Moon Duchin

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Education

University of Chicago — MS 1999, PhD 2005
Mathematics

Harvard University — BA 1998
Mathematics and Women's Studies

Appointments

University of Chicago
Professor of Data Science, Computer Science, and the College — 2025—
Faculty Director | Data and Democracy Research Initiative — 2025—

Cornell University
Professor of Mathematics and Public Policy – *on leave 2025–2026* — 2024–2025

Santa Fe Institute
External Faculty — 2024—

Tufts University
John Dibiaggio Professor of Citizenship and Public Service — 2023–2024
Professor of Mathematics (previously Associate Professor, Assistant Professor) — 2011–2024
Senior Fellow | Jonathan M. Tisch College of Civic Life — 2017–2025
Director | Program in Science, Technology, & Society — 2015–2021

University of Michigan
Assistant Professor (postdoctoral) — 2008–2011

University of California, Davis
NSF VIGRE Postdoctoral Fellow — 2005–2008

Research Interests

Data science for democracy, computational social choice, geometry and redistricting.
Science, technology, and society, computing and law, science policy, census data, privacy.
Random walks and Markov chains, partition problems, networks, algorithmic fairness.
Geometric group theory, geometric topology, hyperbolicity, metric geometry.

Selected Awards & Distinctions

Sloan Professor, MSRI Program in Algorithms, Fairness, and Equity — Fall 2023
Seelye Fellow, University of Auckland Department of Mathematics — 2023
Radcliffe Fellow - Evelyn Green Davis Fellowship — 2018–2019
Guggenheim Fellow — 2018
Fellow of the American Mathematical Society — elected 2017
NSF C-ACCEL (PI) - Harnessing the Data Revolution: Network science of Census data — 2019–2020
NSF grants (PI) - CAREER grant and continuous grants from Topology/Geometric Analysis — 2009–2024
Professor of the Year, Tufts Math Society — 2012–2013
AAUW Dissertation Fellowship — 2004–2005
NSF Graduate Fellowship — 1998–2002
Robert Fletcher Rogers Prize (Harvard Mathematics) — 1995–1996

Political Geometry: Rethinking Redistricting in the U.S. with Math, Law, and Everything In Between
25 chapters, 475 pages. Birkhäuser Books 2022. Preprint online. (eds. Moon Duchin, Olivia Walch)
see: Introduction, Compactness, Communities of Interest, Clustering, Random Walks, Ranked Choice Voting.

Spanning tree methods for redistricting: New methods for sampling and validation
SIAM Review, to appear. Preprint. (with Sarah Cannon, Dana Randall, and Parker Rule)

VoteKit: A Python package for computational social choice research
Journal of Open Source Software **10**(109), 7477. Open access.
(with Christopher Donnay, Jack Gibson, Zach Glaser, Andrew Hong, Malavika Mukundan, and Jennfier Wang)

The group perspective on fairness in multi-winner voting rules
In submission. Preprint. (with Kevin Quinn)

Repetition effects in a sequential Monte Carlo sampler
In submission. Preprint. (with Sarah Cannon and Daryl DeFord)

Proportionality for ranked voting, in theory and practice
In submission. Preprint. (with Gerdus Benade, Chris Donnay, and Thomas Weighill)

Learning blocs and slates from ranked-choice ballots
In submission. Preprint. (with David Shmoys and Kris Tapp)

Mapper graphs for voting analysis
In preparation. Preprint. (with Hazel Brenner, Emarie De La Nuez, and Jordan Phan)

Ranked choice voting and proportional representation
In preparation. Preprint. (with Gerdus Benade, Ruth Buck, Dara Gold, and Thomas Weighill)

Discrete geometry for electoral geography
Political Geography, Volume 109, March 2024. Open access. (with Bridget Eileen Tenner)

Measuring segregation via analysis on graphs
SIAM Journal on Matrix Analysis and Applications (SIMAX), **44** (1) 2023, 80–105. Preprint version.
(with James Murphy and Thomas Weighill)

Implementing partisan symmetry: Problems and paradoxes
Political Analysis **31** (3) 2023, 305–324. Open access.
(with Daryl DeFord, Natasha Dhamankar, Mackenzie McPike, Gabe Schoenbach, and Ki-Wan Sim)

Redistricting for proportionality
The Forum: A Journal of Applied Research in Contemporary Politics, Vol. 20, No. 3-4, Jan 2023, 371–393.
Open access. (with Gabe Schoenbach)

Blind justice: Algorithms and neutrality in the case of redistricting
Proceedings of 2nd ACM Symposium on Computer Science and Law (CS&Law), Nov 2022, 101–108. Open access.
(with Doug Spencer)

Aggregating community maps
ACM Conference on Advances in GIS (SIGSPATIAL), Nov 2022, 1–12. Open access. (with Erin Chambers, Ranthony Edmonds, Parker Edwards, JN Matthews, Anthony Pizzimenti, Chanel Richardson, Parker Rule, and Ari Stern)

Private numbers in public policy: Census, differential privacy, and redistricting
Harvard Data Science Review, Spec. Iss. 2, June 2022. Open access. (w Aloni Cohen, JN Matthews, Bhushan Suwal)

The (homological) persistence of gerrymandering
Foundations of Data Science, Vol 4, Issue 4 (2022): 581–622. Preprint version. (w Tom Needham and Thomas Weighill)

Recombination: A family of Markov chains for redistricting
Harvard Data Science Review. Issue 3.1, Winter 2021. Open access. (with Daryl DeFord and Justin Solomon)

Census TopDown: The impact of differential privacy on redistricting
2nd Symposium on Foundations of Responsible Computing (FORC 2021), 5:1–5:22. Open access.
(with Aloni Cohen, JN Matthews, and Bhushan Suwal)

Computational Redistricting and the Voting Rights Act
Election Law Journal, Volume 20, Number 4 (2021), 407–441. Open access.
(with Amariah Becker, Dara Gold, and Sam Hirsch)

Models, Race, and the Law
Yale Law Journal Forum, Vol. 130 (March 2021). Open access. (with Doug Spencer)

Clustering propensity: Segregation in networks
Preprint. (with Emilia Alvarez, Everett Meike, and Marshall Mueller; appendix by Tyler Piazza)

Mathematics of nested districts: The case of Alaska
Statistics and Public Policy. Vol 7, No 1 (2020), 39–51. Preprint version.
(w/ Sophia Caldera, Daryl DeFord, Sam Gutekunst, & Cara Nix)

A computational approach to measuring vote elasticity and competitiveness
Statistics and Public Policy. Vol 7, No 1 (2020), 69–86. Open access. (with Daryl DeFord and Justin Solomon)

Redistricting reform in Virginia: Districting criteria in context
Virginia Policy Review, Volume XII, Issue II, Spring 2019, 120–146. Preprint version. (with Daryl DeFord)

Locating the representational baseline: Republicans in Massachusetts
Election Law Journal, Volume 18, Number 4, 2019, 388–401. Open access.
(with Taissa Gladkova, Eugene Henninger-Voss, Ben Klingensmith, Heather Newman, and Hannah Wheelen)

Geometry v. Gerrymandering
The Best Writing on Mathematics 2019, ed. Mircea Pitici. Princeton University Press.
reprinted from Scientific American, November 2018, 48–53. Magazine version.

Gerrymandering metrics: How to measure? What's the baseline?
Bulletin of the American Academy for Arts and Sciences, Vol. LXII, No. 2 (Winter 2018), 54–58. Preprint version.

Rebooting the mathematics of gerrymandering: How can geometry track with our political values?
The Conversation (online magazine), October 2017. Open access. (with Peter Levine)

A formula goes to court: Partisan gerrymandering and the efficiency gap
Notices of the American Mathematical Society **64** No. 9 (2017), 1020–1024. Open access. (with Mira Bernstein)

International mobility and U.S. mathematics
Notices of the American Mathematical Society **64**, No. 7 (2017), 682–683. Open access.

Pure Mathematics Publications & Preprints

open access links included

Models of random spanning trees
Random Structures and Algorithms, in revision. Preprint.
(with Eric Babson, Annina Iseli, Pietro Poggi-Corradini, Dylan Thurston, and Jamie Tucker-Foltz)

Conjugation curvature for Cayley graphs
Journal of Topology and Analysis, Vol 14, Number 02 (2022), 439–459. Preprint version.
(with Assaf Bar-Natan and Robert Kropholler)

You can hear the shape of a billiard table: Symbolic dynamics and rigidity for flat surfaces
Commentarii Mathematici Helvetici, Vol 96, Issue 3 (2021), 421–463. Preprint version.
(with Viveka Erlandsson, Christopher Leininger, and Chandrika Sadanand)

Stars at infinity in Teichmüller space
Geometriae Dedicata, Volume 213, 531–545 (2021). (with Nate Fisher) Preprint version.

The Heisenberg group is pan-rational
Advances in Mathematics **346** (2019), 219–263. Open access. (with Michael Shapiro)

Random nilpotent groups I
International Mathematics Research Notices, Vol. 2018, Issue 7 (2018), 1921–1953. Open access.
(with Matthew Cordes, Yen Duong, Meng-Che Ho, and Ayla Sánchez)

Hyperbolic groups
in *Office Hours with a Geometric Group Theorist*, eds. M.Clay,D.Margalit, Princeton U Press (2017), 177–203. Offprint.

Counting in groups: Fine asymptotic geometry
Notices of the American Mathematical Society **63**, No. 8 (2016), 871–874. Open access.

A sharper threshold for random groups at density one-half
Groups, Geometry, and Dynamics **10**, No. 3 (2016), 985–1005. Open access.
(with Katarzyna Jankiewicz, Shelby Kilmer, Samuel Lelièvre, John M. Mackay, and Ayla Sánchez)

Equations in nilpotent groups
Proceedings of the AMS **143** (2015), 4723–4731. Open access. (with Hao Liang and Michael Shapiro)

Statistical hyperbolicity in Teichmüller space
GAFA, Volume 24, Issue 3 (2014), 748–795. Preprint version. (with Howard Masur and Spencer Dowdall)

Fine asymptotic geometry of the Heisenberg group
Indiana University Mathematics Journal 63 No. 3 (2014), 885–916. Preprint version. (with Christopher Mooney)

Pushing fillings in right-angled Artin groups
JLMS, Vol 87, Issue 3 (2013), 663–688. Preprint version. (w Aaron Abrams, Noel Brady, Pallavi Dani, Robert Young)

Spheres in the curve complex
Ahlfors–Bers VI, Contemp. Math. **590** (2013), 1–8. Preprint version. (with Howard Masur and Spencer Dowdall)

The sprawl conjecture for convex bodies
Experimental Mathematics, Volume 22, Issue 2 (2013), 113–122. Offprint. (w Samuel Lelièvre, Christopher Mooney)

Filling loops at infinity in the mapping class group
Michigan Math. J., Vol 61, Issue 4 (2012), 867–874. Preprint version. (w Aaron Abrams, Noel Brady, Pallavi Dani, Robert Young)

The geometry of spheres in free abelian groups
Geom. Dedicata, Volume 161, Issue 1 (2012), 169–187. Preprint version. (with Samuel Lelièvre and Christopher Mooney)

Statistical hyperbolicity in groups
Algebraic and Geometric Topology **12** (2012) 1–18. Open access. (with Samuel Lelièvre and Christopher Mooney)

Length spectra and degeneration of flat metrics
Inventiones Math., Volume 182, Issue 2 (2010), 231–277. Preprint version. (w Christopher Leininger, Kasra Rafi)

Divergence of geodesics in Teichmüller space and the mapping class group
Geometric and Functional Analysis, Volume 19, Issue 3 (2009), 722–742. Preprint version. (with Kasra Rafi)

Curvature, stretchiness, and dynamics
In the Tradition of Ahlfors and Bers IV, Contemp. Math. **432** (2007), 19–30. Offprint.

Geodesics track random walks in Teichmüller space
PhD Dissertation, University of Chicago 2005.

Teaching

Courses Developed or Customized

Data and the State: How Governments "See" People and Places
Interdisciplinary undergraduate course teaching Python-based geospatial tools with policy applications.

Modeling Democracy
Interdisciplinary PhD course on computational social choice and applied modeling of democratic systems.

Mathematics of Social Choice | sites.tufts.edu/socialchoice
Voting theory, impossibility theorems, redistricting, theory of representative democracy, metrics of fairness.
Have designed and taught variants at entry level and math-major level.

History of Mathematics | sites.tufts.edu/histmath
Social history of mathematics, organized around episodes from antiquity to present. Themes include materials and technologies of creation and dissemination, axioms, authority, credibility, and professionalization. In-depth treatment of mathematical content from numeration to cardinal arithmetic to Galois theory.

Reading Lab: Mathematical Models in Social Context | sites.tufts.edu/models
One hr/wk discussion seminar of short but close reading on topics in mathematical modeling, including history of psychometrics; algorithmic bias; philosophy of statistics; problems of model explanation and interpretation.

Reading Lab: Classification | sites.tufts.edu/classification
Discussion-based seminar of close reading on topics in classifications and taxonomies, including censuses; race and ethnicity; academic disciplines, definition in math and law; chemical elements; model organisms; sex and gender.

Geometric Literacy
Module-based graduate topics course. Modules have included: p-adic numbers, hyperbolic geometry, nilpotent geometry, Lie groups, convex geometry and analysis, the complex of curves, ergodic theory, the Gauss circle problem.

Randomized Algorithms (graduate/undergraduate topics course)
Markov Chains (graduate topics course)
Teichmüller Theory (graduate topics course)
Fuchsian Groups (graduate topics course)
Continued Fractions and Geometric Coding (undergraduate topics course)
Mathematics for Elementary School Teachers (inquiry-based course for pre-service teachers)

Standard Courses

Mathematical Modeling and Computation (with Python), Discrete Mathematics, Calculus I-II-III, Intro to Proofs, Linear Algebra, Complex Analysis, Differential Geometry, Abstract Algebra, Graduate Real Analysis

Selected Talks and Lectures

Keynote Lecture — October 2025
Computational Social Choice Workshop (COMSOC), Vienna, Austria

Invited Talk — November 2024
Autumn General Meeting of the American Philosophical Society, Philadelphia, PA

Plenary Lecture — October 2024
SIAM Conference on Mathematics of Data Science (MDS24), Atlanta, GA

Plenary Lecture — June 2023
Symposium on Computational Geometry (SoCG), Dallas, TX

Distinguished Plenary Lecture — June 2021
75th Anniversary Meeting of Canadian Mathematical Society, Ottawa, Ontario — *online (COVID)*

BMC/BAMC Public Lecture — April 2021
Joint British Mathematics/Applied Mathematics Colloquium, Glasgow, Scotland — *online (COVID)*

Gerald and Judith Porter Public Lecture — January 2018
AMS-MAA-SIAM, Joint Mathematics Meetings, San Diego, CA

Mathematical Association of America Distinguished Lecture — October 2016
MAA Carriage House, Washington, DC

American Mathematical Society Invited Address — September 2016
AMS Eastern Sectional Meeting, Brunswick, ME

Named University Lectures

- David Blackwell Seminar in Statistics and Data Science | University of Washington — October 2025
- University Lecture, Data Science Distinguished Lecture | Cornell University — February 2024
- Martha Davenport Heard Lecture | Wellesley College — February 2024
- 47 Lecture | Pomona College — October 2023
- Seelye Public Lecture | University of Auckland, New Zealand — March 2023
- Lorne Campbell Lecture | Queen's University, Ontario — December 2022
- Plancherel Lecture | Université de Fribourg, Switzerland — October 2022
- Loeb Lectures in Mathematics | Washington University in St. Louis — April 2022
- Mathematics and Natural Sciences Divisional Lecture | Reed College — March 2022
- Parsons Lecture | UNC Asheville — October 2020
- Math, Stats, CS, and Society | Macalester College — October 2019
- MRC Public Lecture | Stanford University — May 2019
- Freedman Memorial Colloquium | Boston University — March 2019
- Julian Clancy Frazier Colloquium Lecture | U.S. Naval Academy — January 2019
- Barnett Lecture | University of Cincinnati — October 2018
- School of Science Colloquium Series | The College of New Jersey — March 2018
- Kieval Lecture | Cornell University — February 2018

Department Colloquia

- Northwestern University (data sci) Oct 2025
- Northeastern University (math) Feb 2023
- University of Michigan (math) Sept 2022
- UC Berkeley (math) Apr 2022
- Reed College (math) Dec 2020
- Georgetown (CS) Sept 2020
- Santa Fe Institute (complex systems) July 2020
- Univ of Illinois - Chicago (math) Oct 2019
- UC Berkeley (math) Sept 2018
- Brandeis-Harvard-MIT-NEU (math) Mar 2018
- Northwestern University (math) Oct 2017
- University of Illinois (math) Sept 2017

Minicourses

- Modeling democracy (three hours) | Modern Math Workshop, Puerto Rico October 2022
- Integer programming and combinatorial optimization (two talks) | Georgia Tech May 2021

Visiting Lectures

- Law and Algorithms | Boston University Spring 2024
- Normative, Legal, and Empirical Analyses of Discrimination | Yale Law School Spring 2024
- Optimized Democracy | Harvard (CS) 2021, 2022, 2023, 2024, 2025
- Law of Democracy | Stanford Law School Fall 2022
- A Democracy Initiative | Harvard Law School Fall 2022
- Election Law | Harvard Law School | Yale Law School Spring 2022
- Privacy, Policy, and the U.S. Census | University of Chicago (CS) Spring 2022

Data Science, Computer Science, Quantitative Social Science

- Online Social Choice and Welfare Seminar August 2023
- Data Matters Public Lecture | Data Science Institute, Brown University April 2023
- Computational Social Choice Seminar | Center for Mathematical Social Science, Auckland March 2023
- Societal Considerations and Applications | Simons Institute for the Theory of Computing November 2022
- ACM Symposium on Computer Science and Law | Washington, DC November 2022
- Econ/CS Seminar | Harvard October 2022
- Can Algorithms Bend the Arc Towards Fairness? | Algorithmic Justice Project, UNM/SFI March 2022
- Data Linkage Seminar | Massive Data Institute, McCourt School of Public Policy August 2021
- Mechanism Design for Social Good (MD4SG) Colloquium | MD4SG Initiative November 2020
- Data Science for Social Good (DS4SG) Workshop | Georgia Tech November 2020
- Women in Data Science Conference | Microsoft Research New England March 2020
- Quantitative Research Methods Workshop | Yale Center for the Study of American Politics February 2020
- Societal Concerns in Algorithms and Data Analysis | Weizmann Institute December 2018
- Quantitative Collaborative | University of Virginia March 2018
- Quantitative Social Science | Dartmouth College September 2017
- Data for Black Lives Conference | MIT November 2017

Law, Democracy, Political Science, Geography, Studies of Race and Gender

- Data and Democracy Scholar Talk | Harris School, University of Chicago April 2023
- Voting Rights Panel | Rothgerber Conference, University of Colorado Law School April 2023
- Censuses and Racial Classification | COMPASS, University of Auckland March 2023
- The Long 19th Amendment: Women, Voting, and American Democracy | Radcliffe Institute Nov–Dec 2020
- "The New Math" for Civil Rights | Social Justice Speaker Series, Davidson College November 2020
- Math, Law, and Racial Fairness | Justice Speaker Series, University of South Carolina November 2020
- Voting Rights Conference | Northeastern Public Interest Law Program September 2020
- Political Analysis Workshop | Indiana University November 2019
- Program in Public Law Panel | Duke Law School October 2019
- Redistricting 2021 Seminar | University of Chicago Institute of Politics May 2019
- Geography of Redistricting Conference Keynote | Harvard Center for Geographic Analysis May 2019
- Political Analytics Conference | Harvard University November 2018
- Cyber Security, Law, and Society Alliance | Boston University September 2018

- Clough Center for the Study of Constitutional Democracy | Boston College November 2017
- Tech/Law Colloquium Series | Cornell Tech November 2017
- Constitution Day Lecture | Rockefeller Center for Public Policy, Dartmouth College September 2017

Science, Technology, and Society

- STS Colloquium | Cornell University March 2024
- The Mathematics of Accountability | Sawyer Seminar, Anthropology, Johns Hopkins February 2020
- STS Circle | Harvard Kennedy School of Government September 2019
- Data, Classification, and Everyday Life Symposium | Rutgers Center for Cultural Analysis January 2019
- Science Studies Colloquium | UC San Diego January 2019
- Arthur Miller Lecture on Science and Ethics | MIT Program in Science, Tech, and Society November 2018

Program Development

Director, PI of **Data and Democracy Lab** (formerly MGGG Redistricting Lab) mggg.org

Multidisciplinary research lab with postdocs, research staff, and undergraduate researchers drawn from mathematics, computer science, geography, policy. Hosts law student externs. Provided public mapping support for roughly 140 localities after 2020 Census data released.

Support includes NSF, Crankstart Foundation, Democracy Fund, Kelson Foundation, Sloan Foundation, Thornburg Foundation, Arnold Foundation.

Director of **Structural Democracy Fellowship Program**

Fellowship program distributing research funding to initial cohort of 16 U.S. and international fellows. Tied to weekly online research seminar and special issue of Harvard Data Science Review, titled *Designing Democracy*.

Funded by gift from Crankstart Foundation.

Co-Founder, Program Director of **Science, Technology, and Society Program** sts.tufts.edu

Interdisciplinary program offering a major and minor, with ∼40 affiliated faculty. Initiated popular weekly lunch seminar and developed Reading Lab courses on topics from Automation to Classification to Life to Energy.

Program Organization

Semester Program in *Algorithms, Fairness, and Equity*, Fall 2023
Mathematical Sciences Research Institute, Berkeley CA

Program hosted ∼50 research members on topics connected to mechanism design, fair partitioning, and fair ML.

Short workshops and training programs

- Ranked Choice Modeling Session 2025 (2 days, planned for June 2025 at Cornell)
- Ranked Choice Modeling Session 2023 (1 day, 20 participants from think tanks and NGOs)
- GeoData Bootcamp 2020 (2 weeks, 20 students from around the country)
- Mapping Training 2020 (1 week, 30 students from around the country)
- Graphs and Networks Workshop 2020 (1 day, 500 live participants)
- Data for Election Administration 2019, 2021 (multi-day, dozens of administrators and scholars)

Program Building Research and mentorship programs

- Voting Rights Data Institute 2018, 2019, 2023, 2025
  Six-week summer research programs hosting up to 52 undergraduate and graduate students, respectively, with dozens of visitors from math, CS, law, political science, geography, urban planning, and more.

- Polygonal Billiards Research Cluster 2017, Random Groups Research Cluster 2014
  Five-week intensive summer research programs for vertically integrated groups of 12-14 undergraduate, graduate, postdoctoral, and junior faculty researchers, combining experimental and theoretical work.
- Directed Reading Program and DRP Network sites.google.com/view/drp-network/
  Co-founded highly successful near-peer mentoring program in 2003 at UChicago. Now exists at $>$40 math departments as grad-student-run reading program with excellent outcomes for broadening participation in mathematics. Secured NSF grant to expand the program to more campuses and to fund social science research on outcomes.

Graduate Advising in Mathematics

Nate Fisher (PhD 2021), Sunrose Shrestha (PhD 2020), Ayla Sánchez (PhD 2017), Kevin Buckles (PhD 2015), Mai Mansouri (MS 2014)

Co-advisor or outside committee member

Chris Donnay (PhD 2024 Ohio State), Chris Coscia (PhD 2020 Dartmouth College)

Postdoctoral Advising

Principal supervisor Hane Lee (2025–), Amariah Becker (2020-21), Thomas Weighill (2019–2020)

Co-supervisor Daryl DeFord (MIT 2018–2020), Rob Kropholler (2017–2020), Hao Liang (2013–2016)

Selected Professional Service and Public-Facing Work

Program committees and editorial boards

ACM Conference on Fairness, Accountability, and Computing (FAccT)	2022
Symposium on Foundations of Responsible Computing (FORC)	2021
Harvard Data Science Review	since 2019
Advances in Mathematics	2018–2023

Committee on Science Policy 2020–2022
American Mathematical Society

Amicus Brief of Mathematicians, Law Professors, and Students 2019
principal co-authors: Guy-Uriel Charles and Moon Duchin

Supreme Court of the United States, in Rucho v. Common Cause - cited in dissent

Expert work for redistricting litigation 2018—
reports, deposition, and/or trial testimony

Wisconsin, North Carolina, Alabama, Pennsylvania, South Carolina, Texas, Georgia

Johnson v. Wis. Elections Comm'n, No. 2021AP1450-OA, 2022 WL 621082 (Wis. Mar. 3, 2022); *NC League of Conservation Voters, et al. v. Hall, et al.* No. 21-cvs-500085 (Wake Cnty. Sup. Ct. 2021); *Milligan, et al. v. Merrill, et al.*, Case No. 2:21-cv-01530-AMM and *Thomas, et al. v. Merrill, et al.*, Case No. 2:21-cv-01531-AMM (N.D. Ala. 2021); *Carter v. Chapman*, No. 7 MM 2022, 2022 WL 702894 (Pa. Mar. 9, 2022); *SC NAACP et al. v. Alexander, et al.*, Case No. 3-21-cv-03302-MBS-TJH-RMG (D.S.C.) (three-judge ct.); *TX NAACP et al. v. Abbott*, Case No. 1:21-CV-00943-RP-JES-JVB. *Georgia State Conference of the NAACP et al. v. State of Georgia*, Case No. 1:21-CV-5338-ELB-SCJ-SDG.

Presenter on Public Mapping, Statistical Modeling 2019, 2020
National Conference of State Legislatures

Committee on The Future of Voting: Accessible, Reliable, Verifiable Technology 2017–2018
National Academies of Science, Engineering, and Medicine

Committee on the Human Rights of Mathematicians 2016–2019
American Mathematical Society