Jingmei Hu

(+1) 857-253-8508 ◇ jingmeh@amazon.com
https://jingmeihu.github.io/

Education

Ph.D. in Computer Science — Aug 2016 - May 2022
Harvard University — Cambridge, MA
Co-Advisors: Margo Seltzer (University of British Columbia), Stephen Chong (Harvard)

M.Sc. in Computer Science — Aug 2016 - May 2018
Harvard University — Cambridge, MA
Advisor: Margo Seltzer (University of British Columbia)

B.Sc in Computer Science — Sep 2012 - Jun 2016
Shanghai Jiao Tong University (SJTU) — Shanghai, China

Publications

Towards Porting Operating Systems with Program Synthesis — TOPLAS
ACM Transactions on Programming Languages and Systems
Hu, J., Lu, E., Holland, D.A., Kawaguchi, M., Chong, S. and Seltzer, M.I.

Assuage: Assembly Synthesis Using A Guided Exploration — UIST'21
ACM Symposium on User Interface Software and Technology
Hu, J., Vaithilingam, P., Chong, S., Seltzer, M.I., Glassman, E.L.

Improving Data Scientist Efficiency with Provenance — ICSE'20
ACM/IEEE International Conference on Software Engineering
Hu, J., Joung, J., Jacobs, M., Seltzer, M.I., Gajos, K.

ProvBuild: Improving Data Scientist Efficiency with Provenance (An Extended Abstract) — ICSE'20
ACM/IEEE International Conference on Software Engineering: Companion Proceedings
Hu, J., Joung, J., Jacobs, M., Seltzer, M.I., Gajos, K.

Trials and Tribulations in Synthesizing Operating Systems — PLOS'19
Workshop on Programming Languages and Operating Systems
Hu, J., Lu, E., Holland, D.A., Kawaguchi, M., Chong, S. and Seltzer, M.I.

Shakein: Secure user authentication of smartphones with single-handed shakes — TMC
IEEE transactions on mobile computing (2017)
Zhu, H., **Hu, J.**, Chang, S. and Lu, L.

Aquarium: Cassiopea and Alewife Languages
Technical Report (2019)
Holland, D.A., **Hu, J.**, Kawaguchi, M., Lu, E., Chong, S. and Seltzer, M.I.

Research Experience

Assembly Synthesis with Parallelism — 2021 - 2022
Graduate Research Assistant — Harvard University
Advised by Prof. Stephen Chong, Prof. Margo Seltzer

- Designed a framework for automated parallel synthesis via search space reductions.
- Designed a parallel assembly synthesis system and evaluated with various general assembly programming problems, showing its scalability improvement on assembly synthesis.

Assembly Synthesis Using A Guided Exploration — 2020 - 2021
Graduate Research Assistant — Harvard University
Advised by Prof. Stephen Chong, Prof. Margo Seltzer and Prof. Elena Glassman

- Developed an interactive assembly synthesizer, *Assuage*, that allows the user and the synthesizer to collaboratively search a large space of assembly programs and generate the correct specification-satisfying program.

- Conducted a controlled laboratory study with 21 participants with a wide range of expertise to evaluate the usefulness and usability of *Assuage*.

Porting Operating Systems with Code Synthesis
2018 - 2020

Graduate Research Assistant — Harvard University

Advised by Prof. Stephen Chong and Prof. Margo Seltzer, cooperated with Eric Lu, David Holland and Ming Kawaguchi

- Designed two domain specific languages: *Alewife*, a language for specification of Operating Systems functionality, and *Cassiopea*, a register transfer language style machine description language.
- Implemented a compiler in OCaml and a synthesis engine that takes a machine description and a specification instance, and produces an assembly program using satisfiability-modulo-theories (SMT) solvers.
- Developed usecases from preexisting operating systems to demonstrate the expressivity and usability.

Improving Data Scientist Efficiency with Provenance
2017 - 2018

Graduate Research Assistant — Harvard University

Advised by Prof. Margo Seltzer and Prof. Krzysztof Gajos

- Developed a data analysis environment called *ProvBuild* that leverages language-level provenance to track dependencies in a script and uses change impact analysis to reduce the iterative editing process time in script-based workflow pipelines.
- Conducted a quantitative experiment, a controlled laboratory study and a real-world deployment study to evaluate *ProvBuild*'s performance, effectiveness, and usability.

Smartphone User Authentication Scheme Based on Customized Shakes
2014 - 2015

Undergraduate Research Assistant — Shanghai Jiao Tong University

Advised by Prof. Hongzi Zhu

- Characterized single-handed shaking behavior based on sensory data with biometrical features and devised a training-authentication machine learning methodology for Android-based smartphones.
- Reduced equal error rate to 1.2% and achieved resilience under shoulder-surfing attacks in various working conditions.

Industry Experience

Applied Scientist Intern
May 2021 — Aug 2021

AWS Automated Reasoning Group, Amazon — (Remote) Boston, MA

- Utilized the mutation testing information to analyze the behaviors of test cases with JUnit framework.
- Developed a toolchain to automatically generate test assertions to increase mutation coverage and improve test suite quality.

Applied Scientist Intern
Sep 2020 — Dec 2020

AWS Automated Reasoning Group, Amazon — (Remote) Boston, MA

- Proposed an SMT-native lookahead-based approach for parallel SMT solving on program verification with string theories.
- Deployed the divide-and-conquer methodology, built a distributed solver with AWS cloud services and achieved orders-of-magnitude performance improvement on string-theory verification.

Research Intern
Jun 2020 — Aug 2020

Systems Research Group, Microsoft Research — (Remote) Redmond, WA

- Explored and compared different approaches to integer reasoning for SMT-based verification.

Skills

Programming Languages	(advanced) Python, Objective Caml (OCaml), HTML/CSS/JavaScript, C/C++ (intermediate) Assembly Languages, SQL, MATLAB, Java
Research skills	familiar with cloud services (AWS) and common testing techniques familiar with human interaction related research

Honors, Awards, and Services

ACM-W Scholarship 2020

National Scholarship (China) (Top 1% in SJTU) 2013

Secretary, Harvard Chinese Student and Scholar Association Jun. 2019 - Apr. 2020

Teaching Fellow, COMPSCI 61 Systems Programming and Machine Organization Fall 2017