

Summary

I am an interdisciplinary scholar developing my specialty in Human-AI Interaction and Learning Sciences in the joint CS and LS PhD program at Northwestern University. Previously I was trained in CS and AI at UC Berkeley for my undergrad and master's degrees. I have published AI research in journals and conferences such as NeurIPS and am currently conducting research in HCI and CS Education with *Delta Lab* and the *Center for HCI+D* at Northwestern University. As an ex-software engineer, I bring strong general and ML engineering skills. As a previous middle school teacher, I bring strong interpersonal skills and first-hand insights on child-development and education. As shown through my volunteering positions, I have an interest in local communities and social justice. **My research interests are: authentic learning, teaching and learning in the age of AI, and processes for interdisciplinary collaboration in the development of ethical AI.**

Education

- September 2022—* **Degree:** Ph.D. in Computer Science and Learning Sciences
Current **Where:** Northwestern University, Evanston, IL
Concentration in Human-Computer Interaction, Artificial Intelligence and
Computer Science Education
- August 2018—* **Degree:** M.S. in Electrical Engineering and Computer Science
August 2019 **Where:** University of California, Berkeley, CA
Concentration in Artificial Intelligence
Minor Concentration in Education
- January 2014—* **Degree:** B.A. in Computer Science
December 2017 **Where:** University of California, Berkeley

Publications

- Logan Mondal Bhamidipaty, Tommy Bruzzese, **Caryn Tran**, Rami Ratl Mrad, and Max Kanwal. “DynaDojo: An Extensible Platform for Benchmarking Sample Efficiency in Dynamical System Identification”. *Advances in Neural Information Processing Systems*. 2023. Web. <<https://openreview.net/forum?id=pTSNoBtk8E>>

- **Caryn Tran** and Eleanor O'Rourke. "Understanding Novices' Perceptions of "Authentic" Programming". *Proceedings of the 2023 ACM Conference on International Computing Education Research - Volume 2*. Chicago, IL, USA: Association for Computing Machinery, 2023. 37–38. Web. <<https://doi.org/10.1145/3568812.3603492>>. ICER '23
- Anant Sahai, Joshua Sanz, Vignesh Subramanian, **Caryn Tran**, and Kailas Vodrahalli. "Blind Interactive Learning of Modulation Schemes: Multi-Agent Cooperation Without Co-Design". *IEEE Access* PP. DOI: 10.1109/ACCESS.2020.2984218 (Mar. 2020): 1–1. Web. <<https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=9050734>>
- Anant Sahai, Josh Sanz, Vignesh Subramanian, **Caryn Tran**, and Kailas Vodrahalli. "Learning to Communicate with Limited Co-design". *2019 57th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*. 2019. 184–191. Web. <<https://ieeexplore.ieee.org/abstract/document/8919749>>

Posters and Reports

- **Caryn Tran** and Eleanor O'Rourke. Investigating the Negative Perceptions of Blocks-Based Programming. Poster. Lambert Conference on the Future of Human-Computer Interaction + Design (Oct 2022). Northwestern University.
- **Caryn Tran**, Vignesh Subramanian, Kailas Vodrahalli, and Anant Sahai. "Effect of Model Dissimilarity on Learning to Communicate in a Wireless Setting with Limited Information". MA thesis. EECS Department, University of California, Berkeley, 2019. Web. <<http://www2.eecs.berkeley.edu/Pubs/TechRpts/2019/EECS-2019-129.html>>

Awards

- Design Cluster Fellowship, 2023-2024, Center for HCI+Design at Northwestern University

Research

January 2023—
Current

Lab: Independent Research

Where: Stanford University and Northwestern University

Advisor: N/A

Contributions: Conducting self-directed research on the design of machine learning benchmarks with student collaborators from Stanford University. Published a co-first-author NeurIPS 2023 benchmarks paper on benchmarking dynamical systems identification. Leading research to develop benchmarking design methods and approaches for designing interdisciplinary benchmarks.

September 2022—
Current

Lab: Delta Lab

Where: Northwestern University

Advisor: Eleanor O'Rourke

Contributions:

- Leading investigation of the perception *authenticity* in CS education and programming tools.

- Conducted need-finding study. Presented poster at 2022 Lambert Conference on the Future of Human-Computer Interaction + Design.
- Developed survey instrument to measure perceived authenticity of educational programming tools. Conducted interviews and interface probes to study how authenticity is perceived. Presented poster at 2023 ICER.
- Conducting large-scale survey study.
- Conducting grounded theory method study.
- Leading and conducting participatory design study with students and teachers for the design of an educational programming tool. Negotiating tensions between multiple stakeholders with opposing needs.
- Supporting roles:
 - Qualitative coding video data of children interacting with math game
 - Analyzed interviews of office hours

*December 2017—
August 2019*

Lab: Berkeley Wireless Research Center
Where: University of California, Berkeley
Advisor: Anant Sahai

Contributions: Research conducted at the intersection of reinforcement learning and wireless communications: developing and investigating RL agent learning protocols (echo protocol) for learning wireless communication (modulation).

- Implemented a Polynomial-based learning agent and demonstrated that it is possible to cooperate between agents with different underlying model representations (i.e. neural network) to learn modulation via the echo private preamble protocol. Additionally, showed diverse results with cases in which learning was faster and slower between dissimilar agents.
- Overhauled the machine learning code-base to PyTorch in order to implement custom gradient passing across different agents. These gradient passing agents were used to compare the optimal supervised learning solution to the echo unsupervised learning approach.
- Managed the cloud infrastructure to run the experiments in Google Cloud and on UC Berkeley’s high performance compute clusters. Using high throughput compute, trained and tested various agent combinations for the sake of demonstrating robustness of the echo protocol.

*September 2016—
December 2016*

Lab: Berkeley Institute for Data Science URAP
Where: University of California, Berkeley
Advisor: Cyrus Dioun

Contributions:

- Researched the use of Augmented Reality and Machine learning in mobile shopping.

- Using the Vuforia Augmented Reality SDK, implemented an Android phone app that was used in conjunction with trained image recognition models to identify different marijuana brands.

November 2015—
August 2016

Lab: Bio-Nanosensor Interface URAP
Where: University of California, Berkeley
Advisor: Khalid Waqas
Contributions:

- Worked with a team to develop a graphical user interface using the Swing framework in Java to visualize the current of the 16 sensors on the board in real-time for testing.
- Cleaned and formatted sensor data for analysis. Implemented k-means clustering and support vector machines for outlier detection and classification of sensor activity.

Teaching Experience

September 2023—
December 2023

Position: Graduate Teaching Assistant for TAILS
Where: Northwestern University, Evanston, IL

Co-created and taught graduate reading seminar on transformative generative AI and Learning Sciences. Course was cross-listed for both CS and LS graduate students. Helped design the reading list and supported weekly discussions. Topics covered: introduction to ML and foundation models; ethics; LS theory; impact of AI on CS, writing, and creativity; technological developments of the past; the future of AI and learning.

January 2020—
July 2022

Position: Middle School Computer Science Teacher
Where: Synapse School, Menlo Park, CA

Taught computer science to 5-8th grade students at an independent, lab school.

- Taught 8 sections of mixed-grade computer science courses twice a week, plus electives in literature and STEM once a week.
- Created project-based curriculum units on: functional programming; procedural programming; story-telling; accessible game design; computational art; artificial intelligence and bias in data, user design; computational geometry; computational music; robotics and mechanisms
- Created websites for displaying student work with PhaserJS and NextJS. Designed a 2D-Overhead RPG-style world for online open house during Covid-19.
- Helped with school IT: Investigated security IT breach. Created tools for teachers to write student reports and take attendance

August 2017—
August 2019

Position: Teaching Assistant for CS188
Where: University of California Berkeley, CA

CS188 teaches search, game trees, reinforcement learning, probabilistic graphical models and introductory machine learning.

- Prepared course materials including slides, notes, problem sets, programming assignments, and exams.
- Taught problem-based discussions to up to 50 students, led review sessions, and held 1:1 office hours weekly.

Was an Undergraduate TA for 2 semesters and Head Graduate TA for 1 semester.

January 2016—
May 2016

Position: Student Instructor for CS61AS
Where: University of California Berkeley, CA

61AS is the lab based version of the first class in the lower division computer science course series. Taught in scheme and python, CS61AS, broadly teaches programming techniques, data structures, algorithms, and paradigms via functional programming. As student instructor, I was responsible for running the course including but limited to editing course material, writing tests, grading, class logistics, holding mini-lectures and office hours, managing the course website, and teaching labs.

Software Experience

September 2019—
February 2021

Position: Software Engineer (6th employee)
Where: TeachFX in CA

TeachFX automatically measures teacher talk vs. student talk, wait time, open-ended questions, academic language, and equitable participation using voice AI.

- Full stack software engineering using React/NodeJS and Python/Django/GraphQL. Improved mobile navigation and created the Equity Tracker on the web app to display individual student talk percentages.
- Machine learning development and infrastructure around speaker diarization using Kubernetes and Airflow. Modularized the diarization pipeline for more flexible deployment and better model testing.
- Leading the Microsoft Teams integration in .NET framework in C#. Created a bot in Microsoft Teams to record and identify individual speakers.

November 2017—

Position: Computer Scientist

August 2018

Where: Adobe in San Francisco, CA

- Front-end engineering in React for Adobe PhoneGap Website guided by Spectrum, Adobe's design system.
- Developed authentication tooling/libraries for Adobe's OAuth protocol for Creative Cloud, Document Cloud, and Marketing Cloud on web and Android.
- **Taught weekly introductory Machine Learning to engineers on the SF site using University of Washington curriculum.**

*May 2016—
August 2016*

Position: Computer Scientist Intern

Where: Adobe in San Francisco, CA

- contributed fixes, tests, features to Cordova and published resulting packages to NPM
- Earned committership to the Apache Cordova open-source project
- Architected and completed an extensive refactor of Adobe PhoneGap and Apache Cordova to decouple version dependency

Volunteering & Outreach

*April 2023—
August 2023*

Position: Volunteer Citizenship & ESL Instructor

Where: Vietnamese Association of Illinois in Chicago, IL

*January 2019—
June 2019*

Position: Nonprofit Board Director

Where: Berkeley Student Cooperatives in Berkeley, CA

"The BSC is a 501(c)(3) nonprofit housing cooperative. Our mission is to provide a quality, low-cost, cooperative housing community to university students, thereby providing an educational opportunity for students who might not otherwise be able to afford a university education. Presently the BSC has over 1,300 student members living in or eating at our 17 houses and 3 apartment cooperatives around the UC Berkeley campus. Each house is democratically run, and we all contribute our labor to help keep our housing costs affordable."

Skills

- **Machine Learning:** TensorFlow/Keras, PyTorch, Kubernetes, Airflow, Pandas

- **Back-end and Cloud:** Django, SQL, Google Cloud Platform, Azure Cloud, SLURM workload orchestration
- **Front-end:** React, Android, C#/.NET
- **Programming Languages:** Python, C++, Java, JavaScript
- **Research:** Survey Development and Analysis, Interview, Ethnography, Design Research, Participatory Design