

# Brian Hempel

Postdoctoral Scholar

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## Current

I am a postdoc at UCSD working towards the long-term vision of elevating direct manipulation on runtime objects up to the operating system level, transforming the OS into a universal end-user programming interface. Near-term, this means adding direct manipulation to Matplotlib and also ordinary Python. I am currently supported by a grant I wrote with Devamardeep Hayatpur, Haijun Xia, and Sam Lau, entitled: [Direct Manipulation for Everyday Programming](#).

## Previous

I am indebted to Haijun Xia and Sorin Lerner for supporting me 2023-2024 while grant writing and working on a graphical interface for Matplotlib.

For summer/fall 2022 I was a postdoc at the [Cooperative Institute for Severe and High-Impact Weather Research and Operations \(CIWRO\)](#) and the [Storm Prediction Center \(SPC\)](#) to improve and operationalize my [Nadocast](#) machine learning severe weather outlook generator. Its guidance is now in use by the human forecasters at the SPC.

Prior to that I finished my Ph.D. in March 2022 at the University of Chicago, advised by [Ravi Chugh](#). I focused on improving programming by adding direct manipulation interactions *in addition to* ordinary textual editing, in contrast to most prior approaches that sacrificed ordinary code editing when adding direct manipulation interactions.

## Archival Publications

D. Hayatpur, B. Hempel, R. Lin, and H. Xia. [The Shapes of Abstraction in Data Structure Diagrams](#). *ACM Conference on Human Factors in Computing Systems (CHI 2025)*.

D. Hayatpur, B. Hempel, K. Chen, W. Duan, P. Guo, and H. Xia. [Taking ASCII Drawings Seriously: How Programmers Diagram Code](#). *ACM Conference on Human Factors in Computing Systems (CHI 2024)*.

B. Hempel and R. Chugh. [Maniposynth: Bimodal Tangible Functional Programming](#). *European Conference on Object-Oriented Programming (ECOOP 2022)*.

B. Hempel and R. Chugh. [Tiny Structure Editors for Low, Low Prices! \(Generating GUIs from toString Functions\)](#) *IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC 2020)*. (Short paper.)

B. Hempel, J. Lubin, and R. Chugh. [Sketch-n-Sketch: Output-Directed Programming for SVG](#). *ACM Symposium on User Interface Software and Technology (UIST 2019)*. (Honor-

able Mention for Best Demo.)

[B. Hempel](#), J. Lubin, G. Lu, and R. Chugh. [Deuce: A Lightweight User Interface for Structured Editing](#). *40th International Conference on Software Engineering (ICSE 2018)*.

[B. Hempel](#) and R. Chugh. [Semi-Automated SVG Programming via Direct Manipulation](#). *ACM Symposium on User Interface Software and Technology (UIST 2016)*.

R. Chugh, [B. Hempel](#), M. Spradlin, and J. Albers. [Programmatic and Direct Manipulation, Together at Last](#). *ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2016)*.

## Dissertation

[B. Hempel](#). [Tangible Values with Text: Explorations of Bimodal Programming](#). Ph.D. Dissertation. March 2022.

## Academic Service

<i>Organizing Committee</i>	LIVE 2021, LIVE 2020
<i>Program Committee</i>	VL/HCC 2025, PLDI 2025, LIVE 2024, Onward! Papers 2024, Convivial Computing Salon 2020, LIVE 2018
<i>Artifact Evaluation Committee</i>	PLDI 2019, PLDI 2018
<i>Reviewer</i>	UIST 2025, ESE 2025, CHI 2025, UIST 2024, POPL 2024, UIST 2023, TOCHI 2023, PLATEAU 2023, CHI 2023, UIST 2022, UIST 2021, UIST 2020, CHI 2020, UIST 2018

I am a careful reviewer: for example, 64% of my reviews for UIST were rated “highly useful”. When reviewing, generally I look for the paper’s contribution beyond its problems. All papers will fail to be what you wish, but do they move the conversation forward?

## Teaching

<i>Lecturer</i>	Introduction to Python UCSD COGS 18 · Zero to Pandas in 10 Weeks Mean evaluation rating: 4.3/5.0 (Fall '23) 4.4/5.0 (Winter '24) <i>"I was incredibly intimidated by coding and would previously get overwhelmed and frustrated before I even grasped the basics. Dr. Hempel made everything feel easy while still engaging...I went from dreading any coding related task to loving it, which I never thought possible. I wish I could take an entire Python sequence from him!" - Anon. Student, Winter '24</i>	Fall Qtrtr 2023, Winter Qtrtr 2024
<i>Instructor</i>	Honors Intro to Comp Sci, I UChicago CMSC 16100 · Haskell Mean instructor rating: 4.7/5.0      Mean course rating: 4.6/5.0 <i>"Brian really cares about the subject, so he spent a lot of time making sure the lectures make sense. He's a great instructor!" - Anon. Student</i>	Fall Qtrtr 2019
<i>Lab TA</i>	Honors Intro to Comp Sci, I UChicago CMSC 16100 · Haskell	Fall Qtrtrs 2016-2018, 2020, 2021
<i>TA</i>	Intro to Creative Coding UChicago CMSC 19911 · p5.js	July 2021
<i>TA</i>	Art with Science: Creative Coding UChicago CSP 2021 · p5.js	July 2021
<i>TA</i>	Functional Programming UChicago CMSC 22300 · Okasaki in Elm	Spring 2017
<i>Math Instructor</i>	Mathnasium, Stevensville, MI	2013 – 2015

## Software Artifacts

<a href="#">Maniposynth</a>	<i>Non-linear</i> graphical editing with <i>linear</i> code.
<a href="#">Sketch-n-Sketch</a>	Direct manipulation on <i>output</i> .
<a href="#">Deuce</a>	Direct manipulation on <i>code</i> .
<a href="#">Nadocast.com</a>	Tornado prediction via ML post-processing of public weather models. Operational since June 2022 at the National Weather Service Storm Prediction Center as internal experimental guidance.

## Education

2022. Ph.D. in Computer Science, University of Chicago.

Dissertation: [Tangible Values with Text: Explorations of Bimodal Programming](#).

2019. M.S. in the Computer Science Ph.D. Program, University of Chicago.

M.S. Paper: [Output-Directed SVG Programming](#).

2009. B.S. in Bioinformatics and Biochemistry/Molecular Biology, Michigan Technological University.

## Supplementary Education

2012 – 2013. Diploma, Augustine College (Ottawa). 8-month full-time program on Western Culture.

## Industry Experience

<i>Developer</i>	Collective Idea	Holland, MI	2012, 2014 – 2015
<i>Web Developer</i>	IHS Web Design	Holland, MI	2010 – 2012