Frederick Hohman

Ph.D. Student, Computational Science and Engineering
Georgia Institute of Technology
266 Ferst Dr NW
Atlanta, GA 30332

🏠 fredhohman.com
✉ fredhohman@gatech.edu
🐦 @fredhohman
in linkedin.com/in/fredhohman

Education

Present —
Aug. 2015

Ph.D. in Computational Science and Engineering
Georgia Institute of Technology, Atlanta, GA
Advisor: Polo Chau, Co-advisor: Alex Endert
Research interests: Explainable artificial intelligence, visual analytics, machine learning, deep learning
Overall GPA: 4.00/4.00

May 2015 —
Aug. 2011

B.S. in Mathematics, Area of Emphasis in Applied 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

Research Experience

Present —
Aug. 2016

Georgia Institute of Technology, Atlanta, GA
Graduate Research Assistant, School of Computational Science and Engineering

Member of the Polo Club of Data Science where we bridge data mining and machine learning techniques with principles from human-computer interaction and visualization to make interactive tools to help people understand and explore big data.

Summer 2016

Pacific Northwest National Lab, Richland, WA
National Security Ph.D. Intern, Data Science and Analytics Group

Project: Understanding Deep Learning Models Via Visualization
• Developed Python code using Keras to generate images from deep neural networks to interpret models' semantic understanding.
• Research areas: Deep learning, image analysis, visualization.

May 2016 —
Aug. 2015

Georgia Institute of Technology, Atlanta, GA
Graduate Research Assistant, School of Computational Science and Engineering

Project: Material Informatics
• Built data-driven surrogate model for computationally expensive material grain growth simulations. Created property-structure linkages using machine learning pipeline to predict material properties. Contributed to direction and code repository of PyMKS package: Materials Knowledge Systems in Python.
• Research areas: Physical data science, material informatics, statistics.

May 2015 —
Jan. 2013

University of Georgia, Athens, GA
Undergraduate Researcher, Department of Mathematics, Athens, GA

Undergraduate Thesis: "3D Printing the Trefoil Knot and its Pages"
• Exploring 3D printing in topology. Programmed, designed, and 3D printed 34-piece, color-coordinated, and magnetized 3D puzzle of the trefoil knot fibration illustrating an open-book decomposition. Led 3D printing research and education in UGA mathematics department. Open-sourced and wrote about work (16,000+ views) and 3D printed models (11,000+ views, 2500+ downloads).
• Research areas: 3D modeling, topology, physical visualization, mathematical exposition.

NSF REU in Mathematics and Computational Science, Fairfield, CT
Undergraduate Researcher, Fairfield University, Department of Engineering

Project: Experimental and Numerical Comparison of Oceanic Overflow
• 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 parallel compute numerical simulations while using MATLAB for pre- and post-processing data visualization.
• Research ares: Computational fluid dynamics, data visualization, applied mathematics.

Honors and Awards

2015   President's Fellowship at Georgia Institute of Technology

2015   Outstanding Poster at Joint Mathematics Meeting Undergraduate Poster Session in Computational Math

2015   UGA CURO Research Graduation Distinction

2014   UGA CURO Research Assistantship

2013   Presidential Scholar

2011-2015   Dean's List

2011-2015   Georgia HOPE Scholarship

2011   Mission of Blessed Trinity: Artistic Sensibility (one of two students to receive upon graduation)

2009   Eagle Scout Award

Publications

Conference   **ShapeShop: Visualizing Learned Semantics with Deep Learning**. Fred Hohman, Nathan Hodas, Duen Horng Chau. *Extended Abstracts. ACM Conference on Human Factors in Computing Systems (CHI).* May 6, 2017. Denver, United States. *In preparation.*

VIGOR: Making Sense of Visual Graph Query Results. Robert Pienta, Fred Hohman, Kevin Roundy, Acar Tamersoy, Chris Gates, Alex Endert, Sham Navathe, Duen Horng Chau. *ACM Conference on Intelligent User Interfaces (IUI).* Mar 13, 2017. Limassol, Cyprus. *Under review.*

Experimental and Numerical Comparison of Oceanic Overflow. Thomas H. Gibson, Fred M. Hohman, Theresa J. Morrison, Shanon M. Reckinger, Scott J. Reckinger. *American Physical Society Division of Fluid Dynamics.* Abstract. Nov 23, 2014. San Francisco, USA.

Journal   **The Effect of Numerical Parameters on Eddies in Oceanic Overflows: A Laboratory and Numerical Study**. Shanon M. Reckinger, Thomas H. Gibson, Fred M. Hohman, Theresa J. Morrison, Scott J. Reckinger, Mateus Carvalho. *Journal of Dynamics of Atmospheres and Oceans.* 2016. *Under review.*

Presentations

"Drawing Semantics with Deep Learning"
July 2016   Pacific Northwest National Laboratory. National Security Internship Program Research Symposium.

"3D Printing The Trefoil Knot And Its Pages"
Mar. 2015   UGA Center for Undergraduate Research Symposium. Hands on demo.

"Experimental and Numerical Studies of Oceanic Overflow"
Jan. 2015   Joint Mathematics Meeting. Outstanding Poster at Student Poster Session in Computational Math.

Nov. 2014   American Physical Society 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. Hands on demo.

Press

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.
April 2014	"Mathematics with 3D Printing". Sketches of Topology.

Teaching

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

Math Outreach and Work Experience

2014	**3D Printed Cube Decomposition Trophy**
	University of Georgia Mathematics Department, Athens, GA
	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.
2014	**3D Printed UGA Keychain**
	University of Georgia Lamar Dodd School of Art, Athens, GA
	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.
2014-2015	**Student Notetaker**
	University of Georgia, Athens, GA
	Generated notes for undergraduate mathematics and physics courses for students with disabilities.
2013	**I.T. Assistant**
	St. Joseph Catholic School, Marietta, GA
	Installed and managed network of 65 iPads and 5 MacBooks. Migrated school towards cloud-based interactivity allowing realtime faculty integration and management of student services.

Technology Skills

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

Productivity: Pages, Keynote, Numbers, Microsoft Office

Programming: Python, Matlab, Mathematica, C

Web: HTML, CSS, JavaScript, D3, Bootstrap, LATEX, Markdown, Jekyll, Git

Graphics: Pixelmator, Blender, Meshlab, MakerBot Desktop

Professional Activities

Reviewer

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

ACM Conference on Human Factors in Computing Systems (**CHI**) 2017

Member

2016-Present Association for Computing Machinery (**ACM**)

2016-Present 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
Assistant Professor
School of Computational Science and Engineering, Georgia Institute of Technology
cc.gatech.edu/~dchau/

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

Dr. Nathan Hodas
Senior Research Scientist
Data Sciences and Analytics Group, Pacific Northwest National Laboratory
linkedin.com/in/nathan-hodas

Dr. David Gay
Associate Professor
Department of Mathematics, University of Georgia
euclidlab.org/david-gay/

Dr. Shanon Reckinger
Assistant Teaching Professor
Mechanical and Industrial Engineering Department, Montana State University
shanonreckinger.com