Zachary M. Jones, Ph.D.

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Summary

- a social scientist with a strong background in machine learning, statistics and associated software development with 7+ years experience doing research, communication skills from numerous lectures given, and the ability to learn quickly as needed.
- high-quality reusable software development experience with R, and daily use for 7 years with a focus on machine learning, data manipulation, and visualization.
- software development and data analysis using (7 years) Git/GitHub, GNU Make, Unix Shell, LaTeX, Emacs/Elisp, and Python (data processing and analysis as well as web applications).
- experience presenting technical and non-technical material to students, academics, and government/industy professionals (7 years).
- working with an international team on a large codebase (3 years) and managing a research team (3 years).

Experience

- Moore/Sloan Data Science Postdoctoral Fellowship, eScience Insitute, *University of Washington* (2017-2019).
  - predicted political violence using interpretable machine learning software I developed in R resulting in several peer-reviewed publications (in one of the top journals in political science).
  - implemented machine learning models to code archeological artifacts by period in R suggest new groupings to archeologists as well as evaluate standard groupings.
  - developed a web application to predict cyclist's power/duration dynamics using a semi-parametric anti-isotonic regression in Python using the Strava API.
- Google Summer of Code Fellowship, mlr: **M**achine **L**earning in **R** (2015)
  - implemented generic decomposition methods to make black-box machine learning output interpretable, and visualization methods for interpretation methods, performance and hyperparameter tuning. Participated in evaluation of hyperparameter tuning methods.
  - reviewed and approved code contributions and wrote technical documentation and user tutorials.
- Graduate Research/Teaching, *Pennsylvania State University*, 2014-2017
  - conducted dissertation work on interpretable machine learning methods which involved the development of several R packages implementing methods for decomposing black-box prediction functions and visualizing them resulting in several peer-reviewed publications (in the top two journals in political science) which include applications of these methods.
  - developed large-scale statistical simulations for analysis of the latent space model for networks in R run on a SLURM cluster, and wrote and submitted papers for peer-review based on the simulation and analysis.
  - taught a graduate course on data science that covered applications of machine learning in a variety of disciplines.

  - developed teaching material for machine learning which were peer-reviewed and published. Code examples and simulations were written in `R`. Developed Software Carpentry style teaching materials for reproducible quantitative research.
  - developed and implemented hierarchical gradient boosting algorithm for grouped data in `R`.

- Graduate Research/Teaching, *University of Georgia* (2011-2013)
  - wrote web scraping software for analysis of United Nations Treaty database in Python later used in peer-reviewed publications.
  - performed large-scale analysis of data on human rights abuses written in `R`, run on Amazon's Elastic Compute Cloud and later published in the discipline's flagship journal. Managed software development using Git/Github. Presented research at several large research conferences.
  - implemented system for tracking drug trafficking patterns using open source data on retail prices using `R` and Python.

Education

- Ph.D. Political Science (statistical and computational methods), *Pennsylvania State University* (2017).
- M.A. Political Science, *University of Georgia* (2013).
- B.A. Political Science and Philosophy, *Georgia Southern University* (2010).

Selected Papers, Software, and Talks

1. Interpretable Statistical Learning Methods
   - talks at New Faces in Political Methodology (2018), the University of Colorado: Boulder (2016), and the International Methods Colloquium (2015)
2. mmpf: Monte-Carlo Methods for Prediction Functions, *The R Journal* (2018), Zachary M. Jones.
3. Is There More Violence in the Middle?, *American Journal of Political Science* (2018), Zachary M. Jones and Yonatan Lupu.
4. edarf: Exploratory Data Analysis using Random Forests, *Journal of Open Source Software* (2016), Zachary M. Jones and Fridolin Linder.
5. mlr: Machine Learning in R, *Journal of Machine Learning Research* (2016), Bernd Bischl, Michel Lang, Lars Kotthoff, Julia Schiffner, Jakob Richter, Erich Studerus, Giuseppe Casalicchio and Zachary M. Jones.
6. Enhancing Validity in Observational Settings When Replication is Not Possible, *Political Science Research and Methods* (2016), Christopher J. Fariss and Zachary M. Jones.
7. An Empirical Evaluation of Explanations for State Repression, *American Political Science Review* (2014), Daniel W. Hill Jr. and Zachary M. Jones.
8. Git/GitHub, Transparency, and Legitimacy in Quantitative Research, *The Political Methodologist* (2013).