

# James Yoo

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November, 2024

**Research Interests** My primary research interest is in augmenting programmer productivity, most recently via automated tools that detect defects in code and verify its correctness.

**Research Experience** **Verification for Option Types** September 2023 - October 2024  
Designed a tool to eliminate run-time errors resulting from accessing empty option values via a novel form of rely-guarantee reasoning that joins two type systems (**ASE '24**).

- Developed a static analysis tool that has the highest precision (93%) of any open-source tool that targets errors associated with misuse of option values.
- Detected 13 previously-undiscovered defects in over 1 million non-comment, non-blank lines of real-world Java code.

**Context-Preserving Programming Interfaces** September 2020 - November 2022  
I conducted research in integrated development environments. Developed an IntelliJ IDEA plugin for asking and answering data-flow reachability questions in context (**ICSME '23**).

- Designed and executed a formative study for investigating difficult questions that programmers ask in practice.
- Developed a user interface plugin for IntelliJ IDEA that enables programmers to explore programming questions while maintaining their context within the IDE.
- Designed and executed a randomized counter-balanced within-subjects user study of an user-interface plugin on 20 professional software developers.

**Publications** **J. Yoo**, Michael D. Ernst, and René Just. *Verifying the Option Type with Rely-Guarantee Reasoning* ASE 2024: Proceedings of the 39th ACM/IEEE International Conference on Automated Software Engineering, October 2024, pp. 367-380.

**J. Yoo** and G. Murphy. *Breaking the Bento Box: Accelerating Visual Momentum in Data-flow Analysis*. ICSME 2023: Proceedings of the 39th IEEE International Conference on Software Maintenance and Evolution, October 2023, pp. 306-316.

**Awards** 2017 UBC Computer Science Undergraduate Teaching Award  
2017 UBC Alma Mater Society Service Award

**Education** **University of Washington, Seattle** September 2023 - Present  
PhD student in Computer Science & Engineering  
Advisors: Michael D. Ernst and René Just

**University of British Columbia, Vancouver** November 2022  
Master of Science in Computer Science  
Advisor: Gail C. Murphy  
Thesis: *Investigating Data-flow Reachability Questions*

**University of British Columbia, Vancouver** May 2020  
Bachelor of Science, Major in Computer Science with Co-op

**Industrial Experience** **Applied Scientist Intern, Amazon Web Services** June 2024 - September 2024  
Working with AWS Privacy & Security Automation

- Led efforts to formally-validate the results produced by an industrial-strength static analysis tool widely deployed at AWS.

**Software Developer, Charli AI** February 2023 - September 2023  
As Charli AI's 4th software developer, I was responsible for building out end-to-end solutions in their core application.

- Designed and implemented a service to restrict permissions on AI-generation templates which had been previously hardcoded in a frontend application.
- Led standardization of engineering processes, such as code reviews and incident response steps.

**Software Developer, Twitter Inc.**

October 2022 - January 2023

Privacy Tools and Infrastructure. I worked on a notification system that would be used across the company before I was affected by the layoffs initiated by Elon Musk in his acquisition of Twitter.

**SDE Intern, Twitter Inc.**

June 2021 - August 2021

Privacy and Data Protection Engineering. I received a full-time employment offer from my team.

- Designed and implemented a low-latency end-to-end product analytics framework used by data privacy teams.
- Built out a data pipeline that delivered alarms and service events from Twitter's on-premise datacenters to Google Cloud.

**SDE Intern, Hootsuite Inc.**

Summer 2019 and Summer 2020

- Shepherded an external API migration across a customer-facing service with minimal downtime.
- Extended a core API gateway in Scala to support v2 data ingestion endpoints for social networks.
- Added a feature to communicate reply and comment unavailability for clients when external services were not operational.
- Assumed the role of scrum master for 1 month, planning work and organizing knowledge transfers across teams.

**SDE Intern, Alida CXM**

January 2018 - August

Implemented logging and other visibility metrics across Alida CXM's core surveys product offering.

**SDE Intern, Broadcom Software**

September 2017 - December 2017

Developed and maintained automated user-interface tests in Python.

**Teaching Experience**

**University of Washington, Seattle**

Winter 2024 and Autumn 2024

- TA for CSE 590X: How to PhD, Autumn 2024
- TA for CSE P 504: Advanced Topics in Software Systems: Testing and Debugging, Winter 2024

**Graduate Teaching Assistant Coordinator, U of B.C.**

August 2021 - July 2022

Graduate coordinator for all teaching assistants employed by the department of computer science.

- Designed and administered training sessions for new teaching assistants.
- Coordinated performance reviews and led conflict mitigation for teaching assistants.
- Conducted reviews for TA training processes and prepared budgets each term.

**University of British Columbia, Vancouver**

September 2016 - May 2021

Worked across UBC's offering of core undergraduate programming and software engineering courses, often as a lead teaching assistant (TA). Co-taught a seminar on computer science education research.

- Co-instructor for CPSC 490: Student-led Seminar in Computer Science Education, Winter 2020.
- Lead TA and Infrastructure Lead for CPSC 110: Introduction to Computer Science (7 terms).
- Lead TA for CPSC 210: Software Engineering (3 terms).
- TA for CPSC 221: Introduction to Data Structures and Algorithms, Fall 2018.
- Graduate TA and Guest lecturer for CPSC 310: Software Engineering (4 terms).

**Service**

**University of British Columbia, Vancouver**

- Graduate Student Admissions Committee (2020, 2021).
- Undergraduate Teaching Awards Committee (2021).

**University of Washington, Seattle**

- Chair, Prospective Student Committee (2024).
- Mentor, Pre-application Mentorship Service (2023, 2024).
- Reader, Graduate Applications Committee (2023).