Prof. Heejo Lee), "Detecting Software Vulnerabilities for Mitigating Risks of Open-Source Reuse," *Ph.D.Thesis, Korea University*, August 2022.

[3] **Seunghoon Woo**, Hyunji Hong, Eunjin Choi, and Heejo Lee, "MOVERY: A Precise Approach for Modified Vulnerable Code Clone Discovery from Modified Open-Source Software Components (TO APPEAR)," *In Proceedings of the 31st USENIX Security Symposium* (**Security 2022**), August 2022.

[4] Haram Park, Carlos Nkuba Kayembe, **Seunghoon Woo**, and Heejo Lee, "L2Fuzz: Discovering Bluetooth L2CAP Vulnerabilities Using Stateful Fuzz Testing," *In Proceedings of the 52nd IEEE/IFIP International Conference on Dependable Systems and Networks* (**DSN 2022**), June 2022. (Acceptance rate: 18.7%)

[5] Hyunji Hong, **Seunghoon Woo**, and Heejo Lee, "DICOS: Discovering Insecure Code Snippets from Stack Overflow Posts by Leveraging User Discussions," *In Proceedings of the Annual Computer Security Applications Conference* (**ACSAC 2021**), December 2021. (Acceptance rate: 24.5%)

[6] **Seunghoon Woo**, Dongwook Lee, Sunghan Park, Heejo Lee, and Sven Dietrich, "V0Finder: Discovering the Correct Origin of Publicly Reported Software Vulnerabilities," *In Proceedings of the 30th USENIX Security Symposium* (**Security 2021**), August 2021. (Acceptance rate: 19.0%)

[7] Seongkyeong Kwon, **Seunghoon Woo**, Gangmo Seong, and Heejo Lee, "OctoPoCs: Automatic Verification of Propagated Vulnerable Code Using Reformed Proofs of Concept," *In Proceedings of the 51st IEEE/IFIP International Conference on Dependable Systems and Networks* (**DSN 2021**), June 2021. (Acceptance rate: 16.3%)

[8] **Seunghoon Woo**, Sunghan Park, Seulbae Kim, Heejo Lee, and Hakjoo Oh, "CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse," *In Proceedings of the 43rd International Conference on Software Engineering* (**ICSE 2021**), May 2021. (Acceptance rate: 22.4%)

[9] Seulbae Kim, **Seunghoon Woo**, Heejo Lee, and Hakjoo Oh, "VUDDY: A Scalable Approach for Vulnerable Code Clone Discovery," *In Proceedings of the 38th IEEE Symposium on Security and Privacy* (**S&P 2017**), May 2017. (Acceptance rate: 12.9%)

[10] Seulbae Kim, **Seunghoon Woo**, Heejo Lee, and Hakjoo Oh, "Poster: IoTcube: an automated analysis platform for finding security vulnerabilities", *In 2017 IEEE Symposium on Poster presented at Security and Privacy* (**S&P Poster 2017**), May 2017.

Projects

Project Manager, International Joint Research — Jun 2019 - Present
Development of Automated Vulnerability Discovery Technologies for Blockchain Platform Security

Researcher & Developer, University of Southern California & LA City — Nov 2017 - Present
The Intelligent IoT Integrator (I3): LA Smart City Project

Main Researcher — Apr 2020 - Oct 2020
Verifying Open-Source Software Reliability for Reinforcing Operating System Security

Main Researcher — May 2018 - Oct 2018
Development of DNS-based Lightweight Framework for Addressing Abnormal Network Behaviors

Project Manager, Office of Naval Research — Sep 2017 - Sep 2019
A Study of a DDoS-resilient Network Architecture through Traffic Classification and Isolation

Researcher & Developer, International Joint Research — Feb 2016 - May 2018
Development of Vulnerability Discovery Technologies for IoT Software Security

Patent

[1] Heejo Lee and **Seunghoon Woo**, METHOD FOR IDENTIFYING OPEN-SOURCE SOFTWARE COMPONENTS AT THE SOURCE-CODE LEVEL, APPLICATION, US (17525126, Nov 2021)

[2] Heejo Lee and **Seunghoon Woo**, METHOD FOR IDENTIFYING OPEN-SOURCE SOFTWARE COMPONENTS AT THE SOURCE-CODE LEVEL, APPLICATION, EUROPE (EP21202849.2, Oct 2021)

[3] Heejo Lee and **Seunghoon Woo**, METHOD FOR IDENTIFYING OPEN-SOURCE SOFTWARE COMPONENTS AT THE SOURCE-CODE LEVEL, APPLICATION, KOREA (10-2021-0010585, Jan 2021)

Standard

[1] Heejo Lee, **Seunghoon Woo**, Hyunji Hong, Choonsik Park, Yunseong Choi, Structured Software Vulnerability Database Information Expression for Vulnerability Detection and Resolution, Korea (TTAK.KO-12.0384, Jun 2022)

Open-source Contributions (Selected)

Apple, Fixing security vulnerabilities (with Haram Park) — Dec 2021
Discovered DoS vulnerabilities in Apple tvOS, watchOS, iOS, iPadOS, and macOS Monterey Bluetooth stack

XPDF, Fixing security vulnerabilities (CVE-2020-35376 assigned) — Dec 2020
Detected a stack consumption vulnerability in XPDF (https://www.xpdfreader.com)

Redis, Fixing security vulnerabilities (CVE-2020-14147 assigned) Feb 2020
Detected a possible stack-based buffer overflow vulnerability in Redis (https://github.com/redis/redis)

Stepmania, Fixing security vulnerabilities (CVE-2020-20412 assigned) Sep 2019
Detected a improper validation vulnerability in Stepmania (https://github.com/stepmania/stepmania)

Godot, Fixing security vulnerabilities Jul 2019
Detected a possible remote code execution vulnerability in Godot (https://github.com/godotengine/godot)

LibGDX, Fixing security vulnerabilities Jul 2019
Detected a possible remote code execution vulnerability in LibGDX (https://github.com/libgdx/libgdx)

Talks and Presentations (Selected)

Supply Chain Security Workshop 2022 Jul 2022
Open Source Vulnerability Detection for Supply Chain Security

IoTcube Conference 2021 Aug 2021
Analysis of Reused Open-Source Software Components for Software Bill of Materials

USENIX Security 2021, Paper Presentation Aug 2021
V0Finder: Discovering the Correct Origin of Publicly Reported Software Vulnerabilities

ICSE 2021, Paper Presentation May 2021
CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse

KIISC Online Short Course 2021 Nov 2020
Verification Technology for Open-Source Software Security

IoTcube Conference 2019 Aug 2019
Automatic Vulnerability Analysis Framework Applied to LA Smart City Projects

Workshop among Asian Information Security Labs (WAIS) 2018 Jan 2018
Identifying Constituent OSS in Software through Code Similarity Detection

IEEE S&P Poster 2017 May 2017
Poster presentation: "IoTcube: an automated analysis platform for finding security vulnerabilities"

Honors (Selected)

Academic Scholarship, Korea University 2010 2R, 2011 1R, 2013 2R
Foreign Regular Course Major Study Scholarship, Korea University 2013 2R
National Excellence Scholarship (Science and Engineering), Korea University 2014 1R - 2015 2R
BK21PLUS Scholarship, Brain Korea 21 2017 1R - 2021 1R