

# 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

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

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

Daejeon, Republic of Korea

Mar. 2016 - Feb. 2022

### B.S in School of Computing and Mathematical Science

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)

Daejeon, Republic of Korea

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

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

JHYEOK 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, JHYEOK 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

JHYEOK 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\*, JHYEOK 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 RYU, 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	<b>An Outstanding Ph.D. Thesis</b> , School of Computing, KAIST	Daejeon, Republic of Korea
May 2021	<b>ACM SIGSOFT Distinguished Paper Award</b> , ICSE 2021	Madrid, Spain
Dec. 2020	<b>PhD Fellowship Award</b> , NAVER Corp.	Daejeon, Republic of Korea
Sep. 2019	<b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)	Daejeon, Republic of Korea
Feb. 2019	<b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)	Daejeon, Republic of Korea
Aug. 2018	<b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)	Daejeon, Republic of Korea
Aug. 2017	<b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS320)	Daejeon, Republic of 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, Republic of Korea
Sep. 2016	<b>Outstanding Teaching Assistant Award</b> , School of Computing, KAIST (CS109)	Daejeon, Republic of Korea
Feb. 2016	<b>Magna Cum Laude (GPA: 3.88/4.3)</b> , School of Computing, KAIST	Daejeon, Republic of Korea
Sep. 2014	<b>Workshop 3rd Award</b> , URP Program, KAIST	Daejeon, Republic of 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, Republic of Korea
Jul. 2013	<b>KAIST Presidential Fellowship</b> , School of Computing, KAIST	Daejeon, Republic of Korea

## Teaching

### TEACHER

2023 Spring	<b>COSE 215: Theory of Computation</b> , Korea University	Seoul, Republic of Korea
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### TEACHING ASSISTANT

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

## Talks

### CONFERENCE & WORKSHOP PRESENTATION

Nov. 2021	<b>ASE 2021</b> , JSTAR: JavaScript Specification Type Analyzer using Refinement	Online
Jul. 2021	<b>Doctoral Symposium Track of ECOOP/ISSTA 2021</b> , JavaScript Static Analysis with Evolving Engines and Specification	Online
May 2021	<b>ICSE 2021</b> , JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification	Online
Sep. 2020	<b>ASE 2020</b> , JISET: JavaScript IR-based Semantics Extraction Toolchain	Online
Sep. 2018	<b>Journal First Presentation at ICSME 2018</b> , Towards Analysis and Bug Finding of JavaScript Web Applications in the Wild	Cleveland, USA
Apr. 2018	<b>ProWeb 2018</b> , A Framework for Dynamic Inter-Device Task Dispatch with Eventual Consistency	Nice, France
Jun. 2017	<b>SOAP 2017</b> , Revisiting Recency Abstraction for JavaScript: Towards an Intuitive, Compositional, and Efficient Heap Abstraction	Barcelona, Spain
May 2017	<b>Demonstrations Trak of ICSE 2017</b> , Analysis of JavaScript Web Applications Using SAFE 2.0.	Buenos Aires, Argentina
Apr. 2014	<b>Student Research Competition at Modularity 2014</b> , JavaScript API Misuse Detection by Using TypeScript	Lugano, Switzerland

### INVITED TALKS

Mar. 2023	고려대학교 <b>CS 콜로퀴움</b> , 기계화 명세를 이용한 자바스크립트 언어의 설계와 구현	Seoul, Republic of Korea
Jan. 2023	<b>KCSE 2023</b> , Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis	Pyeongchang, Republic of Korea

Dec. 2022	<b>KSC 2022</b> , Automatically Deriving JavaScript Static Analyzers from Specifications using Meta-Level Static Analysis	Jeju, Republic of 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, Republic of Korea
Jun. 2021	<b>KCC 2021</b> , JISET: JavaScript IR-based Semantics Extraction Toolchain	Jeju, Republic of 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

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

### OTHERS

Jul. 2022	<b>ISSTA 2022</b> , Web Co-Chair	Daejeon, South Korea
Sep. 2015 - Feb. 2019	<b>Samsung Electronics</b> , Reviewer for C++ Code Reviewing Exams	Daejeon, S.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, Emerging Techniques and Applications	Shonan, Japan
Feb. 2015 - Jun. 2015	<b>INSA de Toulouse</b> , Exchange Student Program	Toulouse, France

Jun. 2014 - Nov. 2014  
Dec. 2013 - Jun. 2014

**KOFAC**, Undergraduate Research Program (URP) for Fusion of Creatives  
**School of Computing, KAIST**, Undergraduate Research Project (URP) Program

*Daejeon, S.Korea*  
*Daejeon, S.Korea*