Gwangmu Lee

Software Engineer @ Swiss National Computing Centre (CSCS)

Phone: +41) 78 228 63 33   E-mail: gwangmu.lee@cscs.ch   Home: https://gwangmu.github.io
LinkedIn: https://www.linkedin.com/in/gwangmu-lee-b92568285/

Professional Interest

Software Security	**Software Engineering**	**High-performance Computing**
Vulnerability Detection	Dynamic/Static Software Testing	Workload Containerization
Kernel Security	Code Analysis & Optimization	Container Engine Development

Education

Seoul National University (SNU)   Mar 2017 - Feb 2022
Seoul, South Korea.
Ph.D. in Electrical and Computer Engineering (Advisor: Byoungyoung Lee)

Pohang University of Science and Technology (POSTECH)   Sep 2014 - Feb 2017
Pohang, South Korea.
M.S. in Computer Science and Engineering (Advisor: Jangwoo Kim)

Pohang University of Science and Technology (POSTECH)   Mar 2010 - Aug 2014
Pohang, South Korea.
B.S. in Physics / Computer Science and Engineering (Double Major)

Work Experience

Swiss National Computing Centre (CSCS)   Apr 2024 - Now
Lugano, Switzerland.
Software Engineer (Container Engine and Framework)

École Polytechnique Fédérale de Lausanne (EPFL)   Apr 2022 - Mar 2024
Lausanne, Switzerland.
Post-doc Researcher (Software Security), HexHive

Korea Institute for Advanced Study (KIAS)   Jul 2013 - Aug 2013
Seoul, South Korea.
Research Intern (Astrophysics)

Publications

A Comparative Quality Metric for Untargeted Fuzzing with Logic State Coverage
arXiv (cs.SE), September 2024.
Gwangmu Lee

SyzRisk: A Change-Pattern-Based Continuous Kernel Regression Fuzzer
The 19th ACM ASIA Conference on Computer and Communications Security (**ASIACCS**), July 2024.
Gwangmu Lee, Duo Xu, Solmaz Salimi, Byoungyoung Lee, and Mathias Payer

FuzzOrigin: Detecting UXSS vulnerabilities in Browsers through Origin Fuzzing

The 31st USENIX Security Symposium **(USENIX)**, August 2022.

Sunwoo Kim, Young Min Kim, Jaewon Hur, Suhwan Song, <u>Gwangmu Lee</u>, and Byoungyoung Lee

MundoFuzz: Hypervisor Fuzzing with Statistical Coverage Testing and Grammar Inference

The 31st USENIX Security Symposium **(USENIX)**, August 2022.

Cheolwoo Myung, <u>Gwangmu Lee,</u> and Byoungyoung Lee

Constraint-guided Directed Greybox Fuzzing

The 30th USENIX Security Symposium **(USENIX)**, August 2021.

<u>Gwangmu Lee</u>, Woochul Shim, and Byoungyoung Lee

DynaMix: Dynamic Mobile Device Integration for Efficient Cross-device Resource Sharing

2018 USENIX Annual Technical Conference **(ATC)**, July 2018.

Dongju Chae, Joonsung Kim, <u>Gwangmu Lee</u>, HanJun Kim, Kyung-Ah Chang, Hyogun Lee, and Jangwoo Kim.

Flexon: A Cost-Effective Digital Neuron for Flexible Spiking Neural Network Simulation

The 45th International Symposium on Computer Architecture **(ISCA)**, June 2018.

Dayeol Lee, <u>Gwangmu Lee</u>, Sunghwa Lee, Dongup Kwon, Youngsok Kim, and Jangwoo Kim.
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Architecture-aware Automatic Computation Offload for Native Applications

The 48th Annual IEEE/ACM International Symposium on Microarchitecture **(MICRO)**, December 2015.

<u>Gwangmu Lee</u>, Hyunjoon Park, Seonyeong Heo, Kyung-Ah Chang, Hyogun Lee, and HanJun Kim

Selected Projects

Automatic Patch Backporting for the Linux Kernel Research Project (HexHive), EPFL, Project Lead	May 2023 - Present
Investigating Clang Static Analyzer's False-positives and False-negatives Master's thesis (Cosme Jordan), Supervisor	Mar 2023 - Jun 2023
Porting IR Pass for Address Sanitizer [MEDS, NDSS'18] **to LLVM 12** National Security Research Institute (NSR) × Computer Security Lab. (CompSec), SNU, Researcher	Jun 2020 - Nov 2020
Optimizing Shader Compiler for ARM VLIW-Based Mobile GPU Samsung Electronics × High-performance Computing Lab. (HPC), POSTECH, Researcher	Nov 2014 - Jun 2015
POSTECH-KAIST Science War Official AI Game (Diplomatics) College game development group (G-POS), POSTECH, Lead Programmer	Jun 2012 - Sep 2012

Recognition

26th Graduate Student Scholarship Korea Foundation for Advanced Study (KFAS)	Mar 2015 - Feb 2020
National Science and Engineering Scholarship Korea Student Aid Foundation (KOSAF)	Mar 2010 - Feb 2014

Teaching Experience

Introduction to Programming, Dongji High School, Instructor	Winter 2014

Introduction to Programming, Dongji High School, Instructor   Summer 2015
Object Oriented Programming, POSTECH, Teaching Assistant   Fall 2015
Computer Architecture, POSTECH, Teaching Assistant   Fall 2016
Computer Organization, Seoul National University, Teaching Assistant   Spring 2017
Digital Logic Design, Seoul National University, Teaching Assistant   Fall 2017
Cyber Security and Blockchain, Seoul National University, Teaching Assistant   Fall 2019

Professional Services

Invited Talk	**The Chronicle of Software Vulnerability Detection**	Jun 2023
	Kyung Hee University. Slides available at https://gwangmu.github.io/experience/.	
Reviewer	**IEEE Transactions on Dependable and Secure Computing (TDSC)**	2023
	IEEE Transactions on Software Engineering (TSE)	2023
Prog. Committee	**Intl. Symposium on Research in Attacks, Intrusions and Defense (RAID)**	2024

Skills & Etc

Language	**Korean** (native), **English** (semi-fluent), **Italian** (baby)
Programming Language	**C** (expert)**, Python** (expert), **C++** (advanced), **Go** (advanced), **Bash** (advanced), **Java** (proficient), **Verilog** (proficient), **Scala** (proficient), **Rust** (familiar), **OCaml** (familiar)
Tool and Software	**AFL** (expert), **Syzkaller** (expert), **LLVM IR** (advanced), **Clang Static Analyzer** (advanced), **Linux CLI** (advanced), **Linux Kernel Codebase** (advanced), **LLVM Frontend** (advanced), **Docker** (proficient), **Terraform** (proficient), **Nomad** (proficient), **QEMU** (familiar), **Qt** (familiar)
Personal Repo. (Selected)	**English-to-Hangul Transliterator**
	Mini-project that transliterates English sentences to augmented Hangul sentences, link.
	"Mini Excel" Educational C++ Project
	Semester project for the Bachelor's course "Object Oriented Programming" (Fall 2015), link.
	Cycle-accurate Custom Hardware Simulator
	A spin-off project of *Flexon* (ISCA'18), link.