Gabin An

Software Engineer in Test, Roku
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Profile

During my Ph.D., I concentrated on enhancing the efficiency of testing and debugging large-scale industrial software. My research primarily focused on the following areas:

- **BIC Identification**: Finding the Bug Inducing Commit (BIC) responsible for observed failures to efficiently assign and fix bugs in software systems involving numerous developers [10, 15]
- **Failure Clustering**: Clustering failures based on their root causes to support the utilisation of automated debugging techniques developed under the single fault assumption [12, 13]
- **Fault Localisation with an Insufficient Test Suite**: Augmenting a test suite with additional test cases that can improve the precision of automated fault localisation techniques [11], Pinpointing the faulty location with just a *single* failed execution using the code understanding capabilities of Large Language Model (LLM) [7]
- **Flaky Failure Detection**: Automatically detecting flaky failures to expedite the continuous integration process and optimise the utilisation of both human and computational resources [5]

After earning my Ph.D., I joined Roku's Seoul office as a Software Engineer in Test. At Roku, I am involved in developing and maintaining the test automation infrastructure. Roku is the leading TV streaming platform in the U.S., with over 80 million active user accounts.

Education

Mar 2020 – Aug 2024 — **Ph.D., Computer Science, KAIST**, Republic of Korea
- Advisor: Prof. Shin Yoo
- Thesis: *Synergizing Fault Localization and Continuous Integration to Streamline Bug Resolution in Large-Scale Software Systems* (Distinguished Dissertation Award)
- GPA: 4.11/4.3

Mar 2018 – Feb 2020 — **MSc, Computer Science, KAIST**, Republic of Korea
- Advisor: Prof. Shin Yoo
- Thesis: *Localising Software Faults by Learning Patterns of Failing Executions*
- GPA: 4.15/4.3

Feb 2012 – Feb 2018 — **BSc, Computer Science, KAIST**, Republic of Korea
- Major GPA: 4.06/4.3
- Minor: Business and Technology Management
- Honor: Summa Cum Laude

Mar 2016 — Aug 2016 — **Exchange Student, Informatik, TUM**, Germany

Employment History

June 2024 – Present — **Software Engineer in Test, Roku**
- Location: Seoul, Republic of Korea
- Design, develop and maintain automation frameworks and tools

Employment History (continued)

Jan 2015 – Nov 2015 **Developer, Jobplanet**
- Location: Seoul, Republic of Korea
- Web development (Ruby on Rails)
- API design

Selected Publications

* indicates equal contributions

[1] H. Cho, S. Kang, **G. An**, and S. Yoo, "COSMosFL: Ensemble of Small Language Models for Fault Localisation," in *2th International Workshop on Large Language Models for Code (LLM4Code@ICSE'25)*, May 2025, to appear.

[2] N. Kim, S. Kang, **G. An**, and S. Yoo, "Lachesis: Predicting LLM Inference Accuracy using Structural Properties of Reasoning Paths," in *6th International Workshop on Deep Learning for Testing and Testing for Deep Learning (DeepTest@ICSE'25)*, May 2025, to appear.

[3] H. Lee, **G. An**, and S. Yoo, "METAMON: Finding Inconsistencies between Program Documentation and Behavior using Metamorphic LLM Queries," in *2th International Workshop on Large Language Models for Code (LLM4Code@ICSE'25)*, May 2025, to appear.

[4] J. Son, **G. An**, J. Hong, and S. Yoo, "Evaluating Machine Learning-Based Test Case Prioritization in the Real World: An Experiment with SAP HANA," in *18th IEEE International Conference on Software Testing, Verification and Validation (ICST'25)*, Mar. 2025, to appear.

[5] **G. An**, J. Yoon, T. Bach, J. Hong, and S. Yoo, "Just-in-Time Flaky Test Detection via Abstracted Failure Symptom Matching," in *Proceedings of the 40th International Conference on Software Maintenance and Evolution (ICSME'24)*, Oct. 2024, Industry Track.

[6] J. Choi, **G. An**, and S. Yoo, "Iterative Refactoring of Real-World Open-Source Programs with Large Language Models," in *16th International Symposium on Search-Based Software Engineering (SSBSE'24)*, Jul. 2024, Challenge Track.

[7] S. Kang *, **G. An** *, and S. Yoo, "A Quantitative and Qualitative Evaluation of LLM-based Explainable Fault Localization," in *Proceedings of the ACM on Software Engineering and Volume 1, Number FSE (FSE'24)*, Jul. 2024, Research Track.

[8] **G. An**, M. Kwon, K. Choi, J. Yi, and S. Yoo, "BUGSC++: A Highly Usable Real World Defect Benchmark for C/C++," in *Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE'23)*, Sep. 2023, Tool Demos.

[9] J. Kim, **G. An**, R. Feldt, and S. Yoo, "Learning Test-Mutant Relationship for Accurate Fault Localisation," in *Information and Software Technology*, Jun. 2023.

[10] **G. An**, J. Hong, N. Kim, and S. Yoo, "Fonte: Finding Bug Inducing Commits from Failures," in *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering (ICSE'23)*, May 2023, Technical Track.

[11] **G. An** and S. Yoo, "FDG: A Precise Measurement of Fault Diagnosability Gain of Test Cases," in *Proceedings of the 31st ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'22)*, Jul. 2022, Technical Track.

[12] **G. An** *, J. Yoon *, J. Sohn, J. Hong, D. Hwang, and S. Yoo, "Automatically Identifying Shared Root Causes of Test Breakages in SAP HANA," in *Proceedings of the 44th IEEE/ACM International Conference on Software Engineering (ICSE'22)*, May 2022, SEIP Track.

[13] **G. An**, J. Yoon, and S. Yoo, "Searching for Multi-Fault Programs in Defects4J," in *Proceedings of the 13th International Symposium on Search Based Software Engineering (SSBSE'21)*, Oct. 2021, Challenge Track.

[14] J. Kim, **G. An**, R. Feldt, and S. Yoo, "Ahead of Time Mutation Based Fault Localisation using Statistical Inference," in *Proceedings of the 32nd International Symposium on Software Reliability Engineering (ISSRE'21)*, Oct. 2021, Research Track.

[15] **G. An** and S. Yoo, "Reducing the Search Space of Bug Inducing Commits using Failure Coverage," in *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE'21)*, Aug. 2021, Ideas, Visions, and Reflections Track.

[16] J. Sohn *, **G. An** *, J. Hong, D. Hwang, and S. Yoo, "Assisting Bug Report Assignment Using Automated Fault Localisation: An Industrial Case Study," in *Proceedings of the 14th IEEE International Conference on Software Testing, Verification and Validation (ICST'21)*, Apr. 2021, Industry Track.

[17] **G. An**, A. Blot, J. Petke, and S. Yoo, "PyGGI 2.0: Language Independent Genetic Improvement Framework," in *Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE'19)*, Aug. 2019, Tool Demos.

[18] **G. An**, J. Kim, and S. Yoo, "Comparing Line and AST Granularity Level for Program Repair using PyGGI," in *Proceedings of the 4th Genetic Improvement Workshop (GI@ICSE'18)*, May 2018.

Awards and Achievements

2025 Distinguished Dissertation Award, School of Computing, KAIST

2024 The 40th International Conference on Software Maintenance and Evolution (ICSME 2024)
- **Best Industry Paper Award**
- Paper: G. An, J. Yoon, T. Bach, J. Hong, and S. Yoo, "Just-in-Time Flaky Test Detection via Abstracted Failure" Symptom Matching,"

2022 Korea Software Congress (KSC 2022)
- **Best Paper Award**
- Paper: G. An, M. Kwon, K. Choi, and S. Yoo, "A Collection of Reproducible Bugs in C/C++ Programs"

Microsoft Research Asia PhD Fellowship
- **Nomination Award**

2019 Korea Conference on Software Engineering (KCSE 2019)
- **Best Short Paper Award**
- Paper: G. An, S. Yoo, "Search Space Reduction for Automated Program Repair Using Lexical Features"

2018 CodRep'18: A machine learning competition on source code data
- **Rank: 2nd (official track)**
- Organised by KTH Royal Institute of Technology, Stockholm, Sweden
- Web: `https://github.com/KTH/CodRep-competition`

2017 Korea Software Congress (KSC 2017)
- **Best Presentation Award**
- Paper: G. An, J. Kim, S. Lee, and S. Yoo, "PyGGI: Python General framework for Genetic Improvement"

Selected Research Experience as Research Assistant

Industry-Funded Projects

2024 - Present **LLM-based Fault Localization for Field Failures**
w/ SAP Labs Korea

2022 – 2023 **Identifying Test Flakiness and Predicting Actionable Test Failures**
w/ SAP and SAP Labs Korea

2021 **Identifying Shared Root Causes between Test Breakages**
w/ SAP Labs Korea

2020 **Assisting Bug Report Assignment using Automated Fault Localisation**
w/ SAP Labs Korea

2019 **Assessing the Quality of Test Suite using Mutation Testing**
w/ Samsung Research

Government-Funded Projects

2021 – 2024 **Development of Automatic Software Error Repair Technology that Combines Code Analysis and Error Mining**
Funded by Institute for Information & Communication Technology Planning & Evaluation (IITP)

Miscellaneous Experience

Academic Services

- 2025 **Publicity Co-Chair**, the 40th IEEE/ACM International Conference on Automated Software Engineering (ASE 2025)
- **Program Committee Member**, Tool Demonstration Track, the 32nd Asia-Pacific Software Engineering Conference (APSEC 2025)
- **Program Committee Member**, Research Track, the 40th IEEE/ACM International Conference on Automated Software Engineering (ASE 2025)
- **Program Committee Member**, Journal-First Track, the 40th IEEE/ACM International Conference on Automated Software Engineering (ASE 2025)
- **Program Committee Member**, the 14th Genetic Improvement Workshop @ ICSE 2025
- **Program Committee Member**, Research Track, the 47th International Conference on Software Engineering (ICSE 2025)
- 2024 **Emergency Program Committee Member**, Research Track, the 39th IEEE/ACM International Conference on Automated Software Engineering (ASE 2024)
- **Program Co-Chair**, RENE/NIER Track, the 16th Symposium on Search Based Software Engineering (SSBSE 2024)
- **Organising Committee Member**, the 13th Genetic Improvement Workshop @ ICSE 2024
- 2023 **Program Committee Member**, RENE/NIER Track, the 15th Symposium on Search Based Software Engineering (SSBSE 2023)
- **Program Committee Member**, Joint Artifact Evaluation Track and ROSE Festival, the 39th International Conference on Software Maintenance and Evolution (ICSME 2023)
- **Organising Committee Member**, the 12th Genetic Improvement Workshop @ ICSE 2023
- 2022 **Web Chair**, the 14th Symposium on Search Based Software Engineering (SSBSE 2022)
- **Program Committee Member**, the 11th Genetic Improvement Workshop @ GECCO 2022
- **Program Committee Member**, Joint Artifact Evaluation Track and ROSE Festival, the 38th International Conference on Software Maintenance and Evolution (ICSME 2022)
- 2021 **Program Committee Member**, the 10th Genetic Improvement Workshop @ ICSE 2021
- **Program Committee Member**, Artifact Evaluation Track, the 37th International Conference on Software Maintenance and Evolution (ICSME 2021)
- 2020 **Web Chair**, the 8th Genetic Improvement Workshop @ ICSE 2020

Invited Talks

- 2023 Korea Computer Congress (Jun, KCC 2023)
  - *Fonte: Finding Bug Inducing Commits from Failures*
- Korea Conference on Software Engineering (Feb, KCSE 2023)
  - *Fonte: Finding Bug Inducing Commits from Failures*
- 2022 Korea Software Congress (Dec, KSC 2022)
  - *FDG: A Precise Measurement of Fault Diagnosability Gain of Test Cases*

Teaching & Counselling Experience

- 2023 TA, Introduction to Software Engineering (CS350), School of Computing, KAIST, Spring 2023
- 2021 TA, Computer Ethics and Social Issues (CS489), School of Computing, KAIST, Autumn 2021
- TA, Operating Systems and Lab (CS330), School of Computing, KAIST, Spring 2021
- 2020 TA, Computer Ethics and Social Issues (CS489), School of Computing, KAIST, Autumn 2020
- TA, Automated Software Testing (CS453), School of Computing, KAIST, Spring 2020
- 2019 Head CA (Academic Counseling Assistant), School of Computing, KAIST, Spring 2019
- 2018 CA (Academic Counseling Assistant), School of Computing, KAIST, Fall 2018
- TA, Programming Practice (CS109), KAIST, Spring 2018
- 2017 Undergraduate TA, Programming Practice (CS109), KAIST, Spring 2017

References

Available on Request