Dokyung Song

D704, Engineering Hall #4   Email: dokyungs@yonsei.ac.kr
Yonsei University   Homepage: https://cysec.yonsei.ac.kr/~dokyungs
Seoul, South Korea 03722

Research Interests

My research interests lie at the intersection of systems, security, and programming languages. In particular, I am interested in finding and understanding vulnerabilities in system software including, but not limited to, operating system kernels, web browsers, and compilers.

Education

Dec. 2020	Ph.D., Computer Science	University of California, Irvine

– Dissertation Title: "Precise and Efficient Dynamic Analysis of Systems Software"
– Advisor: Michael Franz

Mar. 2019	M.S., Computer Science	University of California, Irvine
Feb. 2014	B.S., Electrical and Computer Engineering	Seoul National University, Korea

Academic Appointments

Mar. 2021 – *now*	*Assistant Professor*, Computer Science	Yonsei University, Korea
Jan. 2021 – Jan. 2021	*Post-Doctoral Scholar*, Computer Science	University of California, Irvine
Jun. 2019 – Jul. 2019	*Visiting Researcher*, Security in Telecommunications (*Invited by Prof. Jean-Pierre Seifert*)	Technische Universität Berlin, Germany

Employment

Jun. 2020 – Sep. 2020	*Software Engineering Intern*, C/C++ Dynamic Analysis.	Google
Jun. 2018 – Sep. 2018	*Software Engineering Intern*, Fuchsia OS Security.	Google
Jun. 2017 – Sep. 2017	*Interim Engineering Intern*, Product Security Initiative.	Qualcomm
Feb. 2014 – Aug. 2016	*Senior Member of Technical Staff*, Server Technologies.	Oracle
Oct. 2013 – Dec. 2013	*Research Intern*.	SAP Labs Korea
Feb. 2010 – Feb. 2013	*Associate Programmer*.	Smilegate

Publications

Refereed Conference Papers

C7. Jinwoo Choi, Jaeyeon Kim, Chaemin Lim, Suhyun Lee, Jinhoo Lee, **Dokyung Song**, and Youngsok Kim; "**GuardiaNN: Fast and Secure On-Device Inference in TrustZone Using Embedded SRAM and Cryptographic Hardware.**" In *Proceedings of the 23rd ACM/IFIP International Middleware Conference (Middleware)*, November 2022. (To appear)

C6. Geunwoo Kim, Sanghyun Hong, Michael Franz, and **Dokyung Song**; "**Improving Cross-Platform Binary Analysis using Representation Learning via Graph Alignment.**" In *Proceedings of the 31st ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA)*, July 2022. (To appear) (61 papers accepted out of 250 paper submissions = 24.4%)

C5. **Dokyung Song**, Felicitas Hetzelt, Jonghwan Kim, Brent Byunghoon Kang, Jean-Pierre Seifert, and Michael Franz; "**Agamotto: Accelerating Kernel Driver Fuzzing with Lightweight Virtual Machine Checkpoints.**" In *Proceedings of the 29th USENIX Security Symposium (USENIX Security)*, August 2020. (157 papers accepted out of 977 paper submissions = 16.1%)

C4. Alexios Voulimeneas, **Dokyung Song**, Fabian Parzefall, Yeoul Na, Per Larsen, Michael Franz, and Stijn Volckaert; "**Distributed Heterogeneous N-Variant Execution.**" In *Proceedings of the 17th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment (DIMVA)*, June 2020. (13 papers accepted out of 45 submissions = 28.9%)

C3. **Dokyung Song**, Julian Lettner, Prabhu Rajasekaran, Yeoul Na, Stijn Volckaert, Per Larsen, and Michael Franz; "**SoK: Sanitizing for Security.**" In *Proceedings of the 40th IEEE Symposium on Security and Privacy (IEEE S&P)*, May 2019. (84 papers accepted out of 673 submissions + 10 revised paper from the previous year = 12.5%)

C2. **Dokyung Song**, Felicitas Hetzelt, Dipanjan Das, Chad Spensky, Yeoul Na, Stijn Volckaert, Giovanni Vigna, Christopher Kruegel, Jean-Pierre Seifert, and Michael Franz; "**PeriScope: An Effective Probing and Fuzzing Framework for the Hardware-OS Boundary.**" In *Proceedings of the 26th Network and Distributed System Security Symposium (NDSS)*, February 2019. (89 papers accepted out of 521 submissions = 17%)

* Top 10 Finalists, Applied Research Competition, CSAW, November 2019

C1. Julian Lettner, **Dokyung Song**, Taemin Park, Per Larsen, Stijn Volckaert, and Michael Franz; "**PartiSan: Fast and Flexible Sanitization via Run-time Partitioning.**" In *Proceedings of the 21st International Symposium on Research in Attacks, Intrusions and Defenses (RAID)*, September 2018. (33 papers accepted out of 145 submissions = 23%)

Refereed Workshop Papers

W1. Alexios Voulimeneas, **Dokyung Song**, Per Larsen, Michael Franz, and Stijn Volckaert; "**dMVX: Secure and Efficient Multi-Variant Execution in a Distributed Setting**" In *Proceedings of the 14th European Workshop on Systems Security. (EuroSec)*, April 2021.

Professional Service

1. Session Chair, 20th Workshop on Privacy in the Electronic Society (WPES), 2021.

2. Workshop Co-Chair, ACM Conference on Computer and Communications Security (CCS), Seoul, South Korea, 2021.

3. Reviewer, ACM Transactions on Design Automation of Electronic Systems (TODAES), 2020, 2021.

4. Poster Jury Member, IEEE Symposium on Security and Privacy (IEEE S&P), 2019.

5. Student Program Committee Member, IEEE Symposium on Security and Privacy (IEEE S&P), 2019.

Teaching

1. Instructor, Introduction to Computer Science (CSI 2106), Yonsei University, Seoul, South Korea, Summer 2022.

2. Instructor, Information Security (CSI 4109), Yonsei University, Seoul, South Korea, Spring 2022.

3. Instructor, Open Source Projects (CSI 2115), Yonsei University, Seoul, South Korea, Fall 2021.

4. Instructor, AIM Adventure Design (ENG 2010), Yonsei University, Seoul, South Korea, Fall 2021.

5. Instructor, Information Security (CSI 4109), Yonsei University, Seoul, South Korea, Spring 2021.

6. Teaching Assistant, Data Structure Implementation and Analysis (ICS 46), University of California, Irvine, Spring 2017.

7. Teaching Assistant, Data Structure Implementation and Analysis (ICS 46), University of California, Irvine, Fall 2018.

Talks

1. Precise and Efficient Dynamic Analysis of Systems Software. Ph.D. Dissertation Defense, University of California, Irvine, CA, December 2020.

2. Finding Vulnerabilities in Software Systems. Yonsei University, September 2020.

3. Improving libFuzzer using FuzzBench (Intern Talk). Google, September 2020.

4. Agamotto: Accelerating Kernel Driver Fuzzing with Lightweight Virtual Machine Checkpoints. USENIX Security Symposium (USENIX Security), Virtual Attendance, Irvine, CA, August 2020.

5. PeriScope: An Effective Probing and Fuzzing Framework for the Hardware-OS Boundary. Black Hat USA 2019, Las Vegas, NV, August 2019.

6. Dynamic Analysis Techniques for Finding Software Vulnerabilities in C/C++ Programs. Ph.D. Advancement to Candidacy Oral Exam, University of California, Irvine, CA, May 2019.

7. SoK: Sanitizing for Security. IEEE Symposium on Security and Privacy (IEEE S&P), San Francisco, CA, May 2019.

8. PeriScope: An Effective Probing and Fuzzing Framework for the Hardware-OS Boundary. Qualcomm Product Security Summit (QPSS), Qualcomm, San Diego, CA, May 2019.

9. PeriScope: An Effective Probing and Fuzzing Framework for the Hardware-OS Boundary. Network and Distributed System Security Symposium (NDSS), San Diego, CA, February 2019.

10. Fuzzing Fuchsia IPC (Intern Talk). Google, Mountain View, CA, August 2018.

11. Spatial Memory Safety beyond AddressSanitizer (Intern Talk). Qualcomm, San Diego, CA, July 2017.

12. Reproducing Bug 19259446. Oracle, Redwood City, CA, October 2014.

Honors and Awards

1. Outstanding Teaching Award. Yonsei University, February 2022.

2. Student Grant Award. USENIX Security Symposium (USENIX Security), Virtual Attendance, Irvine, CA, August 2020.

3. Student Travel Grant Award. ACM Conference on Computer and Communications Security (CCS), London, U.K., November 2019.

4. Finalist, Applied Research Competition, Cyber Security Awareness Week (CSAW), NYU Tandon School of Engineering, Brooklyn, NY, November 2019.

5. Student Travel Grant Award. Network and Distributed System Security Symposium (NDSS), San Diego, CA, January 2019.

6. Member of Vulnerability Rewards Program. Qualcomm, September 2018.

7. Member of Hall of Fame. Code Aurora Forum, September 2018.

8. National Scholarship for Science and Engineering. Korea Student Aid Foundation (KOSAF), South Korea, 2007 – 2009, 2013.

Discovered Vulnerabilities

1. CVE-2018-11902, CVE-2018-11947, Qualcomm, 2018.
2. SVE-2018-12029, SVE-2018-11783, SVE-2018-11784, SVE-2018-11785, Samsung Mobile, 2018.