

Representation and Redistricting [84-352/84-652] - Fixing A Bug in Democracy: The Math and Practice of Fair Redistricting

Dr. Jonathan Cervas

Location: TBD – room information will be emailed before each class (Our main room will be <https://bit.ly/36fexAI>)

Time: Tuesdays and Thursdays 2:20-3:40pm Eastern

Office Hours via ProMinute, and by appointment

(Instructions for ProMinute can be found here: <https://www.prominute.com/cmu>)

([CMU Academic Calendar](#))

This course will be taught in conjunction with similar courses being taught at two other universities: one at the University of California Irvine, with Prof. Bernie Grofman, a nationally known expert on redistricting, and the other at Princeton University, with neuroscientist and founder of the Princeton Gerrymandering Project Prof. Samuel Wang. Lectures that are live during one of the other university classes will be available online for asynchronous viewing.

[Dr. Bernard Grofman (UCI) – *Tuesdays and Thursdays 12:30-1:50pm Eastern*]
Grofman Zoom - <https://uci.zoom.us/j/8789184776>

[Dr. Samuel Wang (Princeton) – *Thursdays 12:30-3:40pm Eastern*]
Wang Zoom - <http://bit.ly/democracy-bugs>

What does it mean to be represented? Who is represented, who is not? What is the nature of that representation? In practice, does the norms of representation result in policy congruence?

In this course, we will explore the concept of representation, what it means in theory, and how it works in practice. We will explore the theoretical underpinnings of representation from a democratic norms' perspective, the legal and constitutional nature of U.S. institutions, and evaluate empirically how well represented the public is. In the United States, legislative elections are held in single-member districts, which require the drawing of district boundaries every decade. Several weeks of the course will be devoted to understanding this process. The course will culminate with a final project in which we will draw electoral maps that are legally compliant and will be proposed for the 2021 round of redistricting.

Description/Objective: Democracy in the United States is looking a bit rickety. Decades of progress in voting rights are countered by recent efforts to weaken the connection between popular opinion and representational outcomes. This course will address redistricting, the process of redrawing legislative and congressional lines, which every state will do in 2021. Redistricting can remedy a

distorted Census count - or make its effects tenfold worse. We will address how lines can be drawn to enhance fairness and the representation of diverse communities.

Key Topics: The electoral connection, the Voting Rights Act, formal, substantive, descriptive, and symbolic representation, gerrymandering, 'One person, one vote', policy congruence

Prerequisite Knowledge: None required. This course will begin with the most basic understanding of democratic processes and attempt to "build the puzzle" of the complex systems that make up our representative democracy. It will be helpful to be comfortable working with probability and statistics. Redistricting will be done on laptop computer running either Dave's Redistricting App or Maptitude for Redistricting.

Course Relevance: Representation is fundamental to modern government. Understanding how governments respond to public opinion, electoral outcomes, and public sentiment more broadly is key to understanding how republics maintain credibility. Though this class will most squarely focus on the United States, other democratic institutional arrangements will be used for comparison. Recent anti-majoritarian outcomes in the United States have led scholars and the public generally to question the elite-mass electoral link. One particularly crucial aspect of this is in the manipulation of legislative districts, colloquially known as gerrymandering. We will spend several weeks on the provisions of the U.S. Constitution that require the redrawing of legislative districts every decade, including in 2021. Beyond simply learning about this process, we will draw districts using geographic information systems software. The work product produced in this course can be delivered to state and local governments as public input into the redistricting process.

Course Goals: A deeper understanding of how government and its citizenry interact, and how institutional design affects incentive structures. Students will also develop the necessary skills to design legally compliant political districting maps. Students will also learn how to analyze maps using common data techniques. Success in this course has the potential to lead to summer internships. Multiple tracks will be offered for those more interested in the computer science, mathematics, legal, or geographic aspects of redistricting.

Guest Lectures: We have been arranging guest lectures to be shared with the students in each of our courses. Authors of three of your assigned textbooks will each be giving a guest lecture (with a short Q&A opportunity for students that we will deal with by soliciting questions from you in advance and having the instructor ask the guest lecturer the best one or two of those questions). Some of these lectures will be not during our normal course time to accommodate the other universities. For those with non-conflicting schedule, you may attend these live (links will be sent via email). For others you will be able to access the videos asynchronously. One these days, we will still be meeting during the class period. Thursday lectures will usually end by 3:30p, allowing you the extra time over the semester to attend the special lectures.

Assessment Structure: There will be five assignments:

- (1) a one-page single-spaced argumentative paper on a reform to redistricting, with your choice of reform (examples include independent commissions, partisan fairness standards, eliminating commission allowing for legislatures to draw lines exclusively, proportional representation, etc.);
- (2) analysis of the 2011 Pennsylvania U.S. House districting plan and three alternatives (the 2018 court remedial plan, Gov. Wolf's plan, and the state legislative remedial plan; *no matter your skills*

with data or math, you'll be able to do this assignment.), data will be provided, and additional analysis can be conducted in Dave's redistricting app. Should not exceed five pages, and discussion should include comparisons of the features of the plans, including expected minority districts, partisan divisions, county splits, compactness);

(3) drawing of a complete district map of Pennsylvania (using 2020 apportionment and redistricting data [if available]) that captures principles of fairness and neutrality, and

(4) drawing of an unfair map, and a short write up (1-2 pages) explaining the differences.

(5) In lieu of a final, you will prepare a 8-12-page double-spaced thoughtful essay combining insights from the required readings and lectures in the class. The expectation is that I can get a sense that you have done the readings, internalized how the complex systems that we are governed under create distortions of the public will, lead to polarized partisan attitudes, and what this means for American democracy.

In general, submitting assignments on time lets me provide feedback in a more timely and efficient manner. Assignments build on each other, so timely submissions are crucial to your progress in the class. However, sometimes life happens. If you cannot submit an assignment on time, the default will be that you will be eligible for 90% of the grade the first 48 hours that the assignment is late. If you must submit beyond 48 hours past the due date, please contact me cervas@cmu.edu as soon as possible so we can plan.

Course Requirements:

Class Participation 20%

(up to 10% extra credit available for asking questions to guest speakers)

Argumentative Paper/Op-ed 15% (Due March 8)

Plan Comparison & Analysis 20% (Due April 2)

Pennsylvania U.S. House Maps (one fair, one with a partisan bias, and write up) 25% (Due May 6)

Final essay 20% (Due May 17)

Books:

- **NCSL** - Redistricting Law: 2020 (National Conference of State Legislatures) – available free of charge, courtesy of Wendy Underhill and Tim Storey at NCSL ([available online](#))
- **Daley**, David. *Unrigged: How Americans are Battling Back to Save Democracy*, (Liveright Publishing, 2020)
- **Putnam**, Robert. *The Upswing: How America Came Together a Century Ago and How We Can Do It Again*, (Simon and Schuster, 2020)
- **Fiorina**, Morris P. *Unstable Majorities: Polarization, Party Sorting, and Political Stalemate*, (Hoover Institution Press Publication, 2017) – *Many of the chapters are available for free online, though the book ties them all together and is more updated. If money is tight, feel free to just read online.* (<https://www.hoover.org/publications/essays-contemporary-american-politics>)

Readings will be expected to be completed by the week in which it is listed in the section below. Readings are complementary to the lectures. You may read at whatever pace is best for you, so long as you're able to complete the reading by the end of the

course. The readings are all quite pleasant and not very painful. I hope you will enjoy them.

Important Dates:

February 2	First day of class
March 8	Argumentative paper due
April 2	Plan comparison due
May 6	Maps due, last day of class
May 17	Final Essay Due

Guest Lectures:

February 4	12:30p	Mo Fiorina (Stanford University, author of "Unstable Majorities")
February 9	12:30p	David Daley (Former editor of Salon, author of "Unrigged")
February 11	12:30p	Robert Putnam (Harvard University, author of "Bowling Alone")
February 11	2:20p	David Daley (Former editor of Salon, author of "Unrigged")
February 18	12:30p	Mark Braden (Republican Election Law attorney – Racial Gerrymandering and Recounts)
February 25	2:20p	Walter Olson (Fellow at the Cato Institute, Vice-Chair of Md. Redistricting Commission)
March 4	12:30p	Melissa Williams Univ. of Toronto, author "Voice, Trust, and Memory: Marginalized Groups and the Failings of Liberal Representation")

Course Structure: This provides an outline of the course, including topics and reading schedule. Topics are subject to change (1) because the virtual nature of the course and (2) democracy often gives us more urgent topics to address. This is not a history course, and we are living in a time when redistricting will be taking place. I hope to capitalize on this opportunity during the class, as we potentially can impact the process while we learn about it.

Week 1 - Introductions and General Discussion - Polarization, geography, and dysfunction

Feb 2 – First Class, introductions & syllabus

Feb 4 – Overview of Wang/Cervas/Grofman PNAS article on Complex Systems
[12:30pm start & async] Morris Fiorina Guest Lecture

- ✓ [The Great Gerrymander of 2012](#) by Sam Wang (available online)
- ✓ [Executive Summary in NCSL](#) (pg. xiiv-xxi)
- ✓ Fiorina [preface](#) & [chapter 1](#) (available online)

Week 2 - The New Reform movement in America

Feb 9 – Conceptualizing the scope of the problem, mapping out potential remedies; The Upswing – The progressive movement after the Gilded Age

[12:30pm start & async] Dave Daley Guest Lecture

Feb 11 – Dave Daley in conversation

[12:30pm start & async] Robert Putnam Guest Lecture

- ✓ [Putnam chapter 1](#) (available online)
- ✓ Putnam chapters 2 & 3

Week 3 -

Feb 16 – Criteria for districting, from traditional principles to more expansive principles; Karlan's three levels

Feb 18 – Intro to DRA, Redistricting Maine - Additional criteria of districting

[12:30pm start & async] Mark Braden Guest Lecture

- ✓ NCSL Chapter 4 – Redistricting Principles and Criteria
- ✓ Putnam chapters 4, 5, & 6

Week 4 – Redistricting Commissions

Feb 23 – **(NO CLASS CMU)**

Feb 25 – Walter Olson Guest Lecture

- ✓ NCSL Chapter 5 - Redistricting Commissions
- ✓ Putnam chapters 7, 8, & 9

Week 5 – Partisan Gerrymandering and Party Representation

March 2 – Partisan Gerrymandering (Wang)

March 4 – Communities of Interests

[12:30pm start & async] Melissa Williams Guest Lecture

- ✓ Daley chapters 10, 11, & 12
- ✓ NCSL Chapter 6 – Partisan Redistricting

University of California Irvine quarter ends

Parliament is not a *congress* of ambassadors from different and hostile interests; which interests each must maintain, as an agent and advocate, against other agents and advocates; but parliament is a *deliberative* assembly of *one* nation, with *one* interest, that of the whole; where, not local purposes, not local prejudices, ought to guide, but the general good, resulting from the general reason of the whole. You choose a member indeed; but when you have chosen him, he is not member of Bristol, but he is a member of *parliament*. If the local constituent should have an interest, or should form an hasty opinion, evidently opposite to the real good of the rest of the community, the member for that place ought to be as far, as any other, from any endeavour to give it effect. – Edmund Burke

Week 6 – The Voting Rights Act and Racial Gerrymandering

March 9 – The shrinking federal role

March 11 – Racial Gerrymandering (Grofman)

- ✓ [A Voting Rights Battle in a School Board 'Coup'](#)
- ✓ NCSL Chapter 3 – Racial and Language Minorities
- ✓ NCSL Chapter 9 – Redistricting for Local Jurisdictions, Courts, and other state entities (optional)

Week 7 – Apportionment and the U.S. Census

March 16 – Apportionment, Census, and redistricting data (Cervas)

March 18 – Automated Redistricting

- ✓ NCSL Chapter 1 – Census
- ✓ NCSL Chapter 2 – Equal Population
- ✓ Daley Chapters 1, 2, & 3

Week 8 – Measuring Gerrymandering

March 23 – Natural vs artificial tendencies, The Mathematics of Districting (Wang)

March 25 – Pennsylvania 2018 Court Case (Cervas)

- ✓ Daley chapters 4, 5, & 6

Week 9 – Identifying Gerrymanders

March 30 – 2021 Gerrymanders

April 1 – Group map-drawing of Pennsylvania

- ✓ Daley chapters 7, 8, & 9
- ✓ NCSL Chapter 8 – Federalism and Redistricting (optional)

Week 10 – Root causes of dysfunction: Mass and elite polarization

April 6 – Affective & Ideological polarization

April 8 – Spatial and racial patterns (is demography destiny?)

- ✓ Fiorina chapters 2, 3, & 4
- ✓ Wang, Cervas, and Grofman. 2021. PNAS ([available online](#))
- ✓ Madison, James – *Federalist Paper* #10, #51

Week 11 – Alternative voting systems

April 13 – Matching symptoms and remedies RCV Top-Two etc

April 15 – **(NO CLASS CMU)**

- ✓ Fiorina chapters 5, 6, & 7

Week 12 – Strategies for 2021 and Map-building

April 20 – Matching symptoms and remedies continued. Electoral College, Malapportionment, distortions of democracy

April 22 – Group Map drawing (Pennsylvania)

- ✓ Fiorina chapters 8, 9, & 10

Princeton University semester ends

Week 13 – Unattached Interests – (Burke’s arguments)

April 27 – Representing non-voters, and non-citizens. Who doesn’t get represented?

April 29 – How political parties provide representation

Mo Fiorina visits the Institute for Politics and Strategy, 5:45pm EST ([Register Here](#))

- ✓ Fiorina chapters 11 & 12

Week 14 – Why Representation Matters, Concluding thoughts

May 4 – Why representation? Who Votes? What are the alternatives?

May 6 – Last Class

- ✓ No Readings
- ✓ Enacting a Redistricting Plan Through the Legislative Process (optional)

The topics are subject to change. We may have some additional guests, or may choose to focus more or less time on particular subjects. The readings will not change.

Like American democracy itself, this syllabus is subject to amendment. The process of amendment is as follows: (1) all students and the professor get one vote; (2) a simple majority of voters agree to a change; (2) a student’s vote is weighted as $1/n$ where n =number of students and a professor has a vote weighted as $n+1$. All amendments will be announced publicly and no student shall be injured by changes. *You might notice that this clause creates uneven voting power. Basically, I’m a dictator; but I am benevolent, and I want you to success, so I will listen to all requests.*

Optional reading:

- The Concept of Representation, Hanna Pitkin. University of California Press, 1972.
- Patterns of Democracy, Arend Lijphard. Yale University Press, 1999.
- An Economic Theory of Democracy, Anthony Downs. Harper and row, 1957.
- The Righteous Mind: Why Good People Are Divided by Politics and Religion, Haidt, Jonathan
- Why We’re Polarized, Klein, Ezra
- (MATH and CS majors only) Warrington, G. S. (2018). Quantifying Gerrymandering Using the Vote Distribution. *Election Law Journal: Rules, Politics, and Policy*, 17(1), 39–57. <https://doi.org/10.1089/elj.2017.0447>
- Grofman, B., & Cervas, J. R. (2018). Can State Courts Cure Partisan Gerrymandering: Lessons from League of Women Voters v. Commonwealth of Pennsylvania (2018). *Election Law Journal: Rules, Politics, and Policy*, 17(4), 264–285. <https://doi.org/10.1089/elj.2018.0496>
- (MATH and CS majors only) Liu, Y. Y., Cho, W. K. T., & Wang, S. (2016). PEAR: a massively parallel evolutionary computation approach for political redistricting optimization and analysis. *Swarm and Evolutionary Computation*, 30, 78–92. <https://doi.org/10.1016/j.swevo.2016.04.004>
- Terminology of Districting, Bernard Grofman and Jonathan Cervas

- Tufte, E. R. (1973). The Relationship between Seats and Votes in Two-Party Systems. *American Political Science Review*, 67(2), 540–554. <https://doi.org/10.2307/1958782>
- Wang, S. S.-H. (2016). Three Tests for Practical Evaluation of Partisan Gerrymandering. *Stanford Law Review*, 68, 1263–1321.
- (MATH and CS majors only) Duchin, M., Gladkova, T., Henninger-Voss, E., Klingensmith, B., Newman, H., & Wheelen, H. (2019). Locating the Representational Baseline: Republicans in Massachusetts. *Election Law Journal: Rules, Politics, and Policy*, 18(4), 388–401. <https://doi.org/10.1089/elj.2018.0537>
- Wang, S. S.-H., Ober Jr., R. F., & Williams, B. (2019). Laboratories of Democracy Reform: State Constitutions and Partisan Gerrymandering. *Journal of Constitutional Law*, 22(1), 203–290.
- Stephanopoulos, N. O. (2012). Redistricting and the territorial community. *University of Pennsylvania Law Review*, 160(5), 1379–1477.
- (MATH and CS majors only) Cho, W. K. T., & Liu, Y. Y. (2018). Sampling from complicated and unknown distributions. *Physica A: Statistical Mechanics and Its Applications*, 506, 170–178. <https://doi.org/10.1016/j.physa.2018.03.096>
- Cervas, J. R., & Grofman, B. (2020). Tools for identifying partisan gerrymandering with an application to congressional districting in Pennsylvania. *Political Geography*, 76, 102069. <https://doi.org/10.1016/j.polgeo.2019.102069>
- (MATH and CS majors only) Bernstein, M., & Duchin, M. (2017). A Formula Goes to Court: Partisan Gerrymandering and the Efficiency Gap. *Notices of the American Mathematical Society*, 64(09), 1020–1024. <https://doi.org/10.1090/noti1573>
- (MATH and CS majors only) Chikina, M., Frieze, A., & Pegden, W. (2017). Assessing significance in a Markov chain without mixing. *Proceedings of the National Academy of Sciences of the United States of America*, 114(11), 2860–2864. <https://doi.org/10.1073/pnas.1617540114>

ACADEMIC INTEGRITY:

Academic Integrity is a core CMU value, and as a member of the CMU community, it is important that the work you turn in for this class is wholly your own. As your instructor, I will strive to ensure that you develop the necessary knowledge and skills to meet the learning objectives for this class, just as it is your task to put in the effort to complete the work and ask for help if you need it. In this hybrid/remote environment for Spring 2021, you might have questions about what is and is not acceptable. I do not like when politicians steal power from some voters, and likewise I do not like when students steal other's intellectual property. Do not do it, it is not worth it. I have created a course that everyone can be, and should be, successful in.

As a reminder all students should follow CMU's Academic Integrity Policy.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:

If you have a disability and have an accommodations letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.

STUDENT WELLNESS:

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. CMU services are available, and treatment does work. You can learn more about confidential mental health services available on campus at: <http://www.cmu.edu/counseling/>. Support is always available (24/7) from Counseling and Psychological Services: 412-268-2922

DIVERSITY STATEMENT:

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can plan accordingly.