Seunghoon Woo

Assistant Professor (@KOREA UNIVERSITY), Chief Scientist (@LABRADOR LABS)

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SOFTWARE SECURITY; SOFTWARE VULNERABILITY DETECTION;
SOFTWARE COMPOSITION ANALYSIS; CODE CLONE DETECTION.

EARNED DEGREES

- **M.S. & Ph.D.** in Computer Science and Engineering, Korea University (GPA 4.45/4.5)   Sep 2016 - Aug 2022
- **B.S.** in Computer Science and Engineering, Korea University (GPA 4.22/4.5)   Mar 2010 - Feb 2016

DOCTORAL DISSERTATION

- Detecting Software Vulnerabilities for Mitigating Risks of Open-Source Reuse (Advisor: Prof. Heejo Lee)   Aug 2022

WORKING EXPERIENCES

- **Korea University, Assistant Professor**   Sep 2023 - Present
- **LABRADOR LABS Inc., Chief Scientist**   May 2022 - Present
- **Center for Software Security and Assurance (CSSA),** Research Professor   Sep 2022 - Aug 2023
- **National University of Singapore,** Research Intern   Dec 2016 - Feb 2017
- **Samsung Electronics,** Student Intern & Employee   Jun 2014 - Aug 2014, Dec 2015 - Jan 2016
- **DoDotDo (startup),** Core Developer   Jan 2015 - Sep 2015

REVIEWER EXPERIENCES

- **TDSC: IEEE Transactions on Dependable and Secure Computing**   2024
- **TSE: IEEE Transactions on Software Engineering**   2023
- **TOSEM: ACM Transactions on Software Engineering and Methodology**   2023
- **SP&E: Software: Practice and Experience**   2023
- **IEEE Transactions on Vehicular Technology**   2022
- **Journal of Communications and Networks**   2021

PUBLICATIONS - INTERNATIONAL CONFERENCE

[1] **BLOOMFUZZ: Unveiling Bluetooth L2CAP Vulnerabilities via State Cluster Fuzzing with Target-Oriented State Machines (To appear)**
Pyeongju Ahn, Yeonseok Jang, Seunghoon Woo*, and Heejo Lee* (* Co-corresponding authors)
29th European Symposium on Research in Computer Security (ESORICS 2024)
Bydgoszcz, Poland, Sep 2024 (Acceptance rate: N/A)

[2] **CNEPS: A Precise Approach for Examining Dependencies among Third-Party C/C++ Open-Source Components (To appear)**
Yoonjong Na, Seunghoon Woo*, Joomyeong Lee, and Heejo Lee* (* Co-corresponding authors)
ICSE 2024: International Conference on Software Engineering (**Top-tier conference**)
Lisbon, Portugal, Apr 2024 (Acceptance rate: N/A)

[3] **V1SCAN: Discovering 1-day Vulnerabilities in Reused C/C++ Open-source Software Components Using Code Classification Techniques**
Seunghoon Woo, Eunjin Choi, Heejo Lee, and Hakjoo Oh
Security 2023: 32nd USENIX Security Symposium (**Top-tier conference**)
Anaheim, USA, Aug 2023 (Acceptance rate: 29.0%)

[4] **MOVERY: A Precise Approach for Modified Vulnerable Code Clone Discovery from Modified Open-Source Software Components**
Seunghoon Woo, Hyunji Hong, Eunjin Choi, and Heejo Lee
Security 2022: 31st USENIX Security Symposium (**Top-tier conference**)
Boston, USA, Aug 2022 (Acceptance rate: 18.0%)

[5] **L2Fuzz: Discovering Bluetooth L2CAP Vulnerabilities Using Stateful Fuzz Testing**
Haram Park, Carlos Nkuba Kayembe, Seunghoon Woo, and Heejo Lee
DSN 2022: 52nd IEEE/IFIP International Conference on Dependable Systems and Networks
Baltimore, USA, Jun 2022 (Acceptance rate: 18.7%)

[6] **DICOS: Discovering Insecure Code Snippets from Stack Overflow Posts by Leveraging User Discussions**
Hyunji Hong, Seunghoon Woo, and Heejo Lee
ACSAC 2021: Annual Computer Security Applications Conference
Virtual, Dec 2021 (Acceptance rate: 24.5%)

[7] **V0Finder: Discovering the Correct Origin of Publicly Reported Software Vulnerabilities**
Seunghoon Woo, Dongwook Lee, Sunghan Park, Heejo Lee, and Sven Dietrich
Security 2021: 30th USENIX Security Symposium (**Top-tier conference**)
Virtual, Aug 2021 (Acceptance rate: 19.0%)

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

[9] **CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse**
Seunghoon Woo, Sunghan Park, Seulbae Kim, Heejo Lee, and Hakjoo Oh
ICSE 2021: 43rd International Conference on Software Engineering (**Top-tier conference**)
Virtual, May 2021 (Acceptance rate: 22.4%)

[10] **VUDDY: A Scalable Approach for Vulnerable Code Clone Discovery**
Seulbae Kim, Seunghoon Woo, Heejo Lee, and Hakjoo Oh
S&P 2017: 38th IEEE Symposium on Security and Privacy (**Top-tier conference**)
San Jose, USA, May 2017 (Acceptance rate: 12.9%)

PUBLICATIONS - INTERNATIONAL JOURNAL

[1] **ZMAD: Lightweight Model-based Anomaly Detection for the Structured Z-Wave Protocol**
Carlos Nkuba Kayembe, Seunghoon Woo, Heejo Lee, Sven Dietrich
IEEE ACCESS (SCIE/IF: 3.476), Jun 2023

[2] **CIRCUIT: A JavaScript Memory Heap-Based Approach for Precisely Detecting Cryptojacking Websites**
Seunghoon Woo*, Hyunji Hong*, Sunghan Park*, Jeongwook Lee, and Heejo Lee (* contributed equally)
IEEE ACCESS (SCIE/IF: 3.476), Sep 2022

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

PUBLICATIONS - DOMESTIC

[1] **Blockchain Security Threats and Analysis in the Web 3.0 Era**
Seunghoon Woo, Geonwoo Lee, Taejun Lee, Yunseong Choi, Heejo Lee, Kyeongsik Min, and Jinsang Park
KISA INSIGHT, 2023

[2] **Trends in Open-source Software Vulnerability Analysis and Detection Technology**
Seunghoon Woo, Hyunji Hong, and Heejo Lee
OSIA Standards & Technology Review, 2022

[3] **Open-source Software Vulnerability Detection Techniques for Enhancing Supply Chain Security**
Hyunji Hong, Seunghoon Woo, and Heejo Lee
Review of KIISC, 2022

PATENT

[1] **METHOD AND APPARATUS FOR DETECTING PROPAGATION OF SECURITY VULNERABILITIES OF OPEN SOURCE SOFTWARE INHERENT IN COMPONENTS OF TARGET SOFTWARE**
Heejo Lee and Seunghoon Woo
APPLICATION, Korea (10-2024-0023236), Feb 2024

[2] **METHOD FOR IDENTIFYING OPEN-SOURCE SOFTWARE COMPONENTS AT THE SOURCE-CODE LEVEL**
Heejo Lee and Seunghoon Woo
REGISTRATION, US (11836486), Dec 2023

[3] **METHOD FOR IDENTIFYING OPEN-SOURCE SOFTWARE COMPONENTS AT THE SOURCE-CODE LEVEL**
Heejo Lee and Seunghoon Woo
REGISTRATION, Korea (10-2476358), Dec 2022

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

STANDARD

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

PROJECTS (SELECTED)

- **Development of SBOM Technologies for Securing Software Supply Chains (IITP/MSIT)**
Researcher
Apr 2022 - Present

- **Development of Automated Vulnerability Discovery Technologies for Blockchain Security (IITP/MSIT)**
  Project Manager & Researcher & Developer
  International Joint Research (ETH Zurich)
  Jun 2019 - Dec 2022

- **The Intelligent IoT Integrator (I3): LA Smart City Project**
  Researcher & Developer
  International Joint Research (City of LA, University of Southern California, Amazon, etc.)
  Nov 2017 - Present

- **Verifying Open-Source Software Reliability for Reinforcing Operating System Security (NSR)**
  Researcher & Developer
  Apr 2020 - Oct 2020

- **Examining Software Vulnerabilities on Platform for IoT-based Home Appliance Consulting Service (KETI)**
  Researcher & Analyst
  Feb 2020 - Apr 2020

- **Development of DNS-based Lightweight Framework for Addressing Abnormal Network Behaviors (KISTI)**
  Researcher & Developer
  May 2018 - Oct 2018

- **A Study of a DDoS-resilient Network Architecture through Traffic Classification and Isolation (US ONR)**
  Project Manager
  International Joint Research (ETH Zurich, Office of Naval Research)
  Sep 2017 - Sep 2019

- **Development of Vulnerability Discovery Technologies for IoT Software Security (IITP/MSIT)**
  Researcher & Developer
  International Joint Research (ETH Zurich, Carnegie Mellon University, University of Oxford)
  Feb 2016 - May 2018

Real-world Software Contributions (Selected)

Detection tool	VUDDY (S&P 2017)	CENTRIS (ICSE 2021)	V0Finder (Security 2021)	OctoPoCs (DSN 2021)	DICOS (ACSAC 2021)	L2Fuzz (DSN 2022)	MOVERY (Security 2022)	Total
#Reported vulnerabilities	15	5	20	3	4	7	11	**65**

- **Xiaomi,** Resolved security vulnerabilities   Dec 2023
  Detected a Bluetooth vulnerability in Xiaomi devices

- **LibGDX,** Resolved security vulnerabilities   Mar 2022
  Detected a possible remote code execution vulnerability in LibGDX (https://github.com/libgdx/libgdx)

- **Android,** Resolved security vulnerabilities in Android Bluetooth stack   Dec 2021
  Discovered DoS vulnerabilities in Android Bluetooth stack

- **Apple,** Resolved security vulnerabilities   Dec 2021
  Discovered DoS vulnerabilities in Apple tvOS, watchOS, iOS, iPadOS, and macOS Monterey Bluetooth stack

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

- **Gif2png,** Corrected CVE information   Feb 2020
  Corrected wrong CVE information (CVE-2019-17371)

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

- **Stepmania,** Resolved security vulnerabilities (CVE-2020-20412 assigned)   Sep 2019
  Detected a improper validation vulnerability in Stepmania (https://github.com/stepmania/stepmania)
- **Godot,** Resolved security vulnerabilities   Jul 2019
  Detected a possible remote code execution vulnerability in Godot (https://github.com/godotengine/godot)

OPEN-SOURCE SOFTWARE ARTIFACTS

[1] **V1SCAN**, A tool for discovering 1-day security vulnerabilities (Security 2023)
   https://github.com/WOOSEUNGHOON/V1SCAN-public

[2] **MOVERY**, A tool for discovering propagated vulnerable codes (Security 2022)
   https://github.com/WOOSEUNGHOON/MOVERY-public

[3] **V0Finder**, A tool for discovering the correct origin of software vulnerabilities (Security 2021)
   https://github.com/WOOSEUNGHOON/V0Finder-public

[4] **CENTRIS**, A tool for identifying open-source software components (ICSE 2021)
   https://github.com/WOOSEUNGHOON/CENTRIS-public

TALKS AND PRESENTATIONS (SELECTED)

- **USENIX Security 2023,** Paper Presentation   Aug 2023
  V1SCAN: Discovering 1-day Vulnerabilities in Reused C/C++ Open-source Software Components   *Anaheim*, USA
  Using Code Classification Techniques
- **NetSec-KR 2023**   Apr 2023
  Discovering Open-source Software Vulnerabilities for Supply Chain Security   *Seoul*, Korea
- **Blockchain Grand Week**   Dec 2022
  Vulnerabilities and Security in Blockchain Software   *Busan*, Korea
- **UNIST Seminar**   Dec 2022
  Vulnerabilities and Security in Open-Source Software   *Virtual*
- **USENIX Security 2022,** Paper Presentation   Aug 2022
  MOVERY: A Precise Approach for Modified Vulnerable Code Clone Discovery from Modified Open-Source   *Boston*, USA
  Software Components
- **Supply Chain Security Workshop**   Jul 2022
  Open Source Vulnerability Detection for Supply Chain Security   *Seoul*, Korea
- **IoTcube Conference 2021**   Aug 2021
  Analysis of Reused Open-Source Software Components for Software Bill of Materials   *Seoul*, Korea
- **USENIX Security 2021,** Paper Presentation   Aug 2021
  V0Finder: Discovering the Correct Origin of Publicly Reported Software Vulnerabilities   *Virtual*
- **ICSE 2021,** Paper Presentation   May 2021
  CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse   *Virtual*
- **KIISC Online Short Course**   Nov 2020
  Verification Technology for Open-Source Software Security   *Virtual*
- **Workshop among Asian Information Security Labs (WAIS) 2018**   Jan 2018
  Identifying Constituent OSS in Software through Code Similarity Detection   *Wuhan*, China
- **IEEE S&P Poster 2017**, Poster Presentation   May 2017
  IoTcube: an automated analysis platform for finding security vulnerabilities   *San Jose*, USA