Jean SALAC
PhD Candidate | Computer Science

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My research focuses on program comprehension at the K-12 level. Contributions include the investigation of factors critical to program comprehension for young learners, code comprehension strategies for struggling learners like *TIPP&SEE* and diagramming, and *Personalized Assessment Worksheets* for Scratch (PAWS) tool, a custom assessment generator software for Scratch projects. I was motivated to pursue this doctoral research due to my passion for making computer science instruction accessible and effective to people from under-served communities. Through my work, I hope to make computing accessible for everyone and to close the digital divide in today's increasingly technological world.

Education

2017-Present	Doctor of Philosophy | Computer Science | University of Chicago | National Science Foundation Fellow
2020	Master of Science | Computer Science | University of Chicago
2017	Bachelor of Science | Computer Science | University of Virginia | High Distinction

Peer-Reviewed Publications

2021 **Jean Salac**, Cathy Thomas, Chloe Butler, and Diana Franklin. "Understanding the Link between Computer Science Instruction and Reading & Math Performance." Research Paper in the *26th Annual Conference on Innovation and Technology in Computer Science Education*, 2021.

2021 **Jean Salac**, Cathy Thomas, Chloe Butler, and Diana Franklin. "Supporting Diverse Learners in K-8 Computational Thinking with TIPP&SEE." Research Paper in the *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*, 2021.

2020 Diana Franklin, **Jean Salac**, Zachary Crenshaw, Saranya Turimella, Zipporah Klain, Marco Anaya, Cathy Thomas. "Exploring Student Behavior Using the TIPP&SEE Learning Strategy" In *Proceedings of the 2020 ACM Conference on International Computing Education Research*, 2020. **Best Paper Award**

2020 **Jean Salac** and Diana Franklin. "If They Build It, Will They Understand It ?: Exploring the Relationship between Student Code and Performance." Research Paper in the *25th Annual Conference on Innovation and Technology in Computer Science Education*, 2020.

2020 **Jean Salac**, Cathy Thomas, Bryan Twarek, William Marsland, and Diana Franklin. "Comprehending Code : Understanding the Relationship between Reading and Math Proficiency, and 4th-Grade CS Learning Outcomes." Research Paper in the *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 2020.

2020 **Jean Salac**, Cathy Thomas, Chloe Butler, Ashley Sanchez, and Diana Franklin. "TIPP&SEE : A Learning Strategy to Guide Students through Use–>Modify Scratch Activities." Research Paper in the *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 2020.

2020 **Jean Salac**, Qi Jin, Zipporah Klain, Saranya Turimella, Max White, and Diana Franklin. "Patterns in Elementary-Age Student Responses to Personalized & Generic Code Comprehension Questions." Research Paper in the *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 2020.

2020 Diana Franklin, **Jean Salac**, Cathy Thomas, Zené Sekou and Sue Krause. "Eliciting Student Scratch Script Understandings via Scratch Charades." Experience Report in the *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 2020.

2019 **Jean Salac**, Max White, Ashley Wang, and Diana Franklin. "An Analysis through an Equity Lens of the Implementation of Computer Science in K-8 Classrooms in a Large, Urban School District." Research Paper in the *Proceedings of the 50th ACM Technical Symposium on Computer Science Education*, 2019.

2018 David Weintrop, Afsoon Afzal, **Jean Salac**, Patrick Francis, Boyang Li, David C. Shepherd, and Diana Franklin. "Evaluating CoBlox : A comparative study of robotics programming environments for adult novices." In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 2018. **Best Paper Honorable Mention**

2017 Daniel S. Katz, Kyle E. Niemeyer, Sandra Gesing, Lorraine Hwang, Wolfgang Bangerth, Simon Hettrick, Ray Idaszak, **Jean Salac**, Neil Chue Hong, Santiago Nunez-Corrales, Alice Allen, R. Stuart Geiger, Jonah Miller, Emily Chen, Anshu Dubey, and Patricia Lago. "Fourth workshop on sustainable software for science : practice and experiences (WSSSPE4)." *Journal of Open Research Software* 6, no. 1 (2018).

Research Experience

Present – July 2017 | Research Assistant, University of Chicago, PI : Prof. Diana Franklin (CANON Lab)

Project : Comprehending Code for K-8 Students (ages 9-15)

- Led the experimental design of 6 studies, using human factors techniques (e.g. A/B testing, survey design).
- Applied statistical (e.g. ANOVA, ANCOVA) and machine learning (e.g. regression) techniques to analyze educational datasets of 200-500 students, including standardized test scores, demographics, etc.
- Resulted in 9 publications (6 first-author), including 1 Best Paper Award.

Project : Personalized Assessment Worksheets for Scratch (PAWS)

- Applied statistical and machine learning techniques (e.g. factor analysis, etc) to analyze features of student code and assessments.
- Built a tool for automatic generation of personalized written assessments that incorporates student code, and a tool that scraped features of student code for static analysis using Python and shell scripting.

Applied Statistics & Machine Learning | User/Human Factors Design | Software Engineering | Qualitative Analytics

May 2017 – Jan 2016 | Research Assistant, University of Virginia, PIs : Prof. Luther Tychonievich, Prof. Rider Foley

- Researched problematic demographic categories used in STEM higher education, resulting in 1 paper
- Investigated the impact of informal computing education on low-income minority girls using nonparametric statistical techniques and survey design.

Ethnography | Survey Design | Clinical Interviews | Case Study Analysis

Honors and Awards

2020 Invitation to Accessible Computer Science Education Workshop, Microsoft Research
2020 EECS Rising Star, Rising Stars Academic Career Workshop for Women
2019 Graduate Research Fellowship, National Science Foundation
2019 Bridge Builder Leadership Award, University of Chicago
2019 Computer Science Department Teaching Award, University of Chicago
2019 Physical Science Division Teaching Award Nomination, University of Chicago
2018 Graduate Student Leadership Award, University of Chicago
2017 Rader Award for Undergraduate Research, University of Virginia
2016 AAPI Young Leader, White House Initiative for Asian-Americans and Pacific Islanders (WHIAAPI)

Grants

2019 Graduate Research Fellowship, National Science Foundation ($138,000)
2020 CRA-URMD Grad Cohort, Computing Research Association ($500)
2019 Tapia Celebration of Diversity in Computing, Two Sigma ($500)
2019 International Computing Education Research (ICER) Conference Doctoral Consortium, Association for Computing Machinery ($600)
2019 CRA-URMD Grad Cohort, Computing Research Association ($1200)
2018 CRA-W Grad Cohort, Computing Research Association ($500)
2017 Grace Hopper Celebration of Women in Computing, University of Chicago ($1000)
2016 Workshop for Sustainable Software for Science : Practices & Experiences (WSSSPE) Travel Grant, National Science Foundation ($1500)
2016 Grace Hopper Celebration of Women in Computing, University of Virginia ($1000)
2016 SIGCSE Technical Symposium Travel Grant, University of Virginia ($500)
2016 The Jefferson Trust, University of Virginia ($10,320)
2016 Parents Fund Internship Grant, University of Virginia ($4000)

Invited Talks and Workshops

March 2021	"Scratch Strategies to Engage Diverse Learners", Equity in Action Conference, Computer Science Teachers Association
February 2021	"Scratch Strategies to Engage Diverse Learners", Excellence in Teaching Conference, Notre Dame University
2020-21	Workshop on the Next 15 Years of Computing Education Research, National Science Foundation
November 2020	Accessible Computer Science Education Workshop, Microsoft Research

Presentations

2021 **Jean Salac**, Cathy Thomas, Chloe Butler, Diana Franklin. "What is the Relationship between Computer Science Instruction and Reading & Math Performance?", Presentation at the 2021 Conference of the *American Educational Research Association*

2021 **Jean Salac**, Cathy Thomas, Chloe Butler, Diana Franklin. "Supporting Diverse Learners in Computational Thinking with TIPP&SEE", Presentation at the 2021 Conference of the *American Educational Research Association*

2020 **Jean Salac**, Diana Franklin, Cathy Thomas. "TIPP&SEE : A Previewing & Navigating Strategy for Use/Modify Scratch Activities", Presentation at the 2020 Conference of the *American Educational Research Association*

2020 Diana Franklin, **Jean Salac**, Cathy Newman Thomas, Jennifer L. Palmer, Merijke Coenraad, Melissa Cobian, Kris Beck, Andy Rasmussen, David Weintrop. "TIPP&SEE - Supporting Struggling Learners in Elementary CS Instruction", Presentation at the 2020 Conference of the *American Educational Research Association*

2020 Diana Franklin, Jennifer Palmer, Jasmine Marckwordt, Randall Landsberg, Alexandria Muller, Kartik Singhal, **Jean Salac** and Danielle Harlow. "Initial Learning Trajectories for K-12 Quantum Computing", Presentation at the *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, 2020.

2019 Cathy Thomas, Diana Franklin, & **Jean Salac**. "Teacher Perspectives of Year-Long Professional Development in Inclusive Elementary Computer Science.", Poster at annual meeting of the *Teacher Education Division of the Council for Exceptional Children.*

2019 **Jean Salac**, Cathy Thomas, Diana Franklin. "Comprehending Code : Understanding the Relationship between Reading and Math Proficiency, and 4th-Grade CS Learning Outcomes.", Poster at *Tapia Celebration of Diversity in Computing*

2019 **Jean Salac**. "Personalized Assessment Worksheets for Scratch (PAWS) : Exploring a Bridge between Interviews, Written Assessments, and Artifact Analysis", Doctoral Consortium Presentation at International Computing Education Research (ICER) Conference

2019 **Jean Salac**. "Comprehending Code : Developing Computer Science learning strategies to advance Equity", Presentation at *Soapbox Science Chicago*

2019 **Jean Salac**. "Comprehending Code", Poster at *CRA-URMD Grad Cohort*

2017 **Jean Salac**. "The Invisibility of Immigrant & Refugee Students in Computer Science Education", Poster at *Science and Technology Global Conference*

2017 **Jean Salac**. "A Study of the Impact of Informal Computer Science Education on Low-Income Minority Girls", Lightning Talk at *ACM Capital Region Celebration of Women in Computing*

Teaching Experience

Dec 2018 – Sept 2017 | **Teaching Assistant, Computers for Learning, University of Chicago**

- Earned the 2019 Computer Science Department Teaching Award (Top 2 teaching assistants)
- Nominated for the 2019 Physical Science Division Teaching Award, which covers all non-biological science departments at the university
- Designed programming assignments for the development of a 2D game engine in Java
- Lectured on Java, Object-Oriented Programming, and Game Engine Architecture to groups of 20-80 students
- Led lab sessions and instructed students in office hours

Java | Object-Oriented Programming | Git/Github | Game Enginer Architecture

May 2017 – Jan 2017 | **Teaching Assistant, Computer Architecture & Human-Computer Interaction, University of Virginia**

- Aided in the development and evaluation of student assignments
- Led lab sections with 40-50 students
- Mentored students on their independent projects
- Instructed students at office hours

UI/UX Design | C | C++ | Assembly

June 2017 – May 2013

Onsite Educator, National Air & Space Museum, Washington, DC

- Performed demonstrations to visitors to illustrate the science and history behind flight and space
- Attended professional training classes on public speaking, pedagogical methods, astronomy, and physics
- Wrote child-friendly explanations of complex science concepts to visitor questions on our website

Science Communication | STEM Education

Aug 2015 – May 2015

STEM Intern, Systemic Solutions, McLean, VA

- Redesigned the VEX Robotics programming curriculum used in Systemic Solutions summer camps
- Instructed elementary age students in the mechanical design and programming of VEX robots

C++ | C | Micro-controllers

Select Service

Present – May 2020

Graduate Fellow, CRA Education (CRA-E), Computing Research Association

- CRA-E promotes the health of the computing research pipeline by promoting undergraduate research, providing resources to faculty to prepare talented students for research, and encouraging undergraduates to pursue graduate education and research careers in computing fields
- Help with research spotlights to promote undergraduate research
- Provide a graduate student perspective for initiatives to improve the computing research pipeline

Present – Jan 2019

Co-organizer, Women in STEM Symposium, University of Chicago

- Organize panel discussions
- Research and invite speakers
- Apply for grants to support the annual Women in STEM symposium

Present – Feb 2019

CS Representative, Committee on Equity, Diversity, & Inclusion, University of Chicago

- Develop institutional policy for equity, diversity and inclusion for the Physical Sciences Division, which encompasses CS
- Advocate for graduate students who are from under-represented groups in computing
- Disseminate diversity-related resources in my department
- Organize activities that aim to recruit and retain diverse students
- Act as a liaison to the Graduate Recruitment Initiative Team, a grassroots student organization that is committed to enhancing diversity, inclusion, and equity in UChicago STEM graduate programs

Present – 2019

Peer Reviewer, K-12 CS Education, Multiple Publication Venues

- Peer-reviewed papers on K-12 CS education submitted to various publication venues such as SIGCSE, SIGCHI, ITiCSE, ICER, and the Journal of CS Education.

March 2020

Online Organizing Committee Member, RESPECT Conference for Equity and Sustained Participation, Institute of Electrical and Electronics Engineers (IEEE)

- Helped facilitate the transition of the RESPECT conference from in-person to online amidst the COVID-19 pandemic
- Helped coordinate online paper and poster presentations and discussions

Dec 2019 – Jan 2018

Co-Chair & Founder, Graduate Women in CS (GWiCS), University of Chicago

- Advocated for female-identifying graduate students in our department
- Organized monthly activities to build a community of support
- Established and maintain connections with companies, i.e. Google, Microsoft

Other Professional Experience

May 2018 – Jan 2018 | **Co-organizer, Transcending Boundaries Research Symposium, University of Chicago**

- The Transcending Boundaries research Symposium is an inaugural student-led and organized research symposium designed to highlight the work of under-represented minority graduate and post-doctoral scholars at the University of Chicago
- Reviewed research submissions
- Organized and facilitated panel discussions

Science Communication | Grant Writing

Aug 2016 – May 2016 | **Computer Science Education Intern, National Science Foundation, Alexandria, VA**

- Analyzed prior NSF CS education and broadening participation initiatives
- Researched social innovation best practices to help shape President Obama's CS for All initiative

Qualitative Analytics | Policy Analysis | Science Communication | Brief Writing