

Sorelle A. Friedler
Assistant Professor of Computer Science

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RESEARCH INTERESTS

The design and analysis of algorithms, computational geometry, data mining and machine learning, and the application of such algorithms to interdisciplinary problems and data.

APPOINTMENTS

Haverford College Assistant Professor of Computer Science	July 2014 - present
Haverford College Visiting Assistant Professor of Computer Science	July 2012 - June 2014
Google, Inc. Software Engineer, Search Infrastructure and Google [x]	August 2010 - June 2012

EDUCATION

University of Maryland, College Park, MD Computer Science. Thesis title: <i>Geometric Algorithms for Objects in Motion</i> . Advisor: David M. Mount.	Ph.D.	August 2005 - August 2010
University of Maryland, College Park, MD Computer Science.	M.S.	August 2005 - December 2007
Swarthmore College, Swarthmore, PA Computer Science. Minor: Mathematics.	B.A.	August 2000 - May 2004

PAPERS

(Most author orderings are alphabetical. Undergraduate authors are denoted with a *.)

Peer-reviewed Journal Papers

Sorelle A. Friedler and David M. Mount. A Sensor-Based Framework for Kinetic Data Compression. *Computational Geometry: Theory and Applications*, 48(3): 147 - 168, March 2015

Sorelle A. Friedler and David M. Mount. Approximation algorithm for the kinetic robust k-center problem. *Computational Geometry: Theory and Applications*, 43(6-7):572 - 586, 2010.

Sorelle A. Friedler, Yee Lin Tan, Nir J. Peer, and Ben Shneiderman. Enabling teachers to explore grade patterns to identify individual needs and promote fairer student assessment. *Computers & Education*, 51(4): 1467 - 1485, December 2008.

Peer-reviewed Conference Proceedings

Michael Feldman*, Sorelle A. Friedler, John Moeller, Carlos Scheidegger, and Suresh Venkatasubramanian. Certifying and Removing Disparate Impact. Proceedings of the 21st ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2015.

Sorelle A. Friedler and David M. Mount. Spatio-temporal Range Searching over Compressed Kinetic Sensor Data. In *Proc. of the European Symposium on Algorithms (ESA)*, pages 386 - 397, 2010.

Sorelle A. Friedler and David M. Mount. Compressing kinetic data from sensor networks. In *Proc. of the Fifth International Workshop on Algorithmic Aspects of Wireless Sensor Networks (AlgoSensors)*, pages 191 - 202, 2009.

Workshop Papers and Technical Reports

Michael Feldman*, Sorelle A. Friedler, John Moeller, Carlos Scheidegger, and Suresh Venkatasubramanian. Certifying and Removing Disparate Impact. Presented at the *Fairness, Accountability, and Transparency in Machine Learning Workshop*, Dec. 12, 2014. <http://arxiv.org/abs/1412.3756>

F. Betul Atalay, Sorelle A. Friedler, and Dianna Xu. Probabilistic Kinetic Data Structures. Presented at the *Fall Workshop on Computational Geometry*, Oct. 25, 2013. <http://arxiv.org/abs/1412.1039>

Sorelle A. Friedler and David M. Mount. Realistic Compression of Kinetic Sensor Data. University of Maryland Computer Science Department, Technical Report CS-TR-4959, June 6, 2010. <http://hdl.handle.net/1903/10114>

Thesis

Sorelle A. Friedler. Geometric Algorithms for Objects in Motion. Dissertation committee: Prof. David Mount (chair), Prof. William Gasarch, Prof. Samir Khuller, Prof. Steven Selden, Prof. Amitabh Varshney. Defense date: July 30, 2010.

Book Reviews

Sorelle A. Friedler. Review of *Pioneering Women in American Mathematics: the Pre-1940 PhD's* by Judy Green and Jeanne LaDuke. *SIGACT News* 42(2): 37-41, 2011.

Sorelle A. Friedler. Review of *Change is Possible: Stories of Women and Minorities in Mathematics* by Patricia Clark Kenschaft. *SIGACT News* 41(2): 47-50, 2010.

Non-Technical Papers

Sorelle A. Friedler. Submissive Students Do Not Make Good Computer Scientists. *The Billfold*, Sept. 26, 2014. <http://thebillfold.com/2014/09/submissive-students-do-not-make-good-computer-scientists/>

GRANTS AND AWARDS

Data & Society Research Institute Fellow 2015 - 2016
Preventing Discrimination in Machine Learning: from theory to law and policy. \$10,000.

NSF DMR-1307801 2013 - 2016
The Dark Reaction Project: a machine learning approach to materials discovery. Joshua Schrier, Alexander Norquist, and Sorelle Friedler. \$299,998.

Ann G. Wylie Dissertation Fellowship 2009 - 2010
Provides tuition, stipend, and health insurance for one semester. Awarded to “outstanding students working on the final stages of their dissertations.”

AT&T Labs Fellowship Program 2006 - 2009
Provides tuition, stipend, health insurance, and conference funds for 3 years. Awarded to 5 “outstanding under-represented minority and women students” chosen from a national pool.

Verizon Fellowship 2006 - 2007
Monetary award for outstanding academic achievement.

Graduate School Fellow, University of Maryland 2005 - 2007
Monetary award for “academic merit, intellectual ability, and the student’s potential to make a unique contribution to the diversity of the educational experience on this campus.”

PATENTS

Sorelle Alaina Friedler, Mohammed Waleed Kadous, Andrew Lookingbill. *Position indication controls for device locations*. US 20130131973 A1 (also WO 2013078125 A1). Publication date: May 23, 2013.

Mohammed Waleed Kadous, Isaac Richard Taylor, Cedric Dupont, Brian Patrick Williams, Sorelle Alaina Friedler. *Permissions based on wireless network data*. US 20130244684 A1 (also WO2013138304 A1). Publication date: Sep 19, 2013.

SELECTED TALKS

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| Microsoft Research NYC
<i>Detecting and Preventing Discrimination in Machine-Learned Decisions</i> | Jan. 14, 2016 |
| Data & Civil Rights Conference
<i>Discriminatory Machine Learning</i> | Oct. 27, 2015 |
| Grace Hopper Celebration of Women in Computing
<i>Diverse Paths to Teaching and Research at Liberal Arts Colleges</i> | Oct. 15, 2015 |
| Fairness, Accountability, and Transparency in Machine Learning
<i>Certifying and Removing Disparate Impact</i> | Dec. 12, 2014 |
| Fall Workshop on Computational Geometry
<i>Probabilistic Kinetic Data Structures</i> | Oct. 25, 2013 |
| AALAC/Mellon 23 Working Group on Information
<i>Information Content in Motion</i> | Oct. 27, 2012 |
| European Symposium on Algorithms (ESA 2010)
<i>Spatio-temporal Range Searching Over Compressed Kinetic Sensor Data</i> | Sept. 7, 2010 |
| Second Workshop on Massive Data Algorithms (MASSIVE 2010)
<i>Spatio-temporal Range Searching Over Compressed Kinetic Sensor Data</i> | June 17, 2010 |
| Fifth International Workshop on Algorithmic Aspects of Wireless Sensor Networks
<i>Compressing Kinetic Data From Sensor Networks</i> | July 11, 2009 |
| Arcadia University Mathematics Education Colloquium
<i>How do Computers Solve Geometric Problems?</i> | Feb. 19, 2009 |
| AT&T Research Labs Colloquium
<i>An Implementation of Jain's Algorithm for Survivable Network Design.</i> | Aug. 11, 2006 |

SELECTED PRESS

Related to *Certifying and Removing Disparate Impact*:

Lauren Kirchner. When big data becomes bad data. *ProPublica*, September 2, 2015.

Lauren J. Young. Computer Scientists Find Bias in Algorithms. *IEEE Spectrum*, August 21, 2015.

Julianne Pepitone. Can Resume-Reviewing Software Be As Biased As Human Hiring Managers? *NBC News*, August 17, 2015.

Kiona Smith-Strickland. Computer Programs Can Be as Biased as Humans. *Gizmodo*, August 16, 2015.

Hal Hodson. No one in control: The algorithms that run our lives. *New Scientist*, February 4, 2015.

PROFESSIONAL SERVICE

Workshop Co-organizer and Program Committee Chair

2015 ICML Workshop on Fairness, Accountability, and Transparency in Machine Learning

Program Committee Member

2016 SIAM International Conference on Data Mining
2015 SIAM International Conference on Data Mining

Committee Member

2016 CRA Outstanding Undergraduate Researchers Selection Committee
2015 ACM Student Research Competition poster judge at Grace Hopper

Reviewer

2014 ACM-SIAM Symposium on Discrete Algorithms
2011 Symposium on Computational Geometry
2008 Scandinavian Workshop on Algorithm Theory

COLLEGE SERVICE

Appointed Service

Visual Studies Search Committee, member Fall 2015 - Spring 2016
Visual Studies Working Group, member Fall 2014 - Spring 2015

Departmental Service

Computer Science Departmental Search Committee Spring 2015

Advising

class of '19: 5 freshmen advisees Fall 2014 - present
class of '17: 3 majors
class of '16: 9 majors, 3 minors

Other Service / Activities

Innovation Incubator, informal working group member Spring 2015
Beckman Scholars Selection Committee Spring 2015
Critical Making Faculty Seminar, co-organizer Spring 2015
<http://tdh.brynmawr.edu/criticalmaking/>
Tri-Co Hackathon, co-organizer Spring 2014, Spring 2015

UNDERGRADUATE THESIS ADVISEES by graduation year

2016 Casey Falk
Jason Feinberg
Brian Guggenheimer
Geoffrey Martin-Noble
Gabriel Rybeck
Brandon Smith
2015 Michael Feldman, *Computational Fairness: Preventing Machine-Learned Discrimination*
Aaron Lowe, *Persistence in Learning: Persistent Homology and its Application to Machine Learning*
2014 Paulina Cueto, *Identifying the Relationship Between Evolutionary Distance and the Accuracy of Cis-Regulatory Module Predictions*
Harry Levin, *Computerized Redistricting: Examining the Weighted Points Version of the Capacitated k-Center Problem*
Karl Moll, *Community Detection in Multidimensional Social Networks*
Paul Raccuglia, *Dark Reactions: Recommender Guided Materials Discovery*
Yingying (Daisy) Sheng (Bryn Mawr College), *A Practical Evaluation of Kinetic Data Structure on Android Devices*

UNDERGRADUATE RESEARCH STUDENTS

Skyler Ellenburg '18	Fall 2015 - present
Derek Roth '17	Fall 2015 - present
Tosin Alliyu '18	Summer 2015 - present
Tionney Nix '17	Summer 2015 - present
Daniel Washburn '17	Summer 2015 - present
Jason Feinberg '16	Fall 2014 - present
Nora Tien '17	Summer 2014 - present
Joshua Serota '16	Summer 2014
Brian Guggenheimer '16	Summer 2014
Arthur Emidio Teixeira Ferreira '16	Summer 2014
Casey Falk '16	September 2013 - present
Paul Raccuglia '14	September 2012 - June 2014

COURSES TAUGHT

Haverford College

Spring 2016	CS 207	Data Science and Visualization (lecture and lab, 24 students)
Fall 2015	CS 340	Analysis of Algorithms (lecture and lab, 26 students)
Spring 2015	CS 395	Mobile Development for Social Change (lecture and lab, 21 students)
Fall 2014	CS 340	Analysis of Algorithms (lecture and lab, 25 students)
Spring 2014	CS 207	Data Science and Visualization (lecture and lab, 18 students)
Fall 2013	CS 105	Introduction to Computer Science (2 sections and 1 lab, 72 students total)
Spring 2013	CS 340	Analysis of Algorithms (lecture and lab, 32 students)
	CS 395	Mobile Development for Social Change (lecture and lab, 22 students)
Fall 2012	CS 105	Introduction to Computer Science (co-taught with Dave Wonnacott, 78 students)
	CS 101	Fluency with Information Technology (25 students)

University of Maryland, College Park

Summer 2009	CMSC 451	Design and Analysis of Computer Algorithms (10 students)
Summer 2007	CMSC 330	Organization of Programming Languages (39 students)