# Jiajun HU, PhD

## PERSONAL DETAILS


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| *Address* | Department of Computer Science and Engineering<br>The Hong Kong University of Science and Technology<br>Clear Water Bay, Kowloon, Hong Kong, China |
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## ACADEMIC QUALIFICATIONS

**Ph.D. Software Engineering** 2016.9-2024.1

*The Hong Kong University of Science and Technology, Hong Kong, China*

Supervisor: Prof. Shing-Chi Cheung (IEEE fellow & Chair professor)

Research topics: Software Testing, Hybrid Programming, Program Analysis

**B.Eng. Software Engineering** 2012.9-2016.6

*Yangzhou University, Yangzhou, China*

G.P.A. 3.86/4.0, ranks top 5% over 342 students

Advisor: Prof. Xiaobing Sun

Research topics: Software Evolution and Maintenance

## PUBLICATIONS

**Jiajun Hu**, Lili Wei, Yepang Liu, and Shing-Chi Cheung. 2023. $\omega$Test: Webview-Oriented Testing for Android Applications. In *The 32nd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2023)*. ACM, 992-1004. `https://doi.org/10.1145/3597926.3598112`

**Jiajun Hu**, Lili Wei, Yepang Liu, and Shing-Chi Cheung. 2018. A Tale of Two Cities: How WebView Induces Bugs to Android Applications. In *The 33rd ACM/IEEE International Conference on Automated Software Engineering (ASE 2018)*. ACM, 702-713. `https://doi.org/10.1145/3238147.3238180`

**Jiajun Hu**, Xiaobing Sun, David Lo, and Bin Li. 2015. Modeling The Evolution of Development Topics Using Dynamic Topic Models. In *The 22nd International Conference on Software Analysis, Evolution, and Reengineering (SANER 2015)*. IEEE, 3-12. `https://doi.org/10.1109/SANER.2015.7081810`

**Jiajun Hu**, Xiaobing Sun, and Bin Li. 2015. Explore The Evolution of Development Topics via On-line LDA. In *The 22nd International Conference on Software Analysis, Evolution, and Reengineering (SANER 2015)*. IEEE, 555-559. `https://doi.org/10.1109/SANER.2015.7081876`

## PROJECT EXPERIENCE

**Test Generation for Hybrid Apps** HKUST & Fok Ying Tung Research Institute

*Sep 2020 - Jan 2024*

**Objective:** Implement automated test generation & bug detection techniques for hybrid mobile apps

**Technical Details:**

1. Android dalvik bytecode instrumentation for dynamic analysis of the Java-end of an Android app.
2. JavaScript instrumentation for dynamic analysis of the JavaScript-end of an Android app.

3. Android Operating System Customization (I change the source code of the Android 10 OS).
4. Static program analysis (e.g., call graph and data-flow analysis) for an Android app.
5. Automated UI test generation guided by the above-mentioned dynamic & static analysis to detect bugs.
6. Effectiveness evaluation (Apps are tested on 16 Android virtual machines in parallel on a Linux server).

**Results & Achievements:**

1. My testing technique has detected 91 bugs in real-world Android apps without any manual effort.
2. 41 bugs have been either confirmed or fixed by the corresponding app developers.
3. 2 scientific papers (one published in a top-tier software engineering conference and one under submission).
4. A publicly available tool ωTest https://richardhooooo.github.io/wTest/ .
5. A fully-funded trip to Seattle, USA to make a presentation.

**Software Evolution Modeling & Visualization** Yangzhou University

*Dec 2013 - Aug 2015*

**Objective:** Mining software repository to visualize how a software evolves.

**Technical Details:**

1. A web crawler was used to collect data (e.g., commit messages) from open-source softwares.
2. Typical preprocessing techniques (e.g., tokenization) were applied to reduce noise in the data.
3. A machine learning technique called Dynamic Topic Modeling was applied to extract latent topics at different timestamps.
4. The topic (i.e., keywords summarizing a set of texts) and its strength over time were visualized.

**Results & Achievements:**

1. A patent entitled "An approach based on Dynamic Topic Models to model software evolution" was published by State Intellectual Property of the P.R.C.
2. 2 scientific papers published in a top-tier software engineering conference.
3. A publicly available tool https://home.cse.ust.hk/ jhuao/data/SANER'15.zip .
4. A fully-funded trip to Montreal, Canada to make two presentations.

## TALKS

**Oral Presentation**
*The 32nd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2023), Seattle, United States, July 17 to 21, 2023*

**Oral Presentation**
*The 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018), Montpellier, France, September 3 to 7, 2018*

**Oral Presentation**
*The 22nd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2015), Montreal, Canada, March 2 to 6, 2015*

**Oral Presentation**
*The 3rd International Workshop on Evidential Assessment of Software Technologies (EAST 2014), Nanjing, China, May 26, 2014*

## TEACHING

**Teaching Assistant**
*CSIT 5100: Engineering Reliable Object-Oriented Software Systems (Fall 2022 at HKUST)*

**Teaching Assistant**
*CSIT 5100: Engineering Reliable Object-Oriented Software Systems (Fall 2021 at HKUST)*

**Teaching Assistant**
*CSIT 5100: Engineering Reliable Object-Oriented Software Systems (Fall 2020 at HKUST)*

**Teaching Assistant**
*CSIT 5100: Engineering Reliable Object-Oriented Software Systems (Spring 2020 at HKUST)*

**Teaching Assistant**
*COMP 3021: Java Programming (Fall 2019 at HKUST)*

**Teaching Assistant**
*COMP 5100: Engineering Reliable Object-Oriented Software Systems (Spring 2019 at HKUST)*

**Teaching Assistant**
*COMP 1022Q: Introduction to Computing with Excel VBA (Spring 2019 at HKUST)*
**Teaching Assistant**
*COMP 1022Q: Introduction to Computing with Excel VBA (Fall 2018 at HKUST)*
**Teaching Assistant**
*COMP 1022Q: Introduction to Computing with Excel VBA (Spring 2018 at HKUST)*
**Teaching Assistant**
*COMP 3111/3111H: Software Engineering (Fall 2017 at HKUST)*
**Teaching Assistant**
*COMP 1022Q: Introduction to Computing with Excel VBA (Spring 2017 at HKUST)*

## AWARDS AND GRANTS

**SIGSOFT CAPS Grants**
*The 32nd International Symposium on Software Testing and Analysis (ISSTA 2023)*
**SIGSOFT CAPS Grants**
*The 33rd International Conference on Automated Software Engineering (ASE 2018)*
**Research Travel Grant**
*The Hong Kong University of Science and Technology (2018)*
**Postgraduate Studentship**
*The Hong Kong University of Science and Technology (2016-2020)*
**Principal Scholarship**
*Yangzhou University (2015)*
**Principal Scholarship**
*Yangzhou University (2014)*
**Donghua Test Scholarship**
*Yangzhou University (2013)*

## TECHNICAL SKILLS

**Programming Languages**
*Java, JavaScript, HTML, CSS, Python, Shell, C++, SQL*
**Technologies**
*Soot, FlowDroid, Appium, Android, Linux, Latex, Git, Esprima, Node.js, Babel*
**Research Skills**
*Dynamic/Static Program Analysis, Software Testing, Taint Analysis, Mobile Security, Fuzz Testing*