

# 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, 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: Sukeyoung 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

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

Seoul, South Korea

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

Brisbane, Australia

## Publications

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

Minseok Jeon, **Jihyeok Park**, and Hakjoo Oh

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

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

Sukeyoung 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 Sukeyoung 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 Sukeyoung 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

Sukeyoung 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 Sukeyoung 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 Sukeyoung 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 Suhyoung 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 Suhyoung 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 Suhyoung 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

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

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

May 2021 **ACM SIGSOFT Distinguished Paper Award**, ICSE 2021

Dec. 2020 **PhD Fellowship Award**, NAVER Corp.

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

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

Aug. 2018 **Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)

Aug. 2017 **Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)

Jun. 2017 **Best Paper**, International Workshop on the State Of the Art in Java Program Analysis (SOAP)

Feb. 2017 **Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS320)

Sep. 2016 **Outstanding Teaching Assistant Award**, School of Computing, KAIST (CS109)

Feb. 2016 **Magna Cum Laude (GPA: 3.88/4.3)**, School of Computing, KAIST

Daejeon, South Korea

Daejeon, South Korea

Madrid, Spain

Daejeon, South Korea

Daejeon, South Korea

Daejeon, South Korea

Daejeon, South Korea

Daejeon, South Korea

Barcelona, Spain

Daejeon, South Korea

Daejeon, South Korea

Daejeon, South Korea

Sep. 2014 **Workshop 3rd Award**, URP Program, KAIST  
 Apr. 2014 **ACM Student Research Competition 3rd**, International Conference on Modularity 2014  
 Mar. 2014 **Honor Program**, School of Computing, KAIST  
 Jul. 2013 **KAIST Presidential Fellowship**, School of Computing, KAIST

Daejeon, South Korea  
 Lugano, Swiss  
 Daejeon, South Korea  
 Daejeon, South Korea

## Teaching

### TEACHER

2023 Fall **COSE212: Programming Languages**, Korea University  
 2023 Spring **COSE215: Theory of Computation**, Korea University

Seoul, South Korea  
 Seoul, South Korea

### TEACHING ASSISTANT

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

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## Talks

### CONFERENCE & WORKSHOP PRESENTATION

Jun. 2023 **PLDI 2023**, Feature-Sensitive Coverage for Conformance Testing of Programming Language Implementations  
 Nov. 2021 **ASE 2021**, JSTAR: JavaScript Specification Type Analyzer using Refinement  
 Jul. 2021 **Doctoral Symposium Track of ECOOP/ISSTA 2021**, JavaScript Static Analysis with Evolving Engines and Specification  
 May 2021 **ICSE 2021**, JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification  
 Sep. 2020 **ASE 2020**, JISET: JavaScript IR-based Semantics Extraction Toolchain  
 Sep. 2018 **Journal First Presentation at ICSME 2018**, Towards Analysis and Bug Finding of JavaScript Web Applications in the Wild  
 Apr. 2018 **ProWeb 2018**, A Framework for Dynamic Inter-Device Task Dispatch with Eventual Consistency  
 Jun. 2017 **SOAP 2017**, Revisiting Recency Abstraction for JavaScript: Towards an Intuitive, Compositional, and Efficient Heap Abstraction  
 May 2017 **Demonstrations Track of ICSE 2017**, Analysis of JavaScript Web Applications Using SAFE 2.0.  
 Apr. 2014 **Student Research Competition at Modularity 2014**, JavaScript API Misuse Detection by Using TypeScript

Orlando, USA  
 Online  
 Online  
 Online  
 Online  
 Madrid, Spain  
 Nice, France  
 Barcelona, Spain  
 Buenos Aires, Argentina  
 Lugano, Switzerland

### INVITED TALKS

May. 2024 한국과학영재학교 수리정보과학부 콜로퀴움, JavaScript 언어 생태계 자동화 연구를 하기까지의 여정  
 Nov. 2023 고려대학교 융합보안대학원 세미나, 자바스크립트 엔진 보안과 퍼징  
 Oct. 2023 고려대학교 CS 콜로퀴움, 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현  
 May 2023 **SIGPL Summer School 2023**, PL 구현체를 위한 새로운 커버리지를 제안하기까지의 여정  
 May 2023 고려대학교 고려대학교 KUGODS 연사 초청 특강, 프로그래밍 언어 연구란?  
 Apr. 2023 고려대학교 KU-KIST융합대학원 저널클럽, Guiding the Design and Implementation of JavaScript using Mechanized Specification  
 Mar. 2023 고려대학교 CS 콜로퀴움, 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현

Busan, South Korea  
 Seoul, South Korea  
 Seoul, South Korea  
 Chuncheon, South Korea  
 Seoul, South Korea  
 Seoul, South Korea  
 Seoul, South Korea

Mar. 2023	고려대학교 소프트웨어 분석 연구실 세미나, 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

### 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

Oct. 2024	<b>SPLASH 2024 Doctoral Symposium</b> , Program Committee (PC) Member	California, 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
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

### 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

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

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