Fred Hohman

Data science + visualization researcher

I research how to enable **machine learning interpretability** at scale and for everyone, by designing and developing interactive interfaces to help people confidently understand data-driven systems. Besides building tools, I also create **data visualizations** and write interactive articles to simply communicate complex ideas.

I have collaborated with researchers, designers, developers, and artists while working 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@gatech.edu
CV PDF
@fredhohman
@fredhohman
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
Designed and developed interactive visualizations for data iteration in machine learning, published at CHI 2020.

Summer 2018 **Microsoft Research**, Redmond, WA
Research Intern, Human-Computer Interaction Group
Mentor: Steven Drucker
Designed, developed, and deployed interactive interface for operationalizing machine learning interpretability, published at CHI 2019.

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. Prototype presented to lab leadership and secured funding to be incorporated into Mars 2020 mission.

Summer 2016 **Pacific Northwest National Lab**, Richland, WA
National Security Ph.D. Intern, Data Sciences & Analytics Group
Mentor: Nathan Hodas
Built interactive tools that generate synthetic images to explain deep learning classifiers, published at CHI 2017.

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 from Navier-Stokes equations to designed lab-scale experiments to model specific ocean phoneme. Configured MIT General Circulation Model on CPU 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

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

Publications

Selected: Latest & Greatest

Communicating with Interactive Articles
Fred Hohman, Matthew Conlen, Jeffrey Heer, Duen Horng (Polo) Chau
Distill. 2020.
Project Demo PDF Code BibTeX ⭐ Invited Commentary Interactive Article

CNN Explainer: Learning Convolutional Neural Networks with Interactive Visualization
Zijie J. Wang, Robert Turko, Omar Shaikh, Haekyu Park, Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng (Polo) Chau
IEEE Transactions on Visualization and Computer Graphics (TVCG). Salt Lake City, UT, USA, 2021.
Project Demo PDF Video Code BibTeX ⭐ Top of Github Trending

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 Recording Slides 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

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 Demo PDF Blog Video Preview Slides BibTeX ⭐ Deployed at Microsoft Research

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 Demo PDF Blog Video Slides Code BibTeX

All Publications

Communicating with Interactive Articles
Fred Hohman, Matthew Conlen, Jeffrey Heer, Duen Horng (Polo) Chau
Distill. 2020.
Project Demo PDF Code BibTeX ⭐ Invited Commentary Interactive Article

CNN Explainer: Learning Convolutional Neural Networks with Interactive Visualization
Zijie J. Wang, Robert Turko, Omar Shaikh, Haekyu Park, Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng (Polo) Chau
IEEE Transactions on Visualization and Computer Graphics (TVCG). Salt Lake City, UT, USA, 2021.
Project Demo PDF Video Code BibTeX ⭐ Top of Github Trending

Bluff: Interactively Deciphering Adversarial Attacks on Deep Neural Networks
Nilaksh Das*, Haekyu Park*, Zijie J. Wang, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng (Polo) Chau
IEEE Visualization Conference (VIS). Salt Lake City, UT, USA, 2020.
Project Demo PDF BibTeX *Authors contributed equally

mage: Fluid Moves Between Code and Graphical Work in Computational Notebooks
Mary Beth Kery, Donghao Ren, Fred Hohman, Dominik Moritz, Kanit Wongsuphasawat, Kayur Patel
ACM Symposium on User Interface Software and Technology (UIST). Minneapolis, MN, USA, 2020.
Project PDF BibTeX

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 Recording Slides 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 Code 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 *Authors contributed equally

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 Demo 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 Demo PDF Blog Video Preview Slides BibTeX Deployed at Microsoft Research

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 Demo 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 Demo 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 Demo Slides Code BibTeX Best Paper, Honorable Mention

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

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

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

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 Demo PDF Slides Code Data 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 Demo PDF Code BibTeX Microsoft AI for Earth Award

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

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

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

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 Blog Poster

Talks

Interactive Scalable Interfaces for Machine Learning Interpretability
May 2020 IBM Research
Apr. 2020 Microsoft Research
Apr. 2020 Apple
Apr. 2020 Autodesk Research
Dec. 2019 Georgia Tech Thesis Proposal

Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations
Mar. 2020 NVIDIA GTC
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

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

A Viz of Ice and Fire: Exploring Entertainment Video Using Color and Dialogue
Oct. 2017 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

July 2020 "Python in Visual Studio Code - VSCode Features You Need to Know", Tech With Tim
July 2020 "Python in Visual Studio Code – July 2020 Release", Microsoft Developer Blog
June 2020 "How Do Neural Networks Learn?", Two Minute Papers
Mar. 2020 "Visualizing Fairness in Machine Learning", Data Stories Podcast
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
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 — Fall 2019 **Omar Shaikh**
B.S. in Computer Science, Georgia Institute of Technology
Visualization for machine learning education

Present — Fall 2019 **Robert Turko**
B.S. in Computer Science, Georgia Institute of Technology
Visualization for machine learning education

Present — Fall 2019 **Rob Firstman**
B.S. in Computer Science, Georgia Institute of Technology
Visualization for deep learning interpretability

Spr. 2020 — Spr. 2019 **Will Epperson**
B.S. in Computer Science, Georgia Institute of Technology
Visualization for machine learning fairness
🎗 Stamps President's Scholar
Now: PhD Student (HCI) at Carnegie Mellon University

Spr. 2020 — Spr. 2019 **Siwei Li**
B.S. in Computer Science, Georgia Institute of Technology
Visual graph analytics
🎗 Outstanding Undergraduate Researcher, College of Computing, Georgia Institute of Technology
🎗 President's Undergraduate Research Award
Now: Software Engineer II at Google

Spr. 2019 — Spr. 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

Spr. 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

Spr. 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

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 $80,000/year for 3 years

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 — Dec. 2018 **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, twice

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

Service

Organizer
Workshop on Visualization for AI Explainability (**VISxAI**) at IEEE VIS 2020, 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
IEEE Visualization (**VIS**) 2020, 2019, 2018, 2017
ACM Conference on Human Factors in Computing Systems (**CHI**) 2020, 2019, 2018, 2017
ACM User Interface Software and Technology Symposium (**UIST**) 2020
Symposium on Visualization in Data Science (**VDS**) at IEEE VIS 2020, 2019, 2018
Distill Research Journal (**Distill**) 2019
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**) 2019, 2017
ACM Conference on Computer Supported Cooperative Work and Social Computing (**CSCW**) 2019
Human-Centered Machine Learning Perspectives Workshop (**HCMLP**) 2019
1st Deep Learning and Security Workshop (**DLS**) at IEEE SP 2018
IEEE International Conference on Distributed Computing Systems (**ICDCS**) 2017
SIAM International Conference on Data Mining (**SDM**) 2017

Institutional
Georgia Tech CSE Graduate Student Association, Vice President, 2018 - 2020
Georgia Tech CSE Chair Search Committee, 2019 - 2020

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

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

References

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

Dr. Alex Endert, Associate Professor
School of Interactive Computing
Georgia Institute of Technology
va.gatech.edu/endert

Dr. Scott Davidoff, Senior Manager
Human-Centered Design Group

NASA Jet Propulsion Lab
scottdavidoff.com

Dr. Steven Drucker, Partner and Research Manager
Visualization and Interactive Data Analysis Group
Microsoft Research
microsoft.com/en-us/research/people/sdrucker

Dr. Nathan Hodas, Senior Research Scientist
Data Sciences and Analytics Group
Pacific Northwest National Laboratory
signatures.pnnl.gov/bios/nathan-hodas