Expert Report
Christopher T. Kenny

May 31, 2024

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I. INTRODUCTION

1. My name is Christopher T. Kenny and I am a Ph.D. Candidate in Government at Harvard University. My research focuses on redistricting and the use of census data in the United States. I am affiliated with the Center for American Political Studies at Harvard, the Institute for Quantitative Social Science at Harvard, and the Algorithm-Assisted Redistricting Methodology (ALARM) Project.

2. I have been asked to draw redistricting maps for the Daytona Beach City Commission. Using data from the US Census Bureau's 2020 Census PL 94-171 release, I have drawn six redistricting plans, each consisting of 6 zones. In my opinion, each of these plans conforms to the rules and requirements detailed in Section IV.

3. After completing the redistricting plans, I was also asked to briefly analyze the enacted plan for the Daytona Beach City Commission.

II. SUMMARY OF MAPS

4. I have drawn six redistricting plans for the Daytona Beach City Commission. Four of these plans are distinct maps. Two of these are minor variations of the first two plans which underpopulate the district which covers the area west of I-95.

5. Each of the plans keep the area between the Halifax River and Atlantic Ocean together in one zone. This area is near the exact target population of a zone and the river serves as a logical boundary for a zone. This area has 12,075 people, which is a deviation of 112 people, or equivalently 0.94%, from the target population of 11,963.

6. The enacted plan has a large total population deviation. Zone 4 is significantly underpop-

ulated, with a deviation of -928 people, or equivalently -7.76%, from the target population. The largest zone (Zone 1) has a population deviation of 301 people, or equivalently 2.52%, from the target population. This amounts to a range of 10.27%.

III. QUALIFICATIONS AND COMPENSATION

7. I am a Ph.D. Candidate in Government at Harvard University. I have completed all course-work. I have completed my general examinations requirements in American politics and methodology. As such, I hold an MA in Government. I expect to receive my Ph.D. in May 2025. My dissertation is on redistricting in the United States.

8. I have taught courses in political science at the graduate and undergraduate level. In Fall 2021, I was an instructor for a graduate course in statistical methodology for political scientists. In 2022, I was a Pre-Doctoral Fellow at the Election Law Clinic at Harvard Law School. In August 2022, I taught the "Math Prefresher for Political Scientists," which is a short course for entering Ph.D. students in Government. In Springs 2023 and 2024, I taught a course on redistricting and elections for sophomores.

9. My research focuses on the intersection between statistical methodology and American politics, with an emphasis on redistricting and census data. My research has appeared in peer reviewed general science journals, including *Science Advances*, *Scientific Data*, and *PNAS*, and in interdisciplinary journals, including the *Harvard Data Science Review*.

10. My research on census data has focused the effects of privacy protection mechanisms on published counts. This work includes evaluating the privacy protection mechanisms used in the 2020 Census.

11. My research in redistricting has largely focused on the validation of redistricting sampling

methods and their application to political science questions. I am a core member of the ALARM Project, a research project at Harvard University studying algorithmic redistricting methodologies and their application. My research in redistricting has been used by the Maryland Redistricting Commission.[1] My research has also been relied upon in an amici curiae brief in *Alpha Phi Alpha Fraternity, Inc. et al. v. Brad Raffensperger*.[2]

12. As part of my academic research, I have developed software used for research on redistricting and census data. Some notable packages include `redist` (Kenny et al., 2022), `censable` (Kenny, 2022), and `geomander` (Kenny, 2023). I have also developed software for manually drawing redistricting maps, `redistio` (Kenny and McCartan, 2024), which I use to draw the maps in this report. This allows me to control and verify the data used in drawing the maps, unlike using commercial software.

13. My curriculum vitae is attached as Exhibit A.

14. I am being compensated at a rate of $200 per hour.

IV. CRITERIA FOR DRAWING MAPS

15. Below, I describe the criteria considered and criteria that were not considered in drawing the maps.

16. First, all plans consist of 6 equally populated zones. All plans are within a 10% population deviation from the target population of 11,963 residents. Details for this calculation are provided in Section B.

17. Where possible, I have underpopulated the zone to the West of I-95. This zone is still drawn

[1] A memo to the commission is available at https://redistricting.maryland.gov/Documents/Library/mcrc-drafts-2021-0913/2021-0913-memo-algorithms-produced-by-Professor-Rodden.pdf.

[2] A copy of the brief is available at https://static1.squarespace.com/static/60a559b59cfc63389f67f892/t/61fdadc3ff205a1aa1bd0ca7/1644015064277/Alpha+Phi+Alpha+Fraternity+v.+Raffensperger+Brief.

to be within the 10% population deviation from the target population.

18. Second, I have not considered any information about incumbents or candidates. While drawing the plans, I did not review any information about the current or past incumbents of the Daytona Beach City Commission. To this end, I have also not considered any partisan or political data in drawing the plans.

19. Third, counsel provided me with a map of zone 5 in the current plan. Beyond reviewing the shape and location of zone 5, I did not look at or consider any other information about the currently or previously enacted zone map while drawing the plans.

20. Fourth, I have made efforts to place communities within the same zone where possible. These communities include the campuses for Embry Riddle Aeronautical University and Bethune-Cookman University, the neighborhood boundaries recognized by the city[3], and the city's redevelopment zones[4].

21. Fifth, I have ensured that these maps comply with traditional redistricting criteria not otherwise mentioned. These districts are contiguous where possible and connect to nearby districts where there are geographic gaps in the boundaries of the city. I endeavored to make the districts compact, though the external boundary of the city is itself relatively jagged. As such, I follow major internal roads and smooth geographic features where possible for the interior of the map.

22. Sixth and finally, I have not considered any racial information while drawing the maps. In this report, I do report racial statistics for each zone. However, these statistics are provided for informational purposes only and were only added after the maps were drawn.

[3]Neighborhood boundaries are sourced from https://city-of-daytona-beach-hub-site-codb.hub.arcgis.com/datasets/neighborhoods-3.

[4]Redevelopment zone boundaries are sourced from https://city-of-daytona-beach-hub-site-codb.hub.arcgis.com/datasets/redevelopment-zones-2.

V. PROCESS OF DRAWING MAPS

23. For clarity, below I describe the process and data used for drawing the maps.

A. Data Used

24. I first retrieve block-level populations from the 2020 Census using the `censable` R package (Kenny, 2022) for the whole of Volusia County, Florida. Blocks are the smallest geographies in the decennial census where population counts are available.

25. I then subset the blocks to those which are within the boundaries of the City of Daytona Beach.[5] As the municipal boundaries split certain census blocks, I take these to include any block which meets either of the two following conditions. First, if a block is part of the census designated place for Daytona Beach, it is included. Second, if 10% of the block overlaps with the municipal boundaries of Daytona Beach by area and that block is populated, it is included.

B. Population Equality

26. To calculate populations for each zone, I simply aggregate the populations of each census block by zone from the census to each zone to form the total population of the zones.

27. To calculate the target population for residents, I take the sum of the population (71,780 people) and divide it by the number of zones (6). This yields a target population of 11,963 people.

28. All zones must be in the range of 11,366 to 12,561 people to be within the 10% population deviation from the target population.

C. Drawing the Maps

29. I use the `redistio` R package (Kenny and McCartan, 2024) to draw the maps. This package allows me to draw maps of the City of Daytona Beach and assign blocks to zones.

[5] Municipal boundaries are sourced from https://city-of-daytona-beach-hub-site-codb.hub.arcgis.com/datasets/CODB::codb-municipal-boundary.

30. I began the drawing process for the maps with the current boundary of zone 5. I then drew the remaining zones by hand, following the criteria outlined in Section IV.

31. I use overlays of the city's neighborhood boundaries, redevelopment zones, and university boundaries to ensure that these communities are kept together where possible. I also include the lines for the major roads in the city to avoid splitting off small areas from the remainder of the zone.

32. The only data available during the map drawing process was the population data, both for the total population and the voting age population. I did not have any information about the racial composition of the zones or any other demographic data.

33. I have set the population of block `121270832061054` to 0, following instructions from counsel. Counsel informed me that this block's population is attributed to a nearby prison located outside of the city.

34. Counsel provided renumberings of the zones to match the current plan. For example, this ensures that Zone 4 in each of my plans is similar to where Zone 4 is in the current plan. I have followed these renumberings across each plan. Note that I did not see the current plan until the completion of the proposed plans.

D. Addition of Racial Data

35. I include data for the any part Black, White non-Hispanic, and Hispanic voting age populations. The exact variables queried from the Census Bureau API in Section A.

36. Note that the data for any part Black and Hispanic voting age population will each include people who are both Black and Hispanic.

VI. MAPS OF DAYTONA BEACH

37. Below, I present six plans for zones for the City of the Daytona Beach. Each figure follows the same format, where districts are colored by zone. Roads are included as light grey lines. For each plan, I further include some local landmarks for reference. These landmarks include the campuses of Embry Riddle Aeronautical University and Bethune-Cookman University, as well as the Daytona International Speedway and the Daytona Beach International Airport. The green hatched areas are publicly-owned Florida conservation lands.[6]

A. Plan 1

38. Plan 1 presents a first possible redistricting plan for the zones in the City of Daytona Beach. It follows major roads and geographic boundaries where possible. The campus of Bethune Cookman University is split between Zones 3 and 6.

39. A map of Plan 1 is show in Figure 1 and select statistics are shown in Table 1.

[6]Data for the Florida conservation lands are sourced from the Florida Natural Areas Inventory at https://www.fnai.org/publications/gis-data.

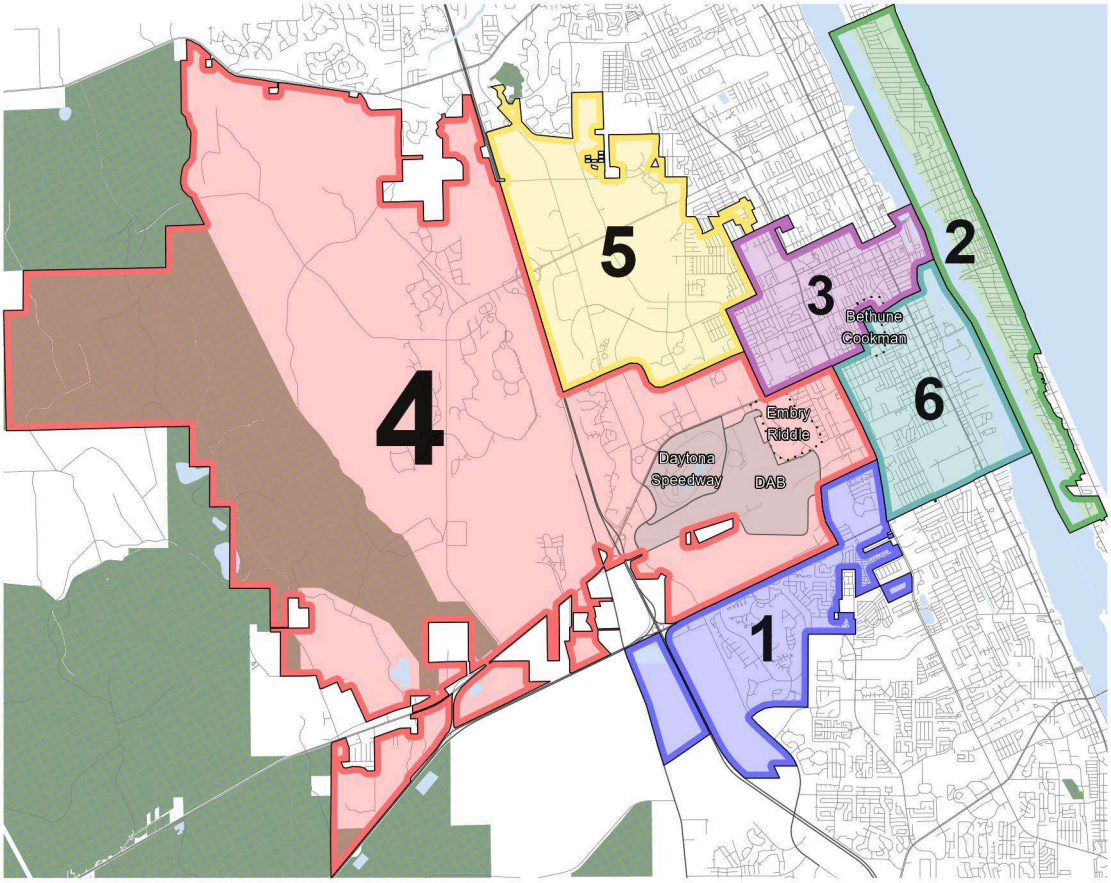

Figure 1: Map of Plan 1

Table 1: Summary statistics for Plan 1

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	11,571	−392	−3.28%	69.84%	15.96%	7.79%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	12,394	431	3.60%	31.08%	57.78%	8.92%
4	11,998	35	0.29%	66.03%	16.96%	9.94%
5	11,670	−293	−2.45%	38.40%	47.66%	9.13%
6	12,072	109	0.91%	41.66%	48.59%	7.26%

B. Plan 2

40. Plan 2 is a variant of Plan 1 which further underpopulates the district to the west of I-95, Zone 4. The only changes in Plan 2 from Plan 1 are in Zones 1 and 4. Zone 1 absorbs some residential area south of Bellevue Avenue from Zone 4.

41. A map of Plan 2 is show in Figure 2 and select statistics are shown in Table 2.

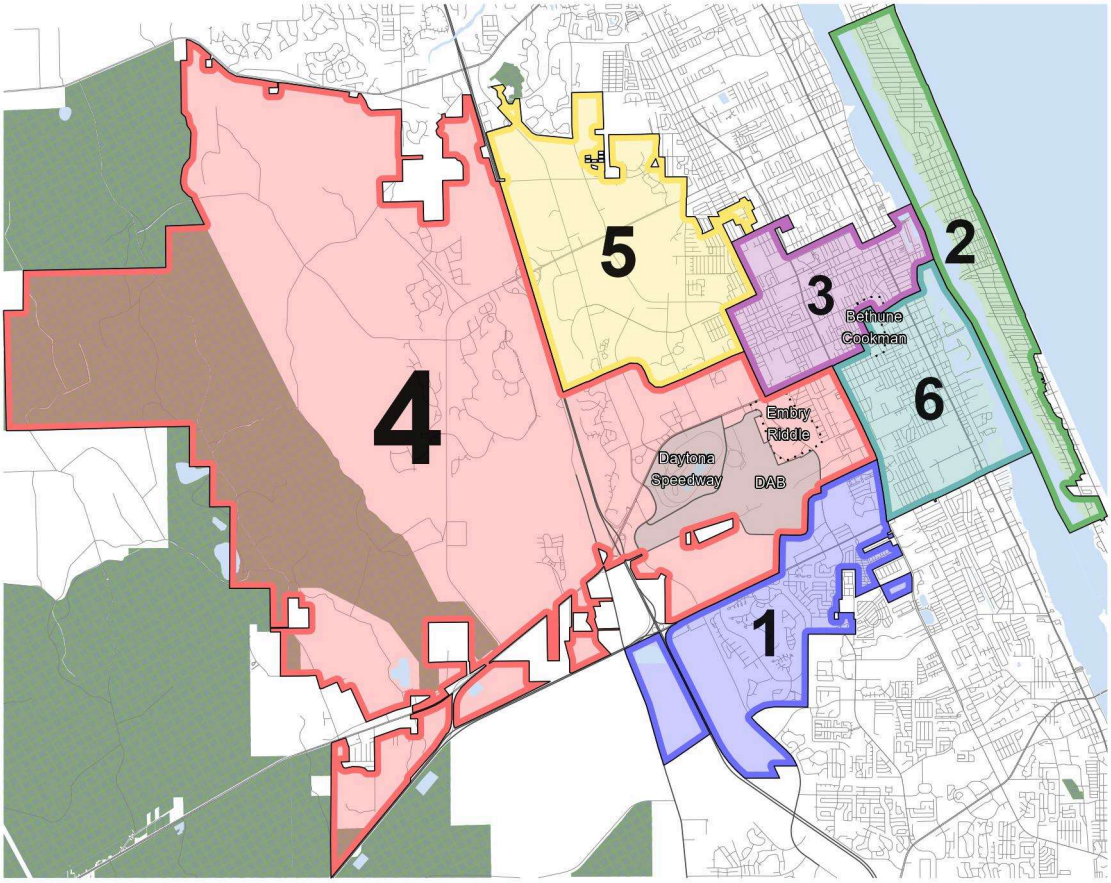

Figure 2: Map of Plan 2

Table 2: Summary statistics for Plan 2

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	12,194	231	1.93%	68.83%	16.64%	7.91%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	12,394	431	3.60%	31.08%	57.78%	8.92%
4	11,375	−588	−4.92%	66.79%	16.37%	9.94%
5	11,670	−293	−2.45%	38.40%	47.66%	9.13%
6	12,072	109	0.91%	41.66%	48.59%	7.26%

C. Plan 3

42. Plan 3 provides a new set of zones for the City of Daytona Beach. It follows major roads and geographic boundaries where possible, with the boundary of Zones 4 and 5 now following I-95 and US 92. In contrast to Plans 1 and 2, this plan keeps the campuses of Bethune-Cookman whole.

43. A map of Plan 3 is show in Figure 3 and select statistics are shown in Table 3.

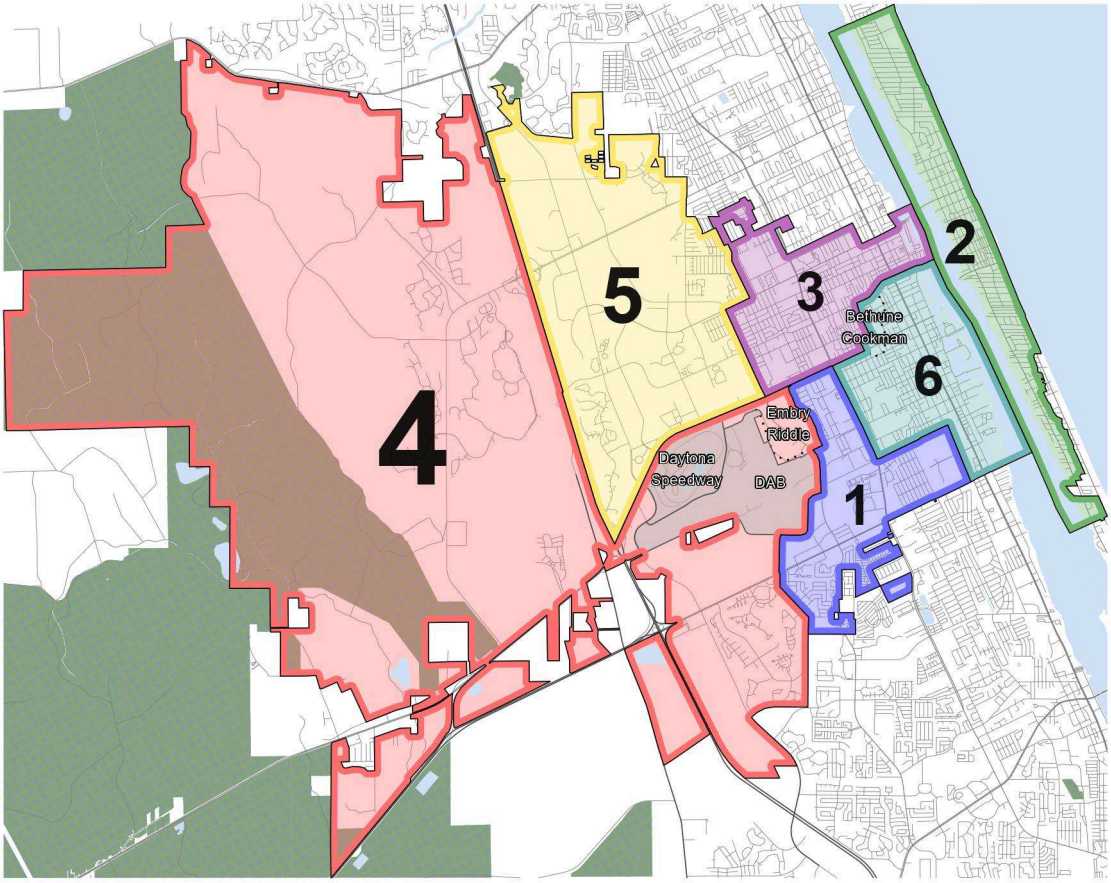

Figure 3: Map of Plan 3

Table 3: Summary statistics for Plan 3

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	11,433	−530	−4.43%	66.22%	19.42%	8.76%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	11,990	27	0.23%	33.56%	54.68%	9.76%
4	11,636	−327	−2.73%	70.01%	13.13%	8.90%
5	12,534	571	4.77%	43.54%	42.77%	8.66%
6	12,112	149	1.25%	33.88%	56.75%	7.21%

D. Plan 4

44. Plan 4 provides a third distinct set of zones for consideration. It follows major roads and geographic boundaries where possible. In contrast to Plans 1, 2, and 3, this plan moves the boundary between Zones 4 and 5 to the east to North Williamson Boulevard. This change allows for smoother boundaries in the area where Zones 1, 4, and 6 meet. The campus of Bethune Cookman University is again split between Zones 3 and 6. Zone 4 is not underpopulated in this plan.

45. A map of Plan 4 is show in Figure 4 and select statistics are shown in Table 4.

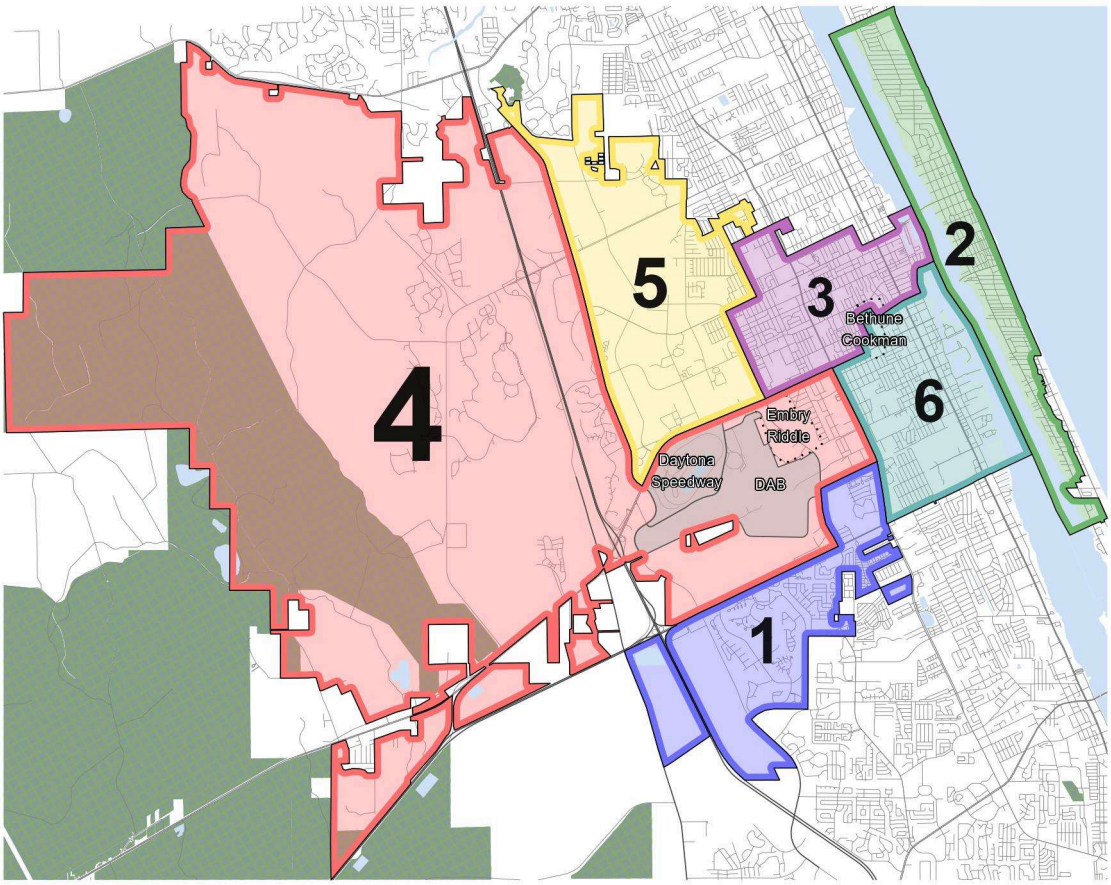

Figure 4: Map of Plan 4

Table 4: Summary statistics for Plan 4

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	11,571	−392	−3.28%	69.84%	15.96%	7.79%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	12,394	431	3.60%	31.08%	57.78%	8.92%
4	12,112	149	1.25%	65.06%	17.24%	10.12%
5	11,556	−407	−3.40%	39.76%	47.16%	8.90%
6	12,072	109	0.91%	41.66%	48.59%	7.26%

E. Plan 5

46. Plan 5 is a variant of Plan 4 which underpopulates the district to the west of I-95, Zone 4. The only changes in Plan 5 from Plan 4 are in Zones 1 and 4. Zone 1 absorbs the entire area south of Bellevue Avenue and east of I-95 from Zone 4.

47. A map of Plan 5 is show in Figure 5 and select statistics are shown in Table 5.

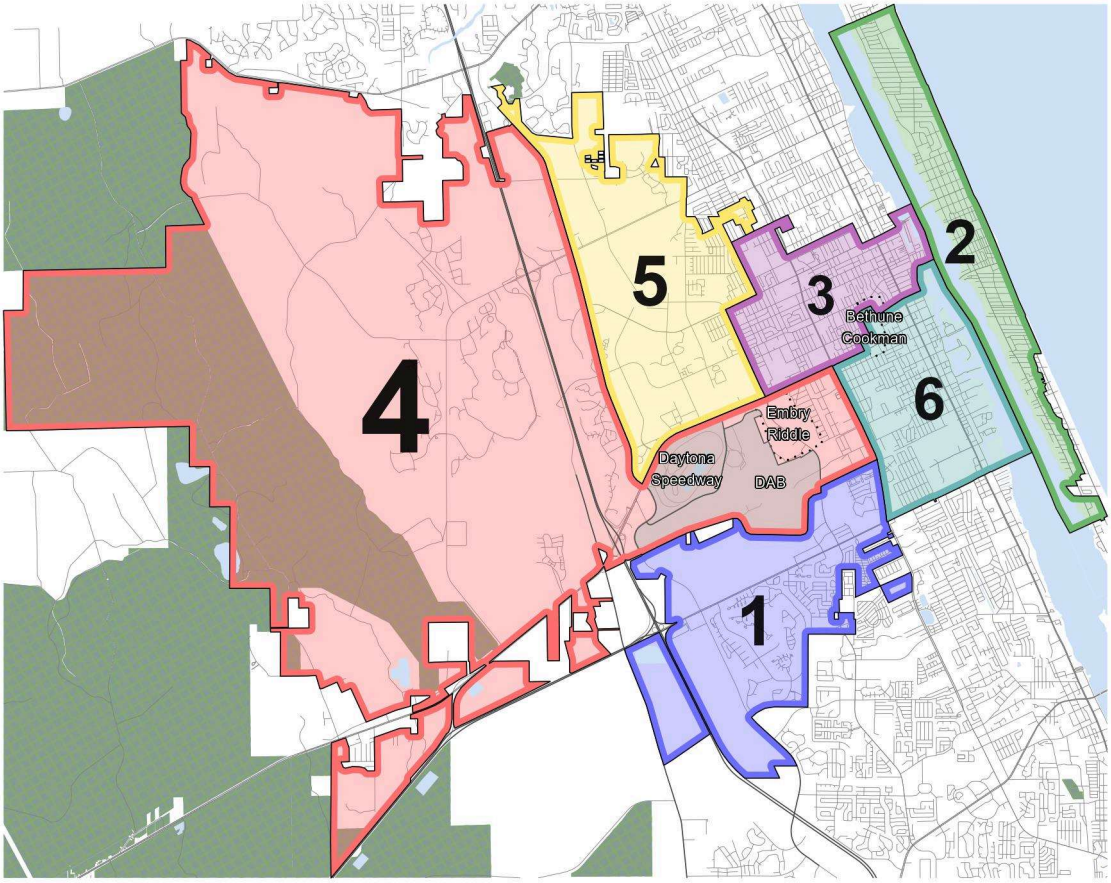

Figure 5: Map of Plan 5

Table 5: Summary statistics for Plan 5

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	12,194	231	1.93%	68.83%	16.64%	7.91%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	12,394	431	3.60%	31.08%	57.78%	8.92%
4	11,489	−474	−3.96%	65.77%	16.66%	10.14%
5	11,556	−407	−3.40%	39.76%	47.16%	8.90%
6	12,072	109	0.91%	41.66%	48.59%	7.26%

F. Plan 6

48. Plan 6 provides a fourth distinct set of zones for consideration. It follows major roads and geographic boundaries where possible. This plan keeps the campuses of Bethune Cookman and Embry Riddle whole. Compared to previous plans, this places more of the area south of Beville Road into Zone 4. However, this introduces a less smooth boundary between Zones 1 and 4 as a result.

49. A map of Plan 6 is show in Figure 6 and select statistics are shown in Table 6.

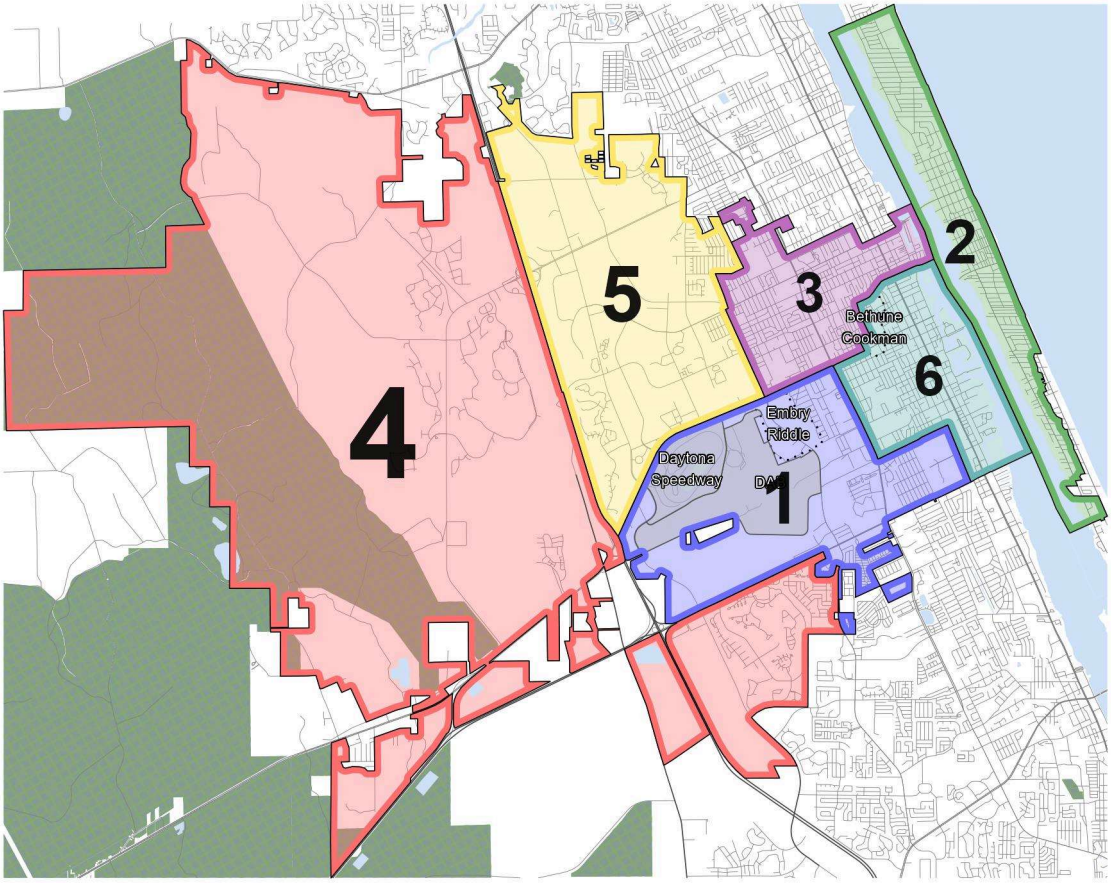

Figure 6: Map of Plan 6

Table 6: Summary statistics for Plan 6

Zone	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	11,525	−438	−3.66%	64.39%	18.14%	10.71%
2	12,075	112	0.94%	81.89%	5.82%	7.17%
3	12,024	61	0.51%	33.01%	55.16%	9.78%
4	11,544	−419	−3.50%	71.80%	14.08%	7.12%
5	12,500	537	4.49%	44.06%	42.30%	8.64%
6	12,112	149	1.25%	33.88%	56.75%	7.21%

VII. ANALYSIS OF ENACTED PLAN

50. The enacted plan for the City of Daytona Beach is shown in Figure 7. I was provided a block assignment file by counsel for this plan. I also compute district assignments from a shapefile downloaded from the City of Daytona Beach's ArcGIS website.[7] The block assignment file and shapefile agree on the district assignments for all populated blocks.

51. After completing all redistricting plans, counsel provided me with a list of addresses for six individuals. I geocoded these addresses using the Census Bureau's batch geocoder.[8] These addresses are shown in Figure 7 as stars.

52. Select statistics for the enacted plan are shown in Table 7. Zone 4 is significantly underpopulated. Of note, the enacted plan thus has a population deviation range of greater than 10%.

[7]City Commission boundaries are sourced from https://gis2.codb.us/arcgis/rest/services/BaseFeatures/AdministrativeData/MapServer/0.

[8]The Census Bureau's geocoder is available at https://geocoding.geo.census.gov/geocoder/.

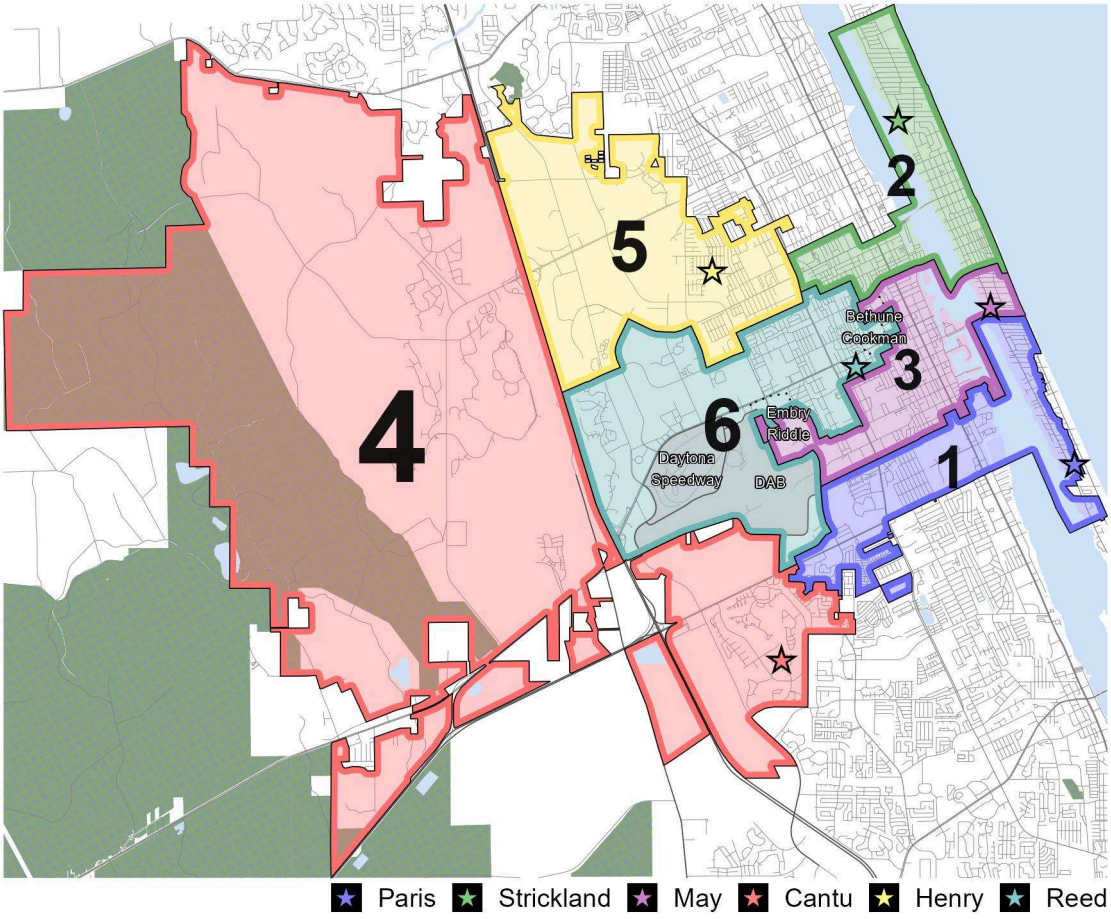

Figure 7: Map of Enacted Plan

Table 7: Summary statistics for the enacted plan

District	Population	Deviation	Deviation (%)	White VAP	Black VAP	Hispanic VAP
1	12,264	301	2.52%	69.52%	17.90%	7.63%
2	12,179	216	1.81%	69.92%	16.87%	8.86%
3	12,087	124	1.04%	44.67%	43.37%	8.47%
4	11,035	−928	−7.76%	70.55%	15.34%	7.26%
5	12,041	78	0.65%	37.15%	49.91%	8.46%
6	12,174	211	1.76%	39.40%	46.41%	9.81%

VIII. APPENDIX

A. Software and Data Sources

53. All analyses are conducting in R (4.4.0), an open source programming language (R Core Team, 2023). R is extended by many packages. For replicability purposes, I list a selection of packages and versions used for this analysis in Table 8.

Table 8: Select R packages used in this analysis

package	version	source
censable	0.0.5	CRAN
cli	3.6.2	CRAN
dplyr	1.1.4	CRAN
forcats	1.0.0	CRAN
fs	1.6.4	CRAN
geomander	2.3.0	CRAN
ggplot2	3.5.1	CRAN
ggredist	0.0.2	Github (alarm-redist/ggredist@ef0168)
gt	0.10.1	CRAN
here	1.0.1	CRAN
lubridate	1.9.3	CRAN
patchwork	1.2.0	CRAN
PL94171	1.1.2	CRAN
purrr	1.0.2	CRAN

readr	2.1.5	CRAN
redist	4.2.0.9000	Github (alarm-redist/redist@61f0a3)
redistio	0.0.0.9000	Github (christopherkenny/redistio@2c45af)
redistmetrics	1.0.7	CRAN
rmapshaper	0.5.0	CRAN
scales	1.3.0	CRAN
sf	1.0-16	CRAN
stringr	1.5.1	CRAN
tibble	3.2.1	CRAN
tidyr	1.3.1	CRAN
tidyverse	2.0.0	CRAN
tinytiger	0.0.8	CRAN
wacolors	0.3.1	CRAN

54. I collect total population and voting age population data using Kenny (2022). This software sources data from the US Census Bureau. For completeness, I list the variables queried from the US Census Bureau in Table 9.

Table 9: API variables queried from the US Census Bureau

Data	Variable	Description
Population	P2_001N	Total population of any race
VAP	P4_001N	voting age population
WVAP	P4_005N	White non-Hispanic voting age population
BVAP	P3_004N, P3_011N, P3_016N, P3_017N, P3_018N, P3_019N, P3_027N, P3_028N, P3_029N, P3_030N, P3_037N, P3_038N, P3_039N, P3_040N, P3_041N, P3_042N, P3_048N, P3_049N, P3_050N, P3_051N, P3_052N, P3_053N, P3_058N, P3_059N, P3_060N, P3_061N, P3_064N, P3_065N, P3_066N, P3_067N, P3_069N, P3_071N	Any part Black voting age population
HVAP	P4_002N	Hispanic voting age population of any race

Kenny, C. T. (2022). *censable: Making Census Data More Usable*. R package version 0.0.5.

Kenny, C. T. (2023). *geomander: Geographic Tools for Studying Gerrymandering*. R package version 2.2.1.

Kenny, C. T. and McCartan, C. (2024). *redistio: Interactive Redistricting*. R package version 0.0.0.9000, http://www.christophertkenny.com/redistio/.

Kenny, C. T., McCartan, C., Fifield, B., and Imai, K. (2022). *redist: Simulation Methods for Legislative Redistricting*. R package.

R Core Team (2023). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed this 31st day of May, 2024.

Christopher T. Kenny

EXHIBIT A

Curriculum Vitae

Christopher T. Kenny

Ph.D. Candidate
Harvard University

christophertkenny.com
christopherkenny@fas.harvard.edu
May 2024

Education

Harvard University — *Cambridge, MA*

Ph.D. (Government) — Expected May 2025

Committee: Kosuke Imai (chair), Steve Ansolabehere, Gary King, Nicholas Stephanopoulos

M.A. (Government) — May 2021

Cornell University — *Ithaca, NY*

B.A. (Mathematics & Government) — May 2019

Peer-Reviewed Publications

7. "Evaluating Bias and Noise Induced by the U.S. Census Bureau's Privacy Protection Methods." 2024. **Christopher T. Kenny**, Cory McCartan, Shiro Kuriwaki, Tyler Simko, and Kosuke Imai. *Science Advances*.

6. "Census Officials Must Constructively Engage with Independent Evaluations." 2024. **Christopher T. Kenny**, Cory McCartan, Tyler Simko, and Kosuke Imai. *Proceedings of the National Academy of Sciences of the United States of America.*

5. "Widespread Partisan Gerrymandering Mostly Cancels Nationally, but Reduces Electoral Competition." 2023. **Christopher T. Kenny**, Cory McCartan, Tyler Simko, Shiro Kuriwaki, and Kosuke Imai. *Proceedings of the National Academy of Sciences of the United States of America.*

4. "Comment: The Essential Role of Policy Evaluation for the 2020 Census Disclosure Avoidance System." 2023. **Christopher T. Kenny**, Shiro Kuriwaki, Cory McCartan, Evan Rosenman, Tyler Simko, and Kosuke Imai. *Harvard Data Science Review.*

3. "Simulated redistricting plans for the analysis and evaluation of redistricting in the United States. 2022. Cory McCartan, **Christopher T. Kenny**, Tyler Simko, George Garcia III, Kevin Wang, Melissa Wu, Shiro Kuriwaki, and Kosuke Imai. *Scientific Data.*

2. “The Impact of the U.S. Census Disclosure Avoidance System on Redistricting and Voting Rights Analysis.” 2021. **Christopher T. Kenny**, Shiro Kuriwaki, Cory McCartan, Evan Rosenman, Tyler Simko, and Kosuke Imai. *Science Advances*.

1. “The Essential Role of Empirical Validation in Legislative Redistricting Simulation.” 2020. Benjamin Fifield, Kosuke Imai, Jun Kawahara, and **Christopher T. Kenny**. *Statistics and Public Policy*.

Selected Working Papers

1. “Individual and Differential Harm in Redistricting.” Cory McCartan and **Christopher T. Kenny**.

2. “Inequality in Administrative Democracy: Methods and Evidence from Financial Rulemaking.“ Daniel P. Carpenter, Angelo Dagonel, Devin Judge-Lord, **Christopher T. Kenny**, Brian Libgober, Steven Rashin, Jacob Waggoner, and Susan Webb Yackee.

Works-in-Progress

1. *Algorithm-Assisted Redistricting Methodology*. Kosuke Imai, **Christopher T. Kenny**, Cory McCartan, and Tyler Simko.

Fellowships and Awards

Fellowships

Pre-Doctoral Fellow, Election Law Clinic, Harvard Law School	2022
Ashford Fellow, Harvard University	2019-Present
V.O. Key Fellow, Department of Government, Harvard University	2019

Awards

Statistical Software Award, Society for Political Methodology (for redist)	2022
Certificate of Distinction in Teaching for Gov 2001	Fall 2021
Herbert Kaufman Award for best paper presented, APSA section for Public Administration for “Inequality in Administrative Democracy”	2021

Data

3. RPV Near Me. 2023. **Christopher T. Kenny**

2. 50-State Redistricting Simulations. 2022. Cory McCartan, **Christopher T. Kenny**, Tyler Simko, George Garcia III, Kevin Wang, Melissa Wu, Shiro Kuriwaki, and Kosuke Imai.

1. 2020 Redistricting Data Files. 2021. **Christopher T. Kenny** and Cory McCartan.

Other Writing

3. Redistricting Process Reform in *The University of Chicago Center for Effective Government's Democracy Reform Primer Series*. 2024. With Steve Ansolabehere.

2. Alpha Phi Alpha Fraternity, Inc. et al. v. Brad Raffensperger, Amici Curiae Brief of Fair Districts Georgia and Election Law Clinic in Support of Plaintiffs. 2021. With the Election Law Clinic at Harvard Law School.

1. Maryland Congressional District Memo. 2021. With Jonathan Rodden.

Software

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jot: *Jot Down Values for Later*. **Christopher T. Kenny**. 2022. [CRAN]

congress: *Access the Congress.gov API*. **Christopher T. Kenny**. 2022. [CRAN]

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crayons: *Color Palettes from Crayon Boxes*. **Christopher T. Kenny**. 2023. [CRAN]

gptzeror: *Identify Text Written by Large Language Models using GPTZero*. **Christopher T. Kenny**. 2023. [CRAN]

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Teaching

Harvard University

Gov 97: Drawing Democracies: Elections and Redistricting in America	2023, 2024
Math Prefresher for Political Scientists. (PhD-level)	2022
Gov 2001: Quantitative Social Science Methods I. (PhD-level)	2021

Presentations

Conferences

American Political Science Association	2023
Midwest Political Science Association	2023,2024
The Institute for Operations Research and the Management Sciences	2022

Society for Political Methodology	2022,2023
Toronto Workshop on Reproducibility	2022
Redistricting Algorithms, Law, and Policy Conference	2021
Harvard American Politics Conference	2020

Seminars

Applied Statistics Workshop, IQSS, Harvard University	Fall 2021
American Politics Research Workshop, Harvard University	Fall 2021-2023, Spring 2021
Graduate Political Economy, Harvard University	Spring 2021

Referee Service

Journal of Politics, Political Analysis, rOpenSci, Quarterly Journal of Political Science

Departmental Service

Webmaster, Graduate Student Association, Department of Government, Harvard University	2020 - 2022

Related Work

Research Assistant, Prof. Kosuke Imai, Harvard University	2020-2021
Research Assistant, Prof. Dan Carpenter, Harvard University	2020