

Rediet Abebe

Cornell University
Gates Hall, Ph.D. Mailing Room
Ithaca, NY 14853

Email: rta36@cornell.edu
Site: <http://www.cs.cornell.edu/~red>

Interests algorithms, artificial intelligence, computational social science, and applications to social good

Academics **Cornell University** Ithaca, NY
Ph.D. candidate in Computer Science Aug. 2015 – present
Master of Science in Computer Science March 2018
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

Selected Fellowships, Awards, and Honors Facebook Emerging Scholar Aug. 2017 – July 2019
Award covering full stipend, tuition, fees, stipend, and conference travel for 2 academic years (\$74,500/year)

Google Generation Scholar Aug. 2016 – May 2017
\$10,000 scholarship grant for outstanding aspiring computer scientists

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 (\$59,000)

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

Grants and Sponsorships Schmidt Family Foundation March 2018
Applied for and received funding for the 2nd Workshop on Mechanism Design for Social Good (\$12,000)

Institute for New Economic Thinking March 2018
Applied for an events grant through the Young Scholars Institute for the 2nd Workshop on Mechanism Design for Social Good (\$5000)

Publications

Abebe, Rediet, Shawndra Hill, Jennifer Wortman Vaughan, Peter M. Small, and H. Andrew Schwartz. “Using Search Queries to Understand Health Information Needs in Africa.” (Under review)
Preliminary version: *Workshop on Machine Learning for the Developing World* (NIPS), 2017.

Benson, Austin, Rediet Abebe, Michael T. Schaub, Ali Jadbabaie, and Jon Kleinberg. “Simplicial Closure and Higher-order Link Prediction.” (Under review)

Abebe, Rediet. “A New Conjectural Family of Inequalities for the Laplacian Spectra of Simplicial Complexes.” (Under review)

Abebe, Rediet, Jon Kleinberg, David Parkes, Charalampos E. Tsourakakis. “Opinion Dynamics with Varying Susceptibility to Persuasion.” *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (KDD), 2018.

Abebe, Rediet, Lada Adamic, and Jon Kleinberg. “Mitigating Overexposure in Viral Marketing.” *Proceedings of the 32nd AAAI Conference on Artificial Intelligence* (AAAI), 2018.

Abebe, Rediet. “Computational Perspectives on Social Good and Access to Opportunity.” *In the ACM/AAAI Conference on AI, Ethics and Society* (AIES), 2018.

Abebe, Rediet, Jon Kleinberg, and David Parkes. “Fair Division via Social Comparison.” *Proceedings of the 16th International Conf. on Autonomous Agents and Multiagent Systems* (AAMAS), 2017.

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.

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).

Published Expository Work

Abebe, Rediet and Kira Goldner. “A Report on the Workshop on Mechanism Design for Social Good.” *ACM SIGecom Exchanges* 16.2 (2018).

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

Theses

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.

Professional Service

Workshop Co-chair, *Black in AI @ NIPS 2018* December 2018
Co-chair for the 2nd Black in AI Workshop at NIPS, a workshop aimed at facilitating collaborations and discussing initiatives to increase the presence of Black researchers in the field of AI.

Workshop Co-chair, *ACM Conf. on Economics and Computation* June 2018
Co-chair for the 1st and 2nd workshop on Mechanism Design for Social Good, an interdisciplinary workshop series, at the ACM Conference on Economics and Computation. The workshop is aimed at fostering interest in algorithmic and mechanism design problems with a social good objective.

Group Co-Founder & Co-organizer, *Mechanism Design for Social Good* Sept. 2016 – present
Co-founded and co-organizing a multi-institutional, interdisciplinary research group with the goal

of identifying algorithmic and mechanism design problems that can improve societal welfare. The group currently has a network of over 100 researchers and is currently working in collaboration with policy makers, non-government organizations, and other agencies with a shared objective.

Group Co-founder & Co-organizer, *Black in AI* March 2016 – present
Co-founded and co-organizing the *Black in AI* group, a group with over 700 members from over 30 countries. The group aims to share ideas, foster collaborations, and discuss initiatives to increase the presence and Black researchers in the field.

Workshop Co-chair, *ACM Conf. on Economics and Computation* June 2017
Co-chair for the 1st and 2nd workshop on Mechanism Design for Social Good.

Workshop Co-chair, *Black in AI @ NIPS 2017* December 2017
Co-chair for the 1st Black in AI Workshop.

Program Committees

- Conference on Fairness, Accountability, and Transparency (FAT* '19)
- The Web Conference (TheWeb '19), Social Networks & Graph Algorithms Track
- The Web Conference (TheWeb '18), Social Networks & Graph Algorithms Track
Best Reviewer: award given to 19 out of 1232 reviewers
- Intl. World Wide Web Conf. (WWW '17), Social Networks & Comp Social Science Track

Invited Talks & Presentations

Youth Skills for Sustainability and Innovation
World Youth Skills Day, *United Nations* July 2018

AI for Good
The AI Element Podcast, *Element AI* July 2018

Access to Opportunity and AI
Salon 24: Artificial Imperfection. *Museum of Modern Art* March 2018

Africa, Access to Opportunity, and AI
African Girls Can Code: Empowering African Women and Girls Through ICT and Coding, 62nd session of the Commission on the Status of Women (CSW62).
United Nations March 2018

Using Search Queries to Understand Health Information Needs in Africa

- Science for Social Good. *IBM Research, Thomas J. Watson Research Center* Aug 2018
- ThursdAI. *Berkman Klein Center for Internet & Society at Harvard* March 2018

Information and Overexposure in Word-of-Mouth Campaigns

- Theory Seminar. *University of Pennsylvania, Department of Computer Science* April 2018
- DOS Optimization Seminar. *Georgia Tech ISyE* April 2018
- (Poster) *AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society* Feb. 2018

Privacy and Poverty

- Privacy Reading Group. *Georgia Tech, ISyE* April 2018

Mitigating Overexposure in Viral Marketing

- Mining and Modeling Network Data. *SIAM Conf. on Discrete Mathematics* June 2018
- *The 32nd AAAI Conference on Artificial Intelligence* Feb. 2018

Fair Division via Social Comparison

- *University of Chicago, Department of Mathematics* Aug 2018
- DOS Optimization Seminar. *Georgia Tech, ISyE* April 2017
- Econ-CS Seminar. *Harvard University, Dept. of Computer Science* May 2017
- (Poster) New York Computer Science & Economics Day. *NYU, Stern School* May 2017

Laplacian Eigenvalues of Simplicial Complexes

- Women in Theory Workshop. *New York University* May 2014
- (Poster) Electric Flows, Graph Laplacians, & Algorithms Workshop. *ICERM* April 2014
- REU Invited Presentation. *University of Chicago, Dept. of Mathematics* Aug. 2013

Research and Internship Experiences

Cornell University

Ithaca, NY

Advisor: Professor Jon Kleinberg

July 2016 – present

Conducting research on algorithms, artificial intelligence, and applications to social good.

Microsoft Research, Computational Social Science

New York City, NY

Mentors: Dr. Jenn Wortman Vaughan and Dr. Shawndra Hill

May 2017 – Aug. 2017

Used data-scientific techniques to understand health information needs of individuals to address health inequality between developing and developed nations.

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.

Harvard University

Cambridge, MA

Mentor: Professor David Parkes

August 2014 – July 2016

Studied allocation problems on social networks and opinion dynamics in social networks as a member of the EconCS group.

Undergraduate Research & Summer School Experiences

- **University of Chicago**, *Supervisor:* Prof. László Babai June 2014 – Aug. 2014
- **University of Chicago**, *Research Supervisor:* Prof. J. Peter May June 2013 – Aug. 2013
- **University of Minnesota**, *Research Supervisor:* Prof. Victor Reiner June 2012 – Aug. 2012
- **MIT**, *Research Supervisor:* Prof. Richard Stanley May 2011 – March 2013
- **Harvard University**, *Research Supervisor:* Prof. Michael Hopkins Spring 2012 & Fall 2012
- **Harvard University**, *Research Supervisor:* Prof. Richard Wilson Sept 2010 – May 2011
- **Harvard University**, *Research Supervisor:* Prof. Amir Yacoby May 2010 – Nov 2010

Teaching Experience

Cornell University

Ithaca, NY

Department of Computer Science, *Teaching Assistant*

Spring 2018

Structure of Information Networks. Hold weekly office hours to assist students with course material, homework, and projects. Guest lectures:

- Modeling Diffusion and Overexposure in Viral Marketing
- Can Cascades be Predicted? Virality and Growth in Cascades
- Resource Allocation Problems in Social Networks

University of Chicago Chicago, IL
Department of Mathematics, *Teaching Assistant* Summer 2013
Supervised research projects on probabilistic analysis of information-sharing protocols (presented at *QCrypt* 2014), irreducible representation of S_n , and book-embedding of k -partite graphs. Served as teaching assistant for a linear algebra and combinatorics course.

Harvard University Cambridge, MA
Department of Mathematics, *Teaching Fellow* Spring 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.

Harvard Freshman Seminar, *Teaching Assistant* Fall 2010 & Fall 2011
Held Office hours and graded problem sets for a freshman seminar on “Calculating π ”.

**Leadership
& Outreach**

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

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.

Alice Cook House Ithaca, NY
Graduate Resident Fellow May 2016 – May 2017
Supported 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.

Cabot House Cambridge, MA
Tutor 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.

Harvard College Math Review

Editor-in-Chief (two terms)

Cambridge, MA
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

News Editor, Junior Executive

Cambridge, MA
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](#).

Selected Work: Abebe, Rediet. "Taking the School Committee Back to School." *The Harvard Crimson*, News sec. Web. 2 Sept. 2010.

Cambridge After-School Program

Tutor

Cambridge, MA
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.

Selected Coursework

Graduate Level (Computer Science): Machine Learning the Frontier, Advanced Topics in Machine Learning, Machine Learning for Data Science, Security and Privacy Technologies, 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

Graduate Level (Economics): Mechanism Design and Approximation, Decision Theory

Graduate Level (Mathematics): 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

Graduate Level (Sociology): Social Inequality: Contemporary Theories, Debates, and Models, Social Dynamics and Computational Methods

Selected Memberships

Underrepresented Minorities in Computing at Cornell, Gender Inclusivity in Mathematics, Harvard Graduate Women in Science and Engineering, Harvard Black Student Association, Harvard African Student Association, Pembroke College Stokes Society

Skills

Languages: Python, MATLAB, R

More languages: Amharic (fluent), English (fluent), French (proficient)