Jinhan Kim

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Date of birth: January 3 1994
Nationality: South Korea

Current Position

Postdoctoral Researcher at Università della Svizzera italiana (USI)

Education

Ph.D. in Computer Science, KAIST, South Korea (March 2017 - February 2023)
Integrated Master and Ph.D. program
Advisor: Prof. Shin Yoo
Committee: Prof. Annibale Panichella, Prof. Moonzoo Kim, Prof. Robert Feldt, Prof. Doo-Hwan Bae
Thesis: Exploiting Mutant's Relationship with Code, Faults, and Patches for Higher Efficacy of Mutation Analysis

B.S. in Computer Science, KAIST, South Korea (March 2012 - February 2017)

Employment and Experience

Postdoctoral Researcher, USI, Lugano, Switzerland (1st September 2023 - Present)
Advisor: Prof. Paolo Tonella
Funding: The European Horizon Project Sec4AI4Sec, NRF Korea Postdoctoral Fellowship Program 2024
I am working as a postdoctoral researcher with Prof. Paolo Tonella.

Postdoctoral Researcher, KAIST, South Korea (1st March 2023 - 31st August 2023)
Advisor: Prof. Shin Yoo
I worked as a postdoctoral researcher at COINSE lab led by Prof. Shin Yoo.

Visiting Ph.D. Student, USI, Lugano, Switzerland (3rd August 2022 - 23rd September 2022)
Advisor: Prof. Paolo Tonella
Funding: Young Researchers' Exchange Prorgramme between South Korea and Switzerland 2022
I visited TAU research group at Università della Svizzera italiana (USI) and conducted research on mutation-based deep learning system testing and an empirical study on deep learning program repair.

Research Intern at Users & Information Lab, KAIST, South Korea (September 2015 - December 2015)
Advisor: Prof. Alice Oh
I designed a new social back-channel application named EliceQ and deployed in a university classroom where students can ask questions anonymously at any time.

Research Intern at NC Lab, KAIST, South Korea (March 2015 - August 2015)
Advisor: Prof. Junehwa Song
I researched on a relational norm intervention for behaviour change, mainly developed an application named BeUpright that enabled a two-week human study.

Publications*

* Unless otherwise specified, they have been published at the main research track.

Preprints

[5] Gunel Jahangirova, Nargiz Humbatova, **Jinhan Kim**, Shin Yoo, and Paolo Tonella. "Real Faults in Deep Learning Fault Benchmarks: How Real Are They?" In: *arXiv preprint*. arXiv (2025).

Under revision at Empirical Software Engineering.

[4] Somin Kim, **Jinhan Kim**, Vincenzo Riccio, Shin Yoo, and Paolo Tonella. "Mutation-Guided Test Generation for DNNs Using Diffusion". In: *arXiv preprint*. arXiv (2025).

[3] **Jinhan Kim**, Nargiz Humbatova, Gunel Jahangirova, Shin Yoo, and Paolo Tonella. "MuFF: Stable and Sensitive Post-training Mutation Testing for Deep Learning". In: *arXiv preprint*. arXiv (2025).

[2] **Jinhan Kim**, Nargiz Humbatova, Gunel Jahangirova, Shin Yoo, and Paolo Tonella. "Fault Localisation and Repair for DL Systems: An Empirical Study with LLMs". In: *arXiv preprint*. arXiv (2025).

Under revision at ACM Transactions on Software Engineering and Methodology.

[1] Samuele Pasini, Gianluca Maragliano, **Jinhan Kim**, and Paolo Tonella. "Cross-Site Scripting Adversarial Attacks Based on Deep Reinforcement Learning: Evaluation and Extension Study". In: *arXiv preprint*. arXiv (2025).

Under revision at Journal of Systems and Software.

Journal Articles

[6] Samuele Pasini, **Jinhan Kim**, Tommaso Aiello, Rocio Lozoya, Antonino Sabetta, and Paolo Tonella. "Evaluating and Improving the Robustness of Security Attack Detectors Generated by LLMs". In: *Empirical Software Engineering*. EMSE (2025).

[5] Masoud Jamshidiyan Tehrani, **Jinhan Kim**, Rosmael Zidane Lekeufack Foulefack, Alessandro Marchetto, and Paolo Tonella. "A Taxonomy of System-Level Attacks on Deep Learning Models in Autonomous Vehicles". In: *ACM Transactions on Software Engineering and Methodology*. TOSEM (2025).

[4] Nargiz Humbatova, **Jinhan Kim**, Gunel Jahangirova, Shin Yoo, and Paolo Tonella. "An Empirical Study of Fault Localisation Techniques for Deep Neural Networks". In: *Empirical Software Engineering*. EMSE 30.5 (2025), p. 124.

[3] **Jinhan Kim**, Gabin An, Robert Feldt, and Shin Yoo. "Learning Test-Mutant Relationship for Accurate Fault Localisation". In: *Information and Software Technology*. IST 162 (2023), p. 107272.

[2] **Jinhan Kim**, Robert Feldt, and Shin Yoo. "Evaluating Surprise Adequacy for Deep Learning System Testing". In: *ACM Transactions on Software Engineering and Methodology*. TOSEM 32.2 (2023), pp. 1–29.

[1] **Jinhan Kim**, Juyoung Jeon, Shin Hong, and Shin Yoo. "Predictive Mutation Analysis via Natural Language Channel in Source Code". In: *ACM Transactions on Software Engineering and Methodology*. TOSEM 31.4 (2022), pp. 1–27.

Conferences & Workshops

[15] **Jinhan Kim**, Nargiz Humbatova, Gunel Jahangirova, Shin Yoo, and Paolo Tonella. "Revisiting "Revisiting Neuron Coverage for DNN Testing: A Layer-Wise and Distribution-Aware Criterion": A Critical Review and Implications on DNN Coverage Testing". In: *Proceedings of the 48th International Conference on Software Engineering*. ICSE. 2026.

To appear.

[14] Masoud Tehrani, **Jinhan Kim**, and Paolo Tonella. "PCLA: A Framework for Testing Autonomous Agents in the CARLA Simulator". In: *Proceedings of the 33rd ACM International Conference on the Foundations of Software Engineering*. FSE Demo. 2025, pp. 1040–1044.

[13] **Jinhan Kim**, Jongchan Park, and Shin Yoo. "The Inversive Relationship Between Bugs and Patches: An Empirical Study". In: *Proceedings of the 18th International Workshop on Mutation Analysis*. Mutation. 2023, pp. 314–323.

[12] **Jinhan Kim**, Nargiz Humbatova, Gunel Jahangirova, Paolo Tonella, and Shin Yoo. "Repairing DNN Architecture: Are We There Yet?" In: *Proceedings of the 16th IEEE International Conference on Software Testing, Verification and Validation*. ICST. 2023, pp. 234–245.

[11] Juyeon Yoon, Seungjoon Chung, Kihyuck Shin, **Jinhan Kim**, Shin Hong, and Shin Yoo. "Repairing Fragile GUI Test Cases Using Word and Layout Embedding". In: *Proceedings of the 15th IEEE International Conference on Software Testing, Verification and Validation*. ICST Industry. 2022.

[10] **Jinhan Kim**, Gabin An, Robert Feldt, and Shin Yoo. "Ahead of Time Mutation Based Fault Localisation Using Statistical Inference". In: *Proceedings of the 32nd International Symposium on Software Reliability Engineering*. ISSRE. 2021, pp. 253–263.

[9] **Jinhan Kim**, Jeongil Ju, Robert Feldt, and Shin Yoo. "Reducing DNN Labelling Cost Using Surprise Adequacy: An Industrial Case Study for Autonomous Driving". In: *Proceedings of the 28th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*. FSE Industry. 2020, pp. 1466–1476.

[8] **Jinhan Kim**, Robert Feldt, and Shin Yoo. "Guiding Deep Learning System Testing Using Surprise Adequacy". In: *Proceedings of the 41st International Conference on Software Engineering*. ICSE. 2019, pp. 1039–1049.

[7] **Jinhan Kim**, Michael G. Epitropakis, and Shin Yoo. "Learning Without Peeking: Secure Multi-Party Computation Genetic Programming". In: *Proceedings of the 10th International Symposium on Search Based Software Engineering*. SSBSE. 2018, pp. 246–261.

[6] Jungkook Park, Yeong Hoon Park, **Jinhan Kim**, Jeongmin Cha, Suin Kim, and Alice Oh. "Elicast: Embedding Interactive Exercises in Instructional Programming Screencasts". In: *Proceedings of the Fifth Annual ACM Conference on Learning at Scale*. L@S. 2018, pp. 1–10.

[5] Gabin An, **Jinhan Kim**, and Shin Yoo. "Comparing Line and AST Granularity Level for Program Repair Using PyGGI". In: *Proceedings of the 4th Genetic Improvement Workshop*. GI. 2018, pp. 19–26.

[4] Gabin An, **Jinhan Kim**, Seongmin Lee, and Shin Yoo. "PyGGI: Python General framework for Genetic Improvement". In: *Proceedings of Korea Software Congress*. KCSE. 2017, pp. 536–538.

[3] **Jinhan Kim**, Junhwi Kim, and Shin Yoo. "GPGPGPU: Evaluation of Parallelisation of Genetic Programming Using GPGPU". In: *Proceedings of the 9th International Symposium on Search Based Software Engineering*. SSBSE Short Papers. 2017, pp. 137–142.

[2] Jaemyung Shin, Bumsoo Kang, Taiwoo Park, Jina Huh, **Jinhan Kim**, and Junehwa Song. "BeUpright: Posture Correction Using Relational Norm Intervention". In: *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. CHI. 2016, pp. 6040–6052.

[1] Jaemyung Shin, Bumsoo Kang, **Jinhan Kim**, Jina Huh, Junehwa Song, and Taiwoo Park. "Demo: Posture Correction Using Smartphone-Based Relational Intervention Model". In: *Proceedings of the 13th ACM Conference on Embedded Networked Sensor Systems*. SenSys Demo. Seoul, South Korea, 2015, pp. 495–496.

Patents

- Method for Evaluating Test Fitness of Input Data for Neural Network and Apparatus Thereof, Korea Patent, No. 1020190104591. Published: August 09, 2021.

Awards and Honors

- Best Paper Award at 18th International Workshop on Mutation Analysis (2023).

- KAIST CoE Ph.D. Dissertation Award (2023): It is awarded to Ph.D. students of the College of Engineering in KAIST who have demonstrated exceptional research capabilities and made notable achievements during their doctoral studies.
- NAVER Ph.D. Fellowship Award (2020): A scholarship awarded to students in School of Computing at KAIST who have demonstrated outstanding research achievements.

Student Supervision

Ph.D.

- Masoud Jamshidiyan Tehrani, Ph.D. Student, Università della Svizzera italiana (February 2024 - Present)
  Co-supervision with Prof. Paolo Tonella
- Samuele Pasini, Ph.D. Student, Università della Svizzera italiana (October 2023 - Present)
  Co-supervision with Prof. Paolo Tonella

Community Services

Organising Committee

- Year 2026: ICST (Testing Tools and Data Showcase Track Chair), DeepTest (Workshop Co-organiser), SBFT (Workshop Co-organiser)
- Year 2025: DeepTest (Workshop Co-organiser)

Program Committee

- Year 2025: ISSTA (Research Track), ASE (NIER Track, Student Research Competition), SSBSE (Challenge Track), SBFT, Mutation, DeMeSSAI
- Year 2024: SCAM (Research Track), ICSE (Demonstrations Track), ASE (Demonstrations Track, NIER Track), DeepTest, Mutation
- Year 2023: Mutation, ASE (NIER Track), ICSME (Artifact Evaluation Track and ROSE Festival)
- Year 2022: Mutation, ICST (Poster Track), ICSME (Registered Reports Track), ICSME (Artifact Evaluation Track and ROSE Festival)
- Year 2021: Mutation, ICSME (Artifact Evaluation Track)
- Year 2020: Mutation

Journal Board

- Year 2025: TOSEM Board of Distinguished Reviewers
- Year 2024: TOSEM Board of Distinguished Reviewers

Journal Reviewer

- Year 2025: TSE, TOSEM, EMSE, STVR, IEEE Computer
- Year 2024: TSE, TOSEM, EMSE, JSEP, JSS
- Year 2023: TSE, TOSEM, EMSE, JSEP
- Year 2022: TOSEM, JSEP
- Year 2021: TOSEM, STVR
- Year 2020: IST, JSS

Talks

- SI Seminar (Software Institute Seminar), Sep. 2024, Lugano, Switzerland
  Title: When Simple is Better than Complex: Coverage and Mutation for DL Testing
- KCSE 2023 (Korea Conference on Software Engineering 2023), Pyeongchang, South Korea
  Invited paper presentation
  Title: Predictive Mutation Analysis via Natural Language Channel in Source Code
- KCSE 2022 (Korea Conference on Software Engineering 2022), Pyeongchang, South Korea
  Invited paper presentation
  Title: Ahead of Time Mutation Based Fault Localisation using Statistical Inference
- KSC 2019 (Korea Software Congress 2019), Pyeongchang, South Korea
  Invited paper presentation
  Title: Guiding Deep Learning System Testing Using Surprise Adequacy

Teaching

Teaching Assistant

- KAIST CS101 Introduction to Programming (Fall 2016, Spring 2020, Fall 2020, Spring 2021)
- KAIST CS453 Automated Software Testing (Spring 2018, Spring 2019)
- KAIST CS454 AI Based Software Engineering (Fall 2021)
- KAIST CS489 Computer Ethics and Social Issues (Fall 2019)

References

- Name: Shin Yoo
  Affiliation: Full Professor, KAIST (Daejeon, South Korea)
  Email: `shin.yoo@kaist.ac.kr`
  Website: `https://coinse.github.io/members/shin.yoo/`
- Name: Paolo Tonella
  Affiliation: Full Professor, Università della Svizzera italiana (Lugano, Switzerland)
  Email: `paolo.tonella@usi.ch`
  Website: `https://www.inf.usi.ch/faculty/tonella/`
- Name: Robert Feldt
  Affiliation: Full Professor, Chalmers University of Technology (Gothenburg, Sweden)
  Email: `robert.feldt@chalmers.se`
  Website: `https://www.cse.chalmers.se/~feldt/`