# DAE R. JEONG (정대룡)

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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 EXPERIENCES

**Postdoctoral Fellow** *Jun. 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. **Ozz: Identifying kernel out-of-order concurrency bugs with in-vivo memory access reordering (to appear)**
   **Dae R. Jeong**, Yewon Choi, Byoungyoung Lee, Insik Shin, and Youngjin Kwon
   *30th ACM Symposium on Operating Systems Principles* (***SOSP***), 2024.

2. **Serenus: Alleviating low-battery anxiety through real-time, accurate, and user-friendly energy consumption prediction of mobile applications (to appear)**
   Sera Lee*, **Dae R. Jeong***, Junyoung Choi, Jaeheon Kwak, Seoyun Son, Jean Y. Song, and Insik Shin
   *ACM Symposium on User Interface Software and Technology* (***UIST***), 2024
   *: co-first authors.

3. **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.

4. **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.

5. **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.

6. **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.

7. **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***.

8. **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.

9. **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.

10. **(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.

11. **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.

12. **(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.

### Under Review (titles are anonymized)

1. **Hypervisor fuzzing**
My role: co-author
*Under review, Top-tier conference in Security*, 2025.

2. **Leveraging customized heterogeneous batteries to alleviate low battery experience for mobile users**
My role: co-author
*Under review, Journal*, 2024.

## OPEN SOURCE CONTRIBUTION

- **Ozz**: A kernel fuzzer to identify out-of-order concurrency bugs
https://anonymized_url.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
- **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

- **KAIST's Research Highlight of 2023 – SegFuzz**, 2024
Selected as one of 29 Research Highlights in 2024 KAIST Annual R&D Report
- **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

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|---|---|
| **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 |