Sungmin Kang

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EDUCATION

Korea Advanced Institute of Science and Technology Mar. 2014 – Aug. 2024

- Integrated Ph.D. in Computer Science (2019 – 2024)
- B.S. in Computer Science (2014 – 2019)

RESEARCH EXPERIENCE

NUS Trustworthy and Secure Software Lab. Mar. 2025 – Current
Research Fellow (Mar. 2025 – Dec. 2026 [expected])

- Project: Enhancing Trust in Agentic Software Systems
- Supervisor: Prof. Abhik Roychoudhury
- Research Areas: LLM Agents, Automatic Debugging

KAIST Computational Intelligence for Software Engineering Lab. Sept. 2018 – Feb. 2025
Full-time Graduate Student (Mar. 2019 – Aug. 2024), Postdoctoral Researcher (Sept. 2024 – Feb. 2025)

- Thesis: Reliable Large Language Model-based Software Artifacts via Execution
- Supervisor: Prof. Shin Yoo
- Research Areas: Software Testing, Automatic Debugging

Microsoft Research Asia Oct. 2022 – Apr. 2023
Research Intern

- Project: Developing an Explainable Automated Debugging Technique via Large Language Models
- Supervisor: Dr. Jian-guang Lou
- Research Areas: Language Models, Automated Program Repair

PUBLICATIONS

CONFERENCES

[1] Louis Milliken, **Sungmin Kang** (2nd author), Shin Yoo, "Beyond pip install: Evaluating LLM Agents for the Automated Installation of Python Projects", *SANER'25*, accepted as full paper.

[2] **Sungmin Kang** (co-1st author), Gabin An, Shin Yoo, "A Quantitative and Qualitative Evaluation of LLM-based Fault Localization", *FSE'24*, accepted as full paper.

[3] **Sungmin Kang** (co-1st author), Wonkeun Choi, Shin Yoo, "A Bayesian Framework for Automated Debugging", *ISSTA'23*, accepted as full paper.

[4] **Sungmin Kang** (co-1st author), Juyeon Yoon, Shin Yoo, "Large Language Models are Few-shot Testers: Exploring LLM-based General Bug Reproduction", *ICSE'23*, accepted as full paper.

[5] **Sungmin Kang** (1st author), Sumi Yun, Jingun Hong, Shin Yoo, Gabin An, "Finding the Needle in the Crash Stack: Industrial-Scale Crash Root Cause Localization with AutoCrashFL", *ICSE SEIP'26*, accepted.

JOURNALS

[1] **Sungmin Kang** (1st author), Bei Chen, Shin Yoo, Jian-guang Lou, "Explainable Automated Debugging via Large Language Model-driven Scientific Debugging", *Empirical Software Engineering*, accepted.

[2] **Sungmin Kang** (co-1st author), Juyeon Yoon, Nargiz Askarbekkyzy, Shin Yoo, "Evaluating Diverse Large Language Models for Automatic and General Bug Reproduction", *ACM Transactions on Software Engineering*, accepted.

[3] **Sungmin Kang** (1st author), Robert Feldt, Shin Yoo, "Deceiving Humans and Machines Alike: Search-based Test Input Generation for DNNs using Variational Autoencoders", *ACM Transactions on Software Engineering and Methodology*, accepted.

[4] Jeongju Sohn, **Sungmin Kang** (co-1st author), Shin Yoo, "Arachne: Search Based Repair of Deep Neural Networks", *ACM Transactions on Software Engineering and Methodology*, accepted.

[5] Kyeong Min Song, Shinho Kim, **Sungmin Kang** (3rd author), Tae Won Nam, Geon Yeong Kim, Hunhee Lim, Eugene N. Cho, Kwang Ho Kim, Se Hun Kwon, Min Seok Jang et al., "Microcellular sensing media with ternary transparency states for fast and intuitive identification of unknown liquids", *Science Advances*, accepted.

[6] Koeun Han, Hee-Jin Jeong, Hee-Bum Yang, **Sung-Min Kang** (4th author), Jin-Kyung Kwon, Seungill Kim, Doil Choi, and Byoung-Cheorl Kang, "An ultra-high-density bin map facilitates high-throughput QTL mapping of horticultural traits in pepper", *DNA Research,* accepted.

WORKSHOPS AND SHORT PAPERS

[1] Jae Yong Lee, **Sungmin Kang** (2nd author), Shin Yoo, "Predictive Prompt Analysis", *FSE'25*, accepted to Ideas, Visions and Reflections track.

[2] Naryeong Kim, **Sungmin Kang** (2nd author), Gabin An, Shin Yoo, "Lachesis: Predicting LLM Inference Accuracy using Structural Properties of Reasoning Paths", ICSE'25 Workshop on Deep Learning for Testing and Testing for Deep Learning, accepted as short paper.

[3] Hyunjoon Cho, **Sungmin Kang** (2nd author), Gabin An, Shin Yoo, "COSMosFL: Ensemble of Small Language Models for Fault Localisation", *ICSE'25 Workshop on Large Language Models for Code,* accepted as full paper.

[4] Jae Yong Lee, **Sungmin Kang** (2nd author), Juyeon Yoon, Shin Yoo, "The GitHub Recent Bugs Dataset for Evaluating LLM-based Debugging Applications", *ICST'24*, accepted to Demonstration track.

[5] Robert Feldt, **Sungmin Kang**(2nd author), Juyeon Yoon, Shin Yoo, "SOCRATEST - Towards Autonomous Testing Agents via Conversational Large Language Models", *ASE'23*, accepted to NIER track.

[6] **Sungmin Kang**(1st author), Shin Yoo, "GLAD: Neural Predicate Synthesis to Repair Omission Faults", *ICSE'23*, accepted as poster.

[7] **Sungmin Kang**(1st author), Shin Yoo, "Towards Objective-Tailored Genetic Improvement Through Large Language Models", *GI'23*, accepted as position paper.

[8] **Sungmin Kang**(1st author), Shin Yoo, "Language Models Can Prioritize Patches for Practical Program Patching", *ICSE'22 Workshop on Automated Program Repair,* 2022, accepted as full paper.

[9] **Sungmin Kang**(1st author), Shin Yoo, "Improving Fault Localization and Automated Program Repair with Suspicious Predicates", *KCSE'22*, accepted as short paper.

[10] **Sungmin Kang**(1st author), Robert Feldt, Shin Yoo, "SINVAD: Search-based Image Space Navigation for DNN Image Classifier Test Input Generation", *ICSE'20 Workshop on Search-based Software Testing, 2020,* accepted as full paper.

[11] **Sungmin Kang**(1st author), Jaegul Choo, and Jaehyuk Chang, "Consistent Comic Colorization with Pixel-wise Background Classification", *NIPS'17 Workshop on Machine Learning for Creativity and Design, 2017*, accepted as poster.

PATENTS

- Method for coloring a target image, and device and computer program therefor, US Patent 12056801
- Method, apparatus, and computer program for completing painting of image, and method, apparatus, and computer program for training artificial neural network, US Patent 11887224
- Method and apparatus for operating benchmark system of software-debugging, Korean Patent App. 10-2024-0087100

INVITED TALKS

- "LLM-based Software Testing and Bug Analysis".
  Talk at National Research Council of Science and Technology (2025)
- "Explainable Program Repair with Automated Scientific Debugging".
  Talk at Dagstuhl Seminar on Automated Programming and Program Repair (2024).
- "Towards Reliable LLM-based Software Generation and Debugging".
  Talk at NUS (2024) and Georgia Tech (2024), Korea U. (2025)
- "The State-of-the-art in LLM-based SE techniques: From Bug Reproduction to Program Repair".
  Talk given at SAP Korea and SureSoft (2023).

SERVICE

CHAIR
Chair for ICST'26 Artifact Evaluation Track

JOURNAL REVIEWER
Reviewer for TSE (2023, 2024, 2025), TOSEM (2023, 2024, 2025), EMSE (2025), JSS (2024, 2025), ASE (2024, 2025), STVR (2025), IEEE Software (2023, 2025), PLOS ONE (2024), IEEE Communications (2024)

CONFERENCE/WORKSHOP REVIEWER
PC member for ICSE (2026), ISSRE (2024, 2025), QUATIC (2025), SSBSE (2025), GI (2024, 2025), SBFT (2025), DeepTest (2025), ISSTA Tool Demo (2025), APSEC Tool Demo (2025), LLMfwEC (2024)

AWARDS

Best Position Paper Award (International Workshop on Genetic Improvement 2023) 2023
For the paper “Towards Objective-Tailored Genetic Improvement Through Large Language Models”

Best Presentation Award (International Workshop on Genetic Improvement 2023) 2023
For the paper “Towards Objective-Tailored Genetic Improvement Through Large Language Models”

Best Short Paper Award (Korea Conference on Software Engineering 2022) 2022
For the paper “Improving Fault Localization and Automated Program Repair with Suspicious Predicates”

Excellent Teaching Assistant Reward (KAIST School of Computing) 2019
As an assistant of the “AI Based Software Engineering” course

SKILLS

Natural Languages
Korean (native), English (native)

Programming Languages
Fluent in Python, familiar with C, Java, bash.