Jihyeok Park (박지혁)

Assistant Professor

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Research Interests

The ultimate goal is to help developers design and implement high-quality software using diverse programming language techniques:

- **program analysis** for automatically understanding program behaviors and detecting software bugs and vulnerabilities.
- **mechanized specification** to fill the gap between human-readable specifications and machine-friendly software.
- **program synthesis** to lessen the burden of software development by automatically generating programs.
- **automated testing** to generate test cases for software automatically on behalf of humans.

Education

Integrated M.S. & Ph.D in School of Computing

Daejeon, Republic of Korea

Korea Advanced Institue of Science and Technology (KAIST)

Mar. 2016 - Feb. 2022

- Ph.D. Thesis - JavaScript Static Analysis for Evolving Language Specifications
- Programming Language Research Group
- Advisor: Sukyoung Ryu

B.S in School of Computing and Mathematical Science

Daejeon, Republic of Korea

Korea Advanced Institue of Science and Technology (KAIST)

Mar. 2012 - Feb. 2016

Work Experience

Mar. 2023 - PRESENT **Assistant Professor**, Korea University — *Seoul, Republic of Korea*

Feb. 2022 - Feb. 2022 **Post Doctoral Fellow**, Oracle Labs — *Brisbane, Australia*

Publications

Feature-Sensitive Coverage for Conformance Testing of Programming Language Implementations

Jihyeok Park, Dongjun Youn, Kanguk Lee, and Sukyoung Ryu

Proceedings of the 43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)

Jun. 2023

Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis

Jihyeok Park, Seungmin An, and Sukyoung Ryu

Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)

Nov. 2022

Filling the Gap between the JavaScript Language Specification and Tools using the JISET Family

Sukyoung Ryu, **Jihyeok Park**, and Seungmin An

Proceedings of the 43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI) Tutorial

Jun. 2022

JSTAR: JavaScript Specification Type Analyzer using Refinement

Jihyeok Park, Seungmin An, Wonho Shin, Yusung Sim, and Sukyoung Ryu

Proceedings of the 36th IEEE/ACM International Conference on Automated Software Engineering (ASE)

Nov. 2021

Accelerating JavaScript Static Analysis via Dynamic Shortcuts

Joonyoung Park*, **Jihyeok Park***, Dongjun Youn, and Sukyoung Ryu (*equally contributed)

Proceedings of the 29th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) — *Aug. 2021*

JavaScript Static Analysis with Evolving Engines and Specification

Jihyeok Park

Proceedings of the 35th European Conference on Object-Oriented Programming and Proceedings of the 30th ACM SIGSOFT International Symposium on Software Testing and Analysis Doctoral Symposium track (ECOOP/ISSTA DS) — *Jul. 2021*

A Survey of Parametric Static Analysis

Jihyeok Park*, Hongki Lee*, and Sukyoung Ryu (*equally contributed)

ACM Computing Surveys (CSUR), Volume 54, Issue 7, Article No. 149, pp 1–37 — *Jul. 2021*

JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification

Jihyeok Park, Seungmin An, Dongjun Youn, Gyeongwon Kim, and Sukyoung Ryu

Proceedings of the 43rd ACM/IEEE International Conference on Software Engineering (ICSE) — *May 2021*

ACM SIGSOFT Distinguished Paper Award

JISET: JavaScript IR-based Semantics Extraction Toolchain

Jihyeok Park, Jihee Park, Seungmin An, and Sukyoung Ryu

Proceedings of the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE) — *Sep. 2020*

Towards Analysis and Bug Finding of JavaScript Web Applications in the Wild

Sukyoung Ryu, **Jihyeok Park**, and Joonyoung Park

IEEE Software, Volume 36, Issue 3, pp 74-82 — *Jun. 2019*

Path Dependent Types with Path-Equality

Jaemin Hong, **Jihyeok Park**, and Sukyoung Ryu

Proceedings of the 9th ACM SIGPLAN Symposium on Scala — *Sep. 2018*

A Framework for Dynamic Inter-Device Task Dispatch with Eventual Consistency

Jihyeok Park, Joonyoung Park, Yoonkyong Lee, Chul-Joo Kim, Byoungoh Kim, and Sukyoung Ryu

Proceedings of the 2nd International Workshop on Programming Technology for the Future Web (ProWeb) — *Apr. 2018*

Toward Building Memory-safe Network Functions with Modest Performance Overhead

Keunhong Lee, Shinae Woo, Sanghyeon Seo, **Jihyeok Park**, Sukyoung Ryu, and Sue Moon

Proceedings of the 3rd SIGCOMM Workshop on Networking and Programming Languages (NetPL '17) — *Aug. 2017*

Revisiting Recency Abstraction for JavaScript: Towards an Intuitive, Compositional, and Efficient Heap Abstraction

Jihyeok Park, Xavier Rival and Sukyoung Ryu

Proceedings of the International Workshop on the State Of the Art in Java Program Analysis (SOAP) — *Jun. 2017*

Best Paper Award

Analysis of JavaScript Web Applications Using SAFE 2.0

Jihyeok Park, Yeonhee Ryou, Joonyoung Park, and Sukyoung Ryu

Proceedings of the 39th International Conference on Software Engineering (ICSE) Demonstrations track — *May 2017*

JavaScript API Misuse Detection by Using TypeScript

Jihyeok Park

Proceedings of the 13th International Conference on Modularity — *Apr. 2014*

ACM Student Research Competition 3rd

Honors & Awards

Mar. 2022	**Ph.D. Dissertation Award**, College of Engineering, KAIST	*Daejeon, Republic of Korea*
Feb. 2022	**An Outstanding Ph.D. Thesis**, School of Computing, KAIST	*Daejeon, Republic of Korea*
May 2021	**ACM SIGSOFT Distinguished Paper Award**, ICSE 2021	*Madrid, Spain*
Dec. 2020	**PhD Fellowship Award**, NAVER Corp.	*Daejeon, Republic of Korea*
Sep. 2019	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)	*Daejeon, Republic of Korea*
Feb. 2019	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)	*Daejeon, Republic of Korea*
Aug. 2018	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)	*Daejeon, Republic of Korea*
Aug. 2017	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)	*Daejeon, Republic of Korea*
Jun. 2017	**Best Paper**, International Workshop on the State Of the Art in Java Program Analysis (SOAP)	*Barcelona, Spain*
Feb. 2017	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)	*Daejeon, Republic of Korea*
Sep. 2016	**Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS109)	*Daejeon, Republic of Korea*
Feb. 2016	**Magna Cum Laude (GPA: 3.88/4.3)**, School of Computing, KAIST	*Daejeon, Republic of Korea*
Sep. 2014	**Workshop 3rd Award**, URP Program, KAIST	*Daejeon, Republic of Korea*
Apr. 2014	**ACM Student Research Competition 3rd**, International Conference on Modularity 2014	*Lugano, Swiss*
Mar. 2014	**Honor Program**, School of Computing, KAIST	*Daejeon, Republic of Korea*
Jul. 2013	**KAIST Presidential Fellowship**, School of Computing, KAIST	*Daejeon, Republic of Korea*

Teaching

Teacher

2023 Spring	**COSE 215: Theory of Computation**, Korea University	*Seoul, Republic of Korea*

Teaching Assistant

2019 Fall	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2019 Spring	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2018 Fall	**CS408: Computer Science Project course**, KAIST	*Daejeon, Republic of Korea*
2018 Fall	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2018 Spring	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2017 Fall	**CS492: Special Topics in Computer Science <Program Analysis>**, KAIST	*Daejeon, Republic of Korea*
2017 Fall	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2017 Spring	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2016 Fall	**CS320: Programming Languages course**, KAIST	*Daejeon, Republic of Korea*
2016 Spring	**CS109: Programming Practice course**, KAIST	*Daejeon, Republic of Korea*

Talks

Conference & Workshop Presentation

Nov. 2021	**ASE 2021**, JSTAR: JavaScript Specification Type Analyzer using Refinement	*Online*
Jul. 2021	**Doctoral Symposium Track of ECOOP/ISSTA 2021**, JavaScript Static Analysis with Evolving Engines and Specification	*Online*
May 2021	**ICSE 2021**, JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification	*Online*
Sep. 2020	**ASE 2020**, JISET: JavaScript IR-based Semantics Extraction Toolchain	*Online*
Sep. 2018	**Journal First Presentation at ICSME 2018**, Towards Analysis and Bug Finding of JavaScript Web Applications in the Wild	*Cleveland, USA*
Apr. 2018	**ProWeb 2018**, A Framework for Dynamic Inter-Device Task Dispatch with Eventual Consistency	*Nice, France*

Jun. 2017	**SOAP 2017**, Revisiting Recency Abstraction for JavaScript: Towards an Intuitive, Compositional, and Efficient Heap Abstraction	*Barcelona*, *Spain*
May 2017	**Demonstrations Trak of ICSE 2017**, Analysis of JavaScript Web Applications Using SAFE 2.0.	*Buenos Aires*, *Argentina*
Apr. 2014	**Student Research Competition at Modularity 2014**, JavaScript API Misuse Detection by Using TypeScript	*Lugano*, *Switzerland*

Invited Talks

Mar. 2023	**고려대학교 CS 콜로퀴움**, 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현	*Seoul*, *Republic of Korea*
Mar. 2023	**고려대학교 소프트웨어 분석 연구실 세미나**, 기계화 명세를 이용한 JavaScript 언어의 설계와 구현	*Seoul*, *Republic of Korea*
Jan. 2023	**KCSE 2023**, Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis	*Pyeongchang*, *Republic of Korea*
Dec. 2022	**KSC 2022**, Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis	*Jeju*, *Republic of Korea*
Feb. 2022	**SIGPL Winter School 2022**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Feb. 2022	**STAAR Workshop**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Jan. 2022	**The 88th meeting of Ecma TC39**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Jan. 2022	**KCSE 2022**, JSTAR: JavaScript Specification Type Analyzer using Refinement	*Online*
Jan. 2022	**KCSE 2022**, JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification	*Online*
Jan. 2022	**Agoric**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Dec. 2021	**KSC 2021**, JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification	*Online*
Dec. 2021	**Département d'Informatique de l'École Normale Supérieure**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Oct. 2021	**EIRIC**, JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification	*Online*
Sep. 2021	**KAISTPL Workshop 2021**, JavaScript Static Analysis for Evolving Language Specifications	*Online*
Jun. 2021	**KAIST Prosys Lab**, Towards Co-evolution of JavaScript Specification and Tools	*Daejeon*, *Republic of Korea*
Jun. 2021	**KCC 2021**, JISET: JavaScript IR-based Semantics Extraction Toolchain	*Jeju*, *Republic of Korea*
Nov. 2019	**National University of Singapore**, Update-Tolerant JavaScript Static Analysis for Frequently Released ECMAScript	*Singapore*

Software

ESMeta: ECMAScript Specification (ECMA-262) Metalanguage

Programming Language Research Group, KAIST — *Jan. 2022 - PRESENT*

- Main developer of ESMeta
- Developed in Scala
- URL: https://github.com/es-meta/esmeta

SAFE: Scalable Analysis Framework for ECMAScript

Programming Language Research Group, KAIST — *Mar. 2016 - PRESENT*

- Main developer of SAFE version 2.0
- Developed in Scala
- URL: https://github.com/sukyoung/safe

Activities

Program Committee (PC) Members

Apr. 2024	**ICSE 2024**, Program Committee (PC) Member	*Lisbon*, *Portugal*
Dec. 2023	**OOPSLA 2023**, Extended Review Committee (ERC) Member	*Lisbon*, *Portugal*
Nov. 2023	**APLAS 2023**, Program Committee (PC) Member	*Taipei*, *Taiwan*
Dec. 2022	**OOPSLA 2022**, Extended Review Committee (ERC) Member	*Auckland*, *New Zealand*
Dec. 2022	**APLAS 2022**, Program Committee (PC) Member	*Auckland*, *New Zealand*

Artifact Evaluation Committe (AEC) Members

Dec. 2023	**OOPSLA 2023**, Artifact Evaluation Committee (AEC) Member	*Lisbon*, *Portugal*
Dec. 2022	**OOPSLA 2022**, Artifact Evaluation Committee (AEC) Member	*Auckland*, *New Zealand*

Oct. 2019	**POPL 2019**, Artifact Evaluation Committee (AEC) Member	*Louisiana*, *United States*
Jul. 2019	**OOPSLA 2019**, Artifact Evaluation Committee (AEC) Member	*Athens*, *Greece*
Jul. 2018	**OOPSLA 2018**, Artifact Evaluation Committee (AEC) Member	*Massachusetts*, *United States*
Jun. 2018	**SAS 2018**, Artifact Evaluation Committee (AEC) Member	*Freiburg im Breisgau*, *Germany*
May. 2018	**ISSTA 2018**, Artifact Evaluation Committee (AEC) Member	*Amsterdam*, *Netherlands*

Others

Jul. 2022	**ISSTA 2022**, Web Co-Chair	*Daejeon*, *South Korea*
Sep. 2015 - Feb. 2019	**Samsung Electronics**, Reviewer for C++ Code Reviewing Exams	*Daejeon*, *S.Korea*
Jul. 2018	**École normale supérieure**, Internship Program (Professor: Xavier Rival)	*Paris*, *France*
Sep. 2017	**NII Shonan Meeting**, Topic: Memory Abstraction, Emerging Techniques and Applications	*Shonan*, *Japan*
Feb. 2015 - Jun. 2015	**INSA de Toulouse**, Exchange Student Program	*Toulouse*, *France*
Jun. 2014 - Nov. 2014	**KOFAC**, Undergraduate Research Program (URP) for Fusion of Creatives	*Daejeon*, *S.Korea*
Dec. 2013 - Jun. 2014	**School of Computing, KAIST**, Undergraduate Research Project (URP) Program	*Daejeon*, *S.Korea*