Ruanqianqian (Lisa) Huang

CONTACT INFORMATION

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RESEARCH INTERESTS

I study programmers of all kinds and build programming systems for them, leveraging techniques in human-computer interaction, programming languages, education, and occasionally machine learning. I aim to design programming systems that account for user and community needs, ease communication, and support creativity.

EDUCATION

University of California, San Diego, La Jolla, CA, USA

Ph.D. in Computer Science — Aug. 2020 - Jun. 2026 (exp.)

- Thesis: *Human-Centered Programming Assistants (tentative)*
- Committee: Sorin Lerner (Chair), Michael Coblenz, Philip Guo, and James Hollan

M.S. in Computer Science — Aug. 2020 - Dec. 2022

Wellesley College, Wellesley, MA, USA — Aug. 2016 - May 2020

B.A. (summa cum laude) in Computer Science (Honors) and Cognitive & Linguistic Sciences

- Thesis: *The Design and Implementation of Venbrace, A Text Language for App Inventor*
- Advisor: Professor Franklyn Turbak

RESEARCH EXPERIENCE

University of California, San Diego — La Jolla, CA

Graduate Student Researcher (*Supervisor: Prof. Sorin Lerner*) — Aug. 2020 - Present

Skills: Full-Stack Development, Large-Scale User Studies, Mixed Methods, Grounded Theory

- Designing and evaluating interface advances for computational notebooks. [Pr.3]
- Designing and evaluating AI assistants for programming education.
- Designed and evaluated live programming tools for GUI development, human-AI interaction, and education. [Pu.2, Pu.4, Pu.5, Pu.6, T.4-6, T.10, P.10]
- Investigated computational notebook usage among scientists via field observations. [Pu.7]
- Investigated debugging in various paradigms via contextual inquiries. [Pu.6, Pu.3]

Apple Inc. — Pittsburgh, PA

HCI Research Intern, AI/ML (*Supervisor: Dr. Mary Beth Kery*) — Apr. 2023 - Sep. 2023

Skills: Full-Stack Development, UI/UX Design, Ethnography, Machine Learning

- Investigated how novices approach machine learning via field observations and interviews.
- Developed novel interaction techniques for machine learning. [T.9]

Microsoft Research — Redmond, WA

Research Intern, RiSE (*Supervisor: Dr. Nikolaj Bjørner*) — Jun. 2022 - Sep. 2022

Skills: Full-Stack Development, Iterative Design, Qualitative Analysis

- Created design guidelines for logic modeling education via participatory design. [Pr.1, T.7]
- Developed the Z3Guide, a 100% client-side web environment for the Z3 theorem prover.
- Organized an online Z3 learning workshop using Z3Guide (N=112).

Wellesley College — Wellesley, MA

Student Researcher (*Supervisor: Prof. Franklyn Turbak*) — Jan. 2019 - Jul. 2020

Skills: Domain-Specific Language Design, Quantitative Analysis of User Interactions

- Designed and developed a text language for App Inventor's visual coding blocks called Venbrace and its tooling (editor and parser), which were evaluated and enhanced through online controlled experiments. [Pu.1, T.2-3]

Research Assistant (*Supervisor: Prof. Panagiotis Metaxas*) Jan. 2018 - Oct. 2018

Skills: Data Visualization, Iterative Design

- Implemented an interactive visualization for TwitterTrails, a platform for Tweet trustworthiness assessment. [T.1]
- Developed data cleaning and analysis scripts for TwitterTrails' database.

Publications & Preprints

Preprints

Pr.3 Brian Hempel, **Ruanqianqian (Lisa) Huang**, Devamardeep Hayatpur, Sorin Lerner, and Haijun Xia. Multi-Modal Plot Authoring. Under review (title modified for anonymous review). 2024.

Pr.2 Ilana Shapiro, **Ruanqianqian (Lisa) Huang**, Zachary Novack, Cheng-i Wang, Hao-Wen Dong, Taylor Berg-Kirkpatrick, Shlomo Dubnov, and Sorin Lerner. Music Corpora-Based Hierarchical Structure Generation. Under review (title modified for anonymous review). 2024.

Pr.1 **Ruanqianqian (Lisa) Huang**, Ayana Monroe, Nikolaj Bjørner, Peli de Halleux, and Sorin Lerner. Designing Student-Centered Experience for Logic Modeling. Under review (title modified for anonymous review). 2024.

Publications

Pu.7 **Ruanqianqian (Lisa) Huang**, Savitha Ravi, Michael He, Boyu Tian, Sorin Lerner, and Michael Coblenz. How Scientists Use Jupyter Notebooks: Goals, Quality Attributes, and Opportunities. To appear in *Proceedings of the IEEE/ACM 47th International Conference on Software Engineering (ICSE '25)*, Ottawa, Canada, 2025.

Pu.6 **Ruanqianqian (Lisa) Huang**, Philip J. Guo, and Sorin Lerner. Unfold: Enabling Live Programming for Debugging GUI Applications. In *2024 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Liverpool, UK, 2024.

Pu.5 **Ruanqianqian (Lisa) Huang**[†], Kasra Ferdowsi[†], Michael B. James, Nadia Polikarpova, and Sorin Lerner. 2024. Validating AI-Generated Code with Live Programming. In *Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI '24)*, May 11–16, 2024, Honolulu, HI, USA. ACM, New York, NY, USA, 8 pages. ([†]Equal contribution)

Pu.4 **Ruanqianqian (Lisa) Huang**, Philip J. Guo, and Sorin Lerner. Unfolding State Changes via Live State-First Debugging. In *the Ninth Workshop on Live Programming (LIVE 2023)*. Cascais, Portugal, October 2023.

Pu.3 **Ruanqianqian (Lisa) Huang**, Elizaveta Pertseva, Michael Coblenz, and Sorin Lerner. How do Haskell programmers debug?. In *the 13th annual workshop on the intersection of HCI and PL (PLATEAU '23)*. Pittsburgh, PA, February 2023.

Pu.2 **Ruanqianqian (Lisa) Huang**, Kasra Ferdowsi, Ana Selvaraj, Adalbert Gerald Soosai Raj, and Sorin Lerner. Investigating the Impact of Using a Live Programming Environment in a CS1 Course. In *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE '22)*. Providence, RI, March 2022.

Pu.1 **Ruanqianqian Huang** and Franklyn Turbak. A Design for Bidirectional Conversion between Blocks and Text for App Inventor. In *2019 IEEE Blocks and Beyond Workshop (B&B)*, Memphis, TN, October 2019.

Talks

T.12 "Unfold: Enabling Live Programming for Debugging GUI Applications". *VL/HCC*, Sep. 2024.

T.11 "Validating AI-Generated Code with Live Programming". *CHI*, May 2024.

T.10 "Unfolding State Changes via Live State-First Debugging". *LIVE Workshop*, Oct. 2023.

T.9 "Robust ML Prototyping with Adaptive Guidance". *Apple HCI Seminar*, Aug. 2023.

T.8 "How do Haskell programmers debug?". *PLATEAU Workshop*, Feb. 2023.

T.7 "User-Enhanced Learning Experience of Symbolic Logic Solving". *Research in Software Engineering Group, Microsoft Research*; *Women in Compilers and Tools Meetup Series, LLVM Organization*; *HCI Intern Seminar Series, Microsoft Research*, Aug. 2022.

T.6 "Impact of Live Programming on Student Learning in a CS1 Course". *Computing Education Research Seminar, UC Davis*, Nov. 2022; *SIGCSE Technical Symposium*, Mar. 2022.

T.5 "Live Front-End Event Handling". *Programming Systems Group, UC San Diego*, Nov. 2021.

T.4 "Programming with Live Programming". *Programming Systems Group, UC San Diego*, Apr. 2021.

T.3 "The Design and Implementation of Venbrace, A Text Language for App Inventor". *App Inventor Team, Massachusetts Institute of Technology*, May 2020.

T.2 "Bidirectional Conversion between Blocks and Text for App Inventor". *Blocks and Beyond Workshop*, Oct. 2019; *MIT App Inventor Summit*, Aug. 2019.

T.1 "Interactive Visualizations and Credibility Evaluations of News Stories on TwitterTrails". *Wellesley College Summer Research Summit*, Aug. 2018.

Teaching Experience

9 academic terms of teaching and mentoring undergrad and grad students at UCSD and Wellesley in courses spanning across various domains of Computer Science.

University of California, San Diego

- **Instructor**, CSE 12 - Basic Data Structures and Object-Oriented Design (N=45) — Summer 2024
- **Instructor**, CSE 193 - Intro to CS Research (N=53) — Fall 2023
- **Teaching Assistant**, CSE 8A - Intro to Programming in Python (N=495) — Fall 2024
- **Teaching Assistant**, CSE 291 - LLMs, Programming, and HCI (N=34) — Spring 2024
- **Teaching Assistant**, CSE 8A - Intro to Programming in Python (N=601) — Fall 2022
- **Teaching Assistant**, CSE 230 - Graduate Programming Languages (N=200+) — Fall 2021
- **Training in Student-Centered College Teaching & Course Design**, UCSD Teaching and Learning Commons — Winter 2024

Wellesley College

- **Tutor**, CS 251 - Principles of Programming Languages — Fall 2019
- **Tutor**, CS 230 - Data Structures — Spring & Fall 2018

Girls Who Code

- Club Facilitator and Teaching Assistant, Intro to Web Programming — Fall 2017

Mentorship Experience

As a graduate student at UCSD, I directly supervised **7 undergraduate and graduate research assistants** as follows:

- Ilana Shapiro (UCSD PhD student), on Symbolic Music Analysis [Pr.2] — 2023 -
- Kaleigh Beachler (UCSD undergrad), on AI Tutor for Programming Education; winner of UCSD Triton Research & Experiential Learning Scholars (TRELS) for summer 2024 (20% acceptance rate) — 2024 -
- Michael He (UCSD undergrad), on Jupyter Notebook Use in Scientific Computing [Pu.7] — 2024
- Boyu Tian (UCSD undergrad), on Jupyter Notebook Use in Scientific Computing [Pu.7] — 2024
- Justin Yao Du (UCSD undergrad; now Databricks), on Live Programming for Unit Testing; selected for presentation in 2022 PLDI Student Research Competition — 2021 - 2022

- Mandeep Syal (UCSD undergrad; now Lumenci), on Live Programming for Unit Testing; selected for presentation in 2022 PLDI Student Research Competition — 2021 - 2022
- Thanh-Nha Tran (UCSD undergrad; now MS student at UCSD), on Live Programming for Unit Testing; selected for presentation in 2022 PLDI Student Research Competition — 2021 - 2022

In Fall 2023, I further advised **53 undergraduate ERSP participants (15 research projects across various domains of Computer Science)** as their instructor for "Intro to CS Research".

Industry Experience

Apple Inc. — Cupertino, CA

Data Analysis Intern, Cloud Infrastructure — Summer 2019

- Forecast future fleet changes to optimize hardware resource allocation with 88.38% accuracy.
- Automated a recurring manual report for Finance by improving the API for search queries.

Avatar Works — Xiamen, China

Software Engineering Intern, Natural Language Processing — Summer 2017

- Assisted with chatbot development by analyzing Chinese textual data using NLTK.

Honors and Awards

UCSD CSE Award for Excellence in Teaching (awarded to 1 PhD student)	2024
2024 Summer Graduate Teaching Scholars, UC San Diego	2023
Special Recognitions for Outstanding Reviews, CHI 2024	2023
PLMW Scholarship, Symposium on Principles of Programming Languages (POPL)	2021
Trustee Scholar (1 of 4 out of 600+ graduates), Wellesley College	2020
Academic Achievement Award, Wellesley College (awarded to 1 graduating CS major)	2020
Sigma Xi Honors Research Society, Wellesley College	2020
Jerome A. Schiff Fellowship for Thesis Research, Wellesley College	2019
Phi Beta Kappa Honor Society (elected as a junior), Wellesley College	2019
Science Center Research Award, Wellesley College	2018
Sandra Wieland Howe Scholarship for Music Performance, Wellesley College	2017

External Service

Invited Speaker: PLMW@SPLASH (2024)

Program Committee: LIVE Workshop (2024), SIGCSE TS (2024, 2025)

Artifact Evaluation Committee: <Programming> (2024)

Reviewer: UIST (2023), TOCE (2023), CHI (2022, 2024, 2025)

Student Volunteer, Symposium on Principles of Programming Languages (POPL) — 2023

Internal Service

Mentor, UCSD Graduate Women in Computing	2024 -
Co-President, UCSD Graduate Women in Computing	2023 - 2024
Mentorship Program Coordinator, UCSD Graduate Women in Computing	2022 - 2023
UCSD CSE Ph.D. Admissions Committee	2021 - 2023
Application Reviewer, UCSD CSE Early Research Scholars Program	2022
Executive Board, Wellesley College Chamber Music Society	2017 - 2020
Volunteer, Harvard PBHA Chinatown Teen	2016 - 2017

Skills

Research Methods • Interview • Survey • Contextual Inquiry • Field Observation • Grounded Theory • Software Usability Testing • Statistical Analysis • Thematic Analysis • Software Instrumentation

Programming Languages & Tools • TypeScript • JavaScript • HTML/CSS • Node.js • React • Python • LaTeX • Java • R • Haskell • Scala • C • GitHub & Git • CI/CD

Design & Arts • Figma • Sketch • Adobe Premiere Pro • Adobe Photoshop

Domain Knowledge • Parsing • Compilation • Program Analysis • Domain-Specific Languages • Time Series Forecasting

References

Sorin Lerner (Thesis Advisor)
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University of California San Diego
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Michael Coblenz
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