**IN THE SUPREME COURT OF OHIO**

| | |
|---|---|
| **LEAGUE OF WOMEN VOTERS OF OHIO, *et al.*,**<br><br>**Petitioners,**<br><br>**v.**<br><br>**OHIO REDISTRICTING COMMISSION, *et al.*,**<br><br>**Respondents.** | **Case No. 2021-1193**<br><br>**Original Action Filed Pursuant to Ohio Const., Art. XI** |

# AFFIDAVIT OF KOSUKE IMAI

Franklin County
/ss
State of Ohio

Now comes affiant Kosuke Imai, having been first duly cautioned and sworn, deposes and states as follows:

1. I am over the age of 18 and fully competent to make this declaration. I have personal knowledge of the statements and facts contained herein.
2. For the purposes of this litigation, I have been asked by counsel for Petitioners to analyze relevant data and provide my expert opinions.
3. To that end, I have personally prepared the report attached to this affidavit as Exhibit A, and swear to its authenticity and to the faithfulness of the opinions expressed, and, to the best of my knowledge, the accuracy of the factual statements made therein.

FURTHER AFFIANT SAYETH NAUGHT

Executed on 01/25/2022, 2022.

Kosuke Imai
Signed on 2022/01/25 12:45:45 -8:00

Kosuke Imai

Sworn and subscribed before me this 01/25/2022 day of _____, 2022

Theresa M Sabo
Signed on 2022/01/25 12:45:45 -8:00

Notary Public

NOTARY PUBLIC STATE OF OHIO

**Theresa M Sabo**
**Commission # 2016-RE-619622**
Electronic Notary Public
State of Ohio
My Comm Exp. Nov 28, 2026

Notary Stamp 2022/01/25 13:45:45 PST F5169537BD83

Notarial act performed by audio-visual communication

# Imai Affadavit.pdf

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## E-Signature Summary

**E-Signature 1: Kosuke Imai (KI)**
January 25, 2022 12:45:45 -8:00 [5993C4CE8228] [108.26.227.252]
imai@harvard.edu (Principal) (Personally Known)

**E-Signature Notary: Theresa M Sabo (TMS)**
January 25, 2022 12:45:45 -8:00 [F5169537BD83] [96.27.183.41]
tess.sabo@gmail.com
I, Theresa M Sabo, did witness the participants named above electronically sign this document.

# EXHIBIT A

**IN THE SUPREME COURT OF OHIO**

League of Women Voters of Ohio,
A. Phillip Randolph Institute of Ohio,
Tom Harry,
Tracy Beavers,
Valerie Lee,
Iris Meltzer,
Sherry Rose,
Bonnie Bishop

*Relators*,

v.

Ohio Redistricting Commission,
Michael DeWine,
Frank LaRose,
Keith Faber,
Matt Huffman,
Robert R. Cupp,
Vernon Sykes,
Emilia S. Sykes

*Respondents*.

Case No. 2021-1193
Original Action Pursuant to
Ohio Const., Art. XI

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**EXPERT REPORT**

**Kosuke Imai, Ph.D.**

**January 25, 2022**

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## Table of Contents

## I. INTRODUCTION AND SCOPE OF WORK

1. My name is Kosuke Imai, Ph.D., and I am a Professor in the Department of Government and the Department of Statistics at Harvard University. I specialize in the development of statistical methods and computational algorithms for and their applications to social science research. I am also affiliated with Harvard's Institute for Quantitative Social Science. My qualifications and compensation are described in my initial report that was submitted to this court.

2. I have been asked by counsel representing the Relators in this case to analyze relevant data and provide my expert opinions related to whether Ohio's recently revised state House districting plan (hereafter the "revised plan") meets the criteria in Article XI, Section 6 of Ohio's Constitution. More specifically, I have been asked to statistically analyze the revised plan's compliance with Article XI, Sections 6(A) and 6(B) by comparing it against other alternative plans that are as or more compliant with other relevant requirements of Article XI.

## II. SUMMARY OF OPINIONS

3. My analysis yields the following findings:

- The Commission's methodology of measuring district-level partisan lean is susceptible to inaccuracies. Classification into Republican-leaning versus Democratic-leaning districts based on the 50% threshold ignores the varying strength of partisanship across districts. The revised plan contains 12 districts whose Democratic vote shares are within one percentage point above the 50% threshold, based on the 2016–2020 election set used by the Commission. Out of these 12 "Democratic-leaning" districts, 9 districts have the Democratic vote share less than a half percentage point above the 50% threshold. The Commission's methodology classifies all of these toss-up districts as Democratic-leaning, grossly overestimating the total number of Democratic-leaning districts under the revised plan.

- The Commission's methodology is highly sensitive to its choice of elections to include for analysis. Removing any one election out of the 2016–2020 election set used by the Commission yields increases the total number of Republican-leaning districts under the

revised plan by 6 to 12 percentage points. The preferred methodology, which I used in my initial expert report as well as in this report, overcomes this problem of the Commission's methodology by computing the fraction of elections that are expected to be won by each party as a measure of partisanship under a given redistricting plan.

- The revised plan exhibits a significant partisan bias in favor of the Republican party. The magnitude of bias is still much greater under the revised plan than *any* of my 5,000 simulated plans, according to the expected number of Republican seats as well as several other standard partisan bias metrics used in the academic literature.

- The revised plan fails to meet the proportionality criteria, making it almost certain for the Republican party to win disproportionately more seats relative to their statewide vote share. The degree of disproportionality is still much greater under the revised plan than *any* of my 5,000 simulated plans.

## III. METHODOLOGY TO EVALUATE THE REVISED PLAN

### A. The Problem of the Commission's Methodology

4. In its Section 8(C)(2) Statement, the Commission evaluates the partisan bias of the revised plan by computing the number of Republican-leaning and Democratic-leaning districts based on the 9 statewide elections from 2016 to 2020. The Commission concludes in the statement that the revised plan "contains 57 Republican-leaning House districts. This corresponds to approximately 57% of the total number of house districts."

5. To calculate the number of Republican-leaning districts, the Commission first computes, for each precinct in the state, the total number of Republican votes and Democratic votes, tallied across the 2016–2020 statewide elections. Then, the Commission classifies a district as "Republican-leaning" if the total number of Republican votes exceeds the total number of Democratic votes, and as "Democratic-leaning" otherwise.

6. This methodology of measuring district-level partisan lean is susceptible to inaccuracies. Consider two hypothetical districts: District A, with a Republican vote share of 50.1%,

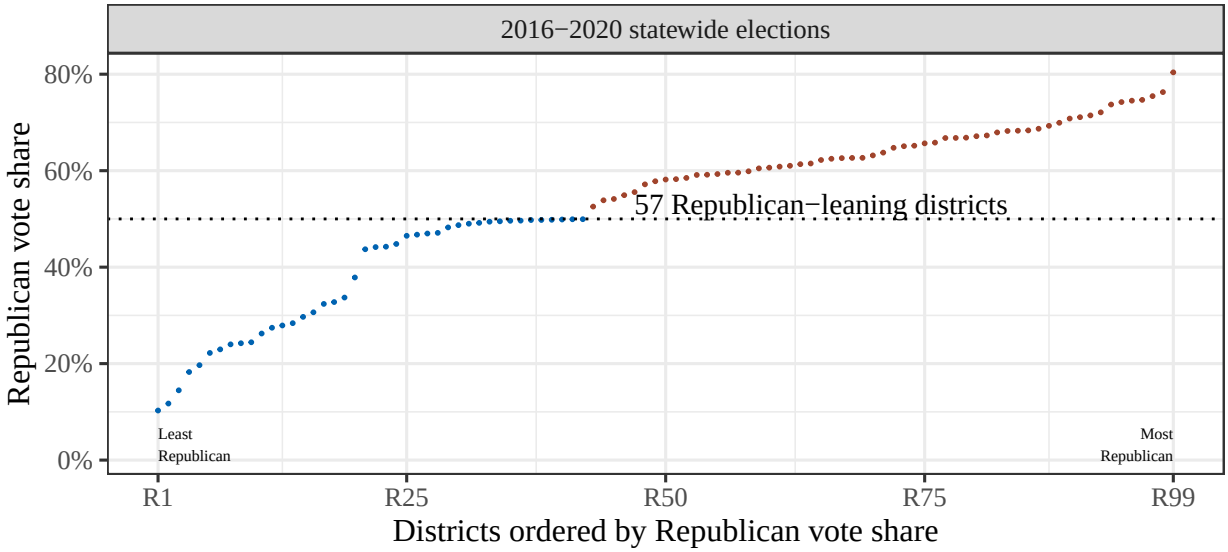


Figure 1: Republican votes shares calculated for the revised plan, computed by adding votes across the 9 statewide elections from 2016-2020.

and District B, with a Republican vote share of 49.9%, under the Commission's calculation of vote share. Since the Republican vote shares of these two districts differ only by 0.2 percentage points, they essentially have the same partisan lean. According to the Commission's methodology, however, District A would be considered "Republican-leaning" while District B would be classified as "Democratic-leaning." In other words, the Commission treats these two toss-up districts in the exactly same way as two lopsided districts, one with the Republican vote share of 100% and another which has the Democratic vote share of 100%.

7. This methodological deficiency biases the Commission's evaluation of the revised plan. Figure 1 shows the Republican vote shares, based on the 2016–2020 elections, of all 99 House districts under the revised plan. In this plot, the districts of the revised plan are ordered by the magnitude of their Republican vote share with the leftmost dot indicating the least Republican district and the rightmost dot representing the most Republican district. This means that district R1 has the lowest Republican vote share while district R99 is has the highest Republican vote share. (To be clear, the R1 through R99 district identifiers do not correspond to the House district numbers in the revised plan.)

8. There are 12 districts whose Republican vote share lies within one percentage point

below the 50% threshold (indicated by a group of blue dots right below the dotted horizontal line). And, 9 out of these 12 districts are within a half percentage point below the threshold. According to the Commission's methodology, these toss-up districts are all classified as "Democratic-leaning" districts. In contrast, there is no toss-up district whose Republican vote share is just above the 50% threshold. Among the districts that are considered by the Commission as "Republican-leaning" (i.e., those above the 50% line), the lowest Republican vote share is 52.6%, representing more than a 5 percentage point lead over Democrats. In other words, using the Commissions' own numbers, a shift in election results by just one percentage point towards the Republicans could lead to as many as 12 more Republican-won seats. By counting what are really toss-up districts as "Democratic-leaning" in this way, the Commission's methodology grossly overestimates the number of Democratic-leaning districts under the revised plan.

### B. A Preferred Methodology

9. I now present a preferred methodology that overcomes the problem of the Commission's methodology explained above. This methodology was used in my initial expert report to this Court to evaluate the enacted plan. Specifically, for any given district of a redistricting plan, I first determine the likely winner based on the vote totals for each statewide election. I then average this number across all the statewide elections, arriving at the fraction of elections in which Republican candidates are expected to win this district (Tallying this number across districts yields the expected number of Republican seats under a redistricting plan).

10. This preferred methodology is based on the key observation that toss-up districts, unlike safe districts, are sometimes won by Republican candidates and other times won by Democrats, depending on elections. Thus, the fraction of elections, for which the Republican party receives more than 50% of votes, represents a superior measure of district-level partisan lean. In fact, political methodologists advocate evaluating redistricting plans by averaging across elections (Gelman and King 1994; Katz, King, and Rosenblatt 2020).

11. Table 1 illustrates the preferred methodology by presenting the proportions of statewide elections that are likely to be won by Republican candidates (based on the 2016–2020

| District number | Rep. vote share | Rep. fraction of elections won |
|---|---|---|
| Classified by the Commission as "Democratic-leaning" | | |
| 52 | 49.94% | 44.44% |
| 23 | 49.93% | 33.33% |
| 27 | 49.88% | 33.33% |
| 10 | 49.82% | 55.56% |
| 15 | 49.78% | 33.33% |
| Classified by the Commission as "Republican-leaning" | | |
| 76 | 52.55% | 88.89% |
| 56 | 53.86% | 88.89% |
| 94 | 54.14% | 88.89% |
| 35 | 54.92% | 88.89% |
| 53 | 55.56% | 88.89% |

Table 1: Districts classified by the Commission as "Democratic-leaning" and "Republican-leaning" whose Republican vote shares, based on the 2016-2020 statewide elections, are the closest to the 50% threshold (five districts each). The fraction of elections won represents the proportion of 9 statewide elections, for which the Republican vote share exceeds 50% for that district.

election set) for five districts classified by the Commission as "Democratic-leaning" and another set of five districts considered by the Commission as "Republican-leaning" districts. These two sets of districts were selected because their Republican vote shares are closest to 50% among the "Democratic-leaning" and "Republican-leaning" districts, respectively.

12. District 52 of the revised plan has a Republican vote share of 49.94%, which is less than one tenth of one percentage point shy of the 50% threshold. The Commission's methodology classifies this district as "Democratic-leaning," but based on the vote shares from each of the 2016–2020 statewide elections, this district would have been won by Republican candidates in 4 out of 9 elections (and by Democratic candidates in the remaining 5 elections). So, District 52 is clearly a toss-up district. Similarly, the other four "Democratic-leaning" districts in the table have the Republican vote share that is less than a quarter of one percentage point below of the 50% threshold. Republican candidates would have won these "Democratic-leaning" districts in 3 to 5 out of 9 elections, implying that they are toss-up districts and could often be won by Republican candidates.

13. The revised plan contains a total of 12 districts, whose Democratic vote share is

between 50% and 51% (5 of which are included in Table 1). The Commission's methodology considers all of these districts as "Democratic-leaning." The preferred methodology, however, reveals that the Republican party would have won about 6 out of these 12 districts when averaging across the 2016–2020 statewide elections.

14. In contrast, five "Republican-leaning" districts in Table 1 exceed the 50% threshold by a greater margin, ranging from 2.6 to 5.6 percentage points (Recall that these districts were selected because they have the lowest Republican vote share among all of the 57 "Republican-leaning" districts). Given the large margin, these districts are expected to be much safer than the five "Democratic-leaning" districts listed in the table. Indeed, the fraction of elections won by the Republican party for these districts is much higher, reaching 88.9% (8 out of 9 elections). Thus, the preferred methodology is able to more accurately measure the varying magnitude of partisan lean than the Commission's methodology.

15. Finally, I demonstrate that the preferred methodology is much less sensitive to the choice of election set used for analysis than the Commission's methodology. To do this, I conduct a so-called *leave-one-out* analysis by removing one election out of the 2016-2020 election set used by the Commission and applying their methodology to the remaining election data. This type of leave-one-out analysis is often used in statistics to examine the robustness of methodology. Since there exist a total number of 9 statewide elections in this set, repeating this procedure yields 9 different estimates of the number of "Republican-leaning" districts under the revised plan. I then compare these results to the Commission's official result based on all of the 9 statewide elections. If the Commission's methodology is not sensitive to the choice of election set used, then removing one election should not greatly affect the resulting estimate. I conduct the same analysis using the preferred methodology and investigate the sensitivity of each methodology to the choice of election set.

16. The left plot of Figure 2 shows that the Commission's methodology is highly sensitive to the choice of election set. When any one election is removed, the total number of "Republican-leaning" districts under the revised plan is much greater than the result based on

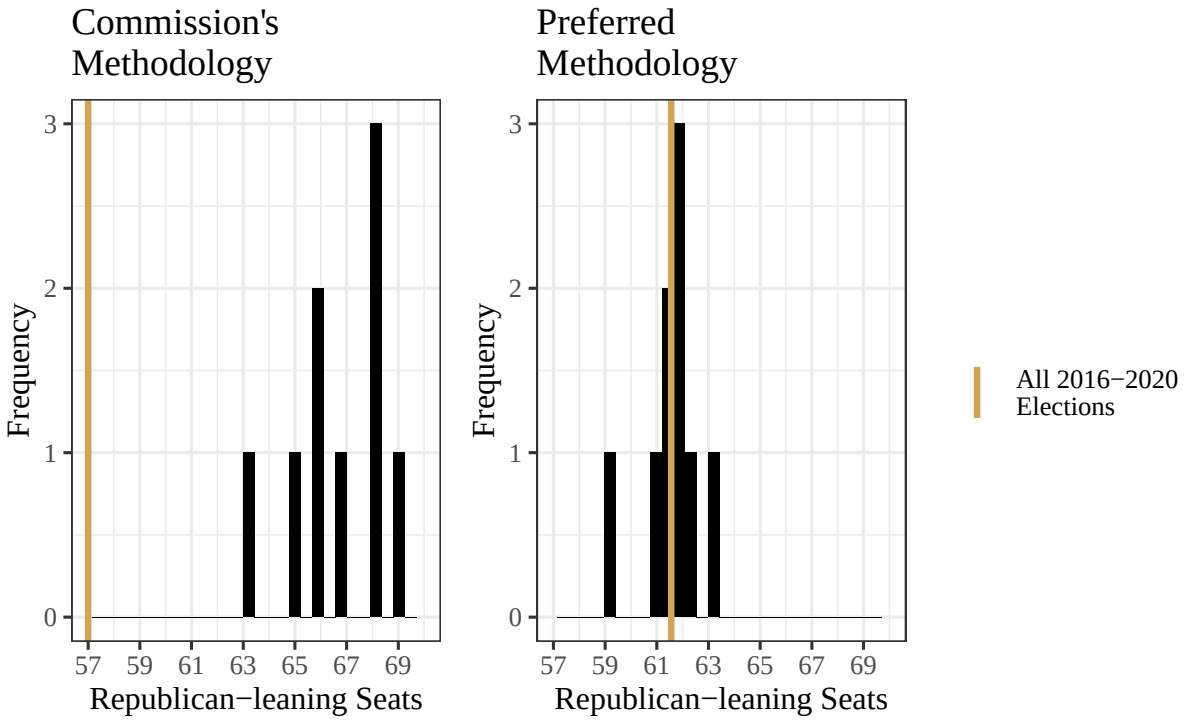


Figure 2: Comparison of election calculations for counting Republican-leaning seats for the 9 statewide elections for 2016-2020, leaving one election out for each calculation.

all 9 statewide elections. Indeed, according to the leave-one-out analysis, the total number of "Republican-leaning" districts ranges from 63 to 69, while the Commission's result based on all 9 statewide elections is only 57 districts. Thus, removing any single election from the 2016–2020 election set increases the total number of Republican-leaning districts by 6 to 12 percentage points. Thus, the Commission's approach is not only sensitive to which elections are included but also grossly underestimates the total number of "Republican-leaning" districts.

17. In contrast, the right plot of Figure 2 shows that the preferred methodology is less sensitive to the choice of election set used. The total number of expected Republican seats under the revised plan ranges from 59.2 to 63.1 with the estimate based on all 9 statewide elections located in the middle of the leave-one-out distribution. Indeed, under the preferred methodology, leaving out one election could only have only a modest effect on expected seat share corresponding to no more than one-ninth of the partisan lean scoring for each district. This and other analyses

presented above demonstrate the advantages of the preferred methodology over the Commission's methodology.

## IV. COMPARISON OF THE REVISED PLAN WITH THE SIMULATED PLANS

18. In my initial expert report for this case, I conducted simulation analyses to evaluate the enacted plan. As explained in that report, the redistricting simulation analysis has the ability to directly account for political geography and redistricting rules specific to the state. By comparing a proposed plan with simulated plans that are generated using a set of redistricting criteria, it is possible to assess the partisan bias of the plan relative to the set of alternative plans one could have drawn by following those specified criteria.

19. I evaluate the revised plan's compliance with Sections 6(A) and 6(B) by comparing it with the same set of 5,000 simulated plans used in my initial report. Recall that these simulated plans are equally or more compliant with Sections 3, 4, and 6(c) than the enacted plan (see the initial report for details). As done in my initial report and my analysis above, I present the evaluation of the revised plan based on a total of 9 statewide elections from 2016 to 2020, which were used by the Commission. My analysis shows that the revised plan still has worse partisan bias and proportionality scores than any of my 5,000 simulated plans.

### A. Compliance with Section 6(A)

20. Figure 3 presents the results regarding the enacted plan's compliance with Section 6(A). As detailed in my initial report, the compliance with Section 6(A) was measured based on four partisan bias metrics that are commonly used in the political science literature. The exact formula for these metrics differs slightly across sources, and I rely on the methods described in Stephanopoulos and McGhee 2015 and Katz, King, and Rosenblatt 2020. I adjusted the sign of each metric so that a smaller value implies less partisan bias with a positive value representing a bias towards the Republican party.

21. When compared to my 5,000 simulated plans (black histogram), the revised plan (yellow vertical line) is a clear outlier favoring the Republican party. Indeed, the revised map is more biased towards the Republican party than any of 5,000 simulated plans for all four partisan

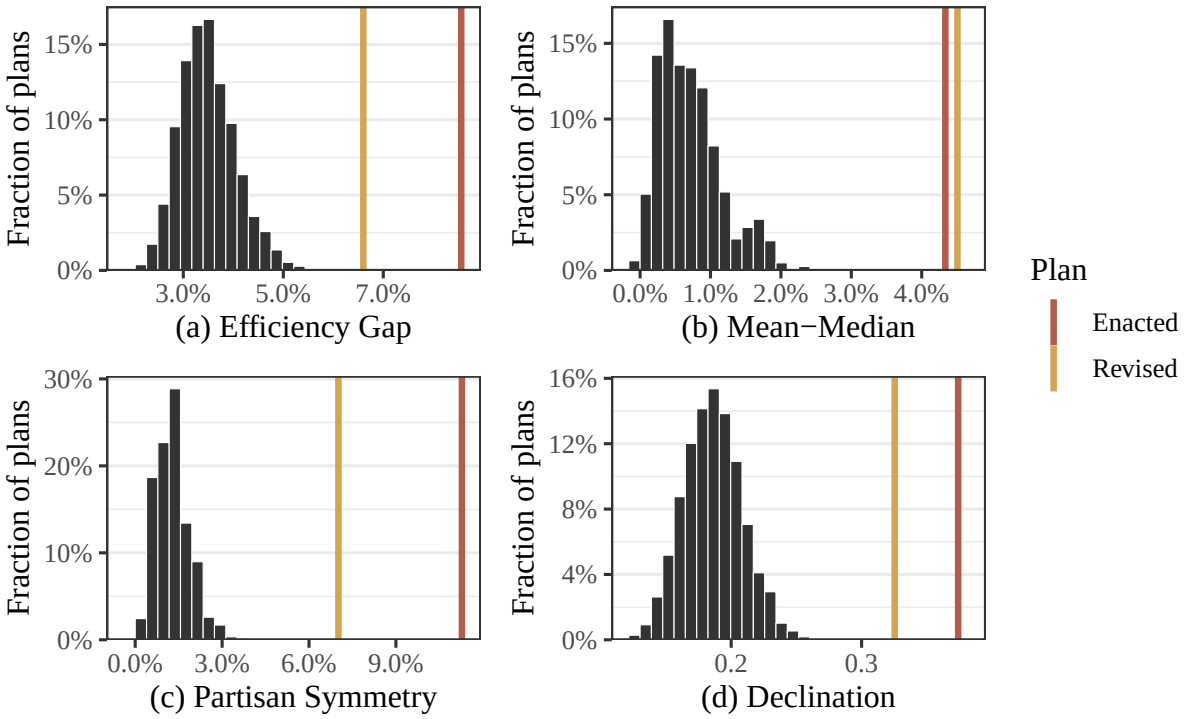


Figure 3: Four partisan bias measures calculated for the 5,000 simulated House redistricting plans computed by averaging across the 9 statewide elections from 2016 to 2020. Overlaid are the values for the revised plan (yellow) and the enacted plan (red). For each measure, larger values (towards the right) correspond to more Republican-favoring plans.

bias metrics I considered. With the exception of the mean-median metric, the revised plan somewhat improves upon the enacted plan. This improvement, however, is too small to make the revised plan comparable to the simulated plans in terms of partisan bias.

22. Under the revised plan, the efficiency gap score is still more than 5 standard deviations greater than the corresponding score under the average simulated plan. Similarly, the revised plan yields the values of mean-median, partisan symmetry, and declination metrics that are over 8, 9, and 6 standard deviations greater than the average simulated plan, respectively. These statistically significant results imply that the revised plan is substantially biased towards the Republican party when compared to the simulated plans.

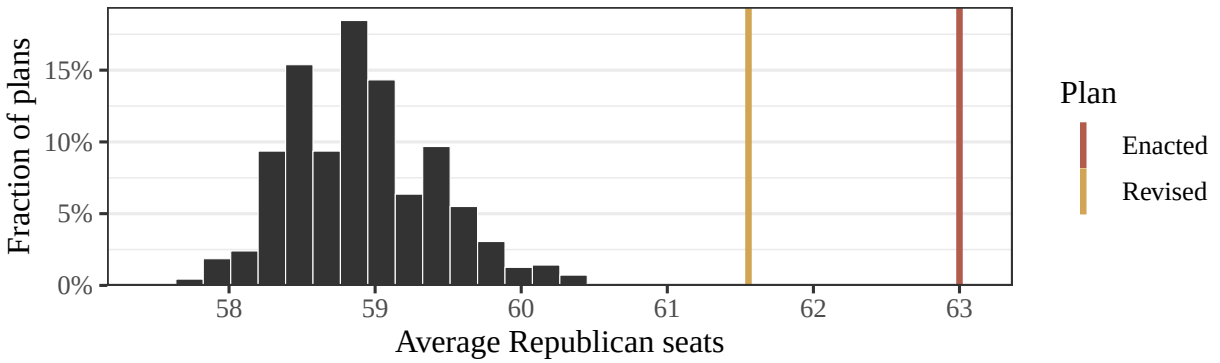


Figure 4: Average number of Repulican seats calculated for the 5,000 simulated House redistricting plans computed by averaging across the 9 statewide elections from 2016 to 2020. Overlaid are the values for the revised plan (yellow) and the enacted plan (red).

### B. Compliance with Section 6(B)

23. I next present the results regarding the plans' compliance with Section 6(B). I use the proportionality metric to examine whether or not the statewide seat share of each party corresponds closely to its statewide vote share under each plan. As I show below, the revised plan is a clear outlier relative to the simulated plans. That is, all of my 5,000 simulated plans are more compliant with Section 6(B) than the revised plan.

24. Following my initial report, I next compare the expected number of Republican seats under the revised plan with that under the same 5,000 simulated plans. The calculation of the expected number of Republican seats is based on the preferred methodology explained above. Figure 4 shows that under the revised plan, the Republican party is expected to win 61.6 seats, which is about 2.7 seats higher than the average simulated plan of 58.9 seats. Indeed, none of my 5,000 simulated plans awards that many seats to Republicans. The difference between the revised plan and the average simulated plan exceeds 5 standard deviations of the simulated plans and is therefore statistically significant. Although the revised plan awards, on average, about 1.4 fewer seat to Republicans than the enacted plan, the revised plan is still much more favorable to the Republican than any of the 5,000 simulated plans.

25. This discrepancy is reflected in the proportionality metric, which is shown in Figure 5. A value of zero for this measure implies complete proportionality, while positive values indicate

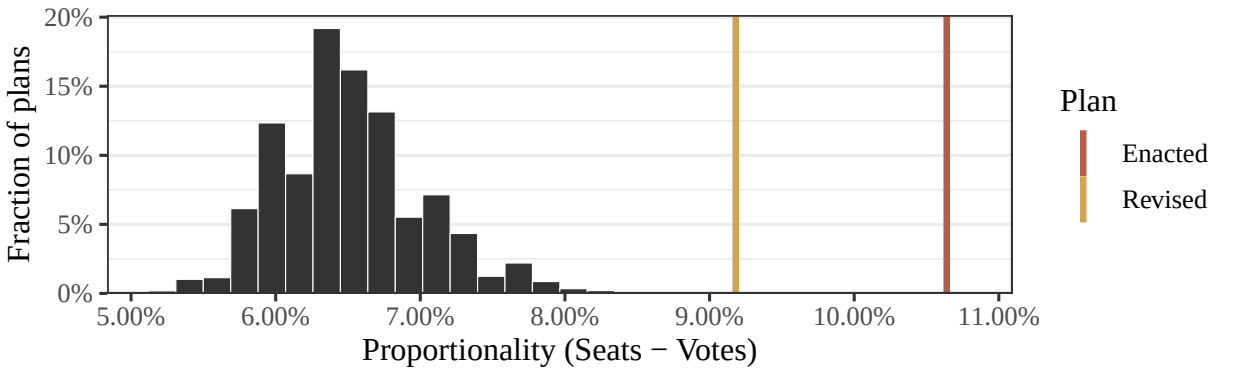


Figure 5: Corresponding proportionality measure calculated for the 5,000 simulated House redistricting plans computed by averaging across the 9 statewide elections from 2016 to 2020. Overlaid are the values for the revised plan (yellow) and the enacted plan (red).

that Republicans win a larger share of seats than vote share, on average. A smaller value indicates a plan's better compliance with Section 6(B). The revised plan has a proportionality score of 9.2%, implying that the Republican party would receive an average of 9.2% more seats under the revised plan than under a proportional plan where the vote share is equal to the seat share. In contrast, under the simulated plans, the average proportionality score is only 6.5%. Indeed, all simulated plans score better than the revised plan. The difference between the revised plan and the average simulated plan is more than 5 standard deviations of the simulated plans and therefore is statistically significant. Although the revised plan improves upon the enacted plan (red) by about 1.5 percentage points, the revised plan is still much more favorable towards the Republican party than any of the 5,000 simulated plans.

# V. APPENDIX

## A. References

Gelman, Andrew, and Gary King. 1994. "A unified method of evaluating electoral systems and redistricting plans." *American Journal of Political Science,* 514–554.

Katz, Jonathan N, Gary King, and Elizabeth Rosenblatt. 2020. "Theoretical foundations and empirical evaluations of partisan fairness in district-based democracies." *American Political Science Review* 114 (1): 164–178.

Stephanopoulos, Nicholas O., and Eric M. McGhee. 2015. "Partisan Gerrymandering and the Efficiency Gap." *University of Chicago Law Review* 82 (2): 831–900.

# EXHIBIT A

# Curriculum Vitae

# Kosuke Imai

## Curriculum Vitae

January 2022

## Contact Information

1737 Cambridge Street
Institute for Quantitative Social Science
Harvard University
Cambridge, MA 02138

Phone: 617-384-6778
Email: Imai@Harvard.Edu
URL: https://imai.fas.harvard.edu

## Education

Ph.D. in Political Science, Harvard University (1999–2003)

A.M. in Statistics, Harvard University (2000–2002)

B.A. in Liberal Arts, The University of Tokyo (1994–1998)

## Positions

Professor, Department of Government and Department of Statistics, Harvard University (2018 – present)

Professor, Department of Politics and Center for Statistics and Machine Learning, Princeton University (2013 – 2018)

Founding Director, Program in Statistics and Machine Learning (2013 – 2017)

Professor of Visiting Status, Graduate Schools of Law and Politics, The University of Tokyo (2016 – present)

Associate Professor, Department of Politics, Princeton University (2012 – 2013)

Assistant Professor, Department of Politics, Princeton University (2004 – 2012)

Visiting Researcher, Faculty of Economics, The University of Tokyo (August, 2006)

Instructor, Department of Politics, Princeton University (2003 – 2004)

## Honors and Awards

1. Invited to read "Experimental Evaluation of Computer-Assisted Human Decision-Making: Application to Pretrial Risk Assessment Instrument." before the Royal Statistical Society Research Section, London (2022).

2. *Highly Cited Researcher* (cross-field category) for "production of multiple highly cited papers that rank in the top 1% by citations for field and year in Web of Science," awarded by Clarivate Analytics (2018, 2019, 2020, 2021).

3. *Excellence in Mentoring Award*, awarded by the Society for Political Methodology (2021).

4. *Statistical Software Award* for developing statistical software that makes a significant research contribution, for "fastLink: Fast Probabilistic Record Linkage," awarded by the Society for Political Methodology (2021).

5. *President*, The Society for Political Methodology (2017–2019). *Vice President and President-elect* (2015–2017).

6. *Elected Fellow*, The Society for Political Methodology (2017).

7. *The Nils Petter Gleditsch Article of the Year Award* (2017), awarded by *Journal of Peace Research*.

8. *Statistical Software Award* for developing statistical software that makes a significant research contribution, for "mediation: R Package for Causal Mediation Analysis," awarded by the Society for Political Methodology (2015).

9. *Outstanding Reviewer Award* for Journal of Educational and Behavioral Statistics, given by the American Educational Research Association (2014).

10. *The Stanley Kelley, Jr. Teaching Award*, given by the Department of Politics, Princeton University (2013).

11. *Pi Sigma Alpha Award* for the best paper presented at the 2012 Midwest Political Science Association annual meeting, for "Explaining Support for Combatants during Wartime: A Survey Experiment in Afghanistan," awarded by the Midwest Political Science Association (2013).

12. Invited to read "Experimental Designs for Identifying Causal Mechanisms" before the Royal Statistical Society Research Section, London (2012).

13. Inaugural recipient of the *Emerging Scholar Award* for a young scholar making exceptional contributions to political methodology who is within ten years of their terminal degree, awarded by the Society for Political Methodology (2011).

14. *Political Analysis Editors' Choice Award* for an article providing an especially significant contribution to political methodology, for "Estimation of Heterogeneous Treatment Effects from Randomized Experiments, with Application to the Optimal Planning of the Get-out-the-vote Campaign," awarded by the Society for Political Methodology and Oxford University Press (2011).

15. *Tom Ten Have Memorial Award* for the best poster presented at the 2011 Atlantic Causal Inference Conference, for "Identifying Treatment Effect Heterogeneity through Optimal Classification and Variable Selection," awarded by the Departments of Biostatistics and Statistics, University of Michigan (2011).

16. Nominated for the *Graduate Mentoring Award*, The McGraw Center for Teaching and Learning, Princeton University (2010, 2011).

17. *New Hot Paper*, for the most-cited paper in the field of Economics & Business in the last two months among papers published in the last year, for "Misunderstandings among Experimentalists and Observationalists about Causal Inference," named by Thomson Reuters' ScienceWatch (2009).

18. *Warren Miller Prize* for the best article published in *Political Analysis*, for "Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference," awarded by the Society for Political Methodology and Oxford University Press (2008).

19. *Fast Breaking Paper* for the article with the largest percentage increase in citations among those in the top 1% of total citations across the social sciences in the last two years, for "Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference," named by Thomson Reuters' ScienceWatch (2008).

20. *Pharmacoepidemiology and Drug Safety Outstanding Reviewer Recognition* (2008).

21. *Miyake Award* for the best political science article published in 2005, for "Do Get-Out-The-Vote Calls Reduce Turnout? The Importance of Statistical Methods for Field Experiments," awarded by the Japanese Political Science Association (2006).

22. *Toppan Prize* for the best dissertation in political science, for *Essays on Political Methodology*, awarded by Harvard University (2004). Also, nominated for American Political Science Association E.E. Schattschneider Award for the best doctoral dissertation in the field of American government and politics.

## Publications in English

### Book

Imai, Kosuke. (2017). *Quantitative Social Science: An Introduction*. Princeton University Press. Translated into Japanese (2018), Chinese (2020), and Korean (2021).

Stata version (2021) with Lori D. Bougher.

Tidyverse version (forthcoming) with Nora Webb Williams

### Refereed Journal Articles

1. Olivella, Santiago, Tyler Pratt, and Kosuke Imai. "Dynamic Stochastic Blockmodel Regression for Social Networks: Application to International Conflicts." *Journal of the American Statistical Association*, Forthcoming.

2. Fan, Jianqing, Kosuke Imai, Inbeom Lee, Han Liu, Yang Ning, and Xiaolin Yang. "Optimal Covariate Balancing Conditions in Propensity Score Estimation." *Journal of Business & Economic Statistics*, Forthcoming.

3. Imai, Kosuke, Zhichao Jiang, D. James Greiner, Ryan Halen, and Sooahn Shin. "Experimental Evaluation of Computer-Assisted Human Decision-Making: Application to Pretrial Risk Assessment Instrument." (with discussion) *Journal of the Royal Statistical Society, Series A (Statistics in Society)*, Forthcoming. To be read before the Royal Statistical Society.

4. Imai, Kosuke, In Song Kim, and Erik Wang. "Matching Methods for Causal Inference with Time-Series Cross-Sectional Data." *American Journal of Political Science*, Forthcoming.

5. Imai, Kosuke and Michael Lingzhi Li. "Experimental Evaluation of Individualized Treatment Rules." *Journal of the American Statistical Association*, Forthcoming.

6. de la Cuesta, Brandon, Naoki Egami, and Kosuke Imai. (2022). "Experimental Design and Statistical Inference for Conjoint Analysis: The Essential Role of Population Distribution." *Political Analysis*, Vol. 30, No. 1 (January), pp. 19–45.

7. Kenny, Christopher T., Shiro Kuriwaki, Cory McCartan, Evan Rosenman, Tyler Simko, and Kosuke Imai. (2021). "The Use of Differential Privacy for Census Data and its Impact on Redistricting: The Case of the 2020 U.S. Census." *Science Advances*, Vol. 7, No. 7 (October), pp. 1-17.

8. Imai, Kosuke and James Lo. (2021). " Robustness of Empirical Evidence for the Democratic Peace: A Nonparametric Sensitivity Analysis." *International Organization*, Vol. 75, No. 3 (Summer), pp. 901–919.

9. Imai, Kosuke, Zhichao Jiang, and Anup Malani. (2021). "Causal Inference with Interference and Noncompliance in the Two-Stage Randomized Experiments." *Journal of the American Statistical Association*, Vol. 116, No. 534, pp. 632-644.

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53. King, Gary, Emmanuela Gakidou, Kosuke Imai, Jason Lakin, Ryan T. Moore, Clayton Nall, Nirmala Ravishankar, Manett Vargas, Martha María Téllez-Rojo, Juan Eugenio Hernández Ávila, Mauricio Hernández Ávila, and Héctor Hernández Llamas. (2009). "Public Policy for the Poor? A Randomized Ten-Month Evaluation of the Mexican Universal Health Insurance Program." (with a comment) *The Lancet*, Vol. 373, No. 9673 (April), pp. 1447–1454.

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58. Ho, Daniel E., and Kosuke Imai. (2008). "Estimating Causal Effects of Ballot Order from a Randomized Natural Experiment: California Alphabet Lottery, 1978–2002." *Public Opinion Quarterly*, Vol. 72, No. 2 (Summer), pp. 216–240.

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## Invited Contributions

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2. Benjamin, Daniel J., *et al.* (2018). "Redefine Statistical Significance." *Nature Human Behaviour*, Vol. 2, No. 1, pp. 6–10.

3. de la Cuesta, Brandon and Kosuke Imai. (2016). "Misunderstandings about the Regression Discontinuity Design in the Study of Close Elections." *Annual Review of Political Science*, Vol. 19, pp. 375–396.

4. Imai, Kosuke (2016). "Book Review of *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction.* by Guido W. Imbens and Donald B. Rubin." *Journal of the American Statistical Association*, Vol. 111, No. 515, pp. 1365–1366.

5. Imai, Kosuke, Bethany Park, and Kenneth F. Greene. (2015). "Usando as respostas previsíveis da abordagem list-experiments como variaveis explicativás em modelos de regressão." *Revista Debates*, Vol. 9, No. 1, pp. 121–151. First printed in *Political Analysis*, Vol. 23, No. 2 (Spring).

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8. Imai, Kosuke, Dustin Tingley, and Teppei Yamamoto. (2013). "Reply to Discussions of "Experimental Designs for Identifying Causal Mechanisms"." *Journal of the Royal Statistical Society, Series A (Statistics in Society)*, Vol. 173, No. 1 (January), pp. 46–49.

9. Imai, Kosuke. (2012). "Comments: Improving Weighting Methods for Causal Mediation Analysis." *Journal of Research on Educational Effectiveness*, Vol. 5, No. 3, pp. 293–295.

10. Imai, Kosuke. (2011). "Introduction to the Virtual Issue: Past and Future Research Agenda on Causal Inference." *Political Analysis*, Virtual Issue: Causal Inference and Political Methodology.

11. Imai, Kosuke, Booil Jo, and Elizabeth A. Stuart. (2011). "Commentary: Using Potential Outcomes to Understand Causal Mediation Analysis." *Multivariate Behavioral Research*, Vol. 46, No. 5, pp. 842–854.

12. Imai, Kosuke, Luke Keele, Dustin Tingley, and Teppei Yamamoto. (2010). "Causal Mediation Analysis Using R," in *Advances in Social Science Research Using R*, H. D. Vinod (ed.), New York: Springer (Lecture Notes in Statistics), pp. 129–154.

13. Imai, Kosuke, Gary King, and Clayton Nall. (2009). "Rejoinder: Matched Pairs and the Future of Cluster-Randomized Experiments." *Statistical Science*, Vol. 24, No. 1 (February), pp. 65–72.

14. Imai, Kosuke. (2003). "Review of Jeff Gill's *Bayesian Methods: A Social and Behavioral Sciences Approach*," *The Political Methodologist*, Vol. 11 No. 1, 9–10.

## Refereed Conference Proceedings

1. Svyatkovskiy, Alexey, Kosuke Imai, Mary Kroeger, and Yuki Shiraito. (2016). "Large-scale text processing pipeline with Apache Spark," *IEEE International Conference on Big Data*, Washington, DC, pp. 3928-3935.

## Other Publications and Manuscripts

1. Goldstein, Daniel, Kosuke Imai, Anja S. Göritz, and Peter M. Gollwitzer. (2008). "Nudging Turnout: Mere Measurement and Implementation Planning of Intentions to Vote."

2. Ho, Daniel E. and Kosuke Imai. (2004). " The Impact of Partisan Electoral Regulation: Ballot Effects from the California Alphabet Lottery, 1978–2002." Princeton Law & Public Affairs Paper No. 04-001; Harvard Public Law Working Paper No. 89.

3. Imai, Kosuke. (2003). "Essays on Political Methodology," *Ph.D. Thesis.* Department of Government, Harvard University.

4. Imai, Kosuke, and Jeremy M. Weinstein. (2000). "Measuring the Economic Impact of Civil War," Working Paper Series No. 51, Center for International Development, Harvard University.

## Selected Manuscripts

1. Goplerud, Max, Kosuke Imai, Nicole E. Pashley. "Estimating Heterogeneous Causal Effects of High-Dimensional Treatments: Application to Conjoint Analysis."

2. Malani, Anup, Phoebe Holtzman, Kosuke Imai, Cynthia Kinnan, Morgen Miller, Shailender Swaminathan, Alessandra Voena, Bartosz Woda, and Gabriella Conti. "Effect of Health Insurance in India: A Randomized Controlled Trial."

3. McCartan, Cory, Jacob Brown, and Kosuke Imai. "Measuring and Modeling Neighborhoods."

4. Ben-Michael, Eli, D. James Greiner, Kosuke Imai, and Zhichao Jiang. "Safe Policy Learning through Extrapolation: Application to Pre-trial Risk Assessment."

5. Tarr, Alexander and Kosuke Imai. "Estimating Average Treatment Effects with Support Vector Machines."

6. McCartan, Cory and Kosuke Imai. "Sequential Monte Carlo for Sampling Balanced and Compact Redistricting Plans."

7. Imai, Kosuke and Zhichao Jiang. "Principal Fairness for Human and Algorithmic Decision-Making."

8. Papadogeorgou, Georgia, Kosuke Imai, Jason Lyall, and Fan Li. "Causal Inference with Spatio-temporal Data: Estimating the Effects of Airstrikes on Insurgent Violence in Iraq."

9. Eshima, Shusei, Kosuke Imai, and Tomoya Sasaki. "Keyword Assisted Topic Models."

10. Tarr, Alexander, June Hwang, and Kosuke Imai. "Automated Coding of Political Campaign Advertisement Videos: An Empirical Validation Study."

11. Chan, K.C.G, K. Imai, S.C.P. Yam, Z. Zhang. "Efficient Nonparametric Estimation of Causal Mediation Effects."

12. Barber, Michael and Kosuke Imai. "Estimating Neighborhood Effects on Turnout from Geocoded Voter Registration Records."

13. Hirano, Shigeo, Kosuke Imai, Yuki Shiraito, and Masaki Taniguchi. "Policy Positions in Mixed Member Electoral Systems: Evidence from Japan."

## Publications in Japanese

1. Imai, Kosuke. (2007). "Keiryō Seijigaku niokeru Ingateki Suiron (Causal Inference in Quantitative Political Science)." *Leviathan*, Vol. 40, Spring, pp. 224–233.

2. Horiuchi, Yusaku, Kosuke Imai, and Naoko Taniguchi. (2005). "Seisaku Jyōhō to Tōhyō Sanka: Field Jikken ni yoru Kensyō (Policy Information and Voter Participation: A Field Experiment)." *Nenpō Seijigaku (The Annals of the Japanese Political Science Association)*, 2005–I, pp. 161–180.

3. Taniguchi, Naoko, Yusaku Horiuchi, and Kosuke Imai. (2004). "Seitō Saito no Etsuran ha Tohyō Kōdō ni Eikyō Suruka? (Does Visiting Political Party Websites Influence Voting Behavior?)" *Nikkei Research Report*, Vol. IV, pp. 16–19.

## Statistical Software

1. Eshima, Shusei, Kosuke Imai, and Tomoya Sasaki. "Keyword Assisted Topic Models." The Comprehensive R Archive Network and GitHub. 2020.

2. Li, Michael Lingzhi and Kosuke Imai. "evalITR: Evaluating Individualized Treatment Rules." available through The Comprehensive R Archive Network and GitHub. 2020.

3. Egami, Naoki, Brandon de la Cuesta, and Kosuke Imai. "factorEx: Design and Analysis for Factorial Experiments." available through The Comprehensive R Archive Network and GitHub. 2019.

4. Kim, In Song, Erik Wang, Adam Rauh, and Kosuke Imai. "PanelMatch: Matching Methods for Causal Inference with Time-Series Cross-Section Data." available through GitHub. 2018.

5. Olivella, Santiago, Adeline Lo, Tyler Pratt, and Kosuke Imai. "NetMix: Mixed-membership Regression Stochastic Blockmodel for Networks." available through CRAN and Github. 2019.

6. Enamorado, Ted, Benjamin Fifield, and Kosuke Imai. "fastLink: Fast Probabilistic Record Linkage." available through The Comprehensive R Archive Network and GitHub. Winner of the Statistical Software Award. 2017.

7. Khanna, Kabir, and Kosuke Imai. "wru: Who Are You? Bayesian Predictions of Racial Category Using Surname and Geolocation." available through The Comprehensive R Archive Network and GitHub. 2015.

8. Fifield, Benjamin, Christopher T. Kenny, Cory McCartan, and Kosuke Imai. "redist: Markov Chain Monte Carlo Methods for Redistricting Simulation." available through The Comprehensive R Archive Network and GitHub. 2015.

9. Imai, Kosuke, James Lo, and Jonathan Olmsted. "emIRT: EM Algorithms for Estimating Item Response Theory Models." available through The Comprehensive R Archive Network. 2015.

10. Blair, Graeme, Yang-Yang Zhou, and Kosuke Imai. "rr: Statistical Methods for the Randomized Response Technique." available through The Comprehensive R Archive Network and GitHub. 2015.

11. Fong, Christian, Marc Ratkovic, and Kosuke Imai. "CBPS: R Package for Covariate Balancing Propensity Score." available through The Comprehensive R Archive Network and GitHub. 2012.

12. Egami, Naoki, Marc Ratkovic, and Kosuke Imai. "FindIt: R Package for Finding Heterogeneous Treatment Effects." available through The Comprehensive R Archive Network and GitHub. 2012.

13. Kim, In Song, and Kosuke Imai. "wfe: Weighted Linear Fixed Effects Regression Models for Causal Inference." available through The Comprehensive R Archive Network. 2011.

14. Shiraito, Yuki, and Kosuke Imai. "endorse: R Package for Analyzing Endorsement Experiments." available through The Comprehensive R Archive Network and GitHub. 2012.

15. Blair, Graeme, and Kosuke Imai. "list: Statistical Methods for the Item Count Technique and List Experiments." available through The Comprehensive R Archive Network and GitHub. 2011.

16. Tingley, Dustin, Teppei Yamamoto, Kentaro Hirose, Luke Keele, and Kosuke Imai. "mediation: R Package for Causal Mediation Analysis." available through The Comprehensive R Archive Network and GitHub. 2009. Winner of the Statistical Software Award. Reviewed in *Journal of Educational and Behavioral Statistics*.

17. Imai, Kosuke. "experiment: R Package for Designing and Analyzing Randomized Experiments." available through The Comprehensive R Archive Network. 2007.

18. Ho, Daniel E., Kosuke Imai, Gary King, and Elizabeth Stuart. "MatchIt: Nonparametric Preprocessing for Parametric Causal Inference." available through The Comprehensive R Archive Network and GitHub. 2005.

19. Imai, Kosuke, Ying Lu, and Aaron Strauss. "eco: Ecological Inference in $2 \times 2$ Tables." available through The Comprehensive R Archive Network and GitHub. 2004.

20. Imai, Kosuke, and David A. van Dyk. "MNP: R Package for Fitting the Multinomial Probit Model." available through The Comprehensive R Archive Network and GitHub. 2004.

21. Imai, Kosuke, Gary King, and Olivia Lau. "Zelig: Everyone's Statistical Software." available through The Comprehensive R Archive Network. 2004.

## External Research Grants

### Principal Investigator

1. National Science Foundation (2021–2024). "Collaborative Research: Causal Inference with Spatio-Temporal Data on Human Dynamics in Conflict Settings." (Algorithm for Threat Detection Program; DMS-2124463). Principal Investigator (with Georgia Papadogeorgou and Jason Lyall) $485,340.

2. National Science Foundation (2021–2023). "Evaluating the Impacts of Machine Learning Algorithms on Human Decisions." (Methodology, Measurement, and Statistics Program; SES-2051196). Principal Investigator (with D. James Greiner and Zhichao Jiang) $330,000.

3. Cisco Systems, Inc. (2020–2022). "Evaluating the Impacts of Algorithmic Recommendations on the Fairness of Human Decisions." (Ethics in AI; CG# 2370386) Principal Investigator (with D. James Greiner and Zhichao Jiang) $110,085.

4. The Alfred P. Sloan Foundation (2020–2022). "Causal Inference with Complex Treatment Regimes: Design, Identification, Estimation, and Heterogeneity." (Economics Program; 2020–13946) Co-Principal Investigator (with Francesca Dominici and Jose Zubizarreta) $996,299

5. Facebook Research Grant (2018). $25,000.

6. National Science Foundation (2016–2021). "Collaborative Conference Proposal: Support for Conferences and Mentoring of Women and Underrepresented Groups in Political Methodology." (Methodology, Measurement and Statistics and Political Science Programs; SES–1628102) Principal Investigator (with Jeffrey Lewis) $312,322. Supplement (SES–1831370) $60,000.

7. The United States Agency for International Development (2015–2017). "Unemployment and Insurgent Violence in Afghanistan: Evidence from the Community Development Program." (AID–OAA–A–12–00096) Principal Investigator (with Jason Lyall) $188,037

8. The United States Institute of Peace (2015–2016). "Assessing the Links between Economic Interventions and Stability: An impact evaluation of vocational and skills training in Kandahar, Afghanistan," Principal Investigator (with David Haines, Jon Kurtz, and Jason Lyall) $144,494.

9. Amazon Web Services in Education Research Grant (2014). Principal Investigator (with Graeme Blair and Carlos Velasco Rivera) $3,000.

10. Development Bank of Latin America (CAF) (2013). "The Origins of Citizen Support for Narcos: An Empirical Investigation," Principal Investigator (with Graeme Blair, Fabiana Machado, and Carlos Velasco Rivera). $15,000.

11. The International Growth Centre (2011–2013). "Poverty, Militancy, and Citizen Demands in Natural Resource-Rich Regions: Randomized Evaluation of the Oil Profits Dividend Plan for the Niger Delta" (RA–2010–12–013). Principal Investigator (with Graeme Blair). $117,116.

12. National Science Foundation, (2009–2012). "Statistical Analysis of Causal Mechanisms: Identification, Inference, and Sensitivity Analysis," (Methodology, Measurement, and Statistics Program and Political Science Program; SES–0918968). Principal Investigator. $97,574.

13. National Science Foundation, (2009–2011). "Collaborative Research: The Measurement and Identification of Media Priming Effects in Political Science," (Methodology, Measurement, and Statistics Program and Political Science Program; SES–0849715). Principal Investigator (with Nicholas Valentino). $317,126.

14. National Science Foundation, (2008–2009). "New Statistical Methods for Randomized Experiments in Political Science and Public Policy," (Political Science Program; SES–0752050). Principal Investigator. $52,565.

15. National Science Foundation, (2006–2009). "Collaborative Research: Generalized Propensity Score Methods," (Methodology, Measurement and Statistics Program; SES–0550873). Principal Investigator (with Donald B. Rubin and David A. van Dyk). $460,000.

16. The Telecommunications Advancement Foundation, (2004). "Analyzing the Effects of Party Webpages on Political Opinions and Voting Behavior," Principal Investigator (with Naoko Taniguchi and Yusaku Horiuchi). $12,000.

### Adviser and Statistical Consultant

1. National Science Foundation (2016–2017). "Doctoral Dissertation Research: Crossing Africa's Arbitrary Borders: How Refugees Shape National Boundaries by Challenging Them." (Political Science Program, SES–1560636). Principal Investigator and Adviser for Co-PI Yang-Yang Zhou's Dissertation Research. $18,900.

2. Institute of Education Sciences (2012–2014). "Academic and Behavioral Consequences of Visible Security Measures in Schools" (R305A120181). Statistical Consultant (Emily Tanner-Smith, Principal Investigator). $351,228.

3. National Science Foundation (2013–2014). "Doctoral Dissertation Research: Open Trade for Sale: Lobbying by Productive Exporting Firm" (Political Science Program, SES–1264090). Principal Investigator and Adviser for Co-PI In Song Kim's Dissertation Research. $22,540.

4. National Science Foundation (2012–2013). "Doctoral Dissertation Research: The Politics of Location in Resource Rent Distribution and the Projection of Power in Africa" (Political Science Program, SES–1260754). Principal Investigator and Adviser for Co-PI Graeme Blair's Dissertation Research. $17,640.

## Invited Short Courses and Outreach Lectures

1. Short Course on Causal Inference and Statistics – Department of Political Science, Rice University, 2009; Institute of Political Science, Academia Sinica, 2014.

2. Short Course on Causal Inference and Identification, The Empirical Implications of Theoretical Models (EITM) Summer Institute – Harris School of Public Policy, University of Chicago, 2011; Department of Politics, Princeton University, 2012.

3. Short Course on Causal Mediation Analysis – Summer Graduate Seminar, Institute of Statistical Mathematics, Tokyo Japan, 2010; Society for Research on Educational Effectiveness Conference, Washington DC, Fall 2011, Spring 2012, Spring 2015; Inter-American Development Bank, 2012; Center for Education Research, University of Wisconsin, Madison, 2012; Bobst Center for Peace and Justice, Princeton University, 2014; Graduate School of Education, University of Pennsylvania, 2014; EITM Summer Institute, Duke University, 2014; Center for Lifespan Psychology, Max Planck Institute for Human Development, 2015; School of Communication Research, University of Amsterdam, 2015; Uppsala University, 2016

4. Short Course on Covariate Balancing Propensity Score – Society for Research on Educational Effectiveness Conference, Washington DC, Spring 2013; Uppsala University, 2016

5. Short Course on Matching Methods for Causal Inference – Institute of Behavioral Science, University of Colorado, Boulder, 2009; Department of Political Science, Duke University, 2013.

6. Lecture on Statistics and Social Sciences – New Jersey Japanese School, 2011, 2016; Kaisei Academy, 2012, 2014; Princeton University Wilson College, 2012; University of Tokyo, 2014

## Selected Presentations

1. Distinguished speaker, Harvard College Summer Program for Undergraduates in Data Science, 2021.

2. Keynote speaker, Kansas-Western Missouri Chapter of the American Statistical Association, 2021.

3. Invited plenary panelist, Association for Computing Machinery Conference on Fairness, Accountability, and Transparency (ACM FAccT) 2021.

4. Keynote speaker, Taiwan Political Science Association, 2020.

5. Keynote speaker, Boston Japanese Researchers Forum, Massachusetts Institute of Technology, 2020.

6. Keynote speaker, Causal Mediation Analysis Training Workshop, Mailman School of Public Health, Columbia University, 2020.

7. Keynote speaker, Special Workshop on Evidence-based Policy Making. World Economic Forum, Centre for the Fourth Industrial Revolution, Japan, 2020.

8. Distinguished speaker, Institute for Data, Systems, and Society. Massachusetts Institute of Technology, 2019.

9. Keynote speaker, The Harvard Experimental Political Science Graduate Student Conference, Harvard University, 2019.

10. Invited speaker, Beyond Curve Fitting: Causation, Counterfactuals, and Imagination-based AI. Association for the Advancement of Artificial Intelligence, Spring Symposium, Stanford University, 2019.

11. Inaugural speaker, Causal Inference Seminar, Departments of Biostatistics and Statistics, Boston University, 2019.

12. Keynote speaker, The Second Latin American Political Methodology Meeting, Universidad de los Andes (Department of Political Science), 2018.

13. Keynote speaker, The First Latin American Political Methodology Meeting, Pontifical Catholic University of Chile (Department of Political Science), 2017.

14. Keynote speaker, Workshop on Uncovering Causal Mechanisms, University of Munich (Department of Economics), 2016.

15. Keynote speaker, The National Quality Registry Research Conference, Stockholm, 2016.

16. Keynote speaker, The UK-Causal Inference Meeting, University of Bristol (School of Mathematics), 2015.
17. Keynote speaker, The UP-STAT Conference, the Upstate Chapters of the American Statistical Association, 2015.
18. Keynote speaker, The Winter Conference in Statistics, Swedish Statistical Society and Umeå University (Department of Mathematics and Mathematical Statistics), 2015.
19. Inaugural invited speaker, The International Methods Colloquium, Rice University, 2015.
20. Invited speaker, The International Meeting on Experimental and Behavioral Social Sciences, University of Oxford (Nuffield College), 2014.
21. Keynote speaker, The Annual Conference of Australian Society for Quantitative Political Science, University of Sydney, 2013.
22. Keynote speaker, The Graduate Student Conference on Experiments in Interactive Decision Making, Princeton University. 2008.

## Conferences Organized

1. The Asian Political Methodology Meetings (January 2014, 2015, 2016, 2017, 2018; co-organizer)
2. The Experimental Research Workshop (September 2012; co-organizer)
3. The 12th World Meeting of the International Society for Bayesian Analysis (June 2012; a member of the organizing committee)
4. Conference on Causal Inference and the Study of Conflict and State Building (May 2012; organizer)
5. The 28th Annual Society for Political Methodology Summer Meeting (July 2011; host)
6. Conference on New Methodologies and their Applications in Comparative Politics and International Relations (February 2011; co-organizer)

## Teaching

### Courses Taught at Harvard

1. Stat 286/Gov 2003 Causal Inference (formally Stat 186/Gov 2002): introduction to causal inference
2. Gov 2003 Topics in Quantitative Methodology: causal inference, applied Bayesian statistics, machine learning

### Courses Taught at Princeton

1. POL 245 Visualizing Data: exploratory data analysis, graphical statistics, data visualization
2. POL 345 Quantitative Analysis and Politics: a first course in quantitative social science
3. POL 451 Statistical Methods in Political Science: basic probability and statistical theory, their applications in the social sciences
4. POL 502 Mathematics for Political Science: real analysis, linear algebra, calculus
5. POL 571 Quantitative Analysis I: probability theory, statistical theory, linear models
6. POL 572 Quantitative Analysis II: intermediate applied statistics
7. POL 573 Quantitative Analysis III: advanced applied statistics
8. POL 574 Quantitative Analysis IV: advanced applied statistics with various topics including Bayesian statistics and causal inference
9. Reading Courses: basic mathematical probability and statistics, applied bayesian statistics, spatial statistics

## Advising

### Current Students

1. Soubhik Barari (Government)
2. Adam Breuer (Computer Science and Government). To be Assistant Professor, Department of Government and Department of Computer Science, Dartmouth College
3. Jacob Brown (Government)
4. Ambarish Chattopadhyay (Statistics)
5. Shusei Eshima (Government)
6. Georgina Evans (Government)
7. Dae Woong Ham (Statistics)
8. Christopher T. Kenny (Government)
9. Michael Lingzhe Li (MIT, Operations Research Center)
10. Jialu Li (Government)
11. Cory McCartan (Statistics)
12. Sayumi Miyano (Princeton, Politics)
13. Sun Young Park (Government)
14. Casey Petroff (Political Economy and Government)

15. Averell Schmidt (Kennedy School)
16. Sooahn Shin (Government)
17. Tyler Simko (Government)
18. Soichiro Yamauchi (Government)
19. Yi Zhang (Statistics)

### Current Postdocs

1. Eli Ben-Michael
2. Evan Rosenman

### Former Students

1. Alexander Tarr (Ph.D. in 2021, Department of Electrical and Computer Engineering, Princeton University; Dissertation Committee Chair)
2. Connor Jerzak (Ph.D. in 2021, Department of Government, Harvard University). Postdoctoral Fellow, Linkoping University. To be Assistant Professor, Department of Government, University of Texas, Austin
3. Shiro Kuriwaki (Ph.D. in 2021, Department of Government, Harvard University). Postdoctoral Fellow, Stanford University. To be Assistant Professor, Department of Political Science, Yale University
4. Erik Wang (Ph.D. in 2020, Department of Politics, Princeton University). Assistant Professor, Department of Political and Social Change, Australian National University
5. Diana Stanescu (Ph.D. in 2020, Department of Politics, Princeton University). Postdoctoral Fellow, Stanford University
6. Nicole Pashley (Ph.D. in 2020, Department of Statistics, Harvard University). Assistant Professor, Department of Statistics, Rutgers University
7. Asya Magazinnik (Ph.D. in 2020, Department of Politics, Princeton University). Assistant Professor, Department of Political Science, Massachusetts Institute of Technology
8. Max Goplerud (Ph.D. in 2020, Department of Government, Harvard University). Assistant Professor, Department of Political Science, University of Pittsburgh
9. Naoki Egami (Ph.D. in 2020, Department of Politics, Princeton University; Dissertation Committee Chair). Assistant Professor, Department of Political Science, Columbia University
10. Brandon de la Cuesta (Ph.D. in 2019, Department of Politics, Princeton University). Postdoctoral Fellow, Center on Global Poverty and Development, Stanford University
11. Yang-Yang Zhou (Ph.D. in 2019, Department of Politics, Princeton University). Assistant Professor, Department of Political Science, University of British Columbia

12. Winston Chou (Ph.D. in 2019, Department of Politics, Princeton University). Senior Data Scientist at Apple

13. Ted Enamorado (Ph.D. in 2019, Department of Politics, Princeton University; Dissertation Committee Chair). Assistant Professor, Department of Political Science, Washington University in St. Louis

14. Benjamin Fifield (Ph.D. in 2018, Department of Politics, Princeton University; Dissertation Committee Chair). Data Scientist, American Civil Liberties Union

15. Tyler Pratt. (Ph.D. in 2018, Department of Politics, Princeton University). Assistant Professor, Department of Political Science, Yale University

16. Romain Ferrali (Ph.D. in 2018, Department of Politics, Princeton University). Assistant Professor, Aix-Marseille School of Economics

17. Julia Morse (Ph.D. in 2017, Woodrow Wilson School, Princeton University). Assistant Professor, Department of Political Science, University of California, Santa Barbara

18. Yuki Shiraito (Ph.D. in 2017, Department of Politics, Princeton University; Dissertation Committee Chair). Assistant Professor, Department of Political Science, University of Michigan

19. Carlos Velasco Rivera (Ph.D. in 2016, Department of Politics, Princeton University). Research Scientist, Facebook

20. Gabriel Lopez Moctezuma (Ph.D. in 2016, Department of Politics, Princeton University). Assistant Professor, Division of the Humanities and Social Sciences, California Institute of Technology

21. Graeme Blair (Ph.D. in 2016, Department of Politics, Princeton University). Assistant Professor, University of California, Los Angeles

22. Jaquilyn R. Waddell Boie (Ph.D. in 2015, Department of Politics, Princeton University). Private consultant

23. Scott Abramson (Ph.D. in 2014, Department of Politics, Princeton University). Associate Professor, Department of Political Science, University of Rochester

24. Michael Barber (Ph.D. in 2014, Department of Politics, Princeton University). Associate Professor, Department of Political Science, Brigham Young University

25. In Song Kim (Ph.D. in 2014, Department of Politics, Princeton University). Associate Professor, Department of Political Science, Massachusetts Institute of Technology

26. Alex Ruder (Ph.D. in 2014, Department of Politics, Princeton University). Senior Community Economic Development Advisor, Federal Reserve Bank of Atlanta

27. Meredith Wilf (Ph.D. in 2014, Department of Politics, Princeton University). Senior Director, Capital Rx

28. Will Bullock. (Ph.D. candidate, Department of Politics, Princeton University). Senior Researcher, Facebook

29. Teppei Yamamoto (Ph.D. in 2011, Department of Politics, Princeton University; Dissertation Committee Chair). Associate Professor, Department of Political Science, Massachusetts Institute of Technology

30. Dustin Tingley (Ph.D. in 2010, Department of Politics, Princeton University). Professor, Department of Government, Harvard University

31. Aaron Strauss (Ph.D. in 2009, Department of Politics, Princeton University). Former Executive Director, Analyst Institute

32. Samir Soneji (Ph.D. in 2008, Office of Population Research, Princeton University; Dissertation Committee Chair). Associate Professor, Department of Health Behavior at the Gillings School of Global Public Health, University of North Carolina, Chapel Hill

33. Ying Lu (Ph.D. in 2005, Woodrow Wilson School, Princeton University; Dissertation Committee Chair). Associate Professor, Steinhardt School of Culture, Education, and Human Development, New York University

### Former Predocs and Postdocs

1. Zhichao Jiang (Postdoctoral Fellow, 2016–2019). Assistant Professor, Department of Biostatistics and Epidemiology, School of Public Health and Health Sciences, University of Massachusetts, Amherst

2. Adeline Lo (Postdoctoral Fellow, 2016–2019). Assistant Professor, Department of Political Science, University of Wisconsin, Madison

3. Yunkyu Sohn (Postdoctoral Fellow, 2016–2018). Assistant Professor, School of Political Science and Economics, Waseda University

4. Xiaolin Yang (Postdoctoral Fellow, 2015–2017). Research Scientist, Amazon

5. Santiago Olivella (Postdoctoral Fellow, 2015–2016). Associate Professor, Department of Political Science, University of North Carolina

6. Drew Dimmery (Predoctoral Fellow, 2015–2016). Research Scientist, Facebook

7. James Lo (Postdoctoral Fellow, 2014–2016). Assistant Professor, Department of Political Science, University of Southern California

8. Steven Liao (Predoctoral Fellow, 2014–2015). Assistant Professor, Department of Political Science, University of California, Riverside

9. Michael Higgins (Postdoctoral Fellow, 2013–2015). Associate Professor, Department of Statistics, Kansas State University

10. Kentaro Hirose (Postdoctoral Fellow, 2012–2015). Assistant Professor, Waseda Institute for Advanced Studies

11. Chad Hazlett (Predoctoral Fellow, 2013–2014). Associate Professor, Departments of Political Science and Statistics, University of California, Los Angeles

12. Florian Hollenbach (Predoctoral Fellow, 2013–2014). Associate Professor, Department of International Economics, Government and Business at the Copenhagen Business School

13. Marc Ratkovic (Predoctoral and Postdoctoral Fellow, 2010–2012). Assistant Professor, Department of Politics, Princeton University

## Editorial and Referee Service

Co-editor for *Journal of Causal Inference* (2014 – present)

Associate editor for *American Journal of Political Science* (2014 – 2019), *Journal of Business & Economic Statistics* (2015 – 2024), *Journal of Causal Inference* (2011 – 2014), *Journal of Experimental Political Science* (2013 – 2017), *Observational Studies* (2014 – present), *Political Analysis* (2014 – 2017).

Editorial board member for *Asian Journal of Comparative Politics* (2014 – present), *Journal of Educational and Behavioral Statistics* (2011 – present), *Journal of Politics* (2007 – 2008, 2019–2020), *Journal of Research on Educational Effectiveness* (2014 – 2016), *Political Analysis* (2010 – 2013), *Political Science Research and Methods* (2019 – present).

Guest editor for *Political Analysis* virtual issue on causal inference (2011).

Referee for *ACM Computing Surveys*, *American Economic Journal: Applied Economics*, *American Economic Review: Insights*, *American Journal of Epidemiology*, *American Journal of Evaluation*, *American Journal of Political Science*, *American Political Science Review*, *American Politics Research*, *American Sociological Review*, *Annals of Applied Statistics*, *Annals of Statistics*, *Annals of the Institute of Statistical Mathematics*, *Biometrics*, *Biometrika*, *Biostatistics*, *BMC Medical Research Methodology*, *British Journal of Mathematical and Statistical Psychology*, *British Journal of Political Science*, *Canadian Journal of Statistics*, *Chapman & Hall/CRC Press*, *Child Development*, *Communications for Statistical Applications and Methods*, *Computational Statistics and Data Analysis*, *Electoral Studies*, *Econometrica*, *Econometrics*, *Empirical Economics*, *Environmental Management*, *Epidemiology*, *European Union Politics*, *IEEE Transactions on Information Theory*, *International Journal of Biostatistics*, *International Journal of Epidemiology*, *International Journal of Public Opinion Research*, *International Migration Review*, John Wiley & Sons, *Journal of Applied Econometrics*, *Journal of Applied Statistics*, *Journal of Biopharmaceutical Statistics*, *Journal of Business and Economic Statistics*, *Journal of Causal Inference*, *Journal of Computational and Graphical Statistics*, *Journal of Conflict Resolution*, *Journal of Consulting and Clinical Psychology*, *Journal of Econometrics*, *Journal of Educational and Behavioral Statistics*, *Journal of Empirical Legal Studies*, *Journal of Multivariate Analysis*, *Journal of Official Statistics*, *Journal of Peace Research*, *Journal of Politics*, *Journal of Research on Educational Effectiveness*,*Journal of Statistical Planning and Inference*, *Journal of Statistical Software*, *Journal of Survey Statistics and Methodology*, *Journal of the American Statistical Association (Case Studies and Applications; Theory and Methods)*, *Journal of the Japanese and International Economies*, *Journal of the Japan Statistical Society*, *Journal of the Royal Statistical Society (Series A; Series B; Series C)*, *Law & Social Inquiry*, *Legislative Studies Quarterly*, *Management Science*, Multivariate Behavioral Research, National Science Foundation (Economics; Methodology, Measurement, and Statistics; Political Science), Natural Sciences and Engineering Research Council of Canada, *Nature Machine Intelligence*, *NeuroImage*, *Osteoporosis International*, *Oxford Bulletin of Economics and Statistics*, *Pharmaceutical Statistics*, *Pharmacoepidemiology and Drug Safety*, *PLOS One*,

*Policy and Internet*, *Political Analysis*, *Political Behavior*, *Political Communication*, *Political Research Quarterly*, *Political Science Research and Methods*, *Population Health Metrics*, *Population Studies*, *Prevention Science*, *Proceedings of the National Academy of Sciences*, Princeton University Press, *Psychological Methods*, *Psychometrika*, *Public Opinion Quarterly*, *Quarterly Journal of Economics*, *Quarterly Journal of Political Science*, *Review of Economics and Statistics*, Routledge, Sage Publications, *Scandinavian Journal of Statistics*, *Science*, Sloan Foundation, Springer, *Sociological Methodology*, *Sociological Methods & Research*, *Statistical Methodology*, *Statistical Methods and Applications*, *Statistical Methods in Medical Research*, *Statistical Science*, *Statistica Sinica*, *Statistics & Probability Letters*, *Statistics in Medicine*, *Systems Biology*, U.S.-Israel Binational Science Foundation, *Value in Health*, *World Politics*.

## University and Departmental Committees

### Harvard University

Department of Government

Member, Curriculum and Educational Policy Committee (2020–2021)

Member, Second-year Progress Committee (2019–2020)

Member, Graduate Placement Committee (2019–2020)

Member, Graduate Admissions Committee (2018–2019)

Member, Graduate Poster Session Committee (2018–2019)

Department of Statistics

Chair, Senior Faculty Search Committee (2021–2022)

Member, Junior Faculty Search Committee (2018–2019)

Member, Second-year Progress Committee (2018–2019, 2020–2021)

### Princeton University

University

Executive Committee Member, Program in Statistics and Machine Learning (2013–2018)

Executive Committee Member, Committee for Statistical Studies (2011-2018)

Member, Organizing Committee, Retreat on Data and Information Science at Princeton (2016)

Member, Council of the Princeton University Community (2015)

Member, Search Committee for the Dean of College (2015)

Member, Committee on the Library and Computing (2013–2016)

Member, Committee on the Fund for Experimental Social Science (2013–2018)

Member, Personally Identifiable Research Data Group (2012–2018)

Member, Research Computing Advisory Group (2013–2018)

Member, Task Force on Statistics and Machine Learning (2014–2015)

Department of Politics

Chair, Department Committee on Research and Computing (2012–2018)

Chair, Formal and Quantitative Methods Junior Search Committee (2012–2013, 2014–2015, 2016–2017)

Chair, Reappointment Committee (2015–2016)

Member, Diversity Initiative Committee (2014–2015)

Member, American Politics Junior Search Committee (2012–2014)

Member, Department Chair's Advisory Committee (2010–2013, 2015–2016)

Member, Department Priority Committee (2012–2013, 2014–2015, 2016–2017)

Member, Formal and Quantitative Methods Curriculum Committee (2005–2006)

Member, Formal and Quantitative Methods Junior Search Committee (2009–2010, 2015–2016)

Member, Formal and Quantitative Methods Postdoc Search Committee (2009–2018)

Member, Graduate Admissions Committee (2012–2013)

Member, Reappointment Committee (2014–2016)

Member, Space Committee (2014–2016)

Member, Undergraduate Curriculum Committee (2014–2015)

Member, Undergraduate Exam Committee (2007–2008)

Member, Undergraduate Thesis Prize Committee (2005–2006, 2008–2011)

Center for Statistics and Machine Learning

Executive Committee Member (2016–2018)

Member, Search Committee (2015–2017)

## Services to the Profession

National Academies of Sciences, Engineering, and Medicine

Committee on National Statistics, Division of Behavioral and Social Sciences and Education, Panel on the Review and Evaluation of the 2014 Survey of Income and Program Participation Content and Design (2014–2017)

National Science Foundation

Proposal Review Panel (2020)

The Society for Political Methodology

President (2017–2019)

Vice President and President Elect (2015–2017)

Annual Meeting Committee, Chair (2011)

Career Award Committee (2015–2017)

Program Committee for Annual Meeting (2012), Chair (2011)

Graduate Student Selection Committee for the Annual Meeting (2005), Chair (2011)

Miller Prize Selection Committee (2010–2011)

Statistical Software Award Committee (2009–2010)

Emerging Scholar Award Committee (2013)

American Statistical Association

Journal of Educational and Behavioral Statistics Management Committee (2016 – present)

Others

External Expert, Department of Methodology, London School of Economics and Political Science (2017)

## Memberships

American Political Science Association; American Statistical Association; Midwest Political Science Association; The Society for Political Methodology.

**CERTIFICATE OF SERVICE**

I, Freda J. Levenson, hereby certify that on this 25th day of January, 2022, I caused a true and correct copy of the foregoing document to be served by email upon the counsel listed below:

Bridget C. Coontz, bridget.coontz@ohioago.gov
Julie M. Pfeiffer, julie.pfeiffer@ohioago.gov
Michael Walton, michael.walton@ohioago.gov

*Counsel for Respondents Ohio Governor DeWine, Ohio Secretary of State LaRose, and Ohio Auditor Faber*

Phillip J. Strach, phil.strach@nelsonmullins.com
Thomas A. Farr, tom.farr@nelsonmullins.com
John E. Branch, III, john.branch@nelsonmullins.com
Alyssa M. Riggins, alyssa.riggins@nelsonmullins.com

*Counsel for Respondents House Speaker Robert R. Cupp and Senate President Matt Huffman*

Erik Clark, ejclark@organlegal.com

*Counsel for Respondent Ohio Redistricting Commission*

*/s/ Freda J. Levenson*
Freda J. Levenson (0045916)
*Counsel for Relators*