DAE R. JEONG (정대룡)

Postdoctoral Researcher
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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

ACADEMIC APPOINTMENTS

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

Under Review (titles are anonymized)

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.

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.

OPEN SOURCE CONTRIBUTION

- **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
- **QEMU**: Reported some bugs (with other students)
  https://qemu.org/
- **Android Open Source Project (AOSP)**: Reported some bugs (with other students)
  https://source.android.com/

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 commitee**

  USENIX Annual Technical Conference (ATC), 2024

  USENIX Conference on Operating Systems Design and Implementation (OSDI), 2024

- **External review commitee**

  USENIX Annual Technical Conference (ATC), 2024

- **Shadow program commitee**

  ACM European Conference on Computer Systems (EuroSys), 2023

TEACHING EXPERIENCES

- **Guest Lecturer**

  Operating System and Lab (CS330), KAIST — Spring 2024

- **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 CONTROLING 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 CONTROLING UNMANNED MOVING OBJECT BASED ON CYLINDRICAL COORDINATE SYSTEM AND RECORDING MEDIUM STORING PROGRAM FOR EXECUTING THE SAME, AND COMPUTER PROGRAOM 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 CONTROLING UNMANNED MOVING OBJECT AND METHOD FOR CONTROLING 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