February 8, 2024

Dear Members of the Selection Committee,

I write to express my interest in your call for an Assistant Professor. I am a postdoctoral fellow in Advanced Statistical, Causal Inference, and Computational Methodologies in the Department of Political Science at McMaster University. I received my PhD from the Department of Political Science at the University of Illinois at Urbana-Champaign under the supervision of Jake Bowers, Matt Winters, Gisela Sin, and Avital Livny.

My research develops standards to navigate research design tradeoffs in the social sciences, with emphasis on quantitative methodology. I apply these ideas to questions about evidence-informed policy, with primary regional focus on Latin America. My work is published in outlets including *World Development*, the *Journal of Experimental Political Science*, *The SAGE Handbook of Research Methods in Political Science and International Relations*, and is under **revise and resubmit** at the *American Political Science Review* and the *British Journal of Political Science*.

My research agenda focuses on developing tools that researchers can adopt to improve statistical precision before data collection. This is overlooked in the statistics, econometrics, and political methodology literature in favor of identifying unbiased estimators. Implicitly, this literature assumes that one can improve statistical precision by increasing sample size. This is not feasible in many social science applications due to resource limitations. Moreover, resource considerations aside, even the least intrusive study has an ethical mandate to identify a research design that maximizes benefits and minimizes harm at the lowest possible cost.

Focusing on experimentation, this agenda follows two strands. First, I examine cases where one can improve statistical precision without sacrificing unbiasedness, which implies unforeseen costs in other dimensions. For example, in work under **R&R** at the *American Political Science Review* with Erin Rossiter (Notre Dame), we show how implementing alternatives to the standard experimental design, such as pre-post outcome measurement or block randomization, may attenuate the expected gains in precision via explicit or implicit sample loss. In a solo-authored piece forthcoming at the *Journal of Experimental Political Science*, I introduce new tools to assess the validity of estimates in double list experiments. This is a variant of the list experiment that promises more precise results but comes with under-explored questionnaire design complications. In work in progress with Inés Fynn (Universidad Católica del Uruguay), Verónica Pérez Bentancur (Universidad de la República), and Lucía Tiscornia (University College Dublin), we show how to combine list experiments with network scale up questions to improve the precision of prevalence rate estimates for sensitive attitudes and behaviors at the cost one additional assumption.

The second strand focuses on cases where one can improve precision by sacrificing unbiasedness deliberately. For example, in work in progress with Jake Bowers (Illinois) and Christopher Grady (USAID), we discuss the circumstances under which researchers should prefer biased yet precise estimators to analyze experimental data, including applications

to block-randomization and M-estimation. In a *SAGE Handbook* chapter with Christopher Grady and Jim Kuklinski (Illinois), we discuss the merits and challenges of increasingly complex survey experimental designs that improve precision at the cost of external validity bias.

I plan to expand my research program toward the use of machine learning and data science to improve statistical inference. An early example comes from my dissertation work, funded by the Lemann Center for Brazilian Studies, on the effect of investigating the use of federal funds among selected mayors in Brazil on the behavior of other mayors in nearby localities. My theory suggests geographic spillovers as a quantity of interest, yet it gives no guidelines for how far away that effect would travel. This presents a tradeoff between operationalizations that introduce bias by being too narrow or too broad. I overcame this problem using a penalized regression framework to choose the optimal upper bound. This innovation received the best poster award in the 2019 Latin American Political Methodology meeting.

My teaching focuses on making quantitative methods accessible to diverse audiences through a combination of flexibility and accountability. I have experience teaching courses on quantitative methods and world politics. At McMaster, I teach data analysis for public policy and public opinion. At Tulane, I taught a seminar on evidence-based policy to address social and political challenges in developing democracies. Both courses emphasize experimental and quasi-experimental designs, and I plan to expand them to include applications to machine learning and data science in the future. At Illinois, I served as a teaching assistant for statistics courses at the undergraduate and PhD levels using a flipped classroom approach. I also served as a math camp instructor for incoming graduate students for three consecutive years. I also have experience teaching introduction to comparative politics in a hybrid format and an online course on the politics of developing countries.

My involvement beyond the classroom also complements my teaching and mentoring. My work as the methods editorial assistant for the *American Political Science Review* gives me the opportunity to shape and influence the development and application of cutting-edge methods in the field. As a PhD student at Illinois, I started a collaborative project in which graduate students introduced their peers to new methods and organized a reading group on computational social science.

I am prepared to teach introductory courses in a research design quantitative methods sequence, as well as electives in causal inference, experiments, survey design, machine learning, data visualization, and their application to evidence-informed policy in the Global South and beyond. You can find copies of current and sample syllabi at <gustavodiaz.org/teaching>.

I believe my expertise makes me an excellent fit at Texas A&M. If you have any questions, you can contact me via email or phone.

Sincerely,

Gustavo Diaz
Postdoctoral Fellow
Department of Political Science
McMaster University