# Frederick Hohman

Ph.D. Student, Computational Science and Engineering
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## 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: Data science, deep learning, visual analytics, information visualization
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 create images from deep neural networks to compare machine v. human 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 mathematics department.
• Research areas: 3D modeling, topology, physical visualization, mathematical exposition.

Summer 2014 **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

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. In submission.*

Conference **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.

# 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 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:** iWork, Microsoft Office

**Programming:** Python, Matlab, Mathematica, C

**Web:** LaTeX, HTML, CSS, Markdown, Jekyll, Git

**Graphics:** Pixelmator, Blender, Meshlab, MakerBot Desktop, Adobe CSS Suite

# Organizations

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

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
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