Fred Hohman

Data science + *visualization* researcher

I'm a Ph.D. candidate in the College of Computing at Georgia Tech advised by Polo Chau and Alex Endert.

My research applies a human-centered approach to designing and developing interactive interfaces that help people understand and explain **machine learning models**. I also write, design, and build explorable explanations and **interactive data visualizations** to simply communicate complex ideas.

I have worked at Apple, Microsoft Research, NASA Jet Propulsion Lab, and Pacific Northwest National Lab.

My research is supported by a NASA Space Technology Research Fellowship.

🏠 fredhohman.com   🐦 @fredhohman

✉ fredhohman@gatech.edu   ⬛ github.com/fredhohman

📄 CV PDF   🎓 Google Scholar

Education

Present —
Aug. 2015
Ph.D. in Computational Science & Engineering
Georgia Institute of Technology, Atlanta, GA
Advisor: Duen Horng (Polo) Chau, Co-advisor: Alex Endert
Thesis: Interactive Scalable Interfaces for Machine Learning Interpretability
Committee: Duen Horng (Polo) Chau, Alex Endert, Chao Zhang, Nathan Hodas, Scott Davidoff, Steven Drucker

May 2018
M.S. in Computational Science & Engineering
Georgia Institute of Technology, Atlanta, GA
GPA: 4.00/4.00

May 2015 —
Aug. 2011
B.S. in Mathematics, B.S. in Physics
University of Georgia, Athens, GA
Thesis: 3D Printing the Trefoil Knot and its Pages
Overall GPA: 3.84/4.00, Magna Cum Laude, Area of Emphasis in Applied Mathematics

Industry Research Experience

Summer 2019
Apple, Seattle, WA
Research Intern, Turi Human-centered Machine Learning Group
Mentor: Kanit Wongsuphasawat, Kayur Patel
Designing and developing interactive tools at the intersection of human-computer interaction and machine learning.

Summer 2018
Microsoft Research, Redmond, WA
Research Intern, Human-Computer Interaction Group
Mentor: Steven Drucker
Exploring how visual analytics can help users explain and interpret machine learning models.

Summer 2017
NASA Jet Propulsion Lab, Pasadena, CA
Creative Computer Scientist, Human Interfaces Group

Mentor: Scott Davidoff, Arun Viswanathan

Joint work between NASA JPL, Caltech, and Art Center creating interactive data visualizations for current scientific research.

Summer 2016 **Pacific Northwest National Lab**, Richland, WA

National Security Ph.D. Intern, Data Sciences & Analytics Group

Mentor: Nathan Hodas

Built interactive visualization tools that generate images from deep neural networks to explain classifier's learned semantics.

Academic Research Experience

Present —
Aug. 2016

Georgia Institute of Technology, Atlanta, GA

Graduate Research Assistant, School of Computational Science and Engineering

Advisor: Duen Horng (Polo) Chau, Alex Endert

Member of the Polo Club of Data Science where we bridge and innovate at the intersection of data mining and human-computer interaction to synthesize scalable, interactive, and interpretable tools that amplify human's ability to understand and interact with big data.

May 2016 —
Aug. 2015

Georgia Institute of Technology, Atlanta, GA

Graduate Research Assistant, School of Computational Science and Engineering

Mentor: Surya Kalidindi

Conducted research in physical data science and material informatics by creating property-structure linkages using machine learning to predict material properties. Contributed to direction and code of PyMKS: Materials Knowledge Systems in Python.

May 2015 —
Jan. 2013

University of Georgia, Athens, GA

Undergraduate Research Assistant, Department of Mathematics

Advisor: David Gay

Explored 3D printing and mathematical exposition in topology. Programmed, designed, and 3D printed 34-piece, color-coordinated, and magnetized 3D puzzle of the trefoil knot fibration. Led 3D printing research and education in mathematics department.

Summer 2014 **REU in Mathematics and Computational Science**, Fairfield, CT

Fairfield University, Department of Mathematics

Mentor: Shanon Reckinger

Directly compared numerical solutions derived from the Navier-Stokes equations to designed experiments performed at the lab-scale to model specific ocean phoneme. Configured MIT General Circulation Model on a linux computer cluster to run parallel computational fluid dynamics simulations.

Honors and Awards

2019 **Best Paper at ACM CHI Conference**

For "Managing Messes in Computational Notebooks"

2018 **Best Paper, Honorable Mention at VISxAI Workshop at IEEE VIS**

For "The Beginner's Guide to Dimensionality Reduction"

2018 — 2021 NASA Space Technology Research Fellowship

For my Ph.D. work on "Understanding Deep Neural Networks Through Attribution and Interactive Experimentation"

2018 Audience Appreciation Award, Runner Up at ACM SIGKDD Conference

For "Shield: Fast, Practical Defense and Vaccination for Deep Learning using JPEG Compression"

2017 — 2018 Microsoft Azure for Research Award: AI for Earth

For our work on "Deep Learning for Fine-scale Population Maps"

2017 Best Demo, Honorable Mention at ACM SIGMOD/PODS Conference

For "Visual Graph Query Construction and Refinement"

2015 — 2019 President's Fellowship at Georgia Institute of Technology

Select number of 1st year doctoral students who bring exemplary levels of scholarship and innovation to their academic departments

2015 Outstanding Poster at JMM Undergraduate Poster Session in Computational Math

For "Experimental and Numerical Comparison of Oceanic Overflow"

2015 UGA CURO Research Graduation Distinction

Awarded to undergraduates who write a thesis, present at the CURO Symposium, and complete 9 research credit hours

2014	**UGA CURO Research Assistantship**
	Stipend awarded to outstanding undergraduates that actively participate in faculty-mentored research
2013	**Presidential Scholar**
	Achieved a 4.0 GPA during a semester with minimum 14 credit hours
2011 — 2015	**Dean's List**
	Achieved at least a 3.5 GPA during a semester with minimum 14 credit hours
2011 — 2015	**Georgia HOPE Scholarship**
	Merit-based award to Georgia residents providing tuition assistance for their undergraduate degree
2011	**Mission of Blessed Trinity: Artistic Sensibility**
	One of two students to receive the Mission Statement award upon high-school graduation
2009	**Eagle Scout Award**
	Highest achievement attainable in the Boy Scouts of America, only 4% of scouts granted this rank

Publications

Selected: Latest & Greatest

Understanding and Visualizing Data Iteration in Machine Learning
Fred Hohman, Kanit Wongsuphasawat, Mary Beth Kery, Kayur Patel
ACM Conference on Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.
🔗 Project 📄 PDF ▦ Video 👁 Preview 📖 BibTeX

Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations
Fred Hohman, Haekyu Park, Caleb Robinson, Duen Horng (Polo) Chau
IEEE Transactions on Visualization and Computer Graphics (TVCG). Vancouver, Canada, 2020.
🔗 Project ▶ Demo 📄 PDF ▦ Video 🎥 Recording ▭ Slides </> Code 📖 BibTeX

FairVis: Visual Analytics for Discovering Intersectional Bias in Machine Learning
Angel Cabrera, Will Epperson, Fred Hohman, Minsuk Kahng, Jamie Morgenstern, Duen Horng (Polo) Chau
IEEE Conference on Visual Analytics Science and Technology (VAST). Vancouver, Canada, 2019.
🔗 Project ▶ Demo 📄 PDF 📰 Blog 🎥 Recording ▭ Slides </> Code 📖 BibTeX

Gamut: A Design Probe to Understand How Data Scientists Understand Machine Learning Models
Fred Hohman, Andrew Head, Rich Caruana, Robert DeLine, Steven Drucker
ACM Conference on Human Factors in Computing Systems (CHI). Glasgow, UK, 2019.
🔗 Project 📄 PDF 📰 Blog ▦ Video 👁 Preview ▭ Slides 📖 BibTeX

Visual Analytics in Deep Learning: An Interrogative Survey for the Next Frontiers
Fred Hohman, Minsuk Kahng, Robert Pienta, Duen Horng (Polo) Chau
IEEE Transactions on Visualization and Computer Graphics (TVCG). Berlin, Germany, 2018.
🔗 Project 📄 PDF 📰 Blog ▦ Video ▭ Slides </> Code 📖 BibTeX

All Publications

Understanding and Visualizing Data Iteration in Machine Learning
Fred Hohman, Kanit Wongsuphasawat, Mary Beth Kery, Kayur Patel
ACM Conference on Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.
🔗 Project 📄 PDF ▦ Video 👁 Preview 📖 BibTeX

The Future of Notebook Programming Is Fluid
Mary Beth Kery, Donghao Ren, Kanit Wongsuphasawat, Fred Hohman, Kayur Patel
Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.
🔗 Project 📄 PDF 📖 BibTeX

CNN 101: Interactive Visual Learning for Convolutional Neural Networks
Zijie J. Wang, Robert Turko, Omar Shaikh, Haekyu Park, Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng (Polo) Chau
Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.
🔗 Project 📄 PDF ▦ Video 📖 BibTeX

Massif: Interactive Interpretation of Adversarial Attacks on Deep Learning

Nilaksh Das, Haekyu Park, Zijie J. Wang, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng (Polo) Chau

Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020.

🔗 Project   📄 PDF   📓 BibTeX

Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations

Fred Hohman, Haekyu Park, Caleb Robinson, Duen Horng (Polo) Chau

IEEE Transactions on Visualization and Computer Graphics (TVCG). Vancouver, Canada, 2020.

🔗 Project   ▶ Demo   📄 PDF   📹 Video   📹 Recording   🖥 Slides   </> Code   📓 BibTeX

FairVis: Visual Analytics for Discovering Intersectional Bias in Machine Learning

Angel Cabrera, Will Epperson, Fred Hohman, Minsuk Kahng, Jamie Morgenstern, Duen Horng (Polo) Chau

IEEE Conference on Visual Analytics Science and Technology (VAST). Vancouver, Canada, 2019.

🔗 Project   ▶ Demo   📄 PDF   📰 Blog   📹 Recording   🖥 Slides   </> Code   📓 BibTeX

TeleGam: Combining Visualization and Verbalization for Interpretable Machine Learning

Fred Hohman*, Arjun Srinivasan*, Steven Drucker

IEEE Visualization Conference (VIS). Vancouver, Canada, 2019.

🔗 Project   ▶ Demo   📄 PDF   👁 Preview   📹 Recording   🖥 Slides   </> Code   📓 BibTeX   * Authors contributed equally

ElectroLens: Understanding Atomistic Simulations through Spatially-resolved Visualization of High-dimensional Features

Xiangyun Lei, Fred Hohman, Duen Horng (Polo) Chau, Andrew Medford

IEEE Visualization Conference (VIS). Vancouver, Canada, 2019.

🔗 Project   📄 PDF   </> Code   📓 BibTeX

Launching the Parametric Press

Matthew Conlen, Fred Hohman

Visualization for Communication at IEEE VIS (VisComm). Vancouver, Canada, 2019.

🔗 Project   📄 PDF   </> Code   📓 BibTeX

Gamut: A Design Probe to Understand How Data Scientists Understand Machine Learning Models

Fred Hohman, Andrew Head, Rich Caruana, Robert DeLine, Steven Drucker

ACM Conference on Human Factors in Computing Systems (CHI). Glasgow, UK, 2019.

🔗 Project   📄 PDF   📰 Blog   📹 Video   👁 Preview   🖥 Slides   📓 BibTeX

Managing Messes in Computational Notebooks

Andrew Head, Fred Hohman, Titus Barik, Steven Drucker, Robert DeLine

ACM Conference on Human Factors in Computing Systems (CHI). Glasgow, UK, 2019.

🔗 Project   📄 PDF   📹 Video   👁 Preview   🖥 Slides   </> Code   📓 BibTeX   🏆 Best Paper

Discovery of Intersectional Bias in Machine Learning Using Automatic Subgroup Generation

Angel Cabrera, Minsuk Kahng, Fred Hohman, Jamie Morgenstern, Duen Horng (Polo) Chau

Debugging Machine Learning Models Workshop at ICLR (Debug ML). New Orleans, LA, USA, 2019.

🔗 Project   📄 PDF   📓 BibTeX

NeuralDivergence: Exploring and Understanding Neural Networks by Comparing Activation Distributions

Haekyu Park, Fred Hohman, Duen Horng (Polo) Chau

Poster, IEEE Pacific Visualization Symposium (PacificVis). Bangkok, Thailand, 2019.

🔗 Project   ▶ Demo   📄 PDF   🖥 Slides   🖼 Poster   📓 BibTeX

Atlas: Local Graph Exploration in a Global Context

James Abello*, Fred Hohman*, Varun Bezzam, Duen Horng (Polo) Chau

ACM Conference on Intelligent User Interfaces (IUI). Los Angeles, CA, USA, 2019.

🔗 Project   📄 PDF   📹 Video   📹 Talk   🖥 Slides   </> Code   📓 BibTeX   * Authors contributed equally

Scalable K-Core Decomposition for Static Graphs Using a Dynamic Graph Data Structure

Alok Tripathy, Fred Hohman, Duen Horng (Polo) Chau, Oded Green

IEEE International Conference on Big Data (Big Data). Seattle, WA, USA, 2018.

🔗 Project   📄 PDF   📓 BibTeX

Visual Analytics in Deep Learning: An Interrogative Survey for the Next Frontiers

Fred Hohman, Minsuk Kahng, Robert Pienta, Duen Horng (Polo) Chau

IEEE Transactions on Visualization and Computer Graphics (TVCG). Berlin, Germany, 2018.

🔗 Project 📄 PDF 📰 Blog 📺 Video 🖥 Slides </> Code 📄 BibTeX

The Beginner's Guide to Dimensionality Reduction

Matthew Conlen, Fred Hohman

Workshop on Visualization for AI Explainability at IEEE VIS (VISxAI). Berlin, Germany, 2018.

🔗 Project 🖥 Slides </> Code 📄 BibTeX 🏆 Best Paper, Honorable Mention

Compression to the Rescue: Defending from Adversarial Attacks Across Modalities

Nilaksh Das, Madhuri Shanbhogue, Shang-Tse Chen, Fred Hohman, Siwei Li, Li Chen, Michael E. Kounavis, Duen Horng (Polo) Chau

Project Showcase, ACM SIGKDD Conference on Knowledge Discovery and Data Mining. London, UK, 2018.

🔗 Project 📄 PDF </> Code 📄 BibTeX

Shield: Fast, Practical Defense and Vaccination for Deep Learning using JPEG Compression

Nilaksh Das, Madhuri Shanbhogue, Shang-Tse Chen, Fred Hohman, Siwei Li, Li Chen, Michael E. Kounavis, Duen Horng (Polo) Chau

ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD). London, UK, 2018.

🔗 Project 📄 PDF 📺 Video </> Code 📄 BibTeX 🏆 Audience Appreciation Award, Runner Up

Large Graph Exploration via Subgraph Discovery and Decomposition

James Abello*, Fred Hohman*, Varun Bezzam, Duen Horng (Polo) Chau

arXiv:1808.04414. 2018.

🔗 Project 📄 PDF 📄 BibTeX   * Authors contributed equally

Interactive Classification for Deep Learning Interpretation

Angel Cabrera, Fred Hohman, Jason Lin, Duen Horng (Polo) Chau

Demo, Conference on Computer Vision and Pattern Recognition (CVPR). Salt Lake City, UT, USA, 2018.

🔗 Project ▶ Demo 📄 PDF 📺 Video </> Code 📄 BibTeX

VIGOR: Interactive Visual Exploration of Graph Query Results

Robert Pienta, Fred Hohman, Alex Endert, Acar Tamersoy, Kevin Roundy, Chris Gates, Shamkant Navathe, Duen Horng (Polo) Chau

IEEE Transactions on Visualization and Computer Graphics (TVCG). Phoenix, AZ, USA, 2018.

🔗 Project 📄 PDF 📺 Video 👁 Preview 📄 BibTeX

A Deep Learning Approach for Population Estimation from Satellite Imagery

Caleb Robinson, Fred Hohman, Bistra Dilkina

1st ACM SIGSPATIAL Workshop on Geospatial Humanities (GeoHum.). Redondo Beach, CA, USA, 2017.

🔗 Project 📄 PDF </> Code 📄 BibTeX 🏆 Microsoft AI for Earth Award

3D Exploration of Graph Layers via Vertex Cloning

James Abello*, Fred Hohman*, Duen Horng (Polo) Chau

Poster, IEEE Conference on Visual Analytics Science and Technology (VAST). Phoenix, AZ, USA, 2017.

🔗 Project 📄 PDF 📺 Video 🖼 Poster 📄 BibTeX   * Authors contributed equally

A Viz of Ice and Fire: Exploring Entertainment Video Using Color and Dialogue

Fred Hohman, Sandeep Soni, Ian Stewart, John Stasko

2nd Workshop on Visualization for the Digital Humanities at IEEE VIS (VIS4DH). Phoenix, AZ, USA, 2017.

🔗 Project 📄 PDF 🖥 Slides </> Code 🗄 Data 📄 BibTeX

mHealth Visual Discovery Dashboard

Dezhi Fang, Fred Hohman, Peter Polack, Hillol Sarker, Minsuk Kahng, Moushumi Sharmin, Mustafa al'Absi, Duen Horng (Polo) Chau

Demo, ACM International Joint Conference on Pervasive and Ubiquitous Computing (Ubicomp). Maui, HI, USA, 2017.

🔗 Project 📄 PDF 📺 Video 🖼 Poster 📄 BibTeX

Keeping the Bad Guys Out: Protecting and Vaccinating Deep Learning with JPEG Compression

Nilaksh Das, Madhuri Shanbhogue, Shang-Tse Chen, Fred Hohman, Li Chen, Michael E. Kounavis, Duen Horng (Polo)

Chau
arXiv:1705.02900. 2017.

🔗 Project 📄 PDF </> Code 📋 BibTeX

Visual Graph Query Construction and Refinement
Robert Pienta, Fred Hohman, Acar Tamersoy, Alex Endert, Shamkant Navathe, Hanghang Tong, Duen Horng (Polo) Chau
Demo, ACM International Conference on Management of Data (SIGMOD/PODS). Chicago, IL, USA, 2017.

🔗 Project 📄 PDF 📺 Video 🖼 Poster 📋 BibTeX 🏆 Best Demo, Honorable Mention

ShapeShop: Towards Understanding Deep Learning Representations via Interactive Experimentation
Fred Hohman, Nathan Hodas, Duen Horng (Polo) Chau
Extended Abstracts on ACM Human Factors in Computing Systems (CHI). Denver, CO, USA, 2017.

🔗 Project 📄 PDF 📺 Video 🖼 Poster </> Code 📋 BibTeX

The Effect of Numerical Parameters on Eddies in Oceanic Overflows: A Laboratory and Numerical Study
Shanon Reckinger, Thomas Gibson, Fred Hohman, Theresa Morrison, Scott Reckinger, Mateus Carvalho
International Journal of Computational Methods and Experimental Measurements (CMEM). 2019.

🔗 Project 📄 PDF 📋 BibTeX

Experimental and Numerical Comparison of Oceanic Overflow
Thomas Gibson, Fred Hohman, Theresa Morrison, Shanon Reckinger, Scott Reckinger
Abstract, American Physical Society Division of Fluid Dynamics (APS DFD). San Francisco, CA, USA, 2014.

🔗 Project 🖼 Poster

Talks

Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations
Oct. 2019   IEEE Visualization

TeleGam: Combining Visualization and Verbalization for Interpretable Machine Learning
Oct. 2019   IEEE Visualization

Gamut: A Design Probe to Understand How Data Scientists Understand Machine Learning Models
June 2019   Microsoft Machine Learning and Data Science Summit
May 2019   ACM Conference on Human Factors in Computing Systems

Explaining Machine Learning Models Using Interactive Visualization
Mar. 2019   Georgia Tech School of CSE Strategic Partnership Program Summit
Apr. 2019   Georgia Tech CSE 6242 Data and Visual Analytics
Mar. 2019   Symantec Research Labs
Mar. 2019   NASA Jet Propulsion Laboratory

Atlas: Local Graph Exploration in a Global Context
Mar. 2019   ACM Intelligent User Interfaces

Visual Analytics in Deep Learning: An Interrogative Survey for the Next Frontiers
Jan. 2019   Carnegie Mellon University
Oct. 2018   University of Georgia
Oct. 2018   IEEE Visualization

The Beginner's Guide to Dimensionality Reduction
Oct. 2018   VISxAI Workshop at IEEE Visulization

Comparing Interactive Local and Global Explanation Paradigms for Human-assisted Machine Learning Tasks
July 2018   Microsoft Research

Graph Playgrounds: 3D Exploration of Graph Layers via Vertex Cloning
Dec. 2017   AT&T Research Labs Graduate Student Symposium

Oct. 2017	**A Viz of Ice and Fire: Exploring Entertainment Video Using Color and Dialogue** 2nd Workshop on Visualization for the Digital Humanities at IEEE Visualization
	Constellation: Visualizing Cybersecurity in Real Time
Aug. 2017	NASA Jet Propulsion Laboratory
Aug. 2017	California Institute of Technology
	Visualizing Learned Semantics with Deep Learning
Nov. 2016	Georgia Tech Ph.D. Qualifying Oral Exam
	Drawing Semantics with Deep Learning
2016	Pacific Northwest National Laboratory
	3D Printing The Trefoil Knot And Its Pages
Mar. 2015	UGA Center for Undergraduate Research Symposium, included hands-on demo
	Experimental and Numerical Studies of Oceanic Overflow
June 2015	AMS Conference on Atmospheric and Oceanic Fluid Dynamics
Jan. 2015	Joint Mathematics Meeting
Nov. 2014	APS Division of Fluid Dynamics
Aug. 2014	Invited and presented on behalf at Brown University, Los Alamos National Lab
July 2014	Northeast REU Mini-Conference at Yale University
July 2014	University of Rhode Island Bay Campus
	3D Printing in Topology
Mar. 2014	UGA Center for Undergraduate Research Symposium, included hands-on demo

Press

Nov. 2019	"The Interactive News Platform for Everyone", Stack Overflow Blog
Oct. 2019	"Is this the dynamic web we were promised?", Hanselminutes Podcast
May 2019	"The Secret Life of a JPEG", Fast Company
Dec. 2018	"'Human Rights' May Help Shape Artificial Intelligence in 2019", Georgia Tech, College of Computing
Dec. 2018	"Designers, Programmers, and Researchers Join Forces to Create a New Kind of Digital Magazine Called the Parametric Press", Georgia Tech, College of Computing
June 2018	"Georgia Tech Teams up with Intel to Protect Artificial Intelligence from Malicious Attacks Using SHIELD", Georgia Tech, College of Computing
Apr. 2018	"CSE Ph.D. Students Claim Three Prestigious Fellowships", Georgia Tech, College of Computing
Dec. 2017	"Georgia Tech Team To Use Microsoft Grant to Study Human Migration Dynamics", Georgia Tech, College of Computing
Sept. 2015	"Georgia Tech PhD Student Puts Finishing Touches on 3D Printed Trumpety Trefoil", 3dprint.com
Spring 2015	"Student Profile: Fred Hohman", 2015 UGA Mathematics Department Newsletter
Feb. 2015	"Falling Water", MITgcm.org
Dec. 2014	"Mathematics/Physics Student Creates 3D Printed Puzzle of Trefoil Knot, Catches Mathematical Community's Interest", 3dprint.com
July 2014	"Day 311 - Trefoil Trumpet", Makerhome.com
Apr. 2014	"Mathematics with 3D Printing", Sketches of Topology

Teaching

Spring 2019	**Graduate Teaching Assistant** *Georgia Institute of Technology, Atlanta, GA* Information Visualization (CS 4460), Instructor: Alex Endert Designed homeworks, held weekly office hours, and mentored student team projects for Information Visualization (CS 4460), an undergraduate course with 134 students enrolled.

Spring 2017	**Graduate Teaching Assistant**
	Georgia Institute of Technology, Atlanta, GA
	Data and Visual Analytics (CSE 6242 / CX 4242), Instructor: Duen Horng (Polo) Chau
	Designed homeworks, held weekly office hours, and mentored student team projects for Data and Visual Analytics (CSE 6242 / CX 4242), a graduate course with 214 students enrolled.

2014 — 2015	**Student Notetaker**
	University of Georgia, Athens, GA
	Generated notes for undergraduate mathematics and physics courses for students with disabilities.

2012	**Tutor**
	University of Georgia, Athens, GA
	Specialized in tutoring calculus to undergraduates.

Mentoring

Present — Spring 2019

Will Epperson
B.S. in Computer Science, Georgia Institute of Technology
Visualization for machine learning fairness
⚇ Stamps President's Scholar

Spring 2019 — Spring 2018

Angel Alexander Cabrera
B.S. in Computer Science, Georgia Institute of Technology
Visualization for machine learning fairness, interactive classification for deep learning
⚇ National Science Foundation Graduate Research Fellowship Program (NSF GRFP)
⚇ Love Family Foundation Scholarship (most outstanding graduating senior), Georgia Institute of Technology
⚇ Stamps President's Scholar
Now: PhD Student (HCI) at Carnegie Mellon University

Spring 2018 — Fall 2016

Dezhi Fang
B.S. in Computer Science, Georgia Institute of Technology
Visual motif discovery
⚇ Outstanding Undergraduate Researcher, College of Computing, Georgia Institute of Technology
⚇ Faculty Materials, Supplies, and Travel Grants for Undergraduate Research
⚇ Awarded President's Undergraduate Research Travel Award
Now: Software Development Engineer at Airbnb

Spring 2018 — Fall 2017

Prasenjeet Biswal
M.S. in Computer Science, Georgia Institute of Technology
Deep learning attribution
Now: Software Development Engineer at Oath

Grants and Funding

2018 — 2021

Understanding Deep Neural Networks Through Attribution and Interactive Experimentation
NSTRF: NASA Space Technology Research Fellowship
Co-PIs: Duen Horng (Polo) Chau
Funded $75,000/year

2017 — 2018

Deep Learning for Fine-scale Population Maps
Microsoft Azure for Research Award: AI for Earth
Co-PIs: Caleb Robinson, Bistra Dilkina
Funded $15,000

Fall 2014

3D Printing the Trefoil Knot and its Pages
UGA CURO Research Assistantship
Co-PIs: David Gay
Funded $1,000

Interactive Articles

Present — **Parametric Press**
Matthew Conlen, Fred Hohman, Sara Stalla, Victoria Uren, Andrew Sass
An experimental, born-digital magazine dedicated to showcasing the expository power that's possible when the audio, visual, and interactive capabilities of dynamic media are effectively combined

May 2019 **The Myth of the Impartial Machine** on Parametric Press
Alice Feng, Shuyan Wu, Fred Hohman, Matthew Conlen, Victoria Uren
Wide-ranging applications of data science bring utopian proposals of a world free from bias, but in reality, machine learning models reproduce the inequalities that shape the data they're fed. Can programmers free their models from prejudice?, ⭐ **Top of Hacker News**

May 2019 **On Particle Physics** on Parametric Press
Riccardo Maria Bianchi, Fred Hohman, Matthew Conlen
A CERN particle physicist walks through the history and science of particle physics, and why you should care about it—even outside of the laboratory

May 2019 **Data Science for Fair Housing** on Parametric Press
Alyson Powell Key, Fred Hohman, Matthew Conlen, Sara Stalla
Cities across America covertly exclude racial minorities from majority-white residential neighborhoods, while gentrification drives people of color out of their homes. In Atlanta, a new nonprofit seeks to resist displacement by supporting the city's most vulnerable residents—but how effective is their project?

Nov. 2018 **Blueberry Pancakes**
Caleb Robinson, Fred Hohman
A toy algorithms problem

July 2018 **The Beginner's Guide to Dimensionality Reduction**
Matthew Conlen, Fred Hohman
Explore the methods data scientists use to visualize high-dimensional data, ⭐ **VISxAI Best Paper, Honorable Mention**

June 2018 **The Math of Card Shuffling**
Fred Hohman
Riffling from factory order to complete randomness, ⭐ **Top of Hacker News**

Oct. 2017 **A Viz of Ice and Fire**
Fred Hohman, Sandeep Soni, Ian Stewart, John Stasko
Exploring and visualizing Game of Thrones using color and dialogue

Design

2017 — 2018 **IDEA Workshop Proceedings Cover (2017, 2018)**
ACM SIGKDD Workshop on Interactive Data Exploration and Analytics (IDEA)
Designed workshop poster and conference proceedings cover

2017 **Brad Myers Advisee Tree**
ACM Conference on Human Factors in Computing Systems (CHI), Denver, USA
Designed and implemented an interactive visualization of Brad Myers's advisee tree shown during his CHI 2017 Lifetime Research Award talk; designed accompanying ribbon worn by attendees at the conference

Aug. 2014 **3D Printed Cube Decomposition Trophy**
University of Georgia Mathematics Department, Athens, USA
Designed, modeled, and 3D printed cube decomposition trophy for annual UGA High School Math Tournament that was given to the top scoring teams and participants

Aug. 2014 **3D Printed UGA Keychain**
University of Georgia Lamar Dodd School of Art, Athens, USA"
Created 3D printed UGA keychain and presentation notes given at Experience UGA: a interdisciplinary event that exposes middle-school and high-school students to hands-on learning activities

Technology Skills

OS: Mac OS X, Ubuntu, Unix Command Line, Windows

Programming: Python, Matlab, Mathematica, C

Web and Writing: HTML, CSS, JavaScript, D3, SQL, Bootstrap, LaTeX, Markdown, Jekyll, Git

Graphics: Affinity Designer, Pixelmator, Matplotlib, Blender, Keynote, Meshlab, MakerBot Desktop

HCI: Contextual Inquiry, Think-Alouds, User Personas, Rapid Paper Prototyping, Affinity Diagraming

Service

Organizer

Workshop on Visualization for AI Explainability (**VISxAI**) at IEEE VIS 2019

Program Commitee

Debugging Machine Learning Models Workshop (**DebugML**) at ICLR 2019

ACM International Conference on Intelligent User Interfaces (**IUI**) 2019

Symposium on Visualization in Data Science (**VDS**) at IEEE VIS 2018

Workshop on Visualization for AI Explainability (**VISxAI**) at IEEE VIS 2018

Workshop on Interactive Data Exploration and Analytics (**IDEA**) at KDD 2018

Reviewer

Distill Research Journal (**Distill**) 2019

ACM Conference on Computer Supported Cooperative Work and Social Computing (**CSCW**) 2019

ACM Conference on Human Factors in Computing Systems (**CHI**) 2020, 2019, 2018, 2017

Human-Centered Machine Learning Perspectives Workshop (**HCMLP**) 2019

IEEE Visual Analytics Science and Technology (**VAST**) 2017, 2018

1st Deep Learning and Security Workshop (**DLS**) at IEEE SP 2018

Symposium on Visualization in Data Science (**VDS**) at IEEE VIS 2017

ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**) 2019, 2017

IEEE International Conference on Distributed Computing Systems (**ICDCS**) 2017

SIAM International Conference on Data Mining (**SDM**) 2017

Member

2016 — Association for Computing Machinery (**ACM**)

2016 — Institute of Electrical and Electronics Engineers (**IEEE**)

2012 — 2015 UGA Mathematics Club

2012 — 2013 Society of Physics Students, UGA Chapter (**SPS**)

2011 — 2015 National Society of Collegiate Scholars (**NSCS**)

References

Dr. Polo Chau, Associate Professor
School of Computational Science and Engineering
Georgia Institute of Technology
Atlanta, GA, USA
cc.gatech.edu/~dchau/

Dr. Alex Endert, Assistant Professor
School of Interactive Computing
Georgia Institute of Technology
Atlanta, GA, USA
va.gatech.edu/endert

Dr. Scott Davidoff, Manager
Human Interfaces Group

NASA Jet Propulsion Lab
Pasadena, CA, USA
scottdavidoff.com

Dr. Steven Drucker, Principal Researcher
Visualization and Interactive Data Analysis Group
Microsoft Research
Redmond, WA, USA
microsoft.com/en-us/research/people/sdrucker

Dr. Nathan Hodas, Senior Research Scientist
Data Sciences and Analytics Group
Pacific Northwest National Laboratory
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