

DAE R. JEONG (정대룡)

Postdoctoral Researcher
School of Computing, KAIST

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RESEARCH INTERESTS

I'm interested in **addressing security and reliability issues in low-level system software and hardware**. Specifically, my research topics include:

- Automating vulnerability detection
- Reproducing and diagnosing system failures
- Mitigating attacks and system hardening
- Formally verifying security properties of systems

WORK EXPERIENCE

Postdoctoral fellow

May. 2024 - Present

School of Computing, Georgia Tech

Postdoctoral researcher

Mar. 2023 - May. 2024

School of Computing, KAIST

EDUCATION

Ph.D in School of Computing, KAIST

Mar. 2016 - Feb. 2023

Advisor: Insik Shin

Thesis: Finding and Diagnosing Concurrency Bugs in a Kernel through Systematic Instruction Scheduling

M.S. in School of Computing KAIST

Mar. 2014 - Feb. 2016

Advisor: Insik Shin

B.S. in School of Computing, KAIST

Mar. 2010 - Feb. 2014

PUBLICATIONS

International Conference

1. **MixMax: Leveraging heterogeneous batteries to alleviate low battery experience for mobile users**
Jaeheon Kwak, Sunjae Lee, **Dae R. Jeong**, Arjun Kumar, Dongjae Shin, Ilju Kim, Donghwa Shin, Kilho Lee, Jinkyu Lee, and Insik Shin
21st ACM International Conference on Mobile Computing Systems (MobiSys), 2023.
2. **SegFuzz: Segmentizing thread interleaving to discover kernel concurrency bugs through fuzzing**
Dae R. Jeong, Byoungyoung Lee, Insik Shin, and Youngjin Kwon
44th IEEE Symposium on Security and Privacy (S&P), 2023.
3. **Diagnosing kernel concurrency failures with AITIA**
Dae R. Jeong, Minkyu Jung, Yoochan Lee, Byoungyoung Lee, Insik Shin, and Youngjin Kwon
18th European Conference on Computer Systems (EuroSys), 2023.

4. **HFL: Hybrid fuzzing on the linux kernel**
Kyungtae Kim, **Dae R. Jeong**, Chung Hwan Kim, Yeongjin Jang, Insik Shin, and Byoungyoung Lee
2020 Annual Network and Distributed System Security Symposium (NDSS), 2020.
5. **FLUID: Flexible user interface distribution for ubiquitous multi-device interaction**
Sangeun Oh, Ahyeon Kim, Sunjae Lee, Kilho Lee, **Dae R. Jeong**, Steven Y. Ko, and Insik Shin
25th ACM Annual International Conference on Mobile Computing and Networking (MobiCom), 2019
Best paper award.
6. **Light-weight novel view synthesis for casual multiview photography (Oral)**
Inchang Choi, Yeong Beum Lee, **Dae R. Jeong**, Insik Shin, and Min H. Kim
14th International Symposium on Visual Computing (ISVC), 2019.
7. **Razzer: Finding kernel race bugs through fuzzing**
Dae R. Jeong, Kyungtae Kim, Basavesh Shivakumar, Byoungyoung Lee, and Insik Shin
40th IEEE Symposium on Security and Privacy (S&P), 2019.
8. **(Ph.D. Forum) Mobile platform design for sharing functionalities between multiple devices**
Sangeun Oh, Hyuck Yoo, **Dae R. Jeong**, Duc Hoang Bui, and Insik Shin
PhD Forum of the 18th IEEE International Conference on Mobile Data Management (MDM), 2017.
9. **Mobile Plus: Multi-device mobile platform for cross-device functionality sharing**
Sangeun Oh, Hyuck Yoo, **Dae R. Jeong**, Duc Hoang Bui, and Insik Shin
15th ACM International Conference on Mobile Computing Systems (MobiSys), 2017.
10. **(Poster) Mobile Plus: Mobile platform for Transparent Sharing of Functionalities Across Devices**
Sangeun Oh, Hyuck Yoo, **Dae R. Jeong**, Sooyoung Park, Duc Hoang Bui, Sungsoo Moon, and Insik Shin
Poster at the 14th ACM International Conference on Mobile Computing Systems (MobiSys), 2016.

Other Publications

1. **Supporting flexible and transparent user interface distribution across mobile devices**
Sangeun Oh, Ahyeon Kim, Sunjae Lee, Kilho Lee, **Dae R. Jeong**, Steven Y. Ko, and Insik Shin
IEEE Transactions on Mobile Computing (TMC), 2024.
2. **Finding and diagnosing concurrency bugs in a kernel through systematic instruction scheduling**
Dae R. Jeong
Ph.D. Dissertation, School of Computing, Korea Advanced Institute of Science and Technology, 2023.
3. **New cpu load classification method for device-agnostic mobile power consumption prediction model**
Kwangho Kim, Sera Lee, **Dae R. Jeong**, and Insik Shin
Korean Institute of Information Scientists and Engineers, 2022.
4. **MoBaP: Mobile battery prediction framework for video streaming**
Sera Lee, **Dae R. Jeong**, and Insik Shin
Korean Institute of Information Scientists and Engineers, 2021.
5. **FLUID: Flexible user interface distribution for ubiquitous multi-device interaction**
Sangeun Oh, Ahyeon Kim, Sunjae Lee, Kilho Lee, **Dae R. Jeong**, Insik Shin, and Steven Y. Ko
GetMobile: Mobile Computing and Communications Review 23 (4), 25–29 2019., 2019.

6. GPGPU Parallelization Techniques for Redundancy Elimination Algorithm

Byunggil Joe, Dae R. Jeong, Jiyeon Lee, and Insik Shin

Korean Institute of Information Scientists and Engineers, 2014.

In Submission

1. Identifying kernel concurrency bugs due to out-of-order-execution through fuzzing

My role: first author

Under review, Top-tier conference in System, 2024.

2. Leveraging customized heterogeneous batteries to alleviate low battery experience for mobile users

My role: co-author

Under review, Journal, 2024.

3. Energy consumption prediction to alleviating low-battery anxiety in mobile environments

My role: co-first author

Under review, Top-tier conference in HCI, 2024.

OPEN SOURCE CONTRIBUTION

- **Android Open Source Project (AOSP)**: Reported some bugs (with other students)
<https://source.android.com/>
- **SegFuzz**: A kernel fuzzer utilizing interleaving coverage to discover concurrency bugs
<https://github.com/casys-kaist/segfuzz>
- **HFL**: A hybrid kernel fuzzer combining symbolic execution and fuzzing
<https://bitbucket.org/anonyk/hfl-release/src/master/>
- **Linux**: Reported and fixed concurrency bugs in various subsystems, Contributor
<https://git.kernel.org/pub/scm/linux/kernel/git/torvalds/linux.git/>
- **Razzer**: A kernel fuzzer focusing on concurrency bugs
<https://github.com/compsec-snu/razzer>

HONORS AND AWARDS

- **Program Directors Award**, 2023
Samsung Global Technology Symposium
- **Outstanding Dissertation Award**, 2023
School of Computing, KAIST
Finding and Diagnosing Concurrency Bugs in a Kernel through Systematic Instruction Scheduling
- **Best Paper Award**, 2021
Korea Institute of Information Scientists and Engineers (한국정보과학회)
MoBaP: Mobile Battery Prediction Framework for Video Streaming,
- **Best Paper Award**, 2019
ACM International Conference on Mobile Computing and Networking (MobiCom)
FLUID: Multi-device Mobile Platform for Flexible User Interface Distribution
- **Naver Ph.D Fellowship Award**, 2019
- **Second prize (우수상)**, 2015
E*5 LabStartup KAIST
Team LeviOsa

- **Undergraduate Student Best Paper Award, 2015**
Korea Institute of Information Scientists and Engineers (한국정보과학회)
GPGPU Parallelization Techniques for Redundancy Elimination Algorithm

PROFESSIONAL ACTIVITIES

- **Artifact evaluation committee**
USENIX Annual Technical Conference (ATC), 2024
USENIX Conference on Operating Systems Design and Implementation (OSDI), 2024
- **External review committee**
USENIX Annual Technical Conference (ATC), 2024
- **External reviewer**
USENIX Symposium on Operating Systems Design and Implementation (OSDI), 2024
ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024
USENIX Annual Technical Conference (ATC), 2022
- **Shadow program committee**
ACM European Conference on Computer Systems (EuroSys), 2023

TEACHING EXPERIENCES

- **Head Teaching Assistant**
Operating System and Lab (CS330), KAIST
Fall 2019, Spring 2017
- **Teaching Assistant**
Operating System and Lab (CS330), KAIST
Spring 2018, Spring 2016, Spring 2015, Spring 2014
Operating System (CS530), KAIST
Fall 2017
Introduction to Programming (CS101), KAIST
Spring 2013

PATENTS (DOMESTIC)

- 무인비행체 조종 방법, 이를 구현하기 위한 프로그램이 저장된 기록매체 및 이를 구현하기 위해 매체에 저장된 컴퓨터프로그램, 1020180052585 (2018.05.08)
METHOD FOR CONTROLLING UNMANNED FLYING OBJECT AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME, AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME
- 원통좌표계 기반 무인이동체 조종 방법, 이를 구현하기 위한 프로그램이 저장된 기록매체 및 이를 구현하기 위해 매체에 저장된 컴퓨터프로그램, 1020180052598 (2018.05.08)
METHOD FOR CONTROLLING UNMANNED MOVING OBJECT BASED ON CYLINDRICAL COORDINATE SYSTEM AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME, AND COMPUTER PROGRAM STORED IN RECORDING MEDIUM FOR EXECUTING THE SAME
- 어플리케이션 수행에 있어서 모바일 기기 간에 기능을 분배하는 방법, 1020170089910 (2017.07.14)
METHOD FOR CROSS-DEVICE FUNCTIONALITY SHARING
- 무인이동체 조종 방법, 이를 구현하기 위한 프로그램이 저장된 기록매체 및 이를 구현하기 위해 매체에 저장된 컴퓨터프로그램, 1017518640000 (2017.06.22)
SMART DEVICE FOR CONTROLLING UNMANNED MOVING OBJECT AND METHOD FOR CONTROLLING UNMANNED MOVING OBJECT AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME, AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME

SKILLS

Programming Languages	C, C++, Golang, Python, Java, JavaScript, Haskell, Shell script
Software Knowledge	Linux, Syzkaller, QEMU/KVM, LLVM, AOSP, SVF
Languages	Korean (first language), English