

**Sorelle A. Friedler**  
**Assistant Professor of Computer Science**

---

Department of Computer Science, Haverford College  
370 Lancaster Ave., Haverford, PA 19041  
sorelle@cs.haverford.edu  
sorelle.friedler.net

**RESEARCH INTERESTS**

The fairness and interpretability of machine learning algorithms, with applications from criminal justice to materials discovery

**APPOINTMENTS**

**Haverford College**

Assistant Professor of Computer Science July 2014 - present  
Visiting Assistant Professor of Computer Science July 2012 - June 2014

**Data & Society Research Institute**

Affiliate September 2016 - present  
Fellow September 2015 - September 2016

**Alphabet, Inc.** (formerly Google, Inc.)

Software Engineer, Search Infrastructure (Google) and X (formerly Google [x]) August 2010 - June 2012

**EDUCATION**

**University of Maryland, College Park, MD**      **Ph.D.**      August 2005 - August 2010  
Computer Science.  
Thesis title: *Geometric Algorithms for Objects in Motion*. Advisor: David M. Mount.

**University of Maryland, College Park, MD**      **M.S.**      August 2005 - December 2007  
Computer Science.

**Swarthmore College, Swarthmore, PA**      **B.A.**      August 2000 - May 2004  
Computer Science. Minor: Mathematics.

**GRANTS AND AWARDS**

**DARPA Synergistic Discovery and Design (SD2)**      2018 - 2019  
*TA2+TA3: Discovering Reactions and Uncovering Mechanisms of Hybrid Organohalide Perovskite Formation*. Joshua Schrier, Sorelle Friedler, and Alexander Norquist. \$3,604,943. (Contract likely extended until 2021.)

**NSF DMR-1709351**      2017 - 2020  
*CDS&E: D3SC: The Dark Reaction Project: A machine-learning approach to exploring structural diversity in solid state synthesis*. Joshua Schrier, Sorelle Friedler, and Alexander Norquist. \$645,288.

**NSF IIS-1633387**      2016 - 2019  
*BIGDATA: Collaborative Research: F: Algorithmic Fairness: A Systemic and Foundational Treatment of Nondiscriminatory Data Mining*. Suresh Venkatasubramanian, danah boyd, and Sorelle Friedler. \$953,432 (Haverford portion: \$172,742).

**Knight News Challenge Prototype Fund**      2016  
*Could your data discriminate?* Sorelle Friedler, Wilneida Negron, Surya Mattu, Suresh Venkatasubramanian. \$35,000.

**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.”

## PAPERS

(Most author orderings are alphabetical. Haverford undergraduate co-authors are denoted with a \*.)

### Peer-reviewed Journal Papers

Philip Adler, Casey Falk\*, Sorelle A. Friedler, Tionney Nix\*, Gabriel Rybeck\*, Carlos Scheidegger, Brandon Smith\*, and Suresh Venkatasubramanian. Auditing Black-box Models for Indirect Influence. *Knowledge and Information Systems*, Oct. 2017. <http://dx.doi.org/10.1007/s10115-017-1116-3>

Paul Raccuglia\*, Katherine C. Elbert\*, Philip D. F. Adler, Casey Falk\*, Malia B. Wenny\*, Aurelio Mollo\*, Matthias Zeller, Sorelle A. Friedler, Joshua Schrier, and Alexander J. Norquist. Machine-learning-assisted materials discovery using failed experiments. *Nature*, 533: 73 - 76, May 5, 2016. <http://dx.doi.org/10.1038/nature17439>

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

Sorelle A. Friedler, Carlos Scheidegger, Suresh Venkatasubramanian, Sonam Choudhary, Evan P. Hamilton, and Derek Roth. A comparative study of fairness-enhancing interventions in machine learning. In *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*, 2019. (Acceptance rate: 24%)

Andrew Selbst, danah boyd, Sorelle A. Friedler, Suresh Venkatasubramanian, and Janet A. Vertesi. Fairness and Abstraction in Sociotechnical Systems. In *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*, 2019. (Acceptance rate: 24%)

Danielle Ensign, Sorelle A. Friedler, Scott Neville, Carlos Scheidegger, Suresh Venkatasubramanian. Decision Making with Limited Feedback: Error bounds for Recidivism Prediction and Predictive Policing. In *Algorithmic Learning Theory (ALT)* 2018. (Acceptance rate: 35%)

Danielle Ensign, Sorelle A. Friedler, Scott Neville, Carlos Scheidegger and Suresh Venkatasubramanian. Runaway Feedback Loops in Predictive Policing. In *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*, 2018. (Acceptance rate: 24%)

Richard L. Phillips\*, Kyu Hyun Chang\*, and Sorelle A. Friedler. Interpretable Active Learning. In *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*, 2018. (Acceptance rate: 24%)

Philip Adler, Casey Falk\*, Sorelle A. Friedler, Gabriel Rybeck\*, Carlos Scheidegger, Brandon Smith\*, and Suresh Venkatasubramanian. Auditing Black-box Models for Indirect Influence. In *Proceedings of the IEEE International Conference on Data Mining (ICDM)*, 2016. (Acceptance rate: 20%, acceptance as regular paper: 8.5%.)

Expanded version available as part of: Auditing Black-box Models for Indirect Influence, *Knowledge and Information Systems*.

F. Betul Atalay, Sorelle A. Friedler, and Dianna Xu. Convex hull for probabilistic points. In Technical Papers of the 29th Conference on Graphics, Patterns and Images (*SIBGRAPI '16*), 2016. (Acceptance rate: 43%.)

Michael Feldman\*, Sorelle A. Friedler, John Moeller, Carlos Scheidegger, and Suresh Venkatasubramanian. Certifying and Removing Disparate Impact. In *Proceedings of the ACM International Conference on Knowledge Discovery and Data Mining (KDD)*, pages 259–268, 2015. (Acceptance rate: 19%.)

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. (Acceptance rate: 27%.)

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. (Acceptance rate: 51%.)

Expanded version available as part of: A Sensor-Based Framework for Kinetic Data Compression, *Computational Geometry: Theory and Applications*.

### **Workshop Papers and Technical Reports**

Danielle Ensign, Sorelle A. Friedler, Scott Neville, Carlos Scheidegger and Suresh Venkatasubramanian. Runaway Feedback Loops in Predictive Policing. Presented as a talk at the *Fairness, Accountability, and Transparency in Machine Learning Workshop (FAT/ML)*, Aug. 14, 2017.

Expanded version available as part of: Runaway Feedback Loops in Predictive Policing, *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*, 2018.

Danielle Ensign, Sorelle Friedler, Scott Neville, Carlos Scheidegger and Suresh Venkatasubramanian. Decision Making with Limited Feedback: Error bounds for Recidivism Prediction and Predictive Policing. Presented as a poster at the *Fairness, Accountability, and Transparency in Machine Learning Workshop (FAT/ML)*, Aug. 14, 2017.

Expanded version available as part of: Error bounds for Recidivism Prediction and Predictive Policing, *Proceedings of Algorithmic Learning Theory (ALT)*, 2018.

Richard L. Phillips\*, Kyu Hyun Chang\*, and Sorelle A. Friedler. Interpretable Active Learning. Presented at the *ICML Workshop on Human Interpretability in Machine Learning (WHI)*, Aug. 10, 2017.

Expanded version available as part of: Interpretable Active Learning, *Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT\*)*.

Sorelle A. Friedler, Carlos Scheidegger, and Suresh Venkatasubramanian. On the (im)possibility of fairness. arXiv:1609.07236, Sept. 23, 2016. <http://arxiv.org/abs/1609.07236>

Ifeoma Ajunwa, Sorelle Friedler, Carlos E. Scheidegger, and Suresh Venkatasubramanian. Hiring by Algorithm: Predicting and Preventing Disparate Impact. Presented at the Yale Law School Information Society Project conference *Unlocking the Black Box: The Promise and Limits of Algorithmic Accountability in the Professions*, Apr. 2, 2016.

This is a translation of the paper *Certifying and Removing Disparate Impact* for a legal audience.

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 (FAT/ML)*, Dec. 12, 2014. <http://arxiv.org/abs/1412.3756>

Expanded version available as part of: Certifying and Removing Disparate Impact, in *Proceedings of the 21st ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*.

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>

Expanded version available as part of: Convex Hull for Probabilistic Points, in *Proceedings of the Brazilian Symposium on Computer Graphics and Image Processing (SIB-GRAPI)*.

Sorelle A. Friedler and David M. Mount. Spatio-temporal Range Searching Over Compressed Kinetic Sensor Data. *Second Workshop on Massive Data Algorithms (MASSIVE 2010)*, June 17, 2010.

Expanded version available as part of: Spatio-temporal Range Searching over Compressed Kinetic Sensor Data, in *Proc. of the European Symposium on Algorithms (ESA)*.

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>

Expanded version available as part of: A Sensor-Based Framework for Kinetic Data Compression, *Computational Geometry: Theory and Applications*.

### Popular Press Articles

Nicholas Diakopoulos and Sorelle Friedler. How to Hold Algorithms Accountable. *MIT Technology Review*, Nov. 17, 2016.

<https://www.technologyreview.com/s/602933/how-to-hold-algorithms-accountable/>

### 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.

### 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.

#### KEYNOTE TALKS

- Scandinavian Symposium and Workshops on Algorithm Theory (SWAT) June 18, 2018  
Malmö, Sweden  
*Optimizing Society? Ensuring Fairness in Automated Decision-Making*
- NSF Workshop on Data Science for Secure and Privacy-aware (DSSP) Sept. 26, 2016  
Large Data Management and Mining, Snowbird, UT  
*Algorithmic Fairness: Guaranteeing fairness and non-discrimination in machine-learned decision making*

#### INVITED TALKS

- Columbia University, Data Science Institute, NY, NY Apr. 6, 2018  
*Auditing, Explaining, and Ensuring Fairness in Algorithmic Systems*
- University of Pennsylvania, Theoretical Computer Science Seminar Feb. 9, 2018  
Philadelphia, PA  
*Feedback Loops in Predictive Policing*
- University of Minnesota, Institute for Advanced Study, Minneapolis, MN Jan. 25, 2018  
*Auditing, Explaining, and Ensuring Fairness in Algorithmic Systems*
- Rutgers University DIMACS REU, New Brunswick, NJ June 13, 2017  
*Auditing Black-box Models*
- Brown University, Providence, RI Mar. 9, 2017  
*Algorithmic Fairness: Guaranteeing fairness and non-discrimination in machine-learned decision making*
- Rutgers / Bryn Mawr Undergraduate Workshop, Camden, NJ July 25, 2016  
*Data Structures for Kinetic Multidimensional Point Sets*
- Consumer Financial Protection Bureau, Washington, DC May 5, 2016  
*Biased Data, Biased Algorithms:  
Detecting and Preventing Discrimination in Machine-Learned Decisions*
- Williams College, Computer Science Dept. Colloquium, Williamstown, MA Apr. 15, 2016  
*Biased Data, Biased Algorithms:  
Detecting and Preventing Discrimination in Machine-Learned Decisions*
- Microsoft Research, NY, NY Jan. 14, 2016  
*Detecting and Preventing Discrimination in Machine-Learned Decisions*
- Arcadia University Mathematics Education Colloquium, Glenside, PA Feb. 19, 2009  
*How do Computers Solve Geometric Problems?*

## CONTRIBUTED TALKS (Conferences and Workshops)

- Machine Learning and Informatics for Chemistry and Materials  
Telluride, CO  
*Interpretable Machine Learning for Scientific Discovery* Oct. 1, 2018
- CCC Workshop on Fair Representations and Fair Interactive Learning  
Philadelphia, PA  
*Fair Representations: making our values explicit* Mar. 18, 2018
- Fairness, Accountability, and Transparency in Machine Learning,  
Halifax, NS, Canada  
*Runaway Feedback Loops in Predictive Policing* Aug. 14, 2017
- International Workshop on Obfuscation: Science, Technology, and Theory  
New York University, NY, NY  
*Obfuscating Data to Prevent Discrimination* Apr. 7, 2017
- AALAC Workshop on Data Ethics, Pomona College, Claremont, CA  
*Algorithmic Fairness* Feb. 10, 2017
- Fairness for Digital Infrastructure Workshop, UPenn, Philadelphia, PA  
*On the (Im)possibility of Fairness* Jan. 20, 2017
- IEEE International Conference on Data Mining, Barcelona, Spain  
*Auditing Black-box Models for Indirect Influence* Dec. 14, 2016
- SIBGRAPI Conference on Graphics, Patterns and Images,  
São José dos Campos, Brazil  
*Convex Hull for Probabilistic Points* Oct. 5, 2016
- Dagstuhl Seminar on Data, Responsibly, Wadern, Germany  
*Auditing Black-box Models* July 19, 2016
- Data & Society Workshop, NY, NY  
*Hiring by Algorithm: Predicting and Preventing Disparate Impact* May 16, 2016
- National Council on Measurement in Education, Washington, DC  
*Fairness and Machine Learning for Educational Practice* (panel) Apr. 9, 2016
- Yale Law, Unlocking the Black Box, New Haven, CT  
*Hiring by Algorithm: Predicting and Preventing Disparate Impact* Apr. 2, 2016
- Fairness, Accountability, and Transparency in Machine Learning,  
Montreal, Canada  
*Certifying and Removing Disparate Impact* Dec. 12, 2014
- Fall Workshop on Computational Geometry, NY, NY  
*Probabilistic Kinetic Data Structures* Oct. 25, 2013

AALAC/Mellon 23 Working Group on Information, Bryn Mawr College, PA <i>Information Content in Motion</i>	Oct. 27, 2012
European Symposium on Algorithms (ESA 2010), Liverpool, UK <i>Spatio-temporal Range Searching Over Compressed Kinetic Sensor Data</i>	Sept. 7, 2010
Second Workshop on Massive Data Algorithms (MASSIVE 2010), Snowbird, Utah <i>Spatio-temporal Range Searching Over Compressed Kinetic Sensor Data</i>	June 17, 2010
Fifth International Workshop on Algorithmic Aspects of Wireless Sensor Networks, Rhodes, Greece <i>Compressing Kinetic Data From Sensor Networks</i>	July 11, 2009
AT&T Research Lab Colloquium, Florham Park, NJ <i>An Implementation of Jain's Algorithm for Survivable Network Design.</i>	Aug. 11, 2006

**PEDAGOGICAL / GENERAL AUDIENCE TALKS**

Philadelphia Fulbright Enrichment Seminar Philadelphia, PA <i>Big Data for the Public Good: Innovations in Civic Engagement</i> (panel)	Apr. 13, 2018
Optimizing Government: Policy Challenges in the Machine Learning Age University of Pennsylvania, Philadelphia, PA <i>Can Technology Be Democratic?</i> <i>Transparency and Accountability in Machine Learning</i> (panel)	Mar. 21, 2017
Center for Information Technology Policy, Princeton University, NJ <i>Principles for Accountable Algorithms</i>	Mar. 3, 2017
IEEE ICDM International Workshop on Privacy and Discrimination in Data Mining, Barcelona, Spain <i>Closing panel: Ethical Data Mining - Challenges and Opportunities</i> (panel)	Dec. 12, 2016
Workshop on Fairness, Accountability, and Transparency in Machine Learning, NY, NY <i>Opening Panel: Setting the Stage</i> (panel)	Nov. 18, 2016
Dagstuhl Seminar on Data, Responsibly, Wadern, Germany <i>Teaching Ethical Issues in Data Mining to Undergraduates</i>	July 21, 2016
NYU Law, Bernstein Institute for Human Rights, NY, NY <i>Data Hygiene and Algorithmic Oversight</i> (panel moderator)	Mar. 22, 2016
SXSW, Austin, TX <i>Biased Algorithms and the Future of Prejudice</i> (panel)	Mar. 13, 2016
Data & Civil Rights Conference, Washington, DC <i>Discriminatory Machine Learning</i>	Oct. 27, 2015
Grace Hopper Celebration of Women in Computing, Houston, TX <i>Diverse Paths to Teaching and Research at Liberal Arts Colleges</i> (panel)	Oct. 15, 2015

## INVITED WORKSHOPS

Integrating Ethics and Social Responsibility into CS and Eng. Curricula Harvard Center for Research on Computation and Society, Cambridge, MA	Oct. 15, 2018
Machine Learning and Informatics for Chemistry and Materials Telluride, CO	Oct. 1-5, 2018
Workshop on the Limits of Artificial Intelligence in Public Policy Princeton University, Princeton, NJ	Sept. 28, 2018
Google Workshop on Fairness in Machine Learning, Cambridge, MA	Sept. 13 - 14, 2018
Data Science Ethics Education Workshop, New York University, NY	Feb. 22, 2018
NSF BIGDATA PI Meeting, Washington, DC	Mar. 13 - 15, 2017
Fairness for Digital Infrastructure Workshop, University of Pennsylvania, Philadelphia, PA	Jan. 19 - 20, 2017
MacArthur Foundation Consultation on Opportunities and Challenges with Algorithmic Decision-Making Tools in the Criminal Justice Field, Chicago, IL	Oct. 28, 2016
USACM Algorithmic Transparency and Accountability, University of Pennsylvania, Philadelphia, PA	Oct. 27, 2016
Dagstuhl Seminar on Data, Responsibly, Wadern, Germany	July 17 - 22, 2016
Data & Civil Rights Conference, Washington, DC	Oct. 27, 2015
NSF Workshop on the Rise of Data in Materials Research, College Park, MD	June 29 - 30, 2015

## SELECTED PRESS

### **Related to *Machine-learning-assisted materials discovery using failed experiments*:**

Adam Marcus and Ivan Oransky. What scientists could learn from startups. *The Week* and *STAT*, May 12, 2016.

Daniela Hernandez. Why Machines Should Learn From Failures. *The Wall Street Journal*, May 6, 2016.

Jordana Cepelewicz. Lab Failures Turn to Gold in Search for New Materials. *Scientific American*, May 6, 2016.

Philip Ball. Computer gleans chemical insight from lab notebook failures. *Nature News*, May 4, 2016.

### **Related to *Certifying and removing disparate impact*:**

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.

### **Background on Algorithmic Fairness:**

Megan Rose Dickey. Algorithmic accountability: Algorithms are designed to make our lives easier. The problem is, they're designed by us. *TechCrunch*, Apr 30, 2017.

Stephanie Pappas. Bad News: Artificial Intelligence Is Racist, Too. *Live Science*, Apr 13, 2017.

Nidhi Subbaraman. Scientists Taught A Robot Language. It Immediately Turned Racist. *BuzzFeed News*, Apr 13, 2017.

Jeremy Hsu. AI Learns Gender and Racial Biases from Language. *IEEE Spectrum*, Apr 13, 2017.

Sam Levin. A beauty contest was judged by AI and the robots didn't like dark skin. *The Guardian*,



September 8, 2016.

David Ingold and Spencer Soper. Amazon Doesn't Consider the Race of Its Customers. Should It? *Bloomberg*, April 21, 2016.

Rose Eveleth. The Inherent Bias of Facial Recognition. *Motherboard*, March 21, 2016.

Laura Sydell. Can Computer Programs be Racist and Sexist? *NPR*, March 15, 2016.

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

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

## **PROFESSIONAL SERVICE**

### **Co-Founder and Executive Committee Member**

Conference on Fairness, Accountability, and Transparency (FAT\*)

### **Guest Editor**

Big Data, "Special Issue on Social and Technical Trade-Offs," 2017

### **Program Committee Co-chair**

2018 Conference on Fairness, Accountability, and Transparency (FAT\*)

2015 and 2016 Workshops on Fairness, Accountability, and Transparency in Machine Learning

### **Program Committee Member**

2019 Black in AI Workshop

2019 AAAI Conference on Artificial Intelligence

2018, 2017 Workshop on Ethics in Natural Language Processing

2018 SIAM Algorithm Engineering and Experiments (ALENEX)

2017 International Conference on Information and Knowledge Management (CIKM)

2018, 2017 ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), Applied Data Science Track

2017 Workshop on Fairness, Accountability, and Transparency in Machine Learning (FAT/ML)

2017 Workshop on Technology and Consumer Protection (ConPro)

2017, 2016, 2015 SIAM International Conference on Data Mining (SDM)

### **Workshop Co-organizer**

2017, 2016, 2015 Workshops on Fairness, Accountability, and Transparency in Machine Learning

2017 AALAC Workshop on Data Ethics

### **Committee Member**

2017, 2016 CRA Outstanding Undergraduate Researchers Selection Committee

2015 ACM Student Research Competition poster judge at Grace Hopper

### **Reviewer**

2017 Nature and Nature Communications

2017 CSCW

2017, 2016 NSF Panels

2014 ACM-SIAM Symposium on Discrete Algorithms

2011 Symposium on Computational Geometry

2008 Scandinavian Workshop on Algorithm Theory

## **Haverford College Teaching and Service**

Haverford College is a leading liberal arts college with a student body of 1,290 composed entirely of undergraduate students. The teaching load is 5 courses per year, with lab / discussion sections and senior thesis advising counting towards the total teaching load. The college operates under a philosophy of shared governance among the administration, faculty, students, and staff.

## UNDERGRADUATE THESIS ADVISEES by graduation year

- 2019 Yasmine Ayad  
Arthur Chang  
Yilin Li  
Jai Nimgaonkar  
Dylan Slack  
Chris Villalta
- 2018 Richard Phillips, *Explaining Neural Network Predictions with Image Certainty Translation*  
Derek Roth, *A Comparison of Fairness-Aware Machine Learning Algorithms*
- 2017 Kyu Chang, *Explaining Active Learning Queries*  
Evan Hamilton, *Benchmarking Fairness Aware Machine Learning*  
Tionney Nix, *A Rule Learning Approach to Discovering Contexts of Discrimination*
- 2016 Casey Falk, *Auditing Deep Neural Networks and Other Black-box Models*  
Jason Feinberg, *k-Robust Nearest Neighbor Search and Classification*  
Brian Guggenheimer, *The Red Pen: Applying Computer Vision to Automate the Grading of Traditional Assignments*  
Geoffrey Martin-Noble, *Optimizing a Machine Learning System for Materials Discovery*  
Gabriel Rybeck, *Indirect Discrimination in the Age of Big Data*  
Brandon Smith, *Auditing Deep Neural Networks to Understand Recidivism Prediction*
- 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

Eniola Ajao '21	Summer 2018
Matthew Scharf '20	Summer 2018
Ben Rogers-Boehme '20	Summer 2018
Christopher Villalta '19	Summer 2018
Dylan Emery '18	Summer 2018
Emile Givental '21	Spring 2018 - present
Hannah Beilinson '20	Spring 2018 - present
Jai Nimgaonkar '19	Spring 2018 - present
Dylan Slack '19	Fall 2017 - present
Gareth Nicholas '20	Fall 2017 - present
Charles Marx '20, Beckman scholar	Summer 2017 - present
Yutong Li '19	Spring 2017 - Fall 2017
Monique Byars '19	Summer 2016 - Summer 2017
Richard Phillips '18, Beckman scholar	Spring 2016 - Spring 2018
Skyler Ellenburg '18	Fall 2015 - Fall 2016
Derek Roth '17	Fall 2015 - Fall 2017
Tosin Alliyu '18	Summer 2015 - Spring 2017
Tionney Nix '17	Summer 2015 - Summer 2017
Daniel Washburn '17	Summer 2015
Geoffrey Martin-Noble '16, Goldwater scholar	Spring 2015 - Spring 2016

Jason Feinberg '16	Fall 2014 - Spring 2016
Nora Tien '17	Summer 2014 - Spring 2017
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 DEVELOPED

### CS 104 Topics in Introductory Programming

Topics in Introductory Programming is designed to give a general introduction to programming as related to data analysis across many fields. Students will be introduced to standard introductory programming imperative and object oriented techniques as well as data structures necessary to create efficient and understandable algorithmic solutions to problems. Data for analysis will be drawn from a single discipline that will vary per semester, forming a theme for topical study. Topical investigations will include the ethics of data use in that field, how data is commonly generated and used, and implementation of important discipline-specific algorithms.

### CS 207 Data Science and Visualization

An introduction to techniques for the automated and human-assisted analysis of data sets. These “big data” techniques are applied to data sets from multiple disciplines and include cluster, network, and other analytical methods paired with appropriate visualizations.

### CS 395 Mobile Development for Social Change

Mobile Development for Social Change will focus on standard software engineering principles, object oriented programming, event-driven and multi-threaded programming, Android-specific mobile development concepts, and designing a positive user experience in the context of a semester-long placement with a local non-profit.

## COURSES TAUGHT

### Haverford College

Spring 2017	CS 104	Topics in Introductory Programming: Social Inquiry (lecture and lab, 25 students)
Fall 2016	CS 340	Analysis of Algorithms (lecture and lab, 32 students)
Spring 2016	CS 207	Data Science and Visualization (lecture and lab, 27 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)

## COLLEGE SERVICE

### Appointed Service

Computer Science Search Committee	Fall 2018 - Spring 2019
Innovation Programs Faculty Coordinator	Fall 2016 - present
Computational Studies Working Group, member	Fall 2016 - Spring 2017
Panel for Cases of Sexual and Racial Harassment, Faculty representative	Fall 2016 - Spring 2017
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, 2017

**Advising**

Fall 2014 - present

class of '22: 3 freshmen advisees

class of '20: 5 freshmen advisees, 8 majors

class of '19: 5 freshmen advisees, 6 majors

class of '18: 6 majors, 3 minors

class of '17: 3 majors

class of '16: 9 majors, 3 minors

**Other Service / Activities**

Innovation Incubator, informal working group member

Spring 2015 - present

Computational Studies, informal working group member

Fall 2015 - present

MakerArts space discussions within VCAM

Fall 2015 - present

Haverford Women in STEM panel participant

Spring 2016

Physics faculty search participant

Spring 2016

Digital scholarship librarian search participant

Spring 2016

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

Haverford OutWeek, panel participant

Fall 2013, Fall 2014