January 18, 2024

Dear Members of the Selection Committee,

I write to express my interest in your call for a Postdoctoral Fellow. 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 the design and analysis surveys and experiments. I apply these ideas to questions about accountability, governance, and representation in the Americas. 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 experiments, 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.

As part of my postdoc, I contribute to three projects under the supervision of Professor Michele Dion. First, I serve as the methods editorial assistant for the *American Political Science Review*, one of the leading journals in the discipline. My involve assisting editors in assessing the quality and relevance of scholarship applying cutting-edge techniques from data science and statistics, which gives me an opportunity to shape and influence their implementation.

Second, I lead the development of a text analysis workflow for a project that seeks to understand gendered patterns in the application and citation of quantitative methods across the social science. I am building a pipeline to collect and pre-process text data from leading journals in anthropology, economics, political science, and sociology since the year 2000 while also reconstructing citation networks across articles. The endline of this project is to leverage this extensive data collection to determine whether scholars write about their peers' use of statistical and data science methods differently depending on their gender.

Third, in a project that also includes Guillem Riambau (Universitat de Barcelona), we use data from the Asian Barometer to understand whether the presence of others during an interview shapes how people respond to face-to-face surveys. I lead the process of harmonizing and documenting the coding of key variables using data spanning 20 years of surveys across 17 countries. This project aims to improve our understanding of how context, culture, and institutions shape measurement error in cross-national surveys.

I plan to expand my research program toward the use of machine learning 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.

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

Sincerely,

Gustavo Diaz
Postdoctoral Fellow
Department of Political Science
McMaster University