EXHIBIT 1

EXPERT REPORT OF DR. STEPHEN ANSOLABEHERE IN SUPPORT OF HUNTER INTERVENOR-PETITIONERS' PROPOSED MAPS

1. Pursuant to the Wisconsin Supreme Court's orders on November 17 and November 30, 2021, and on behalf of the Hunter Intervenor-Petitioners, I, Stephen Ansolabehere, am submitting this expert report and accompanying congressional, assembly, and senate maps.

2. I have been retained by counsel for the Hunter Intervenor-Petitioners. I am being paid at a rate of $600 per hour. My compensation is in no manner contingent on the outcome of this case.

MAPPING ASSIGNMENT & CRITERIA

3. I have been asked by counsel in this matter to draw congressional, state senate, and state assembly redistricting plans for Wisconsin (the "Proposed Maps") with single member districts composed of contiguous territory, with exactly three assembly districts wholly contained in each senate district, that minimize changes from the currently enacted plans adopted by the Legislature in 2011 (the "2011 Maps").

4. Because all of Wisconsin's congressional districts, and most of its state senate and assembly districts, are unconstitutionally malapportioned after a decade of population changes, virtually every district required some change in its boundaries. I was asked to adjust these boundaries according to the following principles:

5. ***Least change***. I have drawn new congressional and legislative districts to comply with the Wisconsin Supreme Court's requirement that new districts adhere to state and federal law while minimizing changes to the 2011 Maps. To the greatest extent possible, I maintained populations and geographic areas in the same districts as under the 2011 Maps. Where boundary changes were necessary, I made

adjustments that were most consistent with the other redistricting criteria specified by the Supreme Court of Wisconsin and described below.

6. ***Population equality***. According to the 2020 census, Wisconsin's resident population is 5,893,718. Thus, the ideal population is 736,714.75 for each of the eight congressional districts, 178,597.5152 for each of the 33 senate districts, and 59,532.50505 for each of the 99 assembly districts. I sought to draw districts with populations as close to these ideals as possible.

7. ***Protection of Racial Minorities.*** I drew maps that follow all requirements imposed by federal law. Specifically, the Voting Rights Act (VRA) prohibits the adoption of districting plans that results in a denial or abridgement of the right to vote on account of race. *See* 52 U.S.C. § 10301. The Equal Protection Clause of the Fourteenth Amendment to the U.S. Constitution further prohibits the predominant use of race to draw a district absent a compelling state interest. *Miller v. Johnson*, 515 U.S. 900, 920 (1995).

8. ***Political boundaries.*** Where changes to the 2011 Maps were necessary to maintain equal population between districts or to comply with the VRA, I adjusted district lines to follow county, municipal, ward, and precinct boundaries.

9. ***Compactness.*** Where changes to the 2011 Maps were necessary, I adjusted district lines to maintain or increase the districts' compactness. Political scientists generally measure a district's compactness according to its "Reock" and "Polsby-Popper" measures, which quantify a district's area dispersion and irregular boundary, respectively. The Reock measure compares a district's area relative to

the most compact circle that has the same length as the district. The Polsby-Popper measure computes the area of a district relative to the area of a circle with the same perimeter. Both measures provide a score between 0 and 1, with higher scores indicating more compactness.

10. ***Communities of interest.*** Where changes to the 2011 Maps were necessary, I adjusted district lines to maintain and unite communities of interest.

11. ***Delayed Voting.*** Where changes to the 2011 Maps were necessary, I sought to minimize the number of voters who must wait six years between voting for their state senator.

EXECUTIVE SUMMARY

12. In this section, I provide an executive summary of how my Proposed Maps comply with the foregoing redistricting criteria and principles.

13. ***Least change.*** The Proposed Hunter Congressional Map adheres very closely to the 2011 Map, with the changes primarily reflecting the need to reduce the population of CD-2 and increase the population of CD-4. Overall, over 93.1% of Wisconsin's population and 94.7% of Wisconsin's geography do not change districts in my Proposed Congressional Map.

14. The Proposed Hunter Assembly Map required more extensive changes due to widespread deviations from population equality and the need to conform to federal and state laws. Even still, the Assembly Districts (ADs) in the Proposed Map cover 71.2% of the same area and 73.2% of the same population as the corresponding districts in the 2011 Map. Additionally, the Proposed Map kept the same numbering of Assembly Districts as in the 2011 Map.

15. The Proposed Hunter Senate Map followed the same triplet formula used to create senate districts (SDs) in the 2011 Map, whereby each SD is the combination of sequentially numbered ADs: ADs 1, 2, and 3 are SD-1; ADs 4, 5, and 6 are SD-2, and so on. The Proposed Map uses that definition, except in two instances where boundary changes made one of the three ADs non-contiguous: with SD-4 and AD-10 in Milwaukee and with SD-31 and AD-91 in Eau Claire, I swapped one neighboring AD into the appropriate SD so that each SD consists of three contiguous ADs. Beyond those two instances, there were no changes in the formula for creating SDs. The Proposed Map's SDs cover over 80% of the same population and geographic area as the corresponding districts in the 2011 Map.

16. ***Population equality***. All eight districts in the Proposed Congressional Map have a population that is either exactly ideal or within one voter of the ideal. The Proposed Senate Map has a maximum population deviation between the most and least populated districts of 0.95%, and the Proposed Assembly Map has a maximum population deviation of 1.82%. See Appendix 1

17. ***Protection of Racial Minorities.*** In the 2011 Map, there are nine majority minority ADs that provide minority voters the opportunity to elect candidates of their choice. These are ADs 8, 9, 10, 11, 12, 16, 17, 18, and 23. Seven are predominantly Black and two are predominantly Hispanic.

18. ***Political boundaries.*** The Proposed Map follows a least change approach while also generating substantial reductions in splits of political boundaries, as demonstrated in the Table below:

	County Splits	Municipality Splits	Civil Division Splits	Precinct Splits	Census Tract Splits
2011 CDs	12	29	42	42	71
Proposed CDs	11	29	20	21	29
2011 ADs	59	149	346	665	717
Proposed ADs	50	114	186	222	538
2011 SDs	57	124	318	576	512
Proposed SDs	42	79	121	123	341

19. ***Compactness.*** The Proposed Map improves the average compactness of districts by making their boundaries more regularly shaped, as demonstrated in the Table below:

	Avg. Reock Score	Avg. Polsby-Popper Score
2011 CDs	0.46	0.29
Proposed CDs	0.46	0.36
2011 ADs	0.40	0.26
Proposed ADs	0.44	0.36
2011 SDs	0.41	0.27
Proposed SDs	0.40	0.30

20. ***Communities of interest.*** Where changes were necessary, I maintained and strengthened the extent to which CDs are anchored in particular communities, such as the City of Milwaukee, and in identifiable regions of the state, such as Southwest Wisconsin (CD-3) and the Northeast and Lake Superior regions (CD-8). One area of particular improvement in this regard is Waukesha. The current version of CD-5 splits Waukesha City and County, weakening its presence as the anchor of CD-5. While CD-5 is close to the ideal population under the 2011 Map,

its borders must change because two neighboring districts—CD-2 and CD-4—are significantly malapportioned. In curing that malapportionment, the Proposed Map eliminates the split of the City of Waukesha and Waukesha County. Waukesha County, with over 400,000 residents, accounts for a majority of CD-5.

21. ***Delayed Voting.*** I minimized delayed voting in senate districts by adhering to the formula used in the 2011 Map for allocating assembly districts to senate districts, as discussed above. Further, because the Proposed Map's assembly districts maintain, to the greatest extent possible, the populations of the 2011 Map's assembly districts, following the 2011 Map formula for creating senate districts minimizes the number of voters who must wait six years between voting for their state senator.

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22. By applying these principles, I produced redistricting plans for Wisconsin's congressional seats, the state senate, and the state assembly that minimize changes from the 2011 Maps. Where I have made changes, they are supported, as much as possible, by the foregoing principles.

QUALIFICATIONS AND EXPERTISE

23. I am the Frank G. Thompson Professor of Government in the Department of Government at Harvard University in Cambridge, Massachusetts. Formerly, I was an Assistant Professor at the University of California, Los Angeles, and I was Professor of Political Science at the Massachusetts Institute of Technology, where I held the Elting R. Morison Chair and served as Associate Head of the Department of Political Science. I am the Principal Investigator of the Cooperative

Congressional Election Study (CCES), a survey research consortium of over 250 faculty and student researchers at more than 50 universities. I also directed the Caltech/MIT Voting Technology Project from its inception in 2000 through 2004 and served on the Board of Overseers of the American National Election Study from 1999 to 2013. I am an election analyst for and consultant to CBS News' Election Night Decision Desk. I am a member of the American Academy of Arts and Sciences (inducted in 2007). My curriculum vitae is attached to this report as Appendix A.

24. I worked as a consultant to the Brennan Center in the case of *McConnell v. FEC*, 540 U.S. 93 (2003). I have testified before the U.S. Senate Committee on Rules, the U.S. Senate Committee on Commerce, the U.S. House Committee on Science, Space, and Technology, the U.S. House Committee on House Administration, and the Congressional Black Caucus on matters of election administration in the United States. I filed an amicus brief with Professors Nathaniel Persily and Charles Stewart on behalf of neither party to the U.S. Supreme Court in the case of *Northwest Austin Municipal Utility District Number One v. Holder*, 557 U.S. 193 (2009), and an amicus brief with Professor Nathaniel Persily and others in the case of *Evenwel v. Abbott*, 578 U.S. 54 (2015). I served as a testifying expert for the Gonzales intervenors in *State of Texas v. United States* before the U.S. District Court for the District of Columbia (No. 1:11-cv-01303); the Rodriguez plaintiffs in *Perez v. Perry*, before the U.S. District Court for the Western District of Texas (No. 5:11-cv-00360); for the San Antonio Water District intervenor in *LULAC v. Edwards Aquifer Authority in the U.S. District Court for the Western District of Texas* (No. 5:12cv620-OLG); for the Department of Justice in

State of Texas v. Holder, before the U.S. District Court for the District of Columbia (No. 1:12-cv-00128); for the Guy plaintiffs in *Guy v. Miller* in the First Judicial District Court in Carson City, Nevada (No. 11-OC-00042-1B); for the Florida Democratic Party in *In re Senate Joint Resolution of Legislative Apportionment* in the Florida Supreme Court (Nos. 2012-CA-412, 2012-CA-490); for the Romo plaintiffs in *Romo v. Detzner* in the Circuit Court of the Second Judicial Circuit in Florida (No. 2012 CA 412); for the Department of Justice in *Veasey v. Perry*, before the U.S. District Court for the Southern District of Texas, Corpus Christi Division (No. 2:13cv00193); for the Harris plaintiffs in *Harris v. McCrory* in the U.S. District Court for the Middle District of North Carolina (No. 1:2013cv00949); for the Bethune-Hill plaintiffs in *Bethune-Hill v. Virginia State Board of Elections* in the U.S. District Court for the Eastern District of Virginia (No. 3: 2014cv00852); for the Fish plaintiffs in *Fish v. Kobach* in the U.S. District Court for the District of Kansas (No. 2:16-cv-02105-JAR); and for intervenors in *Voto Latino, et al. v. Hobbs*, in the U.S. District Court for the District of Arizona (No. 2:19-cv-05685-DWL). I served as an expert witness and filed an affidavit in the North Carolina State Board of Elections hearings regarding absentee ballot fraud in the 2018 election for Congressional District 9 in North Carolina. I have been accepted as an expert in every matter in which I have been proffered as an expert witness.

25. My areas of expertise include American government, with particular expertise in electoral politics, election administration, representation, redistricting, political geography, and public opinion, as well as statistical methods in social sciences and survey research methods. I have authored numerous scholarly works on voting behavior

and elections, the application of statistical methods in social sciences, legislative politics and representation, and distributive politics. This scholarship includes articles in such academic journals as the Journal of the Royal Statistical Society, American Political Science Review, American Economic Review, American Journal of Political Science, Legislative Studies Quarterly, Quarterly Journal of Political Science, Electoral Studies, and Political Analysis. I have published articles on issues of election law in the Harvard Law Review, Texas Law Review, Columbia Law Review, New York University Annual Survey of Law, and Election Law Journal, for which I am a member of the editorial board. I am associate editor of the Harvard Data Science Review, and I have served as associate editor of the Public Opinion Quarterly. I have coauthored three scholarly books on electoral politics in the United States, The End of Inequality: *Baker v. Carr* and the Transformation of American Politics, Going Negative: How Political Advertising Shrinks and Polarizes the Electorate, and The Media Game: American Politics in the Media Age. I am coauthor with Benjamin Ginsberg, Hahrie Han, and Ken Shepsle of American Government: Power and Purpose.

DATA SOURCES

26. To create the maps I am sponsoring, I relied on geographic, population and election data from the Wisconsin State Legislature's Legislative Technical Service Bureau. In particular, I used data downloaded from the Wisconsin State Legislature's GIS Open Data Portal https://data-ltsb.opendata.arcgis.com/.

PROPOSED CONGRESSIONAL MAP

27. Over the course of the past decade, the population of Wisconsin increased from 5,687,285 people in 2010 to 5,893,718 people in 2020. Each congressional district in the state must have 736,715 people, plus or minus 1 person.

28. Population growth did not happen evenly throughout the state, and every CD must be altered to conform to population equality. Two CDs (2 and 8) have more population than 736,715, and six CDs (1, 3, 4, 5, 6, and 7) have less than the required population.

29. Most significantly, CD-2, anchored in the Madison area, has a surplus of 52,678 persons, while CD-4, anchored in Milwaukee, has a shortfall of 41,320 people. Curing this malapportionment is more complicated than swapping excess population from CD-2 directly into CD-4 because the districts are not adjacent. Because CDs 1, 5, and 6 lie between CDs 2 and 4, those districts will also have to shift. The best way to make the populations of CD-2 and CD-4 exactly 736,715 is to modestly shift the boundaries of CDs 1, 5, and 6 in a way that improves compliance with other districting principles. In particular, the Proposed Map shows that it is possible to equalize populations across these districts using a "least change" approach, while complying with the constraints of other constitutional and legal principals, such as maintaining or even reducing the number of political boundary splits, maintaining or even improving compactness, and respecting communities of interest.

30. The Proposed Map keeps the existing districts largely the same, both in population and in land mass. Across all CDs, 93.1% of the population remains in the district that it was in under the 2011 Map, and 94.7% of the land mass overlaps with the land mass of the 2011 CDs. See Appendix 1

31. Following the least change approach, the Proposed Map achieves improvements in political boundary splits. The number of counties that are split by CD lines is reduced from 12 in the 2011 Map to 11 under the Proposed Map. Furthermore, Milwaukee County was split across 4 CDs under the 2011 Map. Because CD-4, which contains Milwaukee County, must expand to gain population, the Proposed Map achieves the ideal population by splitting only 2 CDs. See Appendix 1.

32. The Proposed Map's population-based changes also are made in a manner that improves overall compactness. I applied the two measures of compactness that are most widely used in academic research. The Reock score captures area compactness. It is the area of the district divided by the area of the circle with a diameter that is the same length as the district. Reock penalizes long, narrow districts. The Polsby-Popper score measures perimeter compactness. It is the area of the district divided by the area of the circle that has the same perimeter as the district. Polsby-Popper penalizes districts with highly irregular boundaries or odd shapes. Reock and Polsby-Popper measures each produce scores between 0 and 1, with higher scores indicating greater compactness.

33. The average Reock score of the eight congressional districts is the same (0.46) in the 2011 Map and the Proposed Map. But the average Polsby-Popper score is much higher in the Proposed Map (.36) than in the 2011 Map (0.29). In other words, the Proposed Map makes the boundaries of the districts much more regularly shaped than the 2011 Map, without making the areas less compact, and while keeping the population and geography largely the same.

CD-1

34. CD-1 currently has a population of 727,452, which is 9,263 fewer people than the ideal district size. In my proposed map, CD-1 has 736,715 people, which is a 0.00% deviation from the ideal.

35. CD-1 in the 2011 Map contains the entirety of Kenosha and Racine Counties, as well as parts of Jefferson, Milwaukee, Rock and Walworth Counties. CD-1 shares a border with CD-4 in Milwaukee County and with CD 2 in Rock County.

36. The Proposed Map keeps CD-1 anchored in Kenosha, Racine, and Milwaukee Counties. CD-1 remains in Rock County, which is split with CD-2, and in Walworth County, which is split with CD-5. The Proposed Map eliminates the county boundary split in Jefferson County.

CD-2

37. CD-2 currently has a population of 789,393, which is 52,678 more people than the ideal district size. In my proposed map, CD-2 has 736,714 people, which is a 0.00% deviation from the ideal.

38. In the 2011 Map, CD-2 consists of the entirety of Dane, Green, Iowa, Lafayette, and Sauk Counties, and it splits Richland and Rock Counties. The Proposed Map keeps CD-2 anchored in Dane County. It contains the entirety of Dane, Green, Iowa, and Lafayette Counties. The Proposed Map adds the three Richland County townships that were in CD-2 to CD-3 (see below) to increase the population in CD-3 and to eliminate the split of Richland County. This change is inconsequential to CD-2, and it almost makes up CD-3's population deficit. The Proposed Map reduces CD-2's footprint in Sauk County in order to shed most of CD-2's surplus population. Sauk County has a population of 65,763 people. Of that population, 52,392 are placed into CD-6, and 13,371 remain in CD-2.

CD-3

39. CD-3 covers the southwestern portion of Wisconsin, connecting Stevens Point, Eau Claire, and La Crosse. In my proposed map, CD-3 has 736,715 people, which is a 0.00% deviation from the ideal.

40. The version of CD-3 in the 2011 Map and the Proposed Map are substantially the same. The primary differences are that Richland County is made whole under the Proposed Map by putting the townships of Buena Vista, Cazenovia, and Ithaca to CD-3. Also, there are slight differences in the borders in Chippewa and Jackson Counties to make populations exactly equal in CDs 3 and 7 and to reduce irregular shapes in the borders.

CD-4

41. CD-4 lies entirely in Milwaukee County. It consists of the entirety of the City of Milwaukee, plus surrounding cities. Under the 2011 Map, CD-4 has 41,320 people too few. In my proposed map, CD-4 has 736,715 people, which is a 0.00% deviation from the ideal.

42. To correct this deficit, I expanded the boundary of the district to encompass the cities of River Hills and Oak Creek. Including River Hills in CD-4 eliminates a county boundary crossing, which occurs because CD-6 in the 2011 Map crosses the boundary between Milwaukee and Ozaukee Counties to encompass River Hills. These changes almost entirely make up the population deficit.

CD-5

43. CD-5 is anchored in Waukesha County, to the west of Milwaukee. Under the 2011 Map, it includes the entirety of Washington and Jefferson Counties. It splits Waukesha, Milwaukee, Dodge, and Walworth Counties. Furthermore, the 2011 Map splits the city of

Waukesha. Waukesha is a distinct community of interest, which the Proposed Map unites and brings into a single district. In my proposed map, CD-5 has 736,714 people, which is a 0.00% deviation from the ideal.

44. The Proposed Map makes the City of Waukesha and the County of Waukesha whole. The district consists of the entirety of Dodge, Jefferson, Washington, and Waukesha Counties. Those four counties contain 718,035 people—almost an entire district. To equalize the population, the Proposed Map includes towns along the northern border of Walworth County, which is split in the 2011 Map and in the Proposed Map. The resulting district is highly compact and reduces county and municipal boundary crossings.

CD-6

45. CD-6 stretches from the areas north of Dane County to the areas north of Milwaukee County. It currently has 8,941 people below what is needed to achieve population equality. CD-6 contains all of Columbia, Fond du Lac, Green Lake, Manitowoc, Marquette, Ozaukee, Sheboygan, and Waushara Counties. It splits Dodge County with CD-5, and it splits Winnebago County with CD-8. In my proposed map, CD-6 has 736,714 people, which is a 0.00% deviation from the ideal.

46. The Proposed Map keeps CD-6 in the same location. The district shifts westward into Sauk County to help absorb the population excess in CD-2 and to shift population to CD-4. In the proposed version of this CD, the split of Dodge County is eliminated. The district splits Sauk County, which is necessary to equalize population in CD-2. Winnebago County remains split between CDs 6 and 8, though the magnitude of the split is much smaller.

CD-7

47. CD-7 covers the northwestern third of the State of Wisconsin. Under the 2011 Map, it has 732,582 people, which is 4,133 people below the ideal. In my proposed map, CD-7 has 736,716 people, which is a 0.00% deviation from the ideal.

48. The Proposed Map cures that deficit by taking population from CD-8 in Shawano County. The resulting county split is necessary in order to equalize population.

CD-8

49. CD-8 encompasses Northeast Wisconsin, from Appleton and Green Bay to Door and Marinette Counties. The 2011 version of CD-8 contains the entirety of Brown, Calumet, Door, Kewaunee, Marinette, Menominee, Oconto, Shawano, and Waupaca Counties. It includes part of Winnebago County. The 2020 Census shows that CD-8 under the 2011 Map has a 751,967 people, an excess of 15,252. In my proposed map, CD-8 has 736,715 people, which is a 0.00% deviation from the ideal.

50. The Proposed Map reduces that deficit by shrinking the presence of CD 8 in Winnebago County. The Proposed district contains the entirety of Brown, Calumet, Door, Kewaunee, Marinette, Menominee, Oconto, and Waupaca Counties, and maintains the split of Winnebago County. Shawano County is split with CD-7 to equalize population.

PROPOSED STATE ASSEMBLY MAP

51. Traditionally, Wisconsin has created Assembly Districts (ADs) with maximum deviations of at most 2%. The 2020 Census revealed that very few of the ADs in the 2011 Map had deviations within this range, necessitating changes to most ADs to equalize population.

52. The districts with the largest deviations from equality occurred in three parts of the state: Madison, Milwaukee, and Appleton-Green Bay. The ideal district population for an assembly district is 59,533 people. The Madison and Appleton-Green Bay ADs are substantially over-populated, and the Milwaukee ADs tend to be under-populated. ADs in these areas have absolute deviations well in excess of 10% of the ideal population.

53. Of the ten most over-populated ADs, eight are in Dane County. The two districts with the largest excess populations are ADs 76 and 79, with 71,685 and 69,732 people, respectively. The combined population excesses of ADs 46, 47, 48, 76, 77, 78, 79, and 80—all in the Dane County area—are enough for an entire additional district.

54. Many of the ADs in the Appleton-Green Bay area are substantially over-populated. AD-5 is the third most populous district in the 2011 Map according to the 2020 Census, with a population of 67,428 people. ADs 56, 88, and 2 also rank among the most populous districts in the map.

55. To correct for population overages in these ADs, it is necessary to draw other districts into the Madison and Appleton-Green Bay areas from the surrounding counties. The geographic footprint of the over-populated districts must shrink to conform with equal population requirements, and surrounding ADs must move into the areas left uncovered as the Madison and Appleton-Green Bay ADs shed population. Furthermore, when drawing districts in all three of these areas, I followed updated ward lines that had been adjusted by the municipalities, in an effort to minimize any change not already reflected by a political body.

56. Milwaukee area ADs tend to have the opposite problem. They are under-populated. The districts with the smallest populations are ADs 10 and 18, with 52,628 and 52,987 people, respectively. Each has 11% less population than the ideal district would have. Of the 10 least populated ADs, seven are in Milwaukee: 8, 10, 11, 12, 16, 17, and 18. AD-66 in Racine also makes the list of the ten least populous districts. All of these ADs must expand their footprint in order to increase their populations up to an acceptable level.

57. Balancing the population between Milwaukee and Madison has the effect of drawing districts that are located between these Milwaukee and Dane Counties to the west, toward Madison. Nearly all districts in this region must change their geographic location and population coverage somewhat in order to equalize populations of the ADs. Milwaukee, Madison, and Appleton-Green Bay are the areas with the most extreme cases where AD populations deviate substantially from equality, but population deviations beyond plus or minus 1% of the ideal level are common throughout the state.

58. The Proposed Assembly District Map shifts districts so as to absorb the excess populations in the Madison and Appleton-Green Bay areas. In doing so, it also minimizes county and municipal crossings and improves the overall compactness of districts in the map.

59. Further complicating this task is the fact that Milwaukee has a very substantial minority population. The population in north and central Milwaukee is predominantly Black, and the population in south Milwaukee contains a mix of groups, with Hispanics tending to be the most populous.

60. In the 2011 Map, there are nine majority minority ADs that provide minority voters the opportunity to elect candidates of their choice. These are ADs 8, 9, 10, 11, 12, 16, 17, 18, and 23. Seven are predominantly Black and two are predominantly Hispanic.

61. ADs 8, 9, 10, 11, 12, 16, 17, and 18 are all under-populated. Each of them must expand their geographic area in order to incorporate enough people to reach an acceptable population size. In particular, AD-12 must move west and AD-11 north. The areas covered by these districts exhibit racial polarization: a majority of whites in Proposed AD-11 and Proposed AD-12 vote for the candidates opposed to the minority-preferred candidates.

62. These are reasonably compact districts in which Blacks are a majority of the eligible electorate (the Citizen Voting Age Population or CVAP). Blacks are 56.4% of the CVAP in AD-11 and 50.4% of the CVAP in AD-12. Black voters would have the opportunity to elect their preferred candidates in these districts, as candidates preferred by Blacks won majorities of the vote in each of eight statewide races examined to assess district performance.[1]

63. The creation of an additional district in which Black voters have the opportunity to elect their preferred candidates did not substantially lessen the ability to pursue the "least change" strategy throughout the map. Some surrounding districts were affected, but the overall impact on the degree of change throughout the map was minimal.

[1] In assessing district performance for minority-preferred candidates, I examined election results for US President 2020, US Senator, Governor, Secretary of State, Attorney General and Treasurer in 2018, and US President and US Senator in 2016.

64. The Proposed Assembly District Map overlaps substantially with the 2011 Map. Overall, 73% of the population that was in a specific AD in the 2011 Map remains in that AD under the Proposed Map. The Proposed Map keeps 71% of the land mass of the 2011 ADs in those districts. See Appendix 1. This high degree of overlap of the proposed with existing districts is a consequence of following the least change approach, while equalizing population and complying with state and federal laws and the redistricting criteria specified by the Supreme Court of the State of Wisconsin.

65. Wisconsin has 72 counties. The 2011 Map split 59 of those counties. The Proposed Assembly Map reduces county boundary crossings to 50, a 15% reduction. The high rate of county crossings was emblematic of widespread splitting of political jurisdictions in the 2011 Map. The Proposed Assembly Map also reduces the number of cities and towns that are split from 149 to 114, and reduces precinct (VTD) splits from 665 to 222. See Appendix 1.

66. The Proposed Map achieves improvements in district compactness as well. The area dispersion or spread of districts, as measured by the Reock score, averaged .40, meaning that the districts overall tended not to be overly elongated or sprawling. The Proposed Map made minor improvements that increased compactness overall, increasing the average Reock measure from .40 to .44 (higher is better). More substantial improvements in compactness are made with regard to the regularity or smoothness of the boundaries of districts. The Polsby-Popper score measures the extent to which the districts have highly irregular boundaries or many folds and indentations; higher values are

better. The average Polsby-Popper score is .26 in the 2011 Map, but it is improved to .36 in the Proposed Map. See Appendix 1.

67. In sum, I pursued a least change approach in configuring the Proposed Assembly District Map. The greatest challenge was balancing populations to conform to equal population standards. I equalized populations while maintaining districts in their existing locations and keeping almost three-fourths of the Wisconsin public in their existing assembly districts. That was accomplished in ways that allowed for improvements in the alignment of assembly district boundaries with other political jurisdictions, especially county boundaries, city and town lines, and precinct boundaries.

PROPOSED STATE SENATE MAP

68. The Wisconsin State Senate Districts consist of triplets of neighboring Assembly Districts. In assigning ADs to SDs, I followed the algorithm used in the 2011 Map. ADs are assigned to SDs in numerical order. ADs 1, 2, and 3 are assigned to SD 1; ADs 4, 5, and 6 are assigned to SD 2; and so forth.

69. In the Proposed Map, the only deviation from that approach occurs when boundary changes in a particular triplet of ADs was such that one of the districts was no longer contiguous with the other two in a triplet. That occurred with AD-10 in SD-4 and AD-91 in SD-31. Fortunately, it was easy to exchange AD-17 for 10 in SD-4 and AD-10 for 17 in SD-6. Also, I swapped AD-91 for AD-69 in SD-23 and AD-69 for AD-

91 in SD-31.[2] I chose these specific swaps because they kept the ADs in SDs that are on the same Senate election cycle. The Senators representing SD-4 and SD-6 were elected in 2020, and the Senators representing SD-23 and SD-31 were elected in 2018. This approach minimizes the number of voters who would be delayed in voting for Wisconsin State Senate.

70. The Proposed Map corrects substantial disparities in population under the 2011 Map. Exact equality would result in a population of 178,598 people in each senate district. Under the 2011 Map, there are only 8 SDs with absolute population deviations of less than 1% (i.e., between -1.0% and + 1.0% of exact population equality). The remaining 25 SDs have population deviations above the levels accepted in past redistricting cycles. The district with the largest population in the 2011 Map is SD-26, which has 201,819 people. The district with the smallest population in the 2011 Map is SD-6, which has 162,069 people. The population of SD-26 is 25% larger than the population of SD-6.

71. The assignment of ADs to SDs in the Proposed Map results in absolute population deviations of less than 0.5%, resulting in a substantial improvement over the 2011 Map. The district with the largest population is SD-12 with 179,443. SD-12 deviates from exact population equality by +0.47%. The district with the smallest population is SD-24 with 177,745 people. SD-24 deviates from exact population

[2] These ADs are renumbered (i.e., 10 becomes 17, 17 becomes 10, 69 becomes 91, and 91 becomes 69) in order to maintain the sequence of ADs that assigned to specific SDs and contiguity of SDs.

equality by -0.48%. Hence, the most populous and least populous SDs differ by less than 1% (i.e., 0.95%).

72. The Proposed Senate District Map delays voting for 240,723 people, which is 4% of the total population of the State of Wisconsin. To calculate this number I computed the number of people who were in senate districts that elected senators in 2018 but were moved into senate districts that elected senators in 2020. These people will next have senate elections in 2024, a six-year time span between senate elections. A total of 240,723 people are in census blocks that are moved from senate districts on the 2018 senate election cycle to senate districts on the 2020 cycle.

73. The Proposed Map improves the overall compactness of senate districts. Although not every district is improved, on average, the area dispersion (Reock) is the same in the 2011 Map and the Proposed Map, but the perimeter irregularity (Polsby-Popper) is somewhat better in the Proposed Map than in the 2011 Map. In both the 2011 Map and the Proposed Map, the average area dispersion of senate districts is nearly the same, with average Reock scores of .41 and .40 respectively. The Polsby-Popper score, which measures the irregularity of the boundaries of districts, is .30 in the Proposed Map and .27 in the 2011 Map. Higher values of the Polsby-Popper score mean the districts are more compact and less irregular on their boundaries. *See* Appendix 1.

CONCLUSION

74. The congressional, state senate, and state assembly districts I have drawn minimize changes to the 2011 Maps, and all changes are required by law and justified by recognized redistricting principles.

/s/ Stephen Ansolabehere

Dr. Stephen Ansolabehere

Appendix 1

Table 1. Deviations of Congressional District Populations From Equality Under the 2011 Map

CD Number	2020 Population Under 2011 Map **Deviation from Equality in Bold**
1	727,452 **-9,263**
2	789,393 **+52,678**
3	733,584 **-3,131**
4	695,395 **-41,320**
5	735,571 **-1,144**
6	727,774 **-8,941**
7	732,582 **-4,133**
8	751,967 **+15,252**

Table 2. Continuity of Population and Geography of the Proposed Map with the 2011 Wisconsin Congressional Map

CD Number	% Population Remaining From 2011 Map	% Overlap of Landmass From 2011 Map
1	81.4%	83.8%
2	92.8%	82.9%
3	99.9%	99.7%
4	100%	100%
5	80.1%	98.2%
6	92.4%	95.4%
7	99.9%	99.9%
8	98.0%	98.0%
Overall	93.1%	94.7%

Table 3. Improvement in Political Boundary Crossings of the Proposed Map Compared with the 2011 Map
Number of Times that an Area is Split, by Type of Area

Areas	2011 Map	Proposed Map
Counties	12	11
Places	29	29
Minor Civil Divisions	42	20
Precincts (VTDs)	42	21
Census Tracts	71	29

Table 4. Improvement in Compactness of the Proposed Congressional District Map over the 2011 Map

	2011 Map		Proposed Map	
CD Number	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)
1	0.35	0.30	0.29	0.24
2	0.53	0.43	0.55	0.48
3	0.32	0.16	0.32	0.17
4	0.47	0.38	0.49	0.48
5	0.53	0.23	0.62	0.65
6	0.43	0.26	0.35	0.28
7	0.52	0.26	0.52	0.27
8	0.52	0.32	0.51	0.35
Average	0.46	0.29	0.46	0.36

Table 5. Continuity of Population and Geography of the Proposed Map with the 2011 Wisconsin Assembly District Map

AD Number	% Population From 2011 Map	% Overlap of Landmass From 2011 Map
1	96.0%	45.6%
2	61.2%	89.6%
3	49.6%	11.6%
4	56.7%	59.5%
5	50.2%	57.0%
6	79.8%	82.9%
7	49.2%	48.5%
8	91.9%	91.6%
9	87.3%	76.0%
10	48.6%	48.9%
11	62.8%	63.1%
12	68.9%	82.0%
13	36.9%	54.0%
14	33.9%	9.9%
15	50.1%	20.3%
16	73.4%	72.3%
17	66.8%	73.6%
18	80.8%	83.7%
19	78.7%	83.9%
20	91.6%	95.3%
21	96.9%	97.3%
22	59.5%	50.0%
23	26.3%	17.2%
24	42.5%	70.5%
25	87.3%	68.8%
26	100.0%	100.0%
27	84.9%	69.2%
28	95.2%	97.8%
29	66.1%	84.8%
30	94.9%	84.8%
31	76.2%	94.8%
32	73.3%	86.7%
33	21.7%	2.7%
34	98.1%	95.2%
35	91.5%	91.7%
36	94.7%	95.2%

37	2.6%	10.5%
38	34.4%	60.9%
39	52.4%	44.7%
40	99.9%	100.0%
41	72.9%	95.1%
42	63.3%	54.6%
43	8.6%	7.4%
44	100.0%	100.0%
45	76.9%	51.6%
46	69.2%	67.4%
47	62.6%	31.2%
48	69.6%	75.4%
49	91.9%	85.8%
50	78.7%	70.6%
51	86.1%	80.9%
52	88.4%	58.2%
53	82.7%	98.7%
54	99.9%	74.2%
55	57.1%	33.5%
56	58.3%	95.4%
57	58.2%	46.5%
58	99.0%	99.7%
59	48.1%	57.7%
60	98.2%	98.1%
61	99.7%	98.8%
62	89.0%	99.0%
63	95.9%	99.0%
64	94.7%	96.9%
65	100.0%	100.0%
66	92.9%	81.9%
67	55.2%	71.5%
68	55.4%	20.0%
69	68.8%	67.2%
70	81.9%	85.4%
71	98.6%	92.7%
72	100.0%	100.0%
73	100.0%	100.0%
74	98.0%	96.4%
75	92.8%	87.6%
76	81.6%	55.7%
77	84.1%	73.2%
78	86.6%	90.8%
79	65.8%	56.9%

80	46.2%	24.5%
81	88.5%	67.0%
82	75.4%	89.7%
83	20.7%	32.5%
84	45.7%	80.3%
85	99.1%	97.5%
86	77.9%	70.4%
87	69.7%	81.7%
88	73.5%	40.6%
89	84.0%	87.6%
90	74.1%	75.9%
91	98.5%	95.9%
92	95.5%	94.4%
93	62.2%	76.9%
94	96.5%	88.9%
95	99.7%	99.1%
96	100.0%	100.0%
97	7.6%	36.5%
98	62.5%	54.5%
99	47.5%	30.6%
Overall	73.2%	71.2%

Table 6. Improvement in Political Boundary Crossings of the Proposed Assembly District Map Compared with the 2011 Map
Number of Times that an Area is Split, by Type of Area

Areas	**2011 Map**	**Proposed Map**
Counties	59	50
Place (Town or City)	149	114
Minor Civil Divisions	346	186
Precincts (VTDs)	665	222
Census Tracts	717	538

Table 7. Improvement in Compactness of the Proposed Assembly District Map Compared with the 2011 Map

	2011 Map		Proposed Map	
AD Number	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)
1	0.21	0.25	0.51	0.56
2	0.42	0.27	0.50	0.33
3	0.46	0.28	0.53	0.48
4	0.33	0.15	0.42	0.18
5	0.48	0.26	0.43	0.30
6	0.44	0.23	0.36	0.32
7	0.25	0.20	0.43	0.48
8	0.62	0.49	0.54	0.42
9	0.31	0.19	0.38	0.25
10	0.41	0.18	0.46	0.25
11	0.36	0.19	0.34	0.37
12	0.31	0.32	0.46	0.58
13	0.33	0.31	0.46	0.50
14	0.34	0.33	0.44	0.43
15	0.34	0.41	0.42	0.30
16	0.37	0.31	0.65	0.39
17	0.52	0.38	0.47	0.47
18	0.36	0.31	0.39	0.28
19	0.17	0.13	0.18	0.20
20	0.57	0.42	0.57	0.46
21	0.57	0.50	0.38	0.50
22	0.30	0.19	0.53	0.48
23	0.15	0.14	0.30	0.36
24	0.36	0.31	0.33	0.23
25	0.52	0.43	0.40	0.45
26	0.39	0.17	0.42	0.46
27	0.53	0.21	0.43	0.32
28	0.39	0.36	0.46	0.45
29	0.38	0.38	0.44	0.38
30	0.46	0.55	0.39	0.48
31	0.57	0.27	0.59	0.38
32	0.50	0.20	0.49	0.29

33	0.32	0.18	0.55	0.42
34	0.40	0.30	0.38	0.35
35	0.42	0.36	0.57	0.52
36	0.57	0.33	0.56	0.35
37	0.26	0.15	0.49	0.36
38	0.34	0.22	0.50	0.48
39	0.51	0.32	0.37	0.34
40	0.40	0.29	0.43	0.43
41	0.41	0.22	0.40	0.38
42	0.41	0.19	0.58	0.39
43	0.43	0.13	0.49	0.53
44	0.35	0.06	0.40	0.22
45	0.48	0.44	0.46	0.45
46	0.25	0.19	0.47	0.45
47	0.46	0.08	0.32	0.17
48	0.41	0.04	0.56	0.41
49	0.31	0.34	0.39	0.41
50	0.32	0.26	0.50	0.33
51	0.33	0.36	0.45	0.50
52	0.32	0.27	0.32	0.32
53	0.41	0.15	0.48	0.29
54	0.43	0.13	0.47	0.26
55	0.54	0.46	0.50	0.41
56	0.32	0.19	0.43	0.35
57	0.39	0.38	0.62	0.49
58	0.41	0.15	0.42	0.17
59	0.28	0.21	0.20	0.23
60	0.48	0.25	0.46	0.33
61	0.43	0.18	0.23	0.20
62	0.35	0.40	0.22	0.29
63	0.35	0.33	0.34	0.38
64	0.20	0.07	0.26	0.10
65	0.53	0.29	0.59	0.30
66	0.35	0.18	0.34	0.24
67	0.45	0.27	0.37	0.22
68	0.57	0.25	0.44	0.34
69	0.46	0.42	0.54	0.49
70	0.25	0.17	0.36	0.29
71	0.51	0.25	0.55	0.45
72	0.51	0.40	0.47	0.39
73	0.39	0.38	0.36	0.43
74	0.44	0.36	0.43	0.41
75	0.37	0.42	0.38	0.44

76	0.22	0.21	0.22	0.28
77	0.48	0.07	0.48	0.25
78	0.52	0.07	0.67	0.34
79	0.39	0.05	0.58	0.44
80	0.63	0.35	0.45	0.35
81	0.38	0.23	0.41	0.48
82	0.45	0.43	0.50	0.47
83	0.35	0.22	0.51	0.48
84	0.33	0.34	0.51	0.43
85	0.44	0.19	0.46	0.28
86	0.33	0.16	0.50	0.30
87	0.34	0.35	0.32	0.33
88	0.29	0.20	0.38	0.29
89	0.28	0.17	0.33	0.34
90	0.48	0.20	0.28	0.29
91	0.41	0.07	0.41	0.10
92	0.49	0.47	0.48	0.45
93	0.33	0.17	0.44	0.35
94	0.56	0.25	0.51	0.20
95	0.23	0.09	0.22	0.10
96	0.34	0.35	0.35	0.36
97	0.39	0.24	0.49	0.39
98	0.41	0.27	0.47	0.23
99	0.37	0.30	0.46	0.29
Average	.40	.26	0.44	0.36

Table 8. Racial Composition of Milwaukee Area Assembly Districts in the 2011 Map			
Assembly District	Percent of VAP* That Are Minorities	Percent of VAP That are Black	Percent of VAP That are Hispanic
8	81.7%	11.4%	67.2%
9	71.8%	9.9%	56.2%
10	67.9%	59.4%	5.3%
11	78.7%	65.5%	4.4%
12	71.8%	60.6%	5.2%
16	68.2%	55.6%	6.9%
17	77.4%	68.4%	4.5%
18	74.1%	60.7%	7.3%

* Voting Age Population

Table 9. Racial Composition of Milwaukee Area Assembly Districts in the Proposed Map			
Assembly District	Percent of VAP* That Are Minorities	Percent of VAP That are Black	Percent of VAP That are Hispanic
8	75.6%	9.8%	58.8%
9	68.5%	5.4%	54.7%
10	59.7%	49.1%	4.5%
11	71.1%	55.8%	5.2%
12	65.6%	48.2%	7.2%
16	59.9%	43.9%	4.2%
17	60.7%	47.9%	9.6%
18	68.9%	50.4%	9.6%
23	53.1%	43.0%	3.7%

* Voting Age Population

Table 10. Assignment of Assembly Districts to Senate Districts in Proposed Map	
Senate District Number	Assembly District Numbers
1	1, 2, 3
2	4, 5, 6
3	7, 8, 9
4	11, 12, *17*
5	13, 14, 15
6	*10*, 16, 18

7	19, 20, 21
8	22, 23, 24
9	25, 26, 27
10	28, 29, 30
11	31, 32, 33
12	34, 35, 36
13	37, 38, 39
14	40, 41, 42
15	43, 44, 45
16	46, 47, 48
17	49, 50, 51
18	52, 53, 54
19	55, 56, 57
20	58, 59, 60
21	61, 62, 63
22	64, 65, 66
23	67, 68, *91*
24	70, 71, 72
25	73, 74, 75
26	76, 77, 78
27	79, 80, 81
28	82, 83, 84
29	85, 86, 87
30	88, 89, 90
31	*69,* 92, 93
32	94, 95, 96
33	97, 98, 99

Note: Assembly districts swapped to maintain contiguity are shown in *italics*.

Table 11. Continuity of Population and Geography of the Proposed Senate District Map with the 2011 Wisconsin Assembly District Map

SD Number	% Population From 2011 Map	% Overlap of Landmass From 2011 Map
1	73.5%	93.5%
2	71.3%	85.7%
3	83.1%	77.3%
4	58.4%	69.1%
5	84.0%	70.4%

6	67.8%	63.2%
7	89.6%	95.4%
8	71.1%	74.9%
9	95.8%	84.9%
10	88.6%	95.6%
11	70.0%	70.6%
12	96.3%	97.3%
13	67.3%	75.1%
14	87.8%	93.7%
15	70.5%	50.6%
16	74.3%	61.9%
17	96.2%	91.3%
18	91.7%	89.4%
19	97.1%	97.9%
20	83.2%	72.2%
21	95.1%	99.1%
22	99.7%	99.8%
23	48.5%	33.9%
24	96.0%	93.6%
25	97.6%	97.9%
26	88.9%	78.2%
27	74.0%	51.2%
28	69.0%	71.0%
29	83.5%	82.6%
30	84.0%	81.2%
31	54.3%	91.6%
32	99.0%	97.8%
33	60.6%	66.7%
Overall	80.4%	80.8%

Table 12. Improvement in Political Boundary Crossings of the Proposed Senate District Map Compared with the 2011 Map
Number of Times that an Area is Split, by Type of Area

Areas	**2011 Map**	**Proposed Map**
Counties	57	42
Place (Town or City)	124	79
Minor Civil Divisions	318	121
Precincts (VTDs)	576	123
Census Tracts	512	349

Table 13. Improvement in Compactness of the Proposed Senate District Map Compared with the 2011 Map

	2011 Map		Proposed Map	
SD Number	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)	Area Compactness (Reock)	Perimeter Compactness (Polsby-Popper)
1	0.30	0.27	0.34	0.35
2	0.44	0.20	0.34	0.23
3	0.53	0.39	0.44	0.34
4	0.33	0.22	0.43	0.38
5	0.67	0.47	0.54	0.34
6	0.46	0.32	0.36	0.24
7	0.40	0.50	0.39	0.47
8	0.20	0.15	0.22	0.17
9	0.51	0.43	0.52	0.55
10	0.34	0.28	0.41	0.35
11	0.47	0.20	0.41	0.24
12	0.50	0.34	0.50	0.34
13	0.41	0.22	0.49	0.29
14	0.30	0.15	0.31	0.21
15	0.42	0.28	0.41	0.29
16	0.47	0.07	0.48	0.25
17	0.32	0.28	0.43	0.39
18	0.60	0.50	0.40	0.45
19	0.45	0.46	0.50	0.58
20	0.33	0.24	0.24	0.19
21	0.44	0.22	0.44	0.23
22	0.23	0.07	0.24	0.10
23	0.43	0.28	0.45	0.38
24	0.40	0.25	0.40	0.29
25	0.38	0.26	0.41	0.29
26	0.48	0.06	0.45	0.20
27	0.40	0.11	0.37	0.28
28	0.40	0.30	0.54	0.43
29	0.26	0.23	0.26	0.21
30	0.29	0.23	0.36	0.21
31	0.34	0.27	0.36	0.26
32	0.42	0.32	0.41	0.31
33	0.55	0.21	0.37	0.20
Average	.41	.27	.40	.30

Appendix 2

STEPHEN DANIEL ANSOLABEHERE

Department of Government
Harvard University
1737 Cambridge Street
Cambridge, MA 02138
sda@gov.harvard.edu

EDUCATION

Harvard University	Ph.D., Political Science	1989
University of Minnesota	B.A., Political Science B.S., Economics	1984

PROFESSIONAL EXPERIENCE

ACADEMIC POSITIONS

2016-present	Frank G. Thompson Professor of Government, Harvard University
2008-present	Professor, Department of Government, Harvard University
2015-present	Director, Center for American Politics, Harvard University
1998-2009	Elting Morison Professor, Department of Political Science, MIT (Associate Head, 2001-2005)
1995-1998	Associate Professor, Department of Political Science, MIT
1993-1994	National Fellow, The Hoover Institution
1989-1993	Assistant Professor, Department of Political Science, University of California, Los Angeles

FELLOWSHIPS AND HONORS

American Academy of Arts and Sciences	2007
Carnegie Scholar	2000-02
National Fellow, The Hoover Institution	1993-94
Harry S. Truman Fellowship	1982-86

PUBLICATIONS

Books

2019 *American Government*, 15th edition. With Ted Lowi, Benjamin Ginsberg and Kenneth Shepsle. W.W. Norton.

2014 *Cheap and Clean: How Americans Think About Energy in the Age of Global Warming*. With David Konisky. MIT Press. Recipient of the Donald K. Price book award.

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2013 "Regional Differences in Racially Polarized Voting: Implications for the Constitutionality of Section 5 of the Voting Rights Act" (with Nathaniel Persily and Charles Stewart) 126 *Harvard Law Review* F 205 (2013) http://www.harvardlawreview.org/issues/126/april13/forum_1005.php

2013 "Cooperative Survey Research" *Annual Review of Political Science* (with Douglas Rivers)

2013 "Social Sciences and the Alternative Energy Future" *Daedalus* (with Bob Fri)

2013 "The Effects of Redistricting on Incumbents," *Election Law Journal* (with James Snyder)

2012 "Asking About Numbers: How and Why" *Political Analysis* (with Erik Snowberg and Marc Meredith). doi:10.1093/pan/mps031

2012 "Movers, Stayers, and Registration" *Quarterly Journal of Political Science* (with Eitan Hersh and Ken Shepsle)

2012 "Validation: What Big Data Reveals About Survey Misreporting and the Real Electorate" *Political Analysis* (with Eitan Hersh)

2012 "Arizona Free Enterprise v. Bennett and the Problem of Campaign Finance" *Supreme Court Review* 2011(1):39-79

2012 "The American Public's Energy Choice" *Daedalus* (with David Konisky)

2012 "Challenges for Technology Change" *Daedalus* (with Robert Fri)

2011 "When Parties Are Not Teams: Party positions in single-member district and proportional representation systems" *Economic Theory* 49 (March) DOI: 10.1007/s00199-011-0610-1 (with James M. Snyder Jr. and William Leblanc)

2011 "Profiling Originalism" *Columbia Law Review* (with Jamal Greene and Nathaniel Persily).

2010 "Partisanship, Public Opinion, and Redistricting" *Election Law Journal* (with Joshua Fougere and Nathaniel Persily).

2010 "Primary Elections and Party Polarization" *Quarterly Journal of Political Science* (with Shigeo Hirano, James Snyder, and Mark Hansen)

2010 "Constituents' Responses to Congressional Roll Call Voting," *American Journal of Political Science* (with Phil Jones)

2010 "Race, Region, and Vote Choice in the 2008 Election: Implications for the Future of the Voting Rights Act" *Harvard Law Review* April, 2010. (with Nathaniel Persily, and Charles H. Stewart III)

2010 "Residential Mobility and the Cell Only Population," *Public Opinion Quarterly* (with Brian Schaffner)

2009 "Explaining Attitudes Toward Power Plant Location," *Public Opinion Quarterly* (with David Konisky)

2009 "Public risk perspectives on the geologic storage of carbon dioxide," *International Journal of Greenhouse Gas Control* (with Gregory Singleton and Howard Herzog) 3(1): 100-107.

2008 "A Spatial Model of the Relationship Between Seats and Votes" (with William Leblanc) *Mathematical and Computer Modeling* (November).

2008 "The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting" (with Jonathan Rodden and James M. Snyder, Jr.) *American Political Science Review* (May).

2008 "Access versus Integrity in Voter Identification Requirements." *New York University Annual Survey of American Law,* vol 63.

2008 "Voter Fraud in the Eye of the Beholder" (with Nathaniel Persily) *Harvard Law Review* (May)

2007 "Incumbency Advantages in U. S. Primary Elections," (with John Mark Hansen, Shigeo Hirano, and James M. Snyder, Jr.) *Electoral Studies* (September)

2007 "Television and the Incumbency Advantage" (with Erik C. Snowberg and James M. Snyder, Jr). *Legislative Studies Quarterly*.

2006 "The Political Orientation of Newspaper Endorsements" (with Rebecca Lessem and James M. Snyder, Jr.). *Quarterly Journal of Political Science* vol. 1, issue 3.

2006 "Voting Cues and the Incumbency Advantage: A Critical Test" (with Shigeo Hirano, James M. Snyder, Jr., and Michiko Ueda) *Quarterly Journal of Political Science* vol. 1, issue 2.

2006 "American Exceptionalism? Similarities and Differences in National Attitudes Toward Energy Policies and Global Warming" (with David Reiner, Howard Herzog, K. Itaoka, M. Odenberger, and Fillip Johanssen) *Environmental Science and Technology* (February 22, 2006), http://pubs3.acs.org/acs/journals/doilookup?in_doi=10.1021/es052010b

2006 "Purple America" (with Jonathan Rodden and James M. Snyder, Jr.) *Journal of Economic Perspectives* (Winter).

2005 "Did the Introduction of Voter Registration Decrease Turnout?" (with David Konisky). *Political Analysis*.

2005 "Statistical Bias in Newspaper Reporting: The Case of Campaign Finance" *Public Opinion Quarterly* (with James M. Snyder, Jr., and Erik Snowberg).

2005 "Studying Elections" *Policy Studies Journal* (with Charles H. Stewart III and R. Michael Alvarez).

2005 "Legislative Bargaining under Weighted Voting" *American Economic Review* (with James M. Snyder, Jr., and Michael Ting)

2005 "Voting Weights and Formateur Advantages in Coalition Formation: Evidence from Parliamentary Coalitions, 1946 to 2002" (with James M. Snyder, Jr., Aaron B. Strauss, and Michael M. Ting) *American Journal of Political Science*.

2005 "Reapportionment and Party Realignment in the American States" *Pennsylvania Law Review* (with James M. Snyder, Jr.)

2004 "Residual Votes Attributable to Voting Technologies" (with Charles Stewart) *Journal of Politics*

2004 "Using Term Limits to Estimate Incumbency Advantages When Office Holders Retire Strategically" (with James M. Snyder, Jr.). *Legislative Studies Quarterly* vol. 29, November 2004, pages 487-516.

2004 "Did Firms Profit From Soft Money?" (with James M. Snyder, Jr., and Michiko Ueda) *Election Law Journal* vol. 3, April 2004.

2003 "Bargaining in Bicameral Legislatures" (with James M. Snyder, Jr. and Mike Ting) *American Political Science Review,* August, 2003.

2003 "Why Is There So Little Money in U.S. Politics?" (with James M. Snyder, Jr.) *Journal of Economic Perspectives*, Winter, 2003.

2002 "Equal Votes, Equal Money: Court-Ordered Redistricting and the Public Spending in the American States" (with Alan Gerber and James M. Snyder, Jr.) *American Political Science Review*, December, 2002.
Paper awarded the Heinz Eulau award for the best paper in the American Political Science Review.

2002 "Are PAC Contributions and Lobbying Linked?" (with James M. Snyder, Jr. and Micky Tripathi) *Business and Politics* 4, no. 2.

2002 "The Incumbency Advantage in U.S. Elections: An Analysis of State and Federal Offices, 1942-2000" (with James Snyder) *Election Law Journal,* 1, no. 3.

2001 "Voting Machines, Race, and Equal Protection." *Election Law Journal*, vol. 1, no. 1

2001 "Models, assumptions, and model checking in ecological regressions" (with Andrew Gelman, David Park, Phillip Price, and Larraine Minnite) *Journal of the Royal Statistical Society,* series A, 164: 101-118.

2001 "The Effects of Party and Preferences on Congressional Roll Call Voting." (with James Snyder and Charles Stewart) *Legislative Studies Quarterly* (forthcoming).
Paper awarded the *Jewell-Lowenberg Award* for the best paper published on legislative politics in 2001. Paper awarded the *Jack Walker Award* for the best paper published on party politics in 2001.

2001 "Candidate Positions in Congressional Elections," (with James Snyder and Charles Stewart). *American Journal of Political Science* 45 (November).

2000 "Old Voters, New Voters, and the Personal Vote," (with James Snyder and Charles Stewart) *American Journal of Political Science* 44 (February).

2000 "Soft Money, Hard Money, Strong Parties," (with James Snyder) *Columbia Law*

Review 100 (April):598 - 619.

2000 "Campaign War Chests and Congressional Elections," (with James Snyder) *Business and Politics*. 2 (April): 9-34.

1999 "Replicating Experiments Using Surveys and Aggregate Data: The Case of Negative Advertising." (with Shanto Iyengar and Adam Simon) *American Political Science Review* 93 (December).

1999 "Valence Politics and Equilibrium in Spatial Models," (with James Snyder), *Public Choice.*

1999 "Money and Institutional Power," (with James Snyder), *Texas Law Review* 77 (June, 1999): 1673-1704.

1997 "Incumbency Advantage and the Persistence of Legislative Majorities," (with Alan Gerber), *Legislative Studies Quarterly* 22 (May 1997).

1996 "The Effects of Ballot Access Rules on U.S. House Elections," (with Alan Gerber), *Legislative Studies Quarterly* 21 (May 1996).

1994 "Riding the Wave and Issue Ownership: The Importance of Issues in Political Advertising and News," (with Shanto Iyengar) *Public Opinion Quarterly* 58: 335-357.

1994 "Horseshoes and Horseraces: Experimental Evidence of the Effects of Polls on Campaigns," (with Shanto Iyengar) *Political Communications* 11/4 (October-December): 413-429.

1994 "Does Attack Advertising Demobilize the Electorate?" (with Shanto Iyengar), *American Political Science Review* 89 (December).

1994 "The Mismeasure of Campaign Spending: Evidence from the 1990 U.S. House Elections," (with Alan Gerber) *Journal of Politics* 56 (September).

1993 "Poll Faulting," (with Thomas R. Belin) *Chance* 6 (Winter): 22-28.

1991 "The Vanishing Marginals and Electoral Responsiveness," (with David Brady and Morris Fiorina) *British Journal of Political Science* 22 (November): 21-38.

1991 "Mass Media and Elections: An Overview," (with Roy Behr and Shanto Iyengar) *American Politics Quarterly* 19/1 (January): 109-139.

1990 "The Limits of Unraveling in Interest Groups," *Rationality and Society* 2: 394-400.

1990 "Measuring the Consequences of Delegate Selection Rules in Presidential Nominations," (with Gary King) *Journal of Politics* 52: 609-621.

1989 "The Nature of Utility Functions in Mass Publics," (with Henry Brady) *American Political Science Review* 83: 143-164.

Special Reports and Policy Studies

2010 *The Future of Nuclear Power*, Revised.

2006 *The Future of Coal.* MIT Press. Continued reliance on coal as a primary power source will lead to very high concentrations of carbon dioxide in the atmosphere, resulting in global warming. This cross-disciplinary study – drawing on faculty from Physics, Economics, Chemistry, Nuclear Engineering, and Political Science – develop a road map for technology research and development policy in order to address the challenges of carbon emissions from expanding use of coal for electricity and heating throughout the world.

2003 *The Future of Nuclear Power*. MIT Press. This cross-disciplinary study – drawing on faculty from Physics, Economics, Chemistry, Nuclear Engineering, and Political Science – examines the what contribution nuclear power can make to meet growing electricity demand, especially in a world with increasing carbon dioxide emissions from fossil fuel power plants.

2002 "Election Day Registration." A report prepared for DEMOS. This report analyzes the possible effects of Proposition 52 in California based on the experiences of 6 states with election day registration.

2001 *Voting: What Is, What Could Be.* A report of the Caltech/MIT Voting Technology Project. This report examines the voting system, especially technologies for casting and counting votes, registration systems, and polling place operations, in the United States. It was widely used by state and national governments in formulating election reforms following the 2000 election.

2001 "An Assessment of the Reliability of Voting Technologies." A report of the Caltech/MIT Voting Technology Project. This report provided the first nationwide assessment of voting equipment performance in the United States. It was prepared for the Governor's Select Task Force on Election Reform in Florida.

Chapters in Edited Volumes

2016 "Taking the Study of Public Opinion Online" (with Brian Schaffner) *Oxford Handbook of Public Opinion*, R. Michael Alvarez, ed. Oxford University Press:

New York, NY.

2014 "Voter Registration: The Process and Quality of Lists*" The Measure of American Elections*, Barry Burden, ed..

2012 "Using Recounts to Measure the Accuracy of Vote Tabulations: Evidence from New Hampshire Elections, 1946-2002" in Confirming Elections, R. Michael Alvarez, Lonna Atkeson, and Thad Hall, eds. New York: Palgrave, Macmillan.

2010 "Dyadic Representation" in Oxford Handbook on Congress, Eric Schickler, ed., Oxford University Press.

2008 "Voting Technology and Election Law" in *America Votes!,* Benjamin Griffith, editor, Washington, DC: American Bar Association.

2007 "What Did the Direct Primary Do to Party Loyalty in Congress" (with Shigeo Hirano and James M. Snyder Jr.) in *Process, Party and Policy Making: Further New Perspectives on the History of Congress*, David Brady and Matthew D. McCubbins (eds.), Stanford University Press, 2007.

2007 "Election Administration and Voting Rights" in *Renewal of the Voting Rights Act*, David Epstein and Sharyn O'Hallaran, eds. Russell Sage Foundation.

2006 "The Decline of Competition in Primary Elections," (with John Mark Hansen, Shigeo Hirano, and James M. Snyder, Jr.) *The Marketplace of Democracy*, Michael P. McDonald and John Samples, eds. Washington, DC: Brookings.

2005 "Voters, Candidates and Parties" in *Handbook of Political Economy*, Barry Weingast and Donald Wittman, eds. New York: Oxford University Press.

2003 "Baker v. Carr in Context, 1946 – 1964" (with Samuel Isaacharoff) in *Constitutional Cases in Contex*t, Michael Dorf, editor. New York: Foundation Press.

2002 "Corruption and the Growth of Campaign Spending"(with Alan Gerber and James Snyder). *A User's Guide to Campaign Finance*, Jerry Lubenow, editor. Rowman and Littlefield.

2001 "The Paradox of Minimal Effects," in Henry Brady and Richard Johnston, eds., *Do Campaigns Matter*? University of Michigan Press.

2001 "Campaigns as Experiments," in Henry Brady and Richard Johnson, eds., Do *Campaigns Matter*? University of Michigan Press.

2000 "Money and Office," (with James Snyder) in David Brady and John Cogan, eds., *Congressional Elections: Continuity and Change*. Stanford University Press.

1996 "The Science of Political Advertising," (with Shanto Iyengar) in *Political Persuasion and Attitude Change*, Richard Brody, Diana Mutz, and Paul Sniderman, eds. Ann Arbor, MI: University of Michigan Press.

1995 "Evolving Perspectives on the Effects of Campaign Communication," in Philo Warburn, ed., *Research in Political Sociology*, vol. 7, JAI.

1995 "The Effectiveness of Campaign Advertising: It's All in the Context," (with Shanto Iyengar) in *Campaigns and Elections American Style*, Candice Nelson and James A. Thurber, eds. Westview Press.

1993 "Information and Electoral Attitudes: A Case of Judgment Under Uncertainty," (with Shanto Iyengar), in *Explorations in Political Psychology*, Shanto Iyengar and William McGuire, eds. Durham: Duke University Press.

Working Papers

2009 "Sociotropic Voting and the Media" (with Marc Meredith and Erik Snowberg), American National Election Study Pilot Study Reports, John Aldrich editor.

2007 "Public Attitudes Toward America's Energy Options: Report of the 2007 MIT Energy Survey" CEEPR Working Paper 07-002 and CANES working paper.

2006 "Constituents' Policy Perceptions and Approval of Members' of Congress" CCES Working Paper 06-01 (with Phil Jones).

2004 "Using Recounts to Measure the Accuracy of Vote Tabulations: Evidence from New Hampshire Elections, 1946 to 2002" (with Andrew Reeves).

2002 "Evidence of Virtual Representation: Reapportionment in California," (with Ruimin He and James M. Snyder).

1999 "Why did a majority of Californians vote to lower their own power?" (with James Snyder and Jonathan Woon). Paper presented at the annual meeting of the American Political Science Association, Atlanta, GA, September, 1999.
Paper received the award for the best paper on Representation at the 1999 Annual Meeting of the APSA.

1999 "Has Television Increased the Cost of Campaigns?" (with Alan Gerber and James Snyder).

1996 "Money, Elections, and Candidate Quality," (with James Snyder).

1996 "Party Platform Choice - Single- Member District and Party-List Systems,"(with

James Snyder).

1995 "Messages Forgotten" (with Shanto Iyengar).

1994 "Consumer Contributors and the Returns to Fundraising: A Microeconomic Analysis," (with Alan Gerber), presented at the Annual Meeting of the American Political Science Association, September.

1992 "Biases in Ecological Regression," (with R. Douglas Rivers) August, (revised February 1994). Presented at the Midwest Political Science Association Meetings, April 1994, Chicago, IL.

1992 "Using Aggregate Data to Correct Nonresponse and Misreporting in Surveys" (with R. Douglas Rivers). Presented at the annual meeting of the Political Methodology Group, Cambridge, Massachusetts, July.

1991 "The Electoral Effects of Issues and Attacks in Campaign Advertising" (with Shanto Iyengar). Presented at the Annual Meeting of the American Political Science Association, Washington, DC.

1991 "Television Advertising as Campaign Strategy: Some Experimental Evidence" (with Shanto Iyengar). Presented at the Annual Meeting of the American Association for Public Opinion Research, Phoenix.

1991 "Why Candidates Attack: Effects of Televised Advertising in the 1990 California Gubernatorial Campaign," (with Shanto Iyengar). Presented at the Annual Meeting of the Western Political Science Association, Seattle, March.

1990 "Winning is Easy, But It Sure Ain't Cheap." Working Paper #90-4, Center for the American Politics and Public Policy, UCLA. Presented at the Political Science Departments at Rochester University and the University of Chicago.

Research Grants

1989-1990 Markle Foundation. "A Study of the Effects of Advertising in the 1990 California Gubernatorial Campaign." Amount: $50,000

1991-1993 Markle Foundation. "An Experimental Study of the Effects of Campaign Advertising." Amount: $150,000

1991-1993 NSF. "An Experimental Study of the Effects of Advertising in the 1992 California Senate Electoral." Amount: $100,000

1994-1995 MIT Provost Fund. "Money in Elections: A Study of the Effects of Money on Electoral Competition." Amount: $40,000

1996-1997	National Science Foundation. "Campaign Finance and Political Representation." Amount: $50,000
1997	National Science Foundation. "Party Platforms: A Theoretical Investigation of Party Competition Through Platform Choice." Amount: $40,000
1997-1998	National Science Foundation. "The Legislative Connection in Congressional Campaign Finance. Amount: $150,000
1999-2000	MIT Provost Fund. "Districting and Representation." Amount: $20,000.
1999-2002	Sloan Foundation. "Congressional Staff Seminar." Amount: $156,000.
2000-2001	Carnegie Corporation. "The Caltech/MIT Voting Technology Project." Amount: $253,000.
2001-2002	Carnegie Corporation. "Dissemination of Voting Technology Information." Amount: $200,000.
2003-2005	National Science Foundation. "State Elections Data Project." Amount: $256,000.
2003-2004	Carnegie Corporation. "Internet Voting." Amount: $279,000.
2003-2005	Knight Foundation. "Accessibility and Security of Voting Systems." Amount: $450,000.
2006-2008	National Science Foundation, "Primary Election Data Project," $186,000
2008-2009	Pew/JEHT. "Measuring Voting Problems in Primary Elections, A National Survey." Amount: $300,000
2008-2009	Pew/JEHT. "Comprehensive Assessment of the Quality of Voter Registration Lists in the United States: A pilot study proposal" (with Alan Gerber). Amount: $100,000.
2010-2011	National Science Foundation, "Cooperative Congressional Election Study," $360,000
2010-2012	Sloan Foundation, "Precinct-Level U. S. Election Data," $240,000.
2012-2014	National Science Foundation, "Cooperative Congressional Election Study, 2010-2012 Panel Study" $425,000
2012-2014	National Science Foundation, "2012 Cooperative Congressional Election

Study," $475,000

2014-2016 National Science Foundation, "Cooperative Congressional Election Study, 2010-2014 Panel Study" $510,000

2014-2016 National Science Foundation, "2014 Cooperative Congressional Election Study," $400,000

2016-2018 National Science Foundation, "2016 Cooperative Congressional Election Study," $485,000

2018-2020 National Science Foundation, "2018 Cooperative Congressional Election Study," $844,784.

2019-2022 National Science Foundation, RIDIR: "Collaborative Research: Analytic Tool for Poststratification and small-area estimation for survey data." $942,607

Professional Boards

Editor, Cambridge University Press Book Series, Political Economy of Institutions and Decisions, 2006-2016

Member, Board of the Reuters International School of Journalism, Oxford University, 2007 to present.

Member, Academic Advisory Board, Electoral Integrity Project, 2012 to present.

Contributing Editor, *Boston Review*, The State of the Nation.

Member, Board of Overseers, American National Election Studies, 1999 - 2013.

Associate Editor, Public Opinion Quarterly, 2012 to 2013.

Editorial Board of Harvard Data Science Review, 2018 to present.
Editorial Board of American Journal of Political Science, 2005 to 2009.
Editorial Board of Legislative Studies Quarterly, 2005 to 2010.
Editorial Board of Public Opinion Quarterly, 2006 to present.
Editorial Board of the Election Law Journal, 2002 to present.
Editorial Board of the Harvard International Journal of Press/Politics, 1996 to 2008.
Editorial Board of Business and Politics, 2002 to 2008.
Scientific Advisory Board, Polimetrix, 2004 to 2006.

Special Projects and Task Forces

Principal Investigator, Cooperative Congressional Election Study, 2005 – present.

CBS News Election Decision Desk, 2006-present

Co-Director, Caltech/MIT Voting Technology Project, 2000-2004.

Co-Organizer, MIT Seminar for Senior Congressional and Executive Staff, 1996-2007.

MIT Energy Innovation Study, 2009-2010.
MIT Energy Initiative, Steering Council, 2007-2008
MIT Coal Study, 2004-2006.
MIT Energy Research Council, 2005-2006.
MIT Nuclear Study, 2002-2004.
Harvard University Center on the Environment, Council, 2009-present

Expert Witness, Consultation, and Testimony

2001	Testimony on Election Administration, U. S. Senate Committee on Commerce.
2001	Testimony on Voting Equipment, U.S. House Committee on Science, Space, and Technology
2001	Testimony on Voting Equipment, U.S. House Committee on House Administration
2001	Testimony on Voting Equipment, Congressional Black Caucus
2002-2003	*McConnell v. FEC*, 540 U.S. 93 (2003), consultant to the Brennan Center.
2009	Amicus curiae brief with Professors Nathaniel Persily and Charles Stewart on behalf of neither party to the U.S. Supreme Court in the case of *Northwest Austin Municipal Utility District Number One v. Holder*, 557 U.S. 193 (2009).
2009	Testimony on Voter Registration, U. S. Senate Committee on Rules.
2011-2015	*Perez v. Perry*, U. S. District Court in the Western District of Texas (No. 5:11-cv-00360). Exert witness on behalf of Rodriguez intervenors.
2011-2013	*State of Texas v. United States,* the U.S. District Court in the District of Columbia (No. 1:11-cv-01303), expert witness on behalf of the Gonzales intervenors.
2012-2013	*State of Texas v. Holder*, U.S. District Court in the District of Columbia (No. 1:12-cv-00128), expert witness on behalf of the United States.
2011-2012	*Guy v. Miller* in U.S. District Court for Nevada (No. 11-OC-00042-1B), expert witness on behalf of the Guy plaintiffs.
2012	*In re Senate Joint Resolution of Legislative Apportionment*, Florida Supreme Court (Nos. 2012-CA-412, 2012-CA-490), consultant for the Florida Democratic Party.
2012-2014	*Romo v. Detzner*, Circuit Court of the Second Judicial Circuit in Florida (No. 2012 CA 412), expert witness on behalf of Romo plaintiffs.
2013-2014	*LULAC v. Edwards Aquifer Authority*, U.S. District Court for the Western

	District of Texas, San Antonio Division (No. 5:12cv620-OLG,), consultant and expert witness on behalf of the City of San Antonio and San Antonio Water District
2013-2014	*Veasey v. Perry*, U. S. District Court for the Southern District of Texas, Corpus Christi Division (No. 2:13-cv-00193), consultant and expert witness on behalf of the United States Department of Justice.
2013-2015	*Harris v. McCrory,* U. S. District Court for the Middle District of North Carolina (No. 1:2013cv00949), consultant and expert witness on behalf of the Harris plaintiffs. (later named *Cooper v. Harris*)
2014	Amicus curiae brief, on behalf of neither party, Supreme Court of the United States, *Alabama Democratic Conference v. State of Alabama*.
2014- 2016	*Bethune-Hill v. Virginia State Board of Elections*, U. S. District Court for the Eastern District of Virginia (No. 3:2014cv00852), consultant and expert on behalf of the Bethune-Hill plaintiffs.
2015	Amicus curiae brief in support of Appellees, Supreme Court of the United States, *Evenwell v. Abbott*
2016-2017	*Perez v. Abbott*, U. S. District Court in the Western District of Texas (No. 5:11-cv-00360). Exert witness on behalf of Rodriguez intervenors.
2017-2018	*Fish v. Kobach*, U. S. District Court in the District of Kansas (No. 2:16-cv-02105-JAR). Expert witness of behalf of the Fish plaintiffs.
2020	*Voto Latino, et al. v. Hobbs*, in the U.S. District Court for the District of Arizona (No. 2:19-cv-05685-DWL).
2020	*Wood v. Raffensperger*, in Fulton County, Georgia, Superior Court, (No. 2020CV342959)