

Rediet Abebe

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
Thesis: “Cake Cutting: Equitable Simple Allocations of Heterogeneous Goods”
- Harvard University** Cambridge, MA
Bachelor of Arts in Mathematics Sept. 2009 – May 2013
Advisors: Professors Michael Hopkins & Richard Stanley
Thesis: “Plethysm of Schur Functions and Irreducible Polynomial Representations of $GL(n, \mathbb{C})$ ”
- Selected 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**
- Abebe, Rediet, Jon Kleinberg, David Parkes, Charalampos E. Tsourakakis. “Opinion Dynamics with Varying Susceptibility to Persuasion.” (Working paper)
- Abebe, Rediet. “Computational Perspectives on Social Good and Access to Opportunity.” *In the ACM/AAAI AI, Ethics and Society Conference Student Program.* (In preparation)

Abebe, Rediet, Lada Adamic, and Jon Kleinberg. “Mitigating Overexposure in Viral Marketing.” *Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18)*. New Orleans, LA.

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. “Generalized Brouwer’s Conjecture for Simplicial Complexes.” (In preparation)

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).

Theses & Other Writing

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).

Professional Service

Workshop Co-organizer, *Black in AI @ NIPS 2017* December 2017
Co-organizing the first Black in AI Workshop at NIPS, a half day workshop aimed at fostering collaborations and discussing initiatives to increase the presence of black researchers in the field of Artificial Intelligence.

Workshop Co-chair, *ACM Conf. on Economics and Computation (EC '17)* June 2017
Co-chaired 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 in algorithmic, mechanism design, and optimization problems with a social good objective.

Research Group Co-organizer, *Mechanism Design for Social Good* Sept. 2016 – present
Co-founded and organizing a research group with members from multiple fields and seven institutions, with the goal of identifying algorithmic, mechanism design, and optimization questions that can advance social good by *improving access to opportunity* across different domains including housing, healthcare, economic inequality, online labor markets, and education.

Program Committees

- Intl. World Wide Web Conf. (WWW '18), Social Networks & Graph Algorithms Track
- Intl. World Wide Web Conf. (WWW '17), Social Networks & Comp Social Science Track

Reviewer: ACM Symposium on Theory of Computing (STOC '16), International Symposium on Algorithmic Game Theory (SAGT '15)

Research Experience

Microsoft Research, Computational Social Science New York City, NY
Mentors: Dr. Jenn Wortman Vaughan and Dr. Shawndra Hill May 2017 – Aug. 2017
Used natural language processing to identify misinformation and gaps in people’s knowledge using search queries related to infectious diseases in certain developing 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 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

Computational Perspectives on Inequality

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

Mitigating Overexposure in Viral Marketing

- Social Dynamics Lab. *Cornell University, Department of Sociology* Sept 2017
- Theory Tea Talk. *Cornell University, Department of Computer Science* Sept 2017

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

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

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

Graduate Student Ambassador

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.

Ithaca, NY

Spring 2016 – Present

Girls' Angle, Inc

Mentor, volunteer

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.

Cambridge, MA

Sept. 2009 – Present

Women in Computing at Cornell

Graduate Mentor

Provide academic, career, and personal guidance to undergraduate women in computer science.

Ithaca, NY

January 2016 – Present

Alice Cook House

Graduate Resident Fellow

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.

Ithaca, NY

May 2016 – May 2017

Harvard College Math Review

Editor-in-Chief (two terms)

Selected staff members, provided training for board members, and planned time-line of publication. Chose and edited content for publication alongside staff.

Cambridge, MA

May 2010 – April 2012

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](#).
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.

Teaching Experience

Cornell University Ithaca, NY
Alice H. Cook House, *Tutor* Fall 2016
Hold weekly office hours to assist students with coursework in mathematics, computer science, operations research, and statistics.

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
Cabot House, *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.

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 ”.

Selected Coursework

Graduate Level (Computer Science): Machine Learning the Frontier, 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

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

Undergraduate Level: Abstract Algebra I: Theory of Groups and Vector Spaces, Algebra II: Theory of Rings and Fields, Combinatorics, Topology I: Topological Spaces and the Fundamental Group, Topology II: Smooth Manifolds, Model Theory, Intro. to Mathematical Logic, Probability and Measure, Microeconomic Theory, Intro. to Quantitative Methods for Economics

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)