Ian Arawjo

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POSITION

Assistant Professor of Human-Computer Interaction Jan 2024 – Present
Université de Montréal, Quebec, Canada

EDUCATION

Harvard University, Cambridge, MA Feb 2023 – Dec 2024
Postdoctoral Fellow (PI: Professor Elena Glassman)

Cornell University, Ithaca, NY Aug 2015 – Jan 2023
Ph.D. Candidate in Information Science (Minor in Science & Technology Studies)
Committee: Tapan Parikh, Steven J. Jackson, Susan R. Fussell

Cornell University, Ithaca, NY Aug 2019
Masters of Science (M.S.) in Information Science

Concordia University, Montreal, QC Sept 2010 – June 2014
B. Computer Science, with Distinction
Double major, Computer Science and Computation Art

SELECTED PAPERS

*Authors in {braces} designate equal contributions in that position (dual first authors, second authors, etc).

I. Arawjo, {C. Swoopes, P. Vaithilingam}, M. Wattenberg, and E. L. Glassman. *Chainforge: A Visual Toolkit for Prompt Engineering and LLM Hypothesis Testing.* CHI 2024. *To appear.* (website)

Z. Gu, **I. Arawjo**, K. Li, J. K. Kummerfeld, E. L. Glassman. *An AI-Resilient Text Rendering Technique for Reading and Skimming Documents.* CHI 2024. *To appear.*

I. Arawjo, A. DeArmas, M. Roberts, S. Basu, and T. Parikh. *Notational Programming for Notebook Environments: A Case Study with Quantum Circuits.* UIST 2022. **Best Paper Honorable Mention.** *(top 2% of all submissions)*

I. Arawjo. *To Write Code: The Cultural Fabrication of Programming Notation and Practice.* CHI 2020. **Best Paper Honorable Mention.** *(top 5% of all submissions)*

I. Arawjo and A. Mogos. *Intercultural Computing Education: Towards Justice Across Difference.* ACM Transactions on Computing Education (TOCE): Special Issue on Justice, 2021.

I. Arawjo, A. Mogos, S. Jackson, T. Parikh, and K. Toyama. *Computing Education for Intercultural Learning: Lessons from the Nairobi Play Project.* CSCW 2019. **Best Paper Honorable Mention.** *(top 5% of all submissions)*

I. Arawjo, C.Y. Wang, A. Myers, E. Andersen, and F. Guimbretière. *Teaching Programming with Gamified Semantics.* CHI 2017.

I. Arawjo, D. Yoon, and F. Guimbretière. *TypeTalker: Simplified and Anonymized Multi-Modal Comment System with Speech Recognition and Synthesis.* CSCW 2017.

SUMMARY

My research interests lie at the intersection between human-computer interaction (HCI), computer programming, and artificial intelligence (AI). My dissertation research situated programming as a social and cultural practice, and covered a range of work, from designing an AI system for "handwriting code," to studies of sociocultural tension between students in CS education. Methodologically, I have experience conducting usability studies (mixed methods), ethnographic fieldwork, archival research, and deploying iterative design methods. I have also led the design, development, and publishing of software, including open-source packages, web sites, and games.

EXPERIENCE

Harvard University – Cambridge, MA Feb 2023 – Dec 2024

Postdoctoral Fellow, Computer Science

Worked under Prof. Elena Glassman in the Harvard HCI group. My duties included: mentoring graduate students, collaborating on paper submissions, and helming research projects.

- I led design and development of **ChainForge**, an open-source visual programming environment for making sense of, and testing hypotheses about, the outputs of text generation large language models (LLMs). ChainForge is publicly available on the web (`https://chainforge.ai`) and as a Python package, and is designed for a wide variety of use cases, from prompt engineering to auditing LLMs. Since its launch in late May 2023, it has attained over 1400 stars on GitHub, been installed over 4000 times as a Python package, and enabled other research projects. Collaborators on ChainForge include Martin Wattenberg, Chelse Swoopes, Priyan Vaithilingam, and Shaw-Sean Yang.
- I also led the project **Antagonistic AI**, mentoring and collaborating with Alice Cai, a Harvard undergraduate.
- Finally, I collaborated on the AI copy editor project, **GPT-SM**, mentoring Ziwei Gu. My main contributions are pioneering the LLM-based technique and leading on the initial study design and analysis of results.

Apple – Cupertino, CA Summer 2022

Intern, Apple AI/ML research

Intern in the AI/Machine Learning Research group, under Megan Maher and David Koski. MLR is a group inside Apple AI/ML, led by Samy Bengio. My work pertained to the design of an API for inspecting deep neural network architectures.

Cornell University – Ithaca, NY January 2021 – Present

Programming System Research

Designed notebook programming interface that supports pen-based interactions.

- Implemented Jupyter notebook extension that enables users to open draw canvases within lines of code.
- Developed handwritten quantum circuit recognizer that turns drawings of circuits into IBM Qiskit code (implemented in Python with NetworkX, Keras and custom-trained YOLO v4 recognizer). Extended quantum circuit notation to support abstraction features such as bundled wires and recursion.
- Designed and ran 24-participant between-group usability study to evaluate efficacy and compare notational interface with a typewritten API, Qiskit.

Cornell University – Ithaca, NY Summer 2020

Instructor for HCI Design with AI

Co-instructor for INFO 3450 at Cornell University, which serves as an introduction to human-centered design (HCD) and UX research. 34 students created 9 projects following the HCD cycle (contextual interviews, prototyping, usability tests) and applied lenses from UX-AI research (e.g., calibrating expectations, designing for thresholds). I adapted content and produced lectures and activities for 6 weeks.

Nairobi Play Project – Nairobi, Kenya November 2017 – December 2019
Ethnographic Researcher
Lead researcher studying UNICEF computer science program in Kenya, where multi-ethnic, refugee students designed games around community issues with Scratch software. *Advised by Professors Kentaro Toyama and Steve Jackson.*

- Conducted fieldwork in Nairobi and Kakuma refugee camp. Wrote over 300 pages of notes and held semi-structured interviews across two program cycles.
- Applied grounded theory methods; synthesized and analyzed data with Atlas.TI & SPSS. Wrote Excel and Python scripts to streamline process.
- Designed stratified randomized controlled trial; adapted tests and survey measures to low-literacy context. Results showed sign. gains ($p < 0.05$) in computational thinking skill. Published at CSCW; awarded Honorable Mention.

Cornell University – Ithaca, NY June 2016 – December 2017
Game Designer and Developer
Designed and developed a puzzle game for teaching core programming concepts with minimal tutorials, embodying a new comprehension-first approach. *Advised by Professors Erik Andersen and François Guimbretière.*

- Conducted in-lab and online evaluations of design with mixed methods, comparing between two conditions. Published results at CHI 2017.
- Led team of undergraduates in development, testing, and level design. Achieved Finalist in CHI 2017 Student Game Competition.

Cornell University – Ithaca, NY September 2015 – May 2016
Graduate Research Assistant
Designed interface to edit speech through text while respecting temporal metadata. *Advised by François Guimbretière.*

- Conducted two pilots and in-lab study with mixed methods, finding that system reduces speech anxiety among users. Published results at CSCW 2017.

NT2 Lab – Montreal, QC March 2012 – May 2015
Research Assistant, Lead Programmer and Co-Designer
Designed locative media app for the Montreal Botanical Garden.

- Iterated design by conducting public playtests with potential users. Developed app in Obj-C and OpenGL on the iOS platform with XCode toolchain.
- Launched and installed the app in the garden, May 2015.
- This project secured a $390,000 SSHRC Insight Grant for my supervisor, Dr. Jill Didur, for five years.

AmpLab – Montreal, QC September 2013 – February 2014
Research Assistant, Lead Programmer and Co-Designer
Designed close-listening poetry game featuring content from SpokenWeb archive.

- Developed app in iOS 8 (Obj-C++) with SpriteKit framework and FMOD API.
- Nominated in Student Game Design Competition, CHI PLAY 2014

Rotting Cartridge Games – Montreal, QC Summer 2011 – March 2012
Creator and Developer
Designed, developed and published iOS game *Kale in Dinoland* (personal project).

- Featured by Apple in New and Noteworthy, February 2012.
- Press coverage on TouchArcade, IGN, SlideToPlay, Indiegames.com, and PocketGamer, among others

TALKS

"Lessons from ChainForge." Invited talk at Microsoft Research Montréal, Jan. 2024.

"Programming and Culture." Invited talk at University of Pennsylvania, Oct. 2022.

"Notational Programming as Ontological Design," given at the Programming Languages Development Group (PLDG) at Cornell, Spring '22.

Keynote speaker at Psychology of Programming Interest Group (PPIG), June 2021.

Invited panelist at RESPECT Conference on Advancing Justice in Computing Education: Perspectives on Racism, Power, & Identity, May 2021. With Yolanda Rankin, Sheena Erete, Ron Eglash & Sara Vogel.

I. Arawjo and A. Mogos. *The Case for Intercultural Computing.* Presentation at MakerEd Conference, Oct. 2020; and by invitation to the Lifelong Kindergarten Group at the MIT Media Lab, Dec. 2020.

"To Write Code," on the earliest history of electronic computer programming, given at the Programming Languages Development Group (PLDG) at Cornell, Spring '19.

OTHER WORK

J. Pollock, I. Arawjo, C. Berger, and A. Satyanarayan. *Designing for Semi-formal Programming with Foundation Models.* Workshop Paper, 2024.

I. Arawjo, P. Vaithilingam, M. Wattenberg, and E. L. Glassman. *Chainforge: An open-source visual programming environment for prompt engineering.* Adjunct Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST), 2023.

Race in HCI Collective. *Keepin' it real about race in HCI.* ACM Interactions, 2021.

I. Arawjo, M. Law, and M. Rao. *Reflections on Teaching Remote UX Design* and *AI From the Very Beginning: Integrating AI Perspectives into an Intro UX Course.* Public-facing Medium posts, Sept. & Dec. 2020.

H. Lim, I. Arawjo, Y. Xie, N. Khojasteh and S. Fussell. *Distraction or Life Saver? The Role of Technology in Undergraduate Students' Boundary Management Strategies. Proceedings of the 21st ACM conference on Computer-Supported Cooperative Work (CSCW).* ACM, 2018.

I. Arawjo. *Race as Cultural Algorithm, and Racecraft in HCI.* Extended Abstract presented during *Race in HCI Workshop* at CHI 2020.

I. Arawjo, D. Li, and K. Ma. *Reduct: A Puzzle Game for Children About Evaluating Code.* Demo as Finalist for Best Student Game at CHI 2017.

I. Arawjo, C. Mitchell, and J. Camlot. *PoetryLab: a close listening game for iOS.* Extended Abstracted and Demo presented at CHI PLAY 2014.

J. Didur, I. Arawjo (2013). *Mis-Guided Narratives: Locative Media in Globalized Environments.* Panel at the ACLA Conference, Toronto, Canada, 2013.

GRANTS AND AWARDS

Best Paper Honorable Mention, UIST 2022	October 2022
Best Paper Honorable Mention, CHI 2020	April 2020
Best Paper Honorable Mention, CSCW 2019	November 2019
Travel Grant, Judith Reppy Institute for Peace & Conflict Studies	March 2018

	Finalist, CHI 2017 Student Game Competition	April 2017
	NSF Graduate Research Fellowship Honorable Mention	April 2016
	GRAND NCE Conference Travel Subsidy	May 2013
	Ruth Louise Vaughan Memorial Scholarship	March 2012

TEACHING ASSISTANT (Cornell)	INFO 3450 Intro HCI and UX Research	Fall '19 & '20, Spring '22
	INFO 4240 Designing Tech for Social Impact	Spring & Fall '21
	INFO 3300 Data Visualization for the Web	Spring '20
	INFO 4120 Ubiquitous Computing	Spring '17
	INFO 4320 Rapid Prototyping	Spring '16
	INFO 1300 Intro to Web Programming	Fall '15, '16

GRADUATE CLASSES	STS 6321 Inside Technology *(with Trevor Pinch)*	Fall 2019
	ASRC 4601 Educational Innovation in Africa & the Diaspora	Fall 2018
	STS 7201 Emerging Technologies	Fall 2018
	INFO 6010 Computational Research Methods *(with Paul Ginsparg)*	Fall 2017
	STS 6071 Ethnomethodology *(with Michael Lynch)*	Spring 2017
	INFO 6210 Info, Tech, & Society	Spring 2017
	CS 6110 Advanced Programming Languages	Spring 2017
	CS 6306 Advanced Human Computation	Fall 2016
	INFO 6260 Networks, Crowds, & Markets	Fall 2015
	INFO 6310 Behavioral and Information Technology	Fall 2015

SERVICE

Conferences and Journals – (various locations) 2016 - Present
Reviewer and Program Committee Member
Served in program committee for: ACM Conference on Designing Interactive Systems (DIST) 2023; SPLASH LIVE 2022. Served as a reviewer for CHI, CSCW, DIS, ACM Transactions on Computing Education, and TechTrends.

InfoSci Graduate Student Association – Ithaca, NY Sept. 2017 - May 2018
IS Seminar Organizer
Organized talk series serving Information Science PhD students at Cornell. Refurbished format to hold talks every week; sought and invited speakers from outside the computing department; managed catered lunch on limited budget.

Beverly J. Martin Elementary – Ithaca City School District Fall 2016
Volunteer teacher
Helped teach intro CS to third graders with unplugged activities and Scratch.

SKILLS

UX Research & Design: Ethnography, Grounded theory, Contextual interviews, Pre-post tests, Randomized controlled trials, Usability testing, Mixed methods, Human-centered design process, Archival methods

Programming: JavaScript, Python, Jupyter, Objective-C, C++, C#, Java

Software: ATLAS.ti, SPSS, Excel, Photoshop, Audacity, XCode, Unity

CONTACT REFERENCES

1. Tapan Parikh, Associate Professor, Department of Information Science, Cornell Tech, Email: tsp53@cornell.edu
2. Elena Glassman, Assistant Professor, Harvard University SEAS
3. Kentaro Toyama, Professor, School of Information, University of Michigan, Email: toyama@umich.edu

4. Andrew C. Myers, Professor, Department of Computer Science, Cornell University, Email: andru@cs.cornell.edu
5. Ariam Mogos, Lecturer in Emerging Technologies, Hasso Plattner Institute, Stanford University, Email: ariam@magikalmachines.com