Justin Lubin

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Curriculum Vitae, October 2025

Research Vision

Mission: *To enable scientists to write code with only domain expertise, not programming expertise.*

I co-design programming systems with scientists. These systems empower scientists without a background in computing to write the code they need by themselves. To make new user interactions possible in these systems, I develop **programming language theory** informed by what I learn from my **deep embedding with domain experts** and my mixed methods human-computer interaction research.

Primary area: Programming languages ∘ **Secondary areas:** Human-computer interaction, biology

Education

University of California, Berkeley 2020–
PhD in Computer Science
Advisor: Sarah E. Chasins
Major: Programming languages
Minor: Bioinformatics

University of Chicago 2016–2020
BS in Computer Science (Honors), BS in Mathematics, Minor in Music. *Summa cum laude.*
Advisor: Ravi Chugh
Honors Thesis: Forging Smyth: The Impl. of *Program Sketching with Live Bidirectional Evaluation*

Research Internships

Carnegie Mellon University 2018
Advisors: Jonathan Aldrich (CMU), Alex Potanin (Victoria University of Wellington)
Project: Approximating Polymorphic Effects with Capabilities

Peer-Reviewed Conference and Journal Publications

** = equal contribution, † = research mentee*

Programmable epigenome editing by transient delivery of CRISPR epigenome editor ribonucleoproteins Nat. Commun. '25
Da Xu*, Swen Besselink*, Gokul N. Ramadoss, Philip H. Dierks, **Justin P. Lubin**, Rithu K. Pattali, Jinna I. Brim, Anna E. Christenson, Peter J. Colias, Izaiah J. Ornelas, Sarah E. Chasins, Bruce R. Conklin, and James K. Nuñez
In *Nature Communications (2025)*.

Programming by Navigation PLDI '25
Justin Lubin, Parker Ziegler, and Sarah E. Chasins
In *Proceedings of the ACM on Programming Languages (PACMPL), Issue PLDI (2025)*.

Fast Direct Manipulation Programming with Patch-Reconciliation Correspondence PLDI '25
Parker Ziegler, **Justin Lubin**, and Sarah E. Chasins
In *Proceedings of the ACM on Programming Languages (PACMPL), Issue PLDI (2025)*.

Equivalence by Canonicalization for Synthesis-Backed Refactoring PLDI '24
Justin Lubin, Jeremy Ferguson*†, Kevin Ye*†, Jacob Yim*†, and Sarah E. Chasins
In *Proceedings of the ACM on Programming Languages (PACMPL), Issue PLDI (2024)*.

Exploring the Learnability of Program Synthesizers by Novice Programmers UIST '22
Dhanya Jayagopal*†, **Justin Lubin***, and Sarah E. Chasins
In *Proceedings of the ACM Symposium on User Interface Software and Technology (2022)*.

How Statically-Typed Functional Programmers Write Code OOPSLA '21
Justin Lubin and Sarah E. Chasins
In *Proceedings of the ACM on Programming Languages (PACMPL), Issue OOPSLA (2021)*.

Program Sketching with Live Bidirectional Evaluation ICFP '20
Justin Lubin, Nick Collins, Cyrus Omar, and Ravi Chugh
In *Proceedings of the ACM on Programming Languages (PACMPL), Issue ICFP (2020)*.

Sketch-n-Sketch: Output-Directed Programming for SVG UIST '19
Brian Hempel, **Justin Lubin**, and Ravi Chugh
In *Proceedings of the ACM Symposium on User Interface Software and Technology (2019)*.

Deuce: A Lightweight User Interface for Structured Editing ICSE '18
Brian Hempel, **Justin Lubin**, Grace Lu, and Ravi Chugh
In *Proceedings of the International Conference on Software Engineering (2018)*.

Preprints

Transcriptional regulation of disease-relevant microglial activation programs
Amanda McQuade, Reet Mishra, Venus Hagan, Weiwei Liang, Peter J. Colias, Vincent Cele Castillo, **Justin P. Lubin**, Verena Haage, Victoria Marshe, Masashi Fujita, Layla Gomes, Thomas Ta, Olivia Teter, Sarah E. Chasins, Philip L. De Jager, James K. NuÃśez, and Martin Kampmann

Workshop Publications

** = equal contribution, † = research mentee*

Searching for Incidental Specifications PLATEAU '23
Jeremy Ferguson*†, Kevin Ye*†, Jacob Yim*†, and **Justin Lubin**
In *Proceedings of the Workshop on Evaluation and Usability of Programming Languages and Tools*.

Type-Directed Program Transformations for the Working Functional Programmer PLATEAU '19
Justin Lubin and Ravi Chugh
In *Proceedings of the Workshop on Evaluation and Usability of Programming Languages and Tools*.

Honors

NSF Graduate Research Fellowship (GRFP) 2020–2025

Mentoring and Teaching Awards

Undergraduate Research Mentoring Award (UC Berkeley) 2023
Outstanding Graduate Student Instructor Award (UC Berkeley) 2022

Student Research Competitions

3rd Place Graduate at CHI, *How Statically-Typed Functional Programmers Author Code* 2021
1st Place Undergraduate at SPLASH, *Approximating Polymorphic Effects with Capabilities* 2018

Special Recognition for Outstanding Review

CHI '23, UIST '25 (×2)

Honor Societies

Sigma Xi 2020–
Phi Beta Kappa 2019–

Academic Honors

Enrico Fermi Scholar (University of Chicago) 2020
Harper Award (University of Chicago) 2020
Student Marshal (University of Chicago) 2019–2020
Dean's List (University of Chicago) 2016–2020

Invited Talks and Other Presentations

Invited External Talks

UCSD PL/HCI Graduate Seminar (Philip Guo) — Q&A on Exploring the Learnability of Program Synthesizers by Novice Programmers 2025
UCSC Languages, Systems, and Data Seminar — Programming By Navigation 2024
UPenn PLClub — How Statically-Typed Functional Programmers Write Code 2022
UCSD PL Seminar — How Statically-Typed Functional Programmers Write Code 2021

Invited Internal Talks and Workshops

EPIC Advance — Bug-Free by Construction 2025
Nuñez Lab — From .FASTQs to .SVGs: How to Make a Bioinformatics Pipeline 2025
EPIC Retreat — Unblocking Scientists with Programming by Navigation 2025
Nuñez Lab — Participatory Design and Programming Systems 2024
Nuñez Lab — Wrangling Flow Cytometry Data 2024
Nuñez Lab — Vizualizing Data in Python with the Grammar of Graphics 2023
Nuñez Lab — Re-Imagining Programming for Experimental Biologists 2023
EPIC Retreat — Usable Programming Tools for Experimental Biologists 2023
Nuñez Lab — Analysis and Visualization of RNA-seq Data 2023
EPIC Advance — Exploring the Learnability of Program Synthesizers by Novice Programmers 2022

Guest Lectures

UC Berkeley CS 294: Building User-Centered Programming Tools — User-Centered Design 2023
UC Berkeley CS 164: Programming Languages and Compilers — Compiler Optimizations 2021

Professional Activities and External Service

Dagstuhl Participation

Theories of Programming — 2022

Organizing Committee

Workshop on Evaluation and Usability of Programming Languages and Tools — PLATEAU '25
Workshop on Evaluation and Usability of Programming Languages and Tools — PLATEAU '24
- Additional Responsibilities: Publicity Chair

Workshop on Evaluation and Usability of Programming Languages and Tools — PLATEAU '23

Program Committee

Workshop on Human Aspects of Types and Reasoning Assistants — HATRA '25
Workshop on Live Programming — LIVE '25
Workshop on Human Aspects of Types and Reasoning Assistants — HATRA '24
Workshop on Live Programming — LIVE '24
Symposium on New Ideas in Programming and Reflections on Software (Papers Track) — Onward! '24
Workshop on Human Aspects of Types and Reasoning Assistants — HATRA '23
Workshop on Live Programming — LIVE '23

Reviewer

ACM Symposium on User Interface Software and Technology — UIST '25
- Received Special Recognition for Outstanding Review (×2)

ACM Conference on Human Factors in Computing Systems — CHI '25
Journal of Functional Programming — JFP '24
ACM Conference on Human Factors in Computing Systems — CHI '23
- Received Special Recognition for Outstanding Review

Formal Methods in System Design — FMSD '22
ACM Symposium on User Interface Software and Technology — UIST '21

Social Sessions Co-organizer

PL+HCI "Swimmer" School — 2022

Student Volunteer

Elm in the Spring Conference — 2019
International Conference on Functional Programming (ICFP) — 2018

Mentorship

UG = undergrad

MS Thesis Research Mentees (with Sarah E. Chasins)

Jacob Yim (UG, MS @ UC Berkeley → PhD @ UCSD) — 2022–2025
- *MS Thesis:* Translations Alone Do Not Help Programmers Work With Unfamiliar Abstractions
- Co-authorship at PLDI 2024
- Co-first authorship at PLATEAU 2023

Jeremy Ferguson (UG, MS @ UC Berkeley → Software Engineer @ Voleon) — 2022–2024
- *MS Thesis:* Eliciting Domain Expertise Reduces Examples Needed for Program Synthesis

- Co-authorship at PLDI 2024
- 2nd place UG at POPL SRC 2023, *Synthesizing Vectorized Code via Verified Lifting*
- Co-first authorship at PLATEAU 2023

Dhanya Jayagopal (UG, MS @ UC Berkeley → Software Engineer @ Udemy) 2020–2022
- *MS Thesis:* Study of Program Synthesizers & Novice Programmers
- Co-first authorship at UIST 2022

Additional Research Mentees (with Sarah E. Chasins)

Laila Walker (UG @ UC Berkeley → PhD @ UW, Co-mentored with Jacob Yim) 2024–2025

Kevin Ye (UG, Gap-year Researcher @ UC Berkeley → MS @ Simon Fraser University) 2022–2024
- Co-authorship at PLDI 2024
- Co-first authorship at PLATEAU 2023

Fayaz Shaik (UG @ Ohlone College & TTE REU Mentee → UG @ UCSD) 2021–2022
- Poster at SACNAS NDiSTEM 2021, *User-Centered Data Population of Knowledge Graphs*

SIGPLAN-M Mentees

Carolina Carreira (PhD @ CMU Portugal) 2022–

Adharsh Kamath (Research Fellow @ MSR India & PhD @ UIUC) 2022–

Additional Mentees

Kasozi Vincent (MS @ University of Chlef) 2022–2023

Teaching

University of California, Berkeley

CS 164: Programming Languages and Compilers (TA) Fall 2022

CS 164: Programming Languages and Compilers (Head TA) Fall 2021
- Received Outstanding Graduate Student Instructor Award

University of Chicago

CMSC 22300: Functional Programming (TA) Spring 2020

CMSC 16100: Honors Introduction to Programming I (Grader) Fall 2018

Internal Service

UC Berkeley Programming Systems (PS) Research Group and EECS Department

EECS Faculty Hiring Committee, Student Member 2025

EECS Visit Days Peer Advisor 2021–2023, 2025

PS Visit Days Coordinator 2022

PS Seminar Organizer 2021–2022

PS Graduate Admissions Representative 2021

Leadership, Diversity, and Community Service

Incarceration to College Program — Tutor 2025–

Tutoring incarcerated youth in mathematics to promote success in post-secondary education.

Berkeley Underground Scholars — Graduate Tutor 2023–
Tutoring formerly-incarcerated/systems-impacted students in computer science and mathematics.

EECS Peers — Co-organizer 2023–
Co-leading a graduate student peer support and mentorship organization. *(Mentor since 2022.)*

SIGPLAN-M Long-Term Mentorship Program — Mentor 2022–
Serving as a mentor for the SIGPLAN-M long-term programming languages mentorship program.

Equal Access to Application Assistance Program — Reviewer 2023–2024
Reviewed PhD applications as part of a student-run initiative aiming to ensure that all PhD applicants to UC Berkeley have access to guidance on the application process.

Association of Women in EE&CS (AWE) — Grad School Advisor 2023
Hosted series of office hours to advise women and nonbinary undergraduates interested in grad school.

WiCSE Girl Scout Engineering Day — Activity Designer and Leader 2023
Designed and led educational activities for the Girl Scouts of Northern California to earn their programming and robotics badge.

Women in Computer Science and Electrical Engineering (WiCSE) — Grad Mentor 2022
Served as a mentor for the WiCSE Grad Mentorship Program, where veteran PhD students get paired up with first- and second-year PhD students for general mentorship.

#ShutdownPL — Co-organizer 2020–2022
Cooordinated logistics and managed funding for three keynote speakers at dedicated anti-racist events at ICFP and POPL.

Transfer-to-Excellence Summer Research Program (TTE REU) — Mentor 2021
Served as a research mentor for the TTE REU, a research experience for community college students seeking to transfer to four-year universities.

compileHer Tech Capstone — Activity Leader 2019
Led computer science educational activities for middle school girls in Chicago.