

SEULBAE KIM

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INTERESTS

Systems security; Automated vulnerability detection; Cyber-physical Systems

EDUCATION

Georgia Institute of Technology

Aug 2018 - Present

Ph.D. in Computer Science, College of Computing

Advisor: Dr. Taesoo Kim

Korea University

Mar 2016 - Aug 2018

M.S. in Computer Science and Engineering

Thesis: Scalable Approach for Code Clone Detection and its Application in Practice

Advisor: Dr. Heejo Lee

Korea University

Mar 2010 - Feb 2016

B.S. in Computer Science and Engineering

Goyang Foreign Language High School

Mar 2007 - Feb 2010

Major: English

PUBLICATIONS - CONFERENCE

- [1] **CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse.**
Seunghoon Woo, Sunghan Park, [Seulbae Kim](#), Heejo Lee, and Hakjoo Oh.
In Proceedings of the 43rd International Conference on Software Engineering (ICSE 2021), Madrid, Spain, May 2021. [[pdf](#)] [[code](#)]
- [2] **Finding Semantic Bugs in File Systems with an Extensible Fuzzing Framework.**
[Seulbae Kim](#), Meng Xu, Sanidhya Kashyap, Jungyeon Yoon, Wen Xu, and Taesoo Kim.
In Proceedings of the 27th ACM Symposium on Operating Systems Principles (SOSP 2019), Ontario, Canada, October 2019. (acceptance rate: 13.8% = 38/276) [[pdf](#)] [[code](#)]
- [3] **VUDDY: A Scalable Approach for Vulnerable Code Clone Discovery.**
[Seulbae Kim](#), Seunghoon Woo, Heejo Lee and Hakjoo Oh.
In Proceedings of the 38th IEEE Symposium on Security and Privacy (S&P 2017), San Jose, CA, May 2017. (acceptance rate: 13.3% = 60/450) [[pdf](#)] [[code](#)]
- [4] **SIGMATA: Storage Integrity Guaranteeing Mechanism against Tampering Attempts for Video Event Data Recorders.**
Hyuckmin Kwon, [Seulbae Kim](#) and Heejo Lee.
In Proceedings of the 7th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2016), Orlando, FL, March 2016. (awarded the session's best paper) [[pdf](#)]

PUBLICATIONS - JOURNAL

- [1] **Riding the IoT Wave with VFuzz: Discovering Security Flaws in Smart Home**
Carlos Nkuba, [Seulbae Kim](#), Sven Dietrich, and Heejo Lee.
IEEE Access, Volume 10, pp. 1775-1789, December 2021. [[pdf](#)] [[code](#)] [[CVE summary](#)]
- [2] **Finding Bugs in File Systems with an Extensible Fuzzing Framework**
[Seulbae Kim](#), Meng Xu, Sanidhya Kashyap, Jungyeon Yoon, Wen Xu, and Taesoo Kim.
ACM Transactions on Storage, Volume 16, Issue 2, May 2020. [[pdf](#)]
- [3] **Software systems at risk: An empirical study of cloned vulnerabilities in practice.**
[Seulbae Kim](#) and Heejo Lee.
Computers & Security, Volume 77, pp. 720-736, August 2018. [[pdf](#)]

PATENTS

- [1] Heejo Lee and [Seulbae Kim](#). **Apparatus and Method for Detecting Code Cloning of Software**, US 10146532 B2, December 2018.
- [2] Heejo Lee and [Seulbae Kim](#). **Apparatus and Method for Detecting Code Cloning of Software**, KR 10-1780233, September 2017.

SKILLS

[1] Programming Languages

- C/C++
Hydra: Framework for fuzzing file systems [[code](#)]
- Python
SymC3: Symbolic file system crash consistency checker [[code](#)]
VUDDY: Scalable and accurate vulnerable code clone detector [[code](#)]
- Java
FuncParser: Robust function parser utilizing an island grammar [[code](#)]
- HTML, CSS, PHP, JavaScript
IoTcube: Platform for automated software security analysis [[link](#)]
- Assembly Languages (x86, x86_64)

[2] Hacking/CTF

IDA, IDAPython, pwntools, Metasploit

[3] Software Testing

American Fuzzy Lop (AFL), KLEE, angr

[4] Misc

Linux Kernel Development, KVM, QEMU, Docker, MySQL, MariaDB, MongoDB, Flask, LLVM

TALKS AND PRESENTATIONS

- [1] “Finding Semantic Bugs in File Systems with an Extensible Fuzzing Framework,” Paper presentation at the 27th ACM Symposium on Operating Systems Principles (SOSP 2019), October 2019.

- [2] “Automated Vulnerable Code Clone Detection in Open Source, and its Best Practice,” Invited talk at Viterbi School of Engineering, University of Southern California, November 2017.
- [3] “Case Study and Exercise on Software Vulnerability Analysis,” Lecture and training session at the 3rd Korea Institute of Information Security and Cryptography (KIISC) Short-term Seminar, September 2017.
- [4] “VUDDY: A Scalable Approach for Vulnerable Code Clone Discovery,” Paper presentation at the 38th IEEE Symposium on Security and Privacy, May 2017.
- [5] “IoTcube: An Automated Analysis Platform for Finding Security Vulnerabilities,” Poster presentation at the 38th IEEE Symposium on Security and Privacy, May 2017.
- [6] “SIGMATA: Storage Integrity Guaranteeing Mechanism against Tampering Attempts for Video Event Data Recorders,” Paper presentation at the 7th Multi-Conference on Complexity, Informatics and Cybernetics, March 2016.

TEACHING EXPERIENCE

- **CS6265: Information Security Lab**, Georgia Institute of Technology *Aug 2021 - Dec 2021*
Teaching Assistant
- **CS6265: Information Security Lab**, Georgia Institute of Technology *Jan 2020 - Apr 2020*
Teaching Assistant
- **CS6265: Information Security Lab**, Georgia Institute of Technology *Aug 2019 - Dec 2019*
Teaching Assistant - Managed the Capture The Flag (CTF) game infrastructure, on which students connect to, solve hacking challenges, and submit flags; Held recitation sessions twice a week, teaching and guiding students about various hacking skills required throughout the semester. Student evaluation - overall effectiveness: 4.9/5.0
- **CRE642: Trusted Computing**, Korea University *Sep 2016 - Dec 2016*
Teaching Assistant - Covered the concurrent issues associated with promoting a secure computing environment; Scored the assignments and the presentations of 20 graduate students.
- **CNCE220: Theory of Computation**, Korea University *Mar 2016 - June 2016*
Teaching Assistant - Covered the basics of the Theory of Computation, such as finite automata, context-free grammars, regular languages, and regular expressions; Set and managed assignments of 93 undergraduate students, had office hours every week, answered questions in person and on-line, marked assignments, and proctored exams.

WORK EXPERIENCE

- Data Science and System Security Team, NEC Labs America** *May 2020 - Aug 2020*
Research Intern *Princeton, NJ, USA*
 - Project: Finding misbehaviors of autonomous driving systems through feedback-driven fuzzing
 - Product: AutoFuzzer
- Center for Software Security and Assurance (CSSA)** *Nov 2015 - Feb 2018*
Core Researcher & Developer *Seoul, Korea*
 - Led a project on the development of vulnerability discovery technologies for IoT software security.
 - Product: IoTcube, a platform for automated vulnerability testing (<https://iotcube.net>)

Cylab, Carnegie Mellon University
Visiting Researcher

Jan 2017 - Feb 2017
Pittsburgh, PA, USA

- Worked on the automated attack-vector analysis for IoT firmware.

Republic of Korea Army
Radio & computer systems operator

Sep 2011 - Jun 2013
Paju-si, Gyeonggi-do, South Korea

- Served in the RoK Army as an active duty soldier.
- Deployed and managed an intrusion detection system for a surveillance camera network, programmed a vessel monitoring system, and managed various signal equipment.

AWARDS & SCHOLARSHIPS

Thank a Teacher Program Award (CS6265)	Georgia Tech	May, 2020
Thank a Teacher Program Award (CS6265)	Georgia Tech	Dec, 2019
DEFCON 27 CTF finals, #8 as r00timentary	Las Vegas, NV	Aug, 2019
Honors Scholarship	Korea University	2015