

# Rediet Abebe

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Cornell University  
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- Interests** Algorithms, computational social science, social and information network, mechanism design
- Academics**
- Cornell University** Ithaca, NY  
Ph.D. student in Computer Science Aug. 2015 – present  
Committee: Professors Jon Kleinberg (Chair) Michael Macy, David Parkes, & Kilian Weinberger,  
Affiliation: Theory of Computing, Social Dynamics Lab, and Center for the Study of Inequality
- Harvard University** Cambridge, MA  
Master of Science in Applied Mathematics Sept. 2014 – July 2015  
Advisor: Professor David Parkes  
Affiliation: The EconCS Group and Theory of Computation
- University of Cambridge** Cambridge, UK  
Master of Advanced Study in Mathematics Oct. 2013 – June 2014  
Advisors: Dr. Felix Fischer & Professor Imre Leader
- Harvard University** Cambridge, MA  
Bachelor of Arts in Mathematics Sept. 2009 – May 2013  
Advisors: Professors Michael Hopkins & Richard Stanley
- Fellowships, Awards, and Honors**
- Facebook Emerging Scholar Aug. 2017 - July 2019  
Award covering full tuition, fees, stipend, and conference travel for 2 academic years
- Google Generation Scholar Aug. 2016 – May 2017  
\$10,000 scholarship for outstanding aspiring computer scientists from underrepresented groups
- Graduate Resident Fellow, Alice Cook House Aug. 2016 – May 2017  
Selective leadership and mentorship position given to PhD students by the residential house
- Cornell University Fellowship Aug. 2015 – May 2016  
Selective university fellowship awarded to outstanding incoming graduate students
- Harvard-Cambridge Fellowship Oct. 2013 – June 2014  
Fully-funded year at the University of Cambridge given to 4 out of over 180 applicants
- HHMI IDEAS Research Program May 2010 – May 2013  
Grant for students from underrepresented backgrounds for excellence and promise in research
- PBHA Service Scholarship April 2010 & April 2011  
Award given for exceptional commitment to and leadership in public service
- Publications & Theses**
- Abebe, Rediet, Jon Kleinberg, and David Parkes. “Fair Division via Social Comparison.” *Proceedings of the Sixteenth International Conference on Autonomous Agents and Multiagent Systems (AAMAS '17)*. Sao Paulo, Brazil.
- Abebe, Rediet, Lada Adamic, and Jon Kleinberg. “Mitigating Overexposure in Viral Marketing.” (In submission)

Abebe, Rediet. “Generalized Brouwer’s Conjecture for Simplicial Complexes.” (In submission)

Harding, Charles, Francesco Pompei, Dmitriy Burmistrov, H. Gilbert Welch, Rediet Abebe, and Richard Wilson. “Breast Cancer Screening, Incidence, and Mortality Across US Counties.” *JAMA Internal Medicine* 175.9 (2015): 1483-1489.

Abebe, Rediet. “Cake Cutting: Equitable Simple Allocations of Heterogeneous Goods.” Thesis. University of Cambridge, 2014.

Abebe, Rediet. “Plethysm of Schur Functions and Irreducible Polynomial Representations of  $GL(n, \mathbb{C})$ .” Thesis. Harvard College, 2013.

Abebe, Rediet. “Counting Regions in Hyperplane Arrangements.” *Harvard College Math Review* 5 (2013).

Trifunovic, Luka, Oliver Dial, Mircea Trif, James Wotton, Rediet Abebe, Amir Yacoby, and Daniel Loss. “Long-Distance Spin-Spin Coupling via Floating Gates.” *Physical Review X* 2:011006 (2012).

## Professional Service

**Workshop Co-chair, EC 2017** June 2017  
Co-organizing the First Workshop on Mechanism Design for Social Good, a full day workshop at the 18th ACM Conference on Economics and Computation (EC '17), aimed at creating and raising interest mechanism design problems with a social good objective.

**Mechanism Design for Social Good, Organizer** Sept. 2016–present  
Co-organizing a reading group with members from multiple fields and seven institutions, with the goal of identifying mechanism design questions that can advance social good across different domains including housing, healthcare, economic inequality, online labor markets, and education.

**Program Committee Member, WWW 2017, Social Networks & Computational Social Science**

**Reviewer:** SAGT 2015, STOC 2016

## Committees

- **Computing and Information Sciences** May 2017 - May 2018  
Work with the College Dean and faculty to better understand issues related to diversity and formulate and implement solutions as student representative in the Diveristy Committee
- **Cornell West Campus House** Spring 2017  
Interview and select the Flora Rose House Professor-Dean, who will serve as head of one of five residential houses on the Cornell West Campus House system
- **Harvard-Cambridge Fellowship** Feb. 2017  
Interview and select four scholars for the 2017-2018 academic year

## Research Experience

**Microsoft Research, Computational Social Science** New York City, NY  
*Mentors: Dr. Jenn Wortman Vaughan and Dr. Shawndra Hill* May 2017 – Aug. 2017  
Use data science and theoretical techniques to address problems related to socioeconomic inequality.

**Microsoft Research, Theory Group** Cambridge, MA  
*Mentors: Dr. Nicole Immorlica and Dr. Brendan Lucier* May 2016 – Aug. 2016  
Used computational and network science techniques to analyze behavioral patterns with focus on inequality on real-world networks and the impact of interventions on the integration and network centrality distribution in a popular network formation model for agents with types.

**University of Chicago** Chicago, IL  
*Supervisor:* Professor László Babai June 2014 – Aug. 2014  
Worked on the log-rank conjecture in communication complexity for matrices inspired by Hamming distances. Participated in theoretical computer science courses in property testing, complexity of boolean functions, and communication complexity.

**University of Chicago** Chicago, IL  
*Supervisor:* Professor J. Peter May June 2013 – Aug. 2013  
Linked results in combinatorics and topology to show that shellable simplicial complexes give rise to finite topological spaces that have a weak homotopy type of a wedge of spheres.

**University of Minnesota, Twin Cities** Minneapolis, MN  
*Supervisor:* Professor Victor Reiner June 2012 – Aug. 2012  
Generalized Brouwer's conjecture on the Laplacian eigenvalues for graphs to simplicial complexes of any dimension and resolved it for numerous classes of simplicial complexes.

**Massachusetts Institute of Technology** Cambridge, MA  
*Supervisor:* Professor Richard Stanley May 2011 – March 2013  
Surveyed advanced topics in algebraic and enumerative combinatorics and computational geometry using various graduate-level notes. Wrote senior thesis under Professor Stanley's guidance.

**Harvard University** Cambridge, MA  
*Supervisor:* Professor Michael Hopkins Spring 2012 & Fall 2012  
Studied applications of Schubert varieties to enumerative geometry and theory of symmetric functions, and specifically Schur functions, to representation theory of  $S_n$  and  $GL(n, \mathbb{C})$ .

**Harvard University** Cambridge, MA  
*Supervisor:* Professor Richard Wilson Sept 2010 – May 2011  
Analyzed data to understand factors contributing to incidence, survival and mortality in breast cancer. Some results led to a paper in the *Journal of the American Medical Association, IM*.

**Harvard University** Cambridge, MA  
*Supervisor:* Professor Amir Yacoby May 2010 – Nov 2010  
Studied coherent control and manipulation of single electron spins and modeled experiments.

## Invited Talks & Presentations

### Fair Division via Social Comparison

- DOC Seminar. *Georgia Tech School of Industrial and Systems Engineering* April 2017
- Social Dynamics Lab. *Cornell University, Department of Sociology* April 2017
- Econ-CS Seminar. *Harvard University, Dept. of Computer Science* May 2017
- Theory of Comp. Seminar. *Cornell University, Dept. of Computer Science* May 2017
- (Poster) New York Computer Science & Economics Day. *NYU, Stern School* May 2017

### Computational Perspectives on Fairness and Inequality

- Inequality Discussion Group. *Cornell University, Dept. of Sociology* April 2017

### Laplacian Eigenvalues of Simplicial Complexes

- Mathematics Club. *Cornell University, Dept. of Mathematics* April 2016
- Women in Theory Workshop. *New York University* May 2014
- (Poster) Electric Flows, Graph Laplacians, & Algorithms Workshop. *ICERM* April 2014

**Leadership  
& Outreach**

- REU Invited Presentation. *University of Chicago, Dept. of Mathematics* Aug. 2013

**Alice Cook House** Ithaca, NY  
*Graduate Resident Fellow* May 2016 – May 2017  
Support House Professor-Dean, staff, and fellows to create an engaging, inclusive, and vibrant community in the undergraduate house through leadership and mentorship roles including:

- providing academic support through weekly office hours,
- maintaining community standards, and
- building community by organizing numerous social and intellectual events each week.

**Graduate School Recruitment Office** Ithaca, NY  
*Graduate Student Ambassador* Spring 2016 – Present  
Assist in actively recruiting underrepresented minority and first generation students to the Cornell Graduate School through on and off campus recruitment events, sharing information, and answering questions from prospective graduate students.

**Girls' Angle, Inc** Cambridge, MA  
*Mentor, volunteer* Sept. 2009 – Present  
Organize presentations at events such as the NYC FIRST robotics competitions. Write problems and puzzles for competitions. Recruit mentors, solicited writers, and advertising content. Taught various mathematical topics to girls ages 8-15 during the weekly mentoring sessions.

**Women in Computing at Cornell** Ithaca, NY  
*Graduate Mentor* January 2016 – Present  
Provide academic, career, and personal guidance to undergraduate women in computer science.

**Harvard College Math Review** Cambridge, MA  
*Editor-in-Chief (two terms)* May 2010 – April 2012  
Selected staff members, provided training for board members, and planned time-line of publication. Chose and edited content for publication alongside staff.

**The Harvard Crimson** Cambridge, MA  
*News Editor, Junior Executive* Sept. 2009 – May 2011  
Wrote over 50 articles on city politics, especially related to Cambridge Public Schools. Articles highlighted in various outside domains including [wiki/Cambridge\\_Public\\_School\\_District](http://wiki/Cambridge_Public_School_District).  
*Selected Work:* Abebe, Rediet. "Taking the School Committee Back to School." *The Harvard Crimson*, News sec. Web. 2 Sept. 2010.

**Action for Boston Community Development, Housing** Boston, MA  
*Intern* Winter 2010-2011  
Helped with data entry and analysis for various housing and homelessness related projects.

**Cambridge After-School Program** Cambridge, MA  
*Tutor* Jan. 2011 – May 2012  
Taught a group of students, most of whom come from Ethiopian and Haitian immigrant families. Implemented a problem-solving workshop for students interested in mathematics.

**Franklin I-O Summer Program** Boston, MA  
*Senior Counselor* Summer 2011  
Taught over 20 children from Franklin Field and Franklin Hill Housing developments in Dorchester. Led various activities including field trips, and collaborative community events.

<b>Teaching Experience</b>	<b>Cornell University</b>	Ithaca, NY
	<i>Tutor</i>	Aug. 2015 – present
	Hold weekly office hours to assist students with coursework in mathematics, computer science, operations research, and statistics.	
	<b>University of Chicago</b>	Chicago, IL
	<i>Teaching Assistant</i>	June 2013 – Aug. 2013
	Supervised research projects on probabilistic analysis of information-sharing protocols (presented at <i>QCrypt</i> 2014), irreducible representation of $S_n$ , and book-embedding of $k$ -partite graphs. Served as teaching assistant for a linear algebra and combinatorics course.	
	<b>Harvard University</b>	Cambridge, MA
	<i>Tutor, Cabot House</i>	Fall 2014 – Spring 2015
	Held weekly STEM table for coursework assistance in math and computer science. Provided academic and career advising, including providing research program and fellowship applications.	
	<i>Teaching Fellow</i>	Jan. 2013 – May 2013
	Worked with course head instructors to write weekly quizzes, problem sets, and exam problems. Held guided weekly remedial study and extra review sessions for a small group of students, and led a group of course assistants during weekly problem set sessions for all enrolled students.	
	<i>Teaching Assistant</i>	Fall 2010 & Fall 2011
	Held Office hours and graded problem sets for a freshman seminar on “Calculating $\pi$ ”.	
<b>Relevant Coursework</b>	<b>Graduate Level (Computer Science):</b> Machine Learning the Future, Big Data Systems: Trends and Challenges, Advanced Topics in Machine Learning, Machine Learning for Data Science, Analysis of Algorithms, Topics on Computation in Networks and Crowds: Social Data Mining, Advanced Topics in Artificial Intelligence: Multi-Agent Systems, Bio-inspired Multi-Agent Systems, Topics in Cryptography and Privacy: Differential Privacy	
	<b>Graduate Level (Mathematics):</b> Evolutionary Dynamics, Probability Theory and Stochastic Processes, Graph Limits Theory, Algebraic Topology, Algebraic Geometry, Commutative Algebra, Complex Analysis, Extremal & Probabilistic Combinatorics, Logic & Computation, Biostatistics, Mathematics of Operations Research, Designing Online Contests	
	<b>Graduate Level (Economics):</b> Mechanism Design and Approximation, Decision Theory	
	<b>Selected Undergraduate Level:</b> Abstract Algebra I: Theory of Groups and Vector Spaces, Algebra II: Theory of Rings and Fields, Algebraic Combinatorics, Topology I: Topological Spaces and the Fundamental Group, Topology II: Smooth Manifolds, Introduction to Mathematical Logic, Model Theory, Probability and Measure, Microeconomic Theory	
<b>Selected Memberships</b>	Gender Inclusivity in Mathematics, Harvard Graduate Women in Science and Engineering, Harvard Black Student Association, Harvard African Student Association, Pembroke College Stokes Society	
<b>Skills</b>	<i>Languages:</i> Python, MATLAB, R <i>More languages:</i> Amharic (fluent), English (fluent), French (proficient)	
<b>Citizenship</b>	Ethiopian	