Frederick Hohman

Ph.D. Student, Computational Science and Engineering
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Education

Aug. 2015 – Present
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

Aug. 2011 – May 2015
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

Aug. 2016 – Present
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
• Explored, built, and trained various deep neural network (DNN) models. Developed code to create images from DNNs to compare machine v. human semantic understanding.
• Research areas: Deep learning, image analysis, visualization.

Aug. 2015 – May 2016
Georgia Institute of Technology, Atlanta, GA
Graduate Research Assistant, School of Computational Science and Engineering

Project: Material Informatics
• Applied data science practices to speed up the process of new material characterization, development, and manufacturing to meet needs of national Materials Genome Initiative.
• Research areas: Physical data science, material informatics, statistics.

Jan. 2013 – May 2015
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. Posted models online and have received 10,000+ views and 2,500+ downloads.
• 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: Numerical and Experimental 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.

Presentations

Mar. 2015 "3D Printing The Trefoil Knot And Its Pages." 2015 UGA Center for Undergraduate Research Symposium. Abstract published in UGA Journal of Undergraduate Research Opportunities.

Jan. 2015 "Experimental and Numerical Studies of Oceanic Overflow." Poster. 1st place at 2015 Joint Mathematical Meeting Undergraduate Poster Session in Computational Math.

Nov. 2014 "Experimental and Numerical Studies of Oceanic Overflow." 67th American Physical Society Division of Fluid Dynamics. Abstract published in conference proceedings.

July 2014 "Experimental and Numerical Studies of Oceanic Overflow." NortheastREU Mini-Conference at Yale University. Presented by mentor at Brown University, Los Alamos National Lab.

Mar. 2014 "3D Printing in Topology." 2014 UGA Center for Undergraduate Research Symposium. Abstract published in UGA Journal of Undergraduate Research Opportunities.

Press

Sept. 2015 "Hear Ye! Georgia Tech PhD Student Puts Finishing Touches on 3D Printed Trumpety Trefoil." 3dprint.com.

June 2015 "3D Printing The Trefoil Knot And Its Pages." Wolfram Community. 3000+ views.

Spring 2015 "Student Profile: Fred Hohman." 2015 UGA Mathematics Department Newsletter.

Dec. 2014 "Mathematics/Physics Student Creates 3D Printed Puzzle of Trefoil Knot, Catches Mathematical Community's Interest" 3dprint.com.

Dec. 2014 "3D puzzle of the trefoil knot and its fibrations via 3D printing." Invited to post on Wolfram Community. 11,500+ views. Awarded Wolfram Featured Contributor.

Sept. 2014 "Research Spotlight." UGA Center for Undergraduate Research.

Aug. 2014 "Day 356 - Sunday guest: Fred Hohman and knot fibrations, part 2" Invited to guest post on Makerhome.com.

Aug. 2014 "Day 355 - Saturday guest: Fred Hohman and knot fibrations, part 1" Invited to guest post on Makerhome.com.

July 2014 "Day 311 - Trefoil Trumpet." Makerhome.com.

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

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 to provide for students with disabilities.

2013 **I.T. Assistant**
St. Joseph Catholic School, Marietta, GA
Installed and managed network of 65 iPads controlled by 5 MacBooks. Migrated school towards cloud-based interactivity allowing realtime faculty integration and management of student services.

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

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 (developing: Adobe CSS Suite)

Honors and Awards

2015 President's Fellowship at Georgia Institute of Technology
2015 1st 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
2009 Eagle Scout Award

Organizations

2016-Present Association for Computing Machinery (ACM)
2014-2015 American Physical Society (APS)
2012-2015 UGA Mathematics Club
2012-2013 Society of Physics Students, UGA Chapter (SPS)
2011-2015 National Society of Collegiate Scholars (NSCS)

Coursework

Computational Science and Engineering
6001 Introduction to Computational Science and Engineering
6010 Computational Problem Solving
6643 Numerical Linear Algebra
6730 Modeling and Simulation
6740 Computational Data Analysis
8803 Material Informatics

Computer Science
7450 Information Visualization
8001 Data Visualization Seminar
8903 Special Problems in Personal Visual Analytics

Mathematics
4990H Honors Thesis
4970H Undergraduate Research II
4960H Undergraduate Research I
4760 Mathematics and Music
4720 Partial Differential Equations
4510 Numerical Analysis II
4500 Numerical Analysis I
3200 Introduction to Higher Mathematics
3100H Sequences and Series
3000 Linear Algebra
2700 Elementary Differential Equations

2500 Multivariable Calculus
2260 Calculus II for Science and Engineering

Physics
4800 Introduction to Nanotechnology
4701 Quantum Mechanics I
4300 Thermodynamics
4201 Electricity and Magnetism I
4202 Classical Mechanics II
4101 Classical Mechanics I
3900 Mathematical Methods in Physics
3700 Modern Physics
3320L Electronics
1312L Advanced Introductory Physics II
1311L Advanced Introductory Physics I

Statistics
4520 Mathematical Statistics II
4510 Mathematical Statistics I

Website

Designed, developed, and maintaining fredhohman.com. Displays project expositions and blog posts by using a static site generator to serve code and content publicly on Github.

References

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School of Interactive Computing
Klaus Advanced Computing Building
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Dr. Alex Endert: endert@gatech.edu, (404) 385-4477
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School of Interactive Computing
Technology Square Research Building
85 5th St., NW, Atlanta, GA 30332

Dr. David Gay: dgay@math.uga.edu, (706) 542-4803
euclidlab.org/david-gay/
University of Georgia
Department of Mathematics
Boyd Graduate Research Center, Athens, GA 30602

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