Curriculum Vitae

Contact Information

Dongsun Kim
Associate Professor
College of Informatics
Department of Computer Science and Engineering
Korea University
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Google Scholar: https://scholar.google.com/citations?user=Rmzs0QIAAAAJ
DBLP: https://dblp.org/pid/10/2501-1.html

Summary

- **Vision**: I am pursuing a long-term objective: "***Debugging as Science***", making software maintenance tasks systematic, efficient, and predictable.
- **Topics**: To achieve my vision, I am working on **automated debugging**, with a focus on specific topics such as program repair based on deep learning, proactive debugging, code search for patches, and mining fix patterns with code embedding. In particular, I have pioneered a new research area called "*pattern-based program repair*" for more effective automated debugging. Recently, I am expanding my research area to detecting and fixing security vulnerabilities with large source code models such as Codex and CodeGPT as other program debugging tasks.
- **Publications**: My work has been published in *top-tier conferences* such as 5*ICSE (with an **ACM SIGSOFT Distinguished Paper Award**), 1*FSE, 2*ASE (with an **ACM SIGSOFT Distinguished Paper Award**), and 4*ISSTA, as well as *top-tier journals* such as 4*TSE (with a featured article), 2*TOSEM, 1*CSUR, and 4*EMSE.
- **Awards**: Winner of Two ACM SIGSOFT Distinguished Paper Awards, @ICSE 2013 and @ASE 2023.
- **Recognition**: I am ranked among the **Top-20 most impactful SE researchers** (consolidators) in a recent paper[1]. In addition, I have been invited by five Dagstuhl seminars (17022, 15472, 11062, 24172, and 24431).
- **Citations**: Currently, my research work has been cited more than **3,900** times and the H-index is **25**.
- **Tools open-sourced**: I co-developed *PAR, LSRepair, TBar, iFixR, and AVATAR*, **automatic patch generation tools**, which can fix program bugs by using common fix patterns. In addition, my contributions include *CoCaBu* and *FaCoY*, **code search tools**, which can identify syntactically and semantically similar code fragments from open-source software projects in world-wide code bases such as GitHub.
- **Student Supervision**: I have supervised *three PhD* students (Kui Liu, Anil Koyuncu, and Kisub Kim) and *three MPhil* students (Arooba Shahoor, K C Shweta, and Raphael Sirres).
- **Funding**: I have led research projects on program repair and preventive debugging **as PI** (funded by the Luxembourg National Research Fund and the National Research Foundation of Korea, respectively).

Publications

NOTE: "Kui Liu", "Anil Koyuncu", "Kisub Kim", "Arooba Shahoor" and "Raphael Sirres" have been completed their degrees under my supervision and supported by my grants (*FIXPATTERN* funded by Luxembourg Research Fund and *Preventive Debugging* National Research Foundation of Korea). Thus, I am the corresponding author of the papers in which these students are the first authors.

Peer-Reviewed Journal Papers

[J15] Kisub Kim, Sankalp Ghatpande, **Dongsun Kim**, Xin Zhou, Kui Liu, Tegawendé F. Bissyandé, Jacques Klein, Yves Le Traon, "Big Code Search: a Bibliography", ACM Computing Surveys, Vol. 56, No. 1, pp. 1-49 (2024).

[J14] Elkhan Ismayilzada, Md Mazba Rahman, **Dongsun Kim**, Jooyong Yi, "Poracle: Testing Patches Under Preservation Conditions to Combat the Overfitting Problem of Program Repair", ACM

Transactions on Software Engineering and Methodology, Vol. 33, No. 2, pp 1–39 (2023).

[J13] Tiezhu Sun, Kevin Allix, Kisub Kim, Xin Zhou, **Dongsun Kim**, David Lo, Tegawendé F. Bissyandé, and Jacques Klein, "DexBERT: Effective, Task-Agnostic and Fine-grained Representation Learning of Android Bytecode", IEEE Transactions on Software Engineering, Vol. 49, No. 10, pp. 4691-4706 (2023).

[J12] Kui Liu, Jingtang Zhang, Li Li, Anil Koyuncu, **Dongsun Kim**, Chunpeng Ge, Zhe Liu, Jacques Klein, Tegawendé F. Bissyandé, "Reliable Fix Patterns Inferred from Static Checkers for Automated Program Repair", ACM Transactions on Software Engineering and Methodology, Vol. 32, No. 4, pp. 1-38 (2023).

[J11] Kisub Kim, Sankalp Ghatpande, Kui Liu, Anil Koyuncu, **Dongsun Kim**, Tegawendé F. Bissyandé, Jacques Klein, Yves Le Traon, "DigBug—Pre/post-processing operator selection for accurate bug localization", the Journal of Systems and Software, Vol. 189 (2022).

[J10] Deheng Yang, Kui Liu, **Dongsun Kim**, Anil Koyuncu, Kisub Kim, Haoye Tian, Yan Lei, Xiaoguang Mao, Jacques Klein, Tegawendé F. Bissyandé, "Where Were the Repair Ingredients for Defects4J Bugs? Exploring the Impact of Repair Ingredient Retrieval on the Performance of 24 Program Repair Systems", Empirical Software Engineering Journal, Vol. 26, No. 122 (2021).

[J9] Kui Liu, **Dongsun Kim**, Tegawendé F. Bissyandé, Shin Yoo, Yves Le Traon, "Mining Fix Patterns for FindBugs Violations", the IEEE Transactions on Software Engineering, Vol. 47, No. 1 pp. 165-188 (2021). *Accepted as a Journal-first paper at the 41st International Conference on Software Engineering (ICSE 2019).*

[J8] Kui Liu, Li Li, Anil Koyuncu, **Dongsun Kim**, Zhe Liu, Jacques Klein, Tegawendé F. Bissyandé, "A Critical Review on the Evaluation of Automated Program Repair Systems," the Journal of Systems and Software, Vol. 171. (2021).

[J7] Anil Koyuncu, Kui Liu, Tegawendé F. Bissyandé, **Dongsun Kim**, Jacques Klein, Martin Monperrus, and Yves Le Traon, "FixMiner: Mining Relevant Fix Patterns for Automated Program Repair", the Empirical Software Engineering Journal, Vol. 25, pp. 1980-2024 (2020).

[J6] Daoyuan Li, Li Li, **Dongsun Kim**, Tegawendé F. Bissyandé, David Lo, and Yves Le Traon, "Watch out for This Commit! A Study of Influential Software Changes", the Journal of Software: Evolution and Process, Vol. 31, No. 12, e2181 (2019).

[J5] Jaekwon Lee, **Dongsun Kim**, Woosung Jung, "Cost-aware Clustering of Bug Reports by Using a Genetic Algorithm," Journal of Information Science and Engineering, Vol. 35, No. 1 (2019).

[J4] Raphael Sirres, Tegawendé F. Bissyandé, **Dongsun Kim**, David Lo, Jacques Klein, and Yves Le Traon, "Augmenting and Structuring User Queries to Support Efficient Free-Form Code Search," Empirical Software Engineering Journal, Vol. 23, No. 5, pp. 2622–2654 (2018). *Accepted as a Journal-first paper at the 40th International Conference on Software Engineering (ICSE 2018).*

[J3] Suntae Kim and **Dongsun Kim**, "Automatic Identifier Inconsistency Detection Using Code Dictionary," Empirical Software Engineering Journal, Vol. 21, No. 2, pp. 565-604 (2015).

[J2] **Dongsun Kim**, Yida Tao, Sunghun Kim, and Andreas Zeller, "Where Should We Fix This Bug?: A Two-phase Recommendation Model," the IEEE Transactions on Software Engineering, Vol. 39, No. 11, pp. 1597-1610 (2013).

[J1] **Dongsun Kim**, Xinming Wang, Sunghun Kim, Andreas Zeller, Shing-chi Cheung, and Sooyong Park, "Which Crashes Should I Fix First?: Predicting Top Crashes at an Early Stage to Prioritize Debugging Efforts," the IEEE Transactions on Software Engineering, Vol. 37, No. 3, pp. 430-447 (2011). *Selected as the featured article of the issue.*

Peer-Reviewed Conference Papers

[C28] Kisub Kim, Jounghoon Kim, Byeongjo Park, **Dongsun Kim**, Chun Yong Chong, Yuan Wang, Tiezhu Sun, Daniel Tang, Jacques Klein, Tegawendé F. Bissyandé, "DataRecipe — How to Cook the Data for CodeLLM?", in the Proceedings of the 39th IEEE/ACM International Conference on Automated Software Engineering (ASE 2024), Sacramento, California, United States, October 27-November 1, 2024. Acceptance rate: 27.3% (118+37/587).

[C27] Arooba Shahoor, Jooyong Yi, **Dongsun Kim**, "Preserving Reactiveness: Understanding and Improving the Debugging Practice of Blocking-call Bugs", in the Proceedings of the 33rd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2024), Vienna, Austria, September 16-20, 2024. Acceptance rate: 21% (143/694).

[C26] Zhou Yang, Zhipeng Zhao, Chenyu Wang, Jieke SHI, **Dongsun Kim**, DongGyun Han, David Lo, "Unveiling Memorization in Code Models", in the Proceedings of the 46th IEEE/ACM International Conference on Software Engineering (ICSE 2024), Lisbon, Portugal, April 14-20, 2024. Acceptance rate: 22.3% (234/815).

[C25] Arooba Shahoor, Askar Yeltayuly Khamit, Jooyong Yi, **Dongsun Kim**, "LeakPair: Proactive Repairing of Memory Leaks in Single Page Web Applications", in the Proceedings of the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023), Luxembourg, September 11 - 15, 2023. Acceptance rate: 21% (135/629). 🏆 ACM SIGSOFT Distinguished Paper Award Winner.

[C24] Jingtang Zhang, Kui Liu, **Dongsun Kim**, Li Li, Zhe Liu, Jacques Klein and Tegawendé F. Bissyandé, "Revisiting Test Cases to Boost Generate-and-Validate Program Repair", in the Proceedings of the 37th International Conference on Software Maintenance and Evolution (ICSME 2021), Luxembourg, September 27 - October 1, 2021. Acceptance rate: 24% (43/179).

[C23] Kui Liu, Shangwen Wang, Anil Koyuncu, Kisub Kim, Tegawendé F. Bissyandé, **Dongsun Kim**, Peng Wu, Jacques Klein, Xiaoguang Mao and Yves Le Traon, "On the Efficiency of Test Suite based Program Repair: A Systematic Assessment of 16 Automated Repair Systems for Java Programs", in the Proceedings of the 42nd International Conference on Software Engineering (ICSE 2020), Seoul, South Korea, May 23–29, 2020. Acceptance rate: 20.9% (129/617).

[C22] Anil Koyuncu, Kui Liu, Tegawendé F. Bissyandé, **Dongsun Kim**, Martin Monperrus, Jacques Klein and Yves Le Traon, "iFixR: Bug Report driven Program Repair", in Proceedings of the 27th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2019), Tallinn, Estonia, 26-30 August, 2019. Acceptance rate: 24.4% (74/303).

[C21] Kui Liu, Anil Koyuncu, **Dongsun Kim**, Tegawendé F. Bissyandé, "TBar: Revisiting Template-based Automated Repair", in Proceedings of the 28th International Symposium on Software Testing and Analysis (ISSTA 2019), Beijing, China, July 15-19, 2019. Acceptance rate: 22.5% (32/142).

[C20] Kui Liu, Anil Koyuncu, Tegawendé F. Bissyandé, **Dongsun Kim**, Jacques Klein and Yves Le Traon, "You Cannot Fix What You Cannot Find! An Investigation of Fault Localization Bias in Benchmarking Automated Program Repair Systems", in the Proceedings of the 12th IEEE International Conference on Software Testing, Verification and Validation (ICST 2019), Xi'an, China, April 22-27, 2019. Acceptance rate: 28.1% (31/110).

[C19] Kui Liu, **Dongsun Kim**, Tegawendé F. Bissyandé, Taeyoung Kim, Kisub Kim, Anil Koyuncu, Suntae Kim and Yves Le Traon, "Learning to Spot and Refactor Inconsistent Method Names", in the Proceedings of the 41st International Conference on Software Engineering (ICSE 2019), Montréal, QC, Canada, May 25–31, 2019. Acceptance rate: 20.6% (109/529).

[C18] Kui Liu, Anil Koyuncu, **Dongsun Kim** and Tegawendé F. Bissyandé, "AVATAR : Fixing Semantic Bugs with Fix Patterns of Static Analysis Violations", in Proceedings of the 26th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2019), Hangzhou, China, February 24-27, 2019. Acceptance rate: 30.4% (45/148).

[C17] Kui Liu, Anil Koyuncu, Kisub Kim, **Dongsun Kim**, and Tegawendé Bissyande, "Live Search of Fix Ingredients for Automated Program Repair", in Proceedings of the 25th Asia-Pacific Software Engineering Conference (APSEC 2018) ERA Track, Nara, Japan, December 4-7, 2018. Acceptance rate: 38.9% (14/36). Best ERA Paper Award Winner.

[C16] Kui Liu, **Dongsun Kim**, Li Li, Anil Koyuncu, Tegawendé Bissyande and Yves Le Traon, "A Closer Look at Real-World Patches", in Proceedings of the 34th IEEE International Conference on Software Maintenance and Evolution (ICSME 2018), Madrid, Spain, September 23 - 29, 2018. Acceptance rate: 21.3% (37/174).

[C15] Jaekwon Lee, **Dongsun Kim**, Tegawendé F. Bissyandé, Woosung Jung and Yves Le Traon, "Bench4BL: Reproducibility Study on the Performance of IR-Based Bug Localization", in Proceedings of the 27th International Symposium on Software Testing and Analysis (ISSTA 2018), Amsterdam, Netherlands, July 16 – 21, 2018. Acceptance rate: 19.2% (25/130).

[C14] Kisub Kim, **Dongsun Kim**, Tegawendé F. Bissyandé, Eunjong Choi, Li Li, Jacques Klein and Yves Le Traon, "FaCoY – A Code-to-Code Search Engine", in Proceedings of the 40th International Conference on Software Engineering (ICSE 2018), Gothenburg, Sweden, May 27-June 3, 2018. Acceptance rate: 20.9% (105/502).

[C13] Anil Koyuncu, Tegawendé F. Bissyandé, **Dongsun Kim**, Jacques Klein, Martin Monperrus, and Yves Le Traon, "Impact of Tool Support in Patch Construction," in Proceedings of the 26th International Symposium on Software Testing and Analysis (ISSTA 2017), Santa Barbara, California, United States, July 10-14, 2017. Acceptance rate: 26% (31/118).

[C12] Jorge Augusto Meira, Eduardo Cunha de Almeida, **Dongsun Kim**, Edson Ramiro Lucas Filho, and Yves Le Traon, "Overloaded! --- A Model-based Approach to Database Stress Testing," in

Proceedings of the 27th International Conference on Database and Expert Systems Applications (DEXA 2016), Porto, Portugal, Sep 5-8, 2016, pp. 207-222. Acceptance rate: 28.5% (39/137).

[C11] Deokyoon Ko, Kyeongwook Ma, Sooyong Park, Suntae Kim, **Dongsun Kim**, and Yves Le Traon, "API Document Quality for Resolving Deprecated APIs," in Proceedings of the 21th Asian-Pacific Software Engineering Conference (APSEC 2014), Jeju Island, South Korea, Dec 1-4, 2014, pp. 27-30. Acceptance rate: 30% (67/226).

[C10] **Dongsun Kim**, Jaechang Nam, Jaewoo Song, and Sunghun Kim, "Automatic Patch Generation Learned from Human-written Patches," in Proceedings of the 35th International Conference on Software Engineering (ICSE 2013), San Francisco, May 18-26, 2013, pp. 802–811. Acceptance rate: 18.5% (85/461). 🏆 ACM SIGSOFT Distinguished Paper Award Winner.

[C9] **Dongsun Kim**, Seokhwan Kim, and Sooyong Park, "Usage History-based Architectural Scheduling," in Proceedings of the 33rd Annual IEEE International Computer Software and Applications Conference (COMSAC 2009), Seattle, Washington, July 20-24, 2009, pp. 443-451. Acceptance rate: 20%.

[C8] **Dongsun Kim** and Sooyong Park, "Reinforcement Learning-Based Dynamic Adaptation Planning Method for Architecture-based Self-Managed Software," in Proceedings of the Software Engineering for Adaptive and Self-Managing Systems (SEAMS 2009), Vancouver, BC, Canada, May 18-19, 2009, pp. 76-85. Acceptance rate: 48%.

[C7] **Dongsun Kim** and Sooyong Park, "Dynamic Architectural Selection: A Genetic Algorithm Based Approach," Proceedings of the 1st International Symposium on Search Based Software Engineering (SSBSE 2009), Cumberland Lodge, Windsor, UK, May 13-15, 2009, pp. 59-68, Acceptance rate: 40.9%.

[C6] **Dongsun Kim**, Suntae Kim, Seokhwan Kim, and Sooyong Park, "Software Engineering Education Toolkit for Embedded Software Architecture Design Methodology Using Robotic Systems," in Proceedings of 15th Asia-Pacific Software Engineering Conference (APSEC 2008), Beijing, China, December 3-5, 2008, pp. 317-324. Acceptance rate: 29.8%.

[C5] **Dongsun Kim** and Sooyong Park, "A Q-leaning-Based On-line Planning Approach to Autonomous Architecture Discovery for Self-Managed Software," in Proceedings of 7th International Workshop On System/Software Architectures (IWSSA 2008), Monterrey, Mexico, Nov 9 - 14, 2008, pp.432-441. Acceptance rate: 61%.

[C4] **Dongsun Kim**, Sooyong Park, Muntaek Choi, and Munsang Kim, "Applying Dynamic Software Architecture Management to Home Service Robot Software," in Proceedings of 16th IEEE International Symposium on Robot and Human Interactive Communication, Jeju Island, Korea, August 26-29, 2007, pp. 285-290.

[C3] **Dongsun Kim** and Sooyong Park, "Designing Dynamic Software Architecture for Home Service Robot Software," in Proceedings of the 2006 IFIP International Conference on Embedded And Ubiquitous Computing (EUC 2006), Seoul, Korea, August 1-4, 2006, pp. 437–448. Acceptance rate: 25%.

[C2] **Dongsun Kim**, Sooyong Park, Youngkyun Jin, Hyeongsoo Chang, Yu-Sik Park, In-Young Ko, Kwanwoo Lee, Junhee Lee, Yeon-Chool Park, and Sukhan Lee, "SHAGE: A Framework for Self-managed Robot Software," in Proceedings of the 2006 International Workshop on Software Engineering for Adaptive and Self-Managing Systems (SEAMS 2006), Shanghai, China, May 21-22, 2006, pp. 79-85. Acceptance rate: 59%.

[C1] **Dongsun Kim** and Sooyong Park, "AlchemistJ: A Framework for Self-adaptive Software," in Proceedings of the 2005 IFIP International Conference on Embedded And Ubiquitous Computing (EUC 2005), LNCS3824, Nagasaki, Japan, December 6-9, 2005, pp. 98–109. Acceptance rate: 30%.

Honors and Awards

- **Best Paper**, ACM SIGSOFT Distinguished Paper Award Winner, the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023), September 2023.
- **Best Paper**, ACM SIGSOFT Distinguished Paper Award Winner, the 35th International Conference on Software Engineering (ICSE 2013), May 2013.
- **Best ERA Paper Award**, "Live Search of Fix Ingredients for Automated Program Repair", the 25th Asia-Pacific Software Engineering Conference (APSEC 2018) ERA Track, December 2018.
- **IPSJ SIG SE Excellent Research Award,** "FaCoY – A Code-to-Code Search Engine", in Proceedings of the 40th International Conference on Software Engineering (ICSE 2018), September 2018.
- **Featured Article**, "Which Crashes Should I Fix First?: Predicting Top Crashes at an Early Stage to Prioritize Debugging Efforts", IEEE Transactions on Software Engineering, May 2011.

- **KFAS** (The Korea Foundation for Advanced Studies) Scholarship, August 2004 – February 2008.

Funding

- OpenAI, Research Access Program, "Evaluating Code Generation LLMs", 2,500USD, Jan. 2024-Dec. 2024, **sole PI**.
- National Research Foundation of Korea (NRF), Regional Researcher Program, "Preventive Debugging: Early Error Detection and Automated Repair based on Deep Code Learning for Reliable Software Systems", 280,000 USD, Jun. 2021-May 2024, **sole PI**.
- National Research Foundation of Korea (NRF), Engineering Research Center (ERC), "Software Disaster Research", 13M USD, Jun. 2021-May 2028, **Co-PI**.
- National Security Research Institute of Korea (NSRI), "Machine Learning Models for Automated Program Repair", 60,000 USD, Apr. 2022-Oct. 2022, **sole PI**.
- University of Luxembourg, Internal Research Project (IRP), "Automated Fixing of Program Vulnerabilities in the Android Ecosystem", 127,000 EUR, Sep. 2017-Aug. 2019, **Co-PI**.
- Luxembourg National Research Fund (FNR), CORE Junior Grant, "Automated Program Repair using Fix Patterns Learned from Human-written Patches", 499,000 EUR, Nov. 2015-Oct. 2018, **sole PI**.
- National Research Foundation of Korea (NRF), Post-Doctoral Fellowship Grant, "Crash Prioritization and Automated Crash-fix Generation", 30,000 USD, Dec. 2011-Nov. 2012, **sole PI**.
- Samsung Electronics Co., Ltd., "Topic and Sentiment Analysis of Open Source Communities for Consumer Electronic Products", 80,000 USD, May-Dec. 2012, **Co-PI**.

Professional Activities

Journal Board Member:
- International Journal of Empirical Software Engineering, Review Board, 2014-2018
- International Journal of Automated Software Engineering, Review Board, 2021

Journal and Conference Reviewer:
- IEEE Transactions on Software Engineering
- ACM Transactions on Software Engineering and Methodology
- International Journal of Empirical Software Engineering
- IEEE Software
- Information Sciences
- IEICE Transactions on Information and Systems
- Journal of Software Testing, Verification and Reliability
- Journal of Information Science and Engineering
- Journal of Software Practice and Experience
- Journal of Systems and Software
- Journal of Computer Science and Technology
- Science of Computer Programming
- ACM SIGSOFT Symposium on the Foundations of Software Engineering
- International Working Conference on Mining Software Repositories
- International Conference on Software Maintenance
- IEEE International Conference on Program Comprehension
- International Workshop on Recommendation Systems for Software Engineering
- India Software Engineering Conference
- Workshop on Developing Tools as Plug-ins

Program Committee:
- International Symposium on Software Testing and Analysis (ISSTA), Technical Track, 2025.
- International Conference on Software Engineering (ICSE), Technical Track, 2023.
- Asia-Pacific Software Engineering Conference (APSEC), Technical Track, 2022, 2023.
- International Conference on Software Engineering (ICSE), ACM Student Research Competition (SRC), 2022.
- Mining Software Repositories (MSR), Registered Reports, 2021.
- International Conference on Software Maintenance and Evolution (ICSME), Industrial Track, 2021.
- International Conference on Software Maintenance and Evolution (ICSME), Doctoral Symposium, 2021.
- International Conference on Automated Software Engineering (ASE), Tool demonstration, 2021, 2023.
- International Conference on Program Comprehension (ICPC), Tool track, 2021.
- International Conference on Program Comprehension (ICPC), 2020.
- International Workshop on Automated Program Repair (APR), 2020, 2021, 2022.

- International Symposium on Search-Based Software Engineering, 2014–2016.
- International Workshop on Emerging Trends in Software Metrics, 2016.
- International Conference on Software Engineering, Demonstrations Track, 2015.
- IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER), 2016–2018, 2021-2022.
- RefTest Workshop, 2013, 2014.

Organizing Committee:
- Asia-Pacific Software Engineering Conference (APSEC), 2023; APSEC's 30th Anniversary Symposium Co-Chair.
- International Symposium on Software Testing and Analysis (ISSTA), 2022; Web Co-Chair.
- International Conference on Program Comprehension (ICPC), 2020; Social Media Co-Chair.
- International Symposium on Search-Based Software Engineering, 2013; Publicity Chair.

Invited Talk:
- "Impact of Tool Support in Patch Construction", at the following venues: NAIST (2017) and Osaka University (2017).
- "Looking at the Big Picture: Towards More Effective Software Engineering Research", at the following venues: KAIST (2015) and Chungbuk National University (2015).
- "A New Room: Another Debugging Begins", at the following venues: KAIST (2013) and Korea University (2014).
- Keynote at the International Workshop on Empirical Software Engineering in Practice, 2013 (IWESEP 2013, https://sites.google.com/site/iwesep2013/), Title: "Good Hunting: Locating, Prioritizing, and Fixing Bugs Automatically"
- "Good Hunting: Locating, Prioritizing, and Fixing Bugs Automatically", at the following venues: Ajou University (2013), Sogang University (2013), Chungbuk National University (2013), Korea University (2013), KAIST (2013), LG Electronics (2014), Fasoo.com (2014), Hanyang University (2014).
- "Automated Patch Generation: a pattern-based approach", at the Dagstuhl seminar 11062 on Self-Repairing Programs (http://www.dagstuhl.de/11062/), 2011.

Invited Lectures/Seminars:
- Tutorial on "Applying SAFE to Big-Code" as a part of "Bug detection in JavaScript web apps using the SAFE framework (https://pldi17.sigplan.org/event/pldi-2017-workshops-and-tutorials-bug-detection-in-javascript-web-apps-using-the-safe-framework)", at the 38th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2017).
- Dagstuhl Seminar 24431 on Automated Programming and Program Repair, Dagstuhl, Germany, October 20-25, 2024.
- Dagstuhl Seminar 24172 on Code Search, Dagstuhl, Germany, April 22-24, 2014.
- Dagstuhl Seminar 17022 on Automated Program Repair, Dagstuhl, Germany, January 8-13, 2017.
- Dagstuhl Seminar 15472 on Programming with Big Code, Dagstuhl, Germany, November 15-18, 2015.
- Dagstuhl Seminar 11062 on Self-Repairing Programs, Dagstuhl, Germany, February 6-11, 2011.
- "Coding for Everyone", (invited lecture by The Korea Foundation for Advanced Studies), for High/Middle school students, 2017-2019.
- "Why do need to write a program?", (invited lecture by The Korea Foundation for Advanced Studies), Gyeongnam Science High School, Korea, May, 2017.
- "Programming and your life", (invited lecture by The Korea Foundation for Advanced Studies), KFAS Headquarter, Korea, September, 2016.
- "Software for Everybody", (invited lecture by The Korea Foundation for Advanced Studies), Sunrin Internet High School, Korea, March, 2016.
- "Open Source and Crowdsourcing" (invited lecture by The Korea Foundation for Advanced Studies), Sungnam High School, Korea, December, 2014.
- "Software and Bugs" (invited lecture by The Korea Foundation for Advanced Studies), Kumi High School, Korea, October 2013.

Work Experience

Korea University, Seoul, South Korea
Position: Associate Professor
September 2024 – Present

Kyungpook National University, Daegu, South Korea
Position: *Assistant Professor*
September 2020 – August 2024

Furiosa.ai, Seoul, South Korea
Position: Senior Software Test Engineer
April 2019 – August 2020
My primary tasks in this organization include:
- Leading software debugging with automated techniques such as fuzzing test and automatic bug localization.
- Repairing the software systems running on NPU (Neural Processing Unit) chips.
- Assuring the quality of device drivers, neural model parsers/compilers, NPU simulators implemented by the organization.

The University of Luxembourg, Luxembourg
Position: Research Associate (Project Leader)
November 2013 – November 2018
As an independent researcher, I have focused on devising novel techniques for **automated software debugging**. During this period, my achievements include:
- Proposed program repair techniques such as iFixR (bug report driven repair), TBar (template-based program repair), AVATAR (repair with static analysis violation patterns), and LSRepair (program repair with code search).
- Reported on empirical study of program repair efficiency, adoption of automated repair in practice, fix pattern mining with deep learning, and bug localization benchmark.
- Presented novel code search engines CoCaBu (semantic code search) and FaCoY (code-to-code search).

The Hong Kong University of Science and Technology, Hong Kong
Position: Post-Doctoral Fellow
September 2010 – June 2013
I have developed automated debugging techniques such as bug localization, crash prioritization, and program repair as follows:
- Conducted several empirical studies of bug localization, fault prioritization, and program repair.
- Published two TSE papers, and one ICSE paper with the best paper award.
- Implemented a prototype tool (PAR) for program repair.
- Pioneered pattern-based program repair.
- Acquired a grant as co-PI from Samsung Electronics (Topic and Sentiment Analysis of Open Source Communities for Consumer Electronic Products).

Sogang University, Seoul, Korea
Position: Teaching Assistant
Spring 2003 - Fall 2004
Responsibilities included leading discussion sections and grading assignments for the following classes: 43-115: Software Engineering (Spring 2003), 10-058: C Language (Fall 2003 and Fall 2004), 43-013: Personal Computer Laboratory I (Spring 2004), and 43-152: Advanced Software Practice I (Fall 2004). Led designing and developing coursework and materials for CSE4115: Software Engineering (Spring 2007).

Education

Ph.D. in Computer Science and Engineering, March 2005 – August 2010.
Sogang University (*Korean ranking: 8th*), Seoul, Korea
Thesis: Quality-based Dynamic Software Architecture Selection Using Genetic Algorithms

Master of Science in Computer Science, March 2003 – February 2005.
Sogang University, Seoul, Korea, GPA: 3.98/4.3
Thesis: A Self-Adaptive Software Development Framework using Role and Port based Software Architecture

Bachelor of Engineering in Computer Science, March 2000 – February 2003.
Sogang University, Seoul, Korea, GPA: 3.82/4.3 **Summa Cum Laude**

Student Supervision

- K C Shweta, Master's degree supervisor.
- Arooba Shahoor, Master's degree supervisor, "Proactive Repairing of Memory Leaks in Single Page Applications", 2024.
- Kisub Kim, PhD degree supervisor, "Source Code Search for Semantically Similar Functionalities",

University of Luxembourg, August 2021.
- Anil Koyuncu, PhD degree supervisor (co-advising with Tegawendé F. Bissyandé), "Back to Understanding the Real-World Practice of Software Repair to Boost research in Automated Repair", University of Luxembourg, March 2020.
- Kui Liu, PhD degree supervisor, "Automated Program Repair using Fix Patterns", University of Luxembourg, December 2019.
- Raphael Sirres, Master's degree thesis advisor (Prof. Y. Le Traon being the supervisor), "Resolving the Vocabulary Mismatch Problem in Free-Form Code Search", University of Luxembourg, Sep 2015.

Teaching	- "Software Engineering" (COSE352, English-taught), Korea University, Undergraduate School, Autumn semester, 2024.
- "Software Design" (COMP224, English-taught), Kyungpook National University, Undergraduate School, Autumn semester, 2021-2023.
- "Advanced Software Analysis (Search-based Software Engineering)" (COME826, English-taught), Kyungpook National University, Postgraduate School, Autumn semester, 2021-2023.
- "Software Engineering (Automated Debugging)" (COMP422, English-taught), Kyungpook National University, Undergraduate School, Spring semester, 2021-2023.
- "Open-source Programming" (GLSO215, English-taught), Kyungpook National University, Undergraduate School, Spring semester, 2021.
- "Advanced Software Engineering (Fuzzing)" (COMP730, English-taught), Kyungpook National University, Postgraduate School, Autumn semester, 2020, 2021, 2023.
- "Systems Programming" (ELEC462), Kyungpook National University, Undergraduate School, Autumn semester, 2020.
- "Experimental Methods for Computer Science" (BPINFOR-75, co-teaching, English-taught), the University of Luxembourg, Postgraduate School, Spring semester, 2014, 2015, and 2016.
- "Big Data" (BPINFOR-82, co-teaching, English-taught), the University of Luxembourg, Undergraduate School, Autumn semester, 2014 and 2015.

References

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