Hannah Twigg-Smith

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education

2018 – Present **PhD in Human Centered Design and Engineering**
University of Washington
Advisor: Nadya Peek

2022 **MS in Human Centered Design and Engineering**
University of Washington

2018 **BS in Engineering with Computing**
Franklin W. Olin College of Engineering

research interests

creativity support, digital fabrication, tools and toolkits

full papers

2021 **Tools, Tricks, and Hacks: Exploring Novel Digital Fabrication Workflows on #PlotterTwitter**
Hannah Twigg-Smith, Jasper Tran O'Leary, and Nadya Peek
The ACM CHI Conference on Human Factors in Computing Systems (CHI '21)

2020 **Jubilee: An Extensible Machine for Multi-tool Fabrication**
Joshua Vasquez, Hannah Twigg-Smith, Jasper Tran O'Leary, and Nadya Peek.
The ACM CHI Conference on Human Factors in Computing Systems (CHI '20)

2020 **Dealing with ambiguity: leveraging different types of expertise to guide design questioning**
Giovanna Scalone, Cynthia J. Atman, Kenya Mejia, Hannah Twigg-Smith, Kathryn Shroyer, and Aaron Joya.
The International Journal of Engineering Education 36, no. 2 (2020).

demonstrations

2022 **Dynamic Toolchains for Machine Control**
Hannah Twigg-Smith and Nadya Peek
The ACM Symposium on User Interface Software and Technology (UIST '22)

2022 **Dynamic Toolchains for Machine Control**
Hannah Twigg-Smith and Nadya Peek
The ACM Symposium on Computational Fabrication (SCF '22)

2020 **Jubilee Demo: An Extensible Machine for Multi-tool Fabrication**
Joshua Vasquez, Hannah Twigg-Smith, Jasper Tran O'Leary, and Nadya Peek.
The ACM CHI Conference on Human Factors in Computing Systems (CHI '20)

talks

Upcoming - February 2023 **Dynamic Toolchains**
Cornell Robotics Seminar

November 2021 **Exploring Novel Digital Fabrication Workflows on #PlotterTwitter**
UW CSE Colloquium

November 2019 **Navigating the Limits of Machine Control**
HCDE PhD Preliminary Exam talk

research experience

Sept. 2018 – Present **Machine Agency** *depts.uw.edu/machines*
PI: Nadya Peek
My PhD research focuses on development of software tools for creative practice. I build software development frameworks and toolkits.

January 2022 – Present **DXARTS Softlab** *dx-softlab.com*
PI: Afroditi Psarra
I joined a directed research group within the DXARTS Softlab where I developing tools for CNC textile manufacturing on knitting and embroidery machines.

June 2020 – December 2021 **Klavins Lab, DARPA SD2** *klavinslab.org*
PIs: Eric Klavins and Benjamin Keller
I joined a project funded by DARPA that aimed to explore new ways of communicating and collaborating between biology laboratories, primarily through development of a new common protocol language (PAML). I worked with biologists to prototype new ways of authoring and visualizing laboratory protocols.

January 2019 – April 2019

Center for Engineering Learning and Teaching (CELT) *depts.uw.edu/celtweb*
PI: Cindy Atman
I completed a research rotation with the Center for Engineering Learning and Teaching. We conducted a qualitative analysis of interview data from a study of domain experts who were asked to complete a design task. We investigated how experts leveraged their particular expertise to generate ideas and question the task's constraints, and compared approaches between experts who worked inside and outside the domain of the design task.

teaching experience

Upcoming - Winter 2023

HCDE 438: Modern Web Technologies
Instructor of Record, University of Washington
Project-based course covering modern web technologies and React development.

Fall 2022

HCDE 310: Interactive Systems Design and Technology
Graduate Teaching Assistant, University of Washington
Intermediate course covering Python concepts.

Summer 2022

CSE 160: Data Programming
Graduate Teaching Assistant, University of Washington
Introductory programming course covering Python concepts.

Spring 2022

HCDE 536: Interaction Design and Prototyping
Graduate Teaching Assistant, University of Washington
Project-based course on interaction design practice.

Winter 2022

HCDE 438: Modern Web Technologies
Graduate Teaching Assistant, University of Washington
Project-based course covering modern web technologies and React development.

Winter 2020

HCDE 538: Computational Concepts in HCDE
Graduate Teaching Assistant, University of Washington
Introductory graduate course in Python development.

Spring 2019

HCDE 440: Advanced Physical Computing
Graduate Teaching Assistant, University of Washington
Advanced undergraduate course on physical computing and arduino programming.

Fall 2016 – Spring 2018

ENGR 2510: Software Design
Teaching Assistant, Olin College
Assisted with four iterations of Olin's introductory software engineering course by holding regular office hours and breakout sessions, assisting during class, grading, and developing course materials.

Spring 2018 **ENGR 3240: Tell the Story of What You Make**
Teaching Assistant, Olin College
Visual communication and graphic design fundamentals in Adobe Illustrator.

Fall 2017 **ENGR 3220: User Experience Design**
Teaching Assistant, Olin College
Project-based course covering user-centered experience design.

mentorship

March 2022 – Present **Linh-Chi Tran** *undergraduate research assistant*
Chi is an undergraduate research assistant aiding me in technical development of the Planager. In addition to teaching them necessary web development skills for the project, I created a quarter-long implementation plan for a feature set that they have ownership over. We meet weekly to discuss progress and work through technical issues.

industry experience

Summer 2018 **Google: Stadia** – Waterloo, Ontario
Software Engineering Intern
I developed the first iteration of the game asset upload flow for the Stadia developer tools team. I also assisted in building out various features of the Stadia partner portal pre-launch.

Summer 2017 **Google: Chrome Speed Operations** – Mountain View, California
Software Engineering Intern
I designed and implemented a new feature for the Chrome Performance Dashboard that visualized Chrome performance benchmarks across devices.

Summer 2016 **Google: Engineering Productivity** – Boulder, Colorado
Engineering Practicum Intern
I designed and implemented a customizable and extensible dashboard webapp to display widgets important to a Google engineer's daily workflow.

Summer 2015 **National Astronomical Observatory of Japan: Subaru Telescope** – Hilo, Hawaii
Software Engineering Intern
I rewrote the best-fit focusing programs for the observatory's Multi-Object Infrared Camera and Spectrograph (MOIRCS) instrument. After interviewing astronomers to understand their user needs, I developed a visualization of the instrument focus fit and integrated it into the existing observation control system.

Summer 2014 **'Imiloa Astronomy Center** – Hilo, Hawaii

Visual Media Intern

I created an immersive virtual tour of 13 observatories on Mauna Kea for display in the 'Imiloa astronomy center museum and planetarium. I spent weeks on the 14000-foot summit taking high-resolution photos, which I stitched into spherical panoramas. I created the interactive tour in PanoTour Pro.

selected projects

June 2019 – November 2019 **Tool Foundry Accelerator: Make It So**

My team was selected as one of the five cohort members of the inaugural Tool Foundry Accelerator program, which funds research and development of affordable tools for scientific discovery. Our work focuses on the development of a tool-changing motion platform for automation. We presented our work to investors and professionals at the Tool Foundry showcase in New York in November 2019.

August 2017 – May 2018 **Solidworks Apps for Kids: Slice-It**

Slice-It was my year-long undergraduate capstone project sponsored by Solidworks Apps for Kids. My team of five created a web-based computer-aided design program for slicing three-dimensional forms into orthogonal planes and building interlocking paper models. We conducted multiple user studies with children of employees, and finished the year with a full-featured model generator complete with an assembly animation, labeling instruction system, and direct-to-laser cutter support.

August 2017 – May 2018 **Return Design** *returndesign.org*

I volunteered as a student designer for Return Design, a small pro-bono design studio that develops graphics and branding for non-profit organizations.

skills

I am always looking for new things to put on this (non-exhaustive) list.

Programming Languages

Extensive experience with Python and JavaScript

Frequent interaction with G-code, HPGL, knitout, and other CNC languages

Comfortable working with Processing, Lua, Java, C++, Arduino, C, MATLAB, Prolog, and more

Personal interest in playful, esoteric languages such as Chef, Piet, Whitespace, etc.

Other Technologies

Tools such as git, docker, heroku

Development on MacOS, Windows, Linux

Web technologies and frameworks such as Web Components, Lit, React, Angular, Flask, Django, Node, SVG, HTML, CSS/SASS/LESS, webpack, babel, and others

IoT technologies including Raspberry Pi, Arduino/ESP8266, HomeAssistant scripting

Design Software

3D: Rhino3D/Grasshopper, OnShape, some Solidworks

2D: Illustrator, Inkscape, XD

Photo/Video: Photoshop, Lightroom, Premier, ShotCut

Other Skills

Proficiency with many types of CNC machines (along with their various software and file formats) including plotters, vinyl cutters, 3D printers, laser cutters, mills, embroidery, and knitting machines

Various fabrication methods such as molding and casting (silicone, plaster, resin, etc.), textiles (sewing, knitting, crochet), some woodworking

other interests

games and playful experiences

puzzles of all sorts

absurdist and surreal humor