

# Jihyeok Park (박지혁)

ASSISTANT PROFESSOR

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## Research Interests

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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

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

Daejeon, South Korea

KOREA ADVANCED INSTITUTE 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, South Korea

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

Mar. 2012 - Feb. 2016

## Work Experience

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Mar. 2023 - PRESENT **Assistant Professor**, Korea University

Seoul, South Korea

Feb. 2022 - Feb. 2023 **Post Doctoral Fellow**, Oracle Labs

Brisbane, Australia

## Publications

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### [ASE 2025] Debun: Detecting Bundled JavaScript Libraries on Web using Property-Order Graphs

Seojin Kim\*, Sungmin Park\*, and Jihyeok Park (\* equally contributed)

Proceedings of the IEEE/ACM International Conference on Automated Software Engineering

### [FSE 2025 Demo] JSSpecVis: A JavaScript Language Specification Visualization Tool

Minseok Choe\*, Kyungho Song\*, Hyunjoon Kim, and Jihyeok Park (\* equally contributed)

Proceedings of the ACM International Conference on the Foundations of Software Engineering Demonstration track

### [PLDI 2024] PL4XGL: A Programming Language Approach to Explainable Graph Learning

Minseok Jeon, Jihyeok Park<sup>†</sup>, and Hakjoo Oh<sup>†</sup> (<sup>†</sup> corresponding authors)

Proceedings of the 45th ACM SIGPLAN Conference on Programming Language Design and Implementation

### [CACM 2024] JavaScript Language Design and Implementation in Tandem

Sukyoung Ryu and Jihyeok Park

Communications of the ACM

### [PLDI 2023] Feature-Sensitive Coverage for Conformance Testing of Programming Language Implementations

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

Proceedings of the 44th ACM SIGPLAN Conference on Programming Language Design and Implementation

### [ESEC/FSE 2022] 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

### [PLDI 2022 Tutorial] 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 Tutorial

## [ASE 2021] 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

## [ESEC/FSE 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

## [ECOOP/ISSTA 2021 DS] 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

## [CSUR 2021] A Survey of Parametric Static Analysis

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

ACM Computing Surveys, Volume 54, Issue 7, Article No. 149, pp 1-37

## [ICSE 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

### ACM SIGSOFT Distinguished Paper Award

## [ASE 2020] 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

## [IEEE Software 2019] 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

## [Scala 2018] Path Dependent Types with Path-Equality

Jaemin Hong, Jihyeok Park, and Sukyoung Ryu

Proceedings of the 9th ACM SIGPLAN Symposium on Scala

## [ProWeb 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

## [NetPL 2017] 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

## [SOAP 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

### Best Paper Award

## [ICSE 2017 Demo] 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 Demonstrations track

## [Modularity 2014] JavaScript API Misuse Detection by Using TypeScript

Jihyeok Park

Proceedings of the 13th International Conference on Modularity

### ACM Student Research Competition 3rd

## Honors & Awards

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Dec. 2023 고려대학교 우수강좌, Dept. Computer Science and Engineering, Korea University (COSE212)

Seoul, South Korea

Mar. 2022 Ph.D. Dissertation Award, College of Engineering, KAIST

Daejeon, South Korea

Feb. 2022 An Outstanding Ph.D. Thesis, School of Computing, KAIST

Daejeon, South Korea

May 2021 ACM SIGSOFT Distinguished Paper Award, ICSE 2021

Madrid, Spain

Dec. 2020 PhD Fellowship Award, NAVER Corp.

Daejeon, South Korea

Sep. 2019 Outstanding Teaching Assistant Award, School of Computing, KAIST (CS320)

Daejeon, South Korea

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|-----------|--|----------------------|
| Feb. 2019 | <b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)                   | Daejeon, South Korea |
| Aug. 2018 | <b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)                   | Daejeon, South Korea |
| Aug. 2017 | <b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)                   | Daejeon, South Korea |
| Jun. 2017 | <b>Best Paper</b> , International Workshop on the State Of the Art in Java Program Analysis (SOAP) | Barcelona, Spain     |
| Feb. 2017 | <b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)                   | Daejeon, South Korea |
| Sep. 2016 | <b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS109)                   | Daejeon, South Korea |
| Feb. 2016 | <b>Magna Cum Laude (GPA: 3.88/4.3)</b> , School of Computing, KAIST                                | Daejeon, South Korea |
| Sep. 2014 | <b>Workshop 3rd Award</b> , URP Program, KAIST   | Daejeon, South Korea |
| Apr. 2014 | <b>ACM Student Research Competition 3rd</b> , International Conference on Modularity 2014          | Lugano, Swiss        |
| Mar. 2014 | <b>Honor Program</b> , School of Computing, KAIST  | Daejeon, South Korea |
| Jul. 2013 | <b>KAIST Presidential Fellowship</b> , School of Computing, KAIST                                  | Daejeon, South Korea |

## Teaching

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### TEACHER

|             |  |                    |
|-------------|--|--------------------|
| 2025 Spring | <b>COSE215: Theory of Computation</b> , Korea University                 | Seoul, South Korea |
| 2024 Fall   | <b>COSE212: Programming Languages</b> , Korea University                 | Seoul, South Korea |
| 2024 Spring | <b>COSE215: Theory of Computation</b> , Korea University                 | Seoul, South Korea |
| 2024 Spring | <b>AAA705: Software Testing and Quality Assurance</b> , Korea University | Seoul, South Korea |
| 2024 Spring | <b>SWS121: Secure Programming</b> , Korea University                     | Seoul, South Korea |
| 2023 Fall   | <b>COSE212: Programming Languages</b> , Korea University                 | Seoul, South Korea |
| 2023 Spring | <b>COSE215: Theory of Computation</b> , Korea University                 | Seoul, South Korea |

### TEACHING ASSISTANT

|             |   |                      |
|-------------|---|----------------------|
| 2019 Fall   | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2019 Spring | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2018 Fall   | <b>CS408: Computer Science Project course</b> , KAIST                             | Daejeon, South Korea |
| 2018 Fall   | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2018 Spring | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2017 Fall   | <b>CS492: Special Topics in Computer Science &lt;Program Analysis&gt;</b> , KAIST | Daejeon, South Korea |
| 2017 Fall   | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2017 Spring | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2016 Fall   | <b>CS320: Programming Languages course</b> , KAIST                                | Daejeon, South Korea |
| 2016 Spring | <b>CS109: Programming Practice course</b> , KAIST                                 | Daejeon, South Korea |

## Talks

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|           |   |                                      |
|-----------|---|--------------------------------------|
| Aug, 2025 | <b>SIGPL Summer School 2025</b> , 안전한 자바스크립트 언어 생태계 확보 기술<br><b>Programming Language Standardization and Specification</b> , Trusted JavaScript Language Environments with ESMeta | Seoul, South Korea<br>Bergen, Norway |
| Jul. 2025 | <b>Real-World Programming Language Specification (RPLS)</b> , Trusted JavaScript Language Environments with ESMeta  | Seoul, South Korea                   |
| May 2025  | 고려대학교 CS 콜로퀴움, 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현  | Seoul, South Korea                   |
| Apr. 2025 | <b>Software Convergence Symposium 2025 (SWCS)</b> , 기계화 명세를 통한 안전한 자바스크립트 언어 생태계 확보 기술  | Seoul, South Korea                   |
| Nov. 2024 | <b>Ulsan National Institute of Science and Technology (UNIST)</b> , Language Design and Implementation using JavaScript Mechanized Specification                                  | Ulsan, South Korea                   |
| Jun. 2024 | <b>Instituto Superior Técnico of University of Lisbon</b> , Language Design and Implementation using JavaScript Mechanized Specification  | Lisbon, Portugal                     |
| May 2024  | 한국과학영재학교 수리정보과학부 콜로퀴움, JavaScript 언어 생태계 자동화 연구를 하기까지의 여정   | Busan, South Korea                   |
| Nov. 2023 | 고려대학교 융합보안대학원 세미나, 자바스크립트 엔진 보안과 퍼징   | Seoul, South Korea                   |
| Oct. 2023 | 고려대학교 CS 콜로퀴움, 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현  | Seoul, South Korea                   |

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|-----------|---|--------------------------|
| Aug. 2023 | <b>SIGPL Summer School 2023</b> , PL 구현체를 위한 새로운 커버리지를 제안하기까지의 여정   | Chuncheon, South Korea   |
| May 2023  | 고려대학교 고려대학교 <b>KUGODS</b> 연사 초청 특강, 프로그래밍 언어 연구란?   | Seoul, South Korea       |
| Apr. 2023 | 고려대학교 <b>KU-KIST</b> 융합대학원 저널클럽, Guiding the Design and Implementation of JavaScript using Mechanized Specification               | Seoul, South Korea       |
| Mar. 2023 | 고려대학교 <b>CS 콜로퀴움</b> , 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현  | Seoul, South Korea       |
| Mar. 2023 | 고려대학교 <b>소프트웨어 분석 연구실 세미나</b> , 기계화 명세를 이용한 JavaScript 언어의 설계와 구현   | Seoul, South Korea       |
| Jan. 2023 | <b>KCSE 2023</b> , Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis        | Pyeongchang, South Korea |
| Dec. 2022 | <b>KSC 2022</b> , Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis         | Jeju, South Korea        |
| Feb. 2022 | <b>SIGPL Winter School 2022</b> , JavaScript Static Analysis for Evolving Language Specifications                                 | Online                   |
| Feb. 2022 | <b>STAAR Workshop</b> , JavaScript Static Analysis for Evolving Language Specifications   | Online                   |
| Jan. 2022 | <b>The 88th meeting of Ecma TC39</b> , JavaScript Static Analysis for Evolving Language Specifications                            | Online                   |
| Jan. 2022 | <b>KCSE 2022</b> , JSTAR: JavaScript Specification Type Analyzer using Refinement   | Online                   |
| Jan. 2022 | <b>KCSE 2022</b> , JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification                            | Online                   |
| Jan. 2022 | <b>Agoric</b> , JavaScript Static Analysis for Evolving Language Specifications   | Online                   |
| Dec. 2021 | <b>KSC 2021</b> , JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification                             | Online                   |
| Dec. 2021 | <b>Département d’Informatique de l’École Normale Supérieure</b> , JavaScript Static Analysis for Evolving Language Specifications | Online                   |
| Oct. 2021 | <b>EIRIC</b> , JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification                                | Online                   |
| Sep. 2021 | <b>KAISTPL Workshop 2021</b> , JavaScript Static Analysis for Evolving Language Specifications                                    | Online                   |
| Jun. 2021 | <b>KAIST Prosys Lab</b> , Towards Co-evolution of JavaScript Specification and Tools  | Daejeon, South Korea     |
| Jun. 2021 | <b>KCC 2021</b> , JISET: JavaScript IR-based Semantics Extraction Toolchain   | Jeju, South Korea        |
| Nov. 2019 | <b>National University of Singapore</b> , Update-Tolerant JavaScript Static Analysis for Frequently Released ECMAScript           | Singapore                |

## Software

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### 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

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### COMMITTEE MEMBERS

|           |  |                         |
|-----------|--|-------------------------|
| Nov. 2026 | <b>CCS 2026</b> , Program Committee (PC) Member  | Hague, Netherlands      |
| Jun. 2026 | <b>PLDI 2026</b> , Review Committee (RC) Member  | Boulder, United States  |
| Mar. 2026 | <b>SAC 2026 (PL Track)</b> , Program Committee (PC) Member                                     | Thessaloniki, Greece    |
| Jun. 2025 | <b>RPLS 2025</b> , Co-Chair  | Seoul, South Korea      |
| Oct. 2025 | <b>SAS 2025</b> , Program Committee (PC) Member  | Singapore               |
| Sep. 2025 | <b>SCAM 2025</b> , Program Committee (PC) Member   | Auckland, New Zealand   |
| Oct. 2025 | <b>OOPSLA 2025</b> , Review Committee (RC) Member  | Singapore               |
| Apr. 2025 | <b>SAC 2025 (PL Track)</b> , Program Committee (PC) Member                                     | Sicily, Italy           |
| Oct. 2024 | <b>APLAS 2024 Student Research Competition &amp; Posters</b> , Selection Committee (SC) Member | Kyoto, Japan            |
| Oct. 2024 | <b>SPLASH 2024 Doctoral Symposium</b> , Program Committee (PC) Member                          | Pasadena, United States |
| Apr. 2024 | <b>SAC 2024 (PL Track)</b> , Program Committee (PC) Member                                     | Avila, Spain            |
| Apr. 2024 | <b>ICSE 2024</b> , Program Committee (PC) Member   | Lisbon, Portugal        |

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|-----------|---|-----------------------|
| Dec. 2023 | <b>OOPSLA 2023</b> , Extended Review Committee (ERC) Member | Lisbon, Portugal      |
| Nov. 2023 | <b>APLAS 2023</b> , Program Committee (PC) Member           | Taipei, Taiwan        |
| Dec. 2022 | <b>OOPSLA 2022</b> , Extended Review Committee (ERC) Member | Auckland, New Zealand |
| Dec. 2022 | <b>APLAS 2022</b> , Program Committee (PC) Member           | Auckland, New Zealand |
| Jul. 2022 | <b>ISSTA 2022</b> , Web Co-Chair                            | Daejeon, South Korea  |

## ARTIFACT EVALUATION COMMITTEE (AEC) MEMBERS

|           |   |                               |
|-----------|---|-------------------------------|
| Dec. 2023 | <b>OOPSLA 2023</b> , Artifact Evaluation Committee (AEC) Member | Lisbon, Portugal              |
| Dec. 2022 | <b>OOPSLA 2022</b> , Artifact Evaluation Committee (AEC) Member | Auckland, New Zealand         |
| Oct. 2019 | <b>POPL 2019</b> , Artifact Evaluation Committee (AEC) Member   | Louisiana, United States      |
| Jul. 2019 | <b>OOPSLA 2019</b> , Artifact Evaluation Committee (AEC) Member | Athens, Greece                |
| Jul. 2018 | <b>OOPSLA 2018</b> , Artifact Evaluation Committee (AEC) Member | Massachusetts, United States  |
| Jun. 2018 | <b>SAS 2018</b> , Artifact Evaluation Committee (AEC) Member    | Freiburg im Breisgau, Germany |
| May. 2018 | <b>ISSTA 2018</b> , Artifact Evaluation Committee (AEC) Member  | Amsterdam, Netherlands        |

## JOURNAL REVIEWERS

|      |  |
|------|--|
| 2025 | <b>Transactions on Software Engineering and Methodology (TOSEM)</b> , Reviewer |
| 2024 | <b>IEEE Transactions on Software Engineering (TSE)</b> , Reviewer              |
| 2023 | <b>IEEE Transactions on Software Engineering (TSE)</b> , Reviewer              |
| 2022 | <b>IEEE Transactions on Software Engineering (TSE)</b> , Reviewer              |

## OTHERS

|                       |  |                      |
|-----------------------|--|----------------------|
| Sep. 2015 - Feb. 2019 | <b>Samsung Electronics</b> , Reviewer for C++ Code Reviewing Exams               | Daejeon, South Korea |
| Jul. 2018             | <b>École normale supérieure</b> , Internship Program (Professor: Xavier Rival)   | Paris, France        |
| Sep. 2017             | <b>NII Shonan Meeting</b> , Topic: Memory Abstraction                            | Shonan, Japan        |
| Feb. 2015 - Jun. 2015 | <b>INSA de Toulouse</b> , Exchange Student Program                               | Toulouse, France     |
| Jun. 2014 - Nov. 2014 | <b>KOFAC</b> , Undergraduate Research Program (URP) for Fusion of Creatives      | Daejeon, South Korea |
| Dec. 2013 - Jun. 2014 | <b>School of Computing, KAIST</b> , Undergraduate Research Project (URP) Program | Daejeon, South Korea |