# Patrick Vossler

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## Research Interests

My research focuses on developing new statistical methodologies for high-dimensional data and expanding our theoretical understanding of commonly-used machine learning methods in high-dimensional settings. I am particularly interested in developing nonparametric methods with rigorous statistical guarantees for causal inference problems.

## Education

**2017-** **University of Southern California**, Los Angeles, CA
Ph.D. in Business Statistics

Thesis: "High-Dimensional Random Forests and Causal Inference"
Advisors: Prof. Yingying Fan, Prof. Jinchi Lv
Expected Completion: May 2022

**2013-2017** **University of Southern California**, Los Angeles, CA
B.S. Economics and Mathematics

Graduated with Honors, Magna Cum Laude

## Employment

**2015-2017** **Omaze**, Los Angeles, CA
*Data Science Intern*

- Liased with senior members of the marketing and product teams to create automated reports of social media ad conversion.

- Built connected data science pipeline with user analytics data.

- Deployed Javascript user interface A/B tests and analyzed subsequent data from the Apache Spark cluster with Scala and Python to optimize website layout for increasing user conversion rate.

## Honors / Awards

**2020**        **Hannan Graduate Student Travel Award**, Institute of Mathematical Statistics

- Awarded for the paper "Asymptotic properties of high-dimensional random forests."

- Funds the travel expenses of students who are graduate students statistics or probability to present their research at an IMS sponsored or co-sponsored meeting. One of 16 students worldwide to receive this award.

**2020**        **James S. Ford Award**, USC Marshall School of Business

- Awarded to third year Ph.D. students based upon their scholastic performance and the quality of their dissertation abstract. One recipient per year.

**2014-2016**   **Student Opportunities for Academic Research (SOAR)**, USC Dornsife

- Funding for undergraduates for participation as a research assistant in a faculty member's project during the spring or fall semester. Received the award for five different semesters.

## Publications

**2021**        Phillips, C., Shah, P. and Vossler, P. (2021) **Immigrants, Intersectionality and the Politics of Substantive Representation**. *Journal of Women, Politics & Policy*.

- To appear.

## Working Papers

**2021**        Chi, C.-M., Vossler, P., Fan, Y. and Lv, J. (2021). **Asymptotic properties of high-dimensional random forests**. *The Annals of Statistics*.

- Under 2nd review for revision.

Demirkaya, E., Fan, Y., Gao, L., Lv, J., Vossler, P. and Wang, J. (2021). **Nonparametric inference of heterogeneous treatment effects with two-scale distributional nearest neighbors**. *Journal of the American Statistical Association*.

- Under revision.

Du, X., Fan, Y., Lv, J., Sun, T. and Vossler, P. (2021). **High-dimensional average treatment effect inference with deep neural networks**. *Journal of Econometrics*.

- Under review.

## Works in Progress

**2021**
Vossler, P., Fan, Y. and Lv, J. (2021). **TSI: high-dimensional nonparametric inference of heterogeneous treatment effects**.
- In preparation and to be submitted to *Journal of the American Statistical Association.*

Vossler, P., Fan, Y. and Lv, J. (2021). **FLINK: feature selection in causal inference with knockoffs**.
- In preparation and to be submitted to *Journal of the Royal Statistical Society Series B.*

Vossler, P., Jones, C., Lv, J. and Wang, J. (2021). **High-dimensional option return inference with deep learning**.
- In preparation and to be submitted to *Journal of Financial Economics.*

## Research Experience

**2021-**
**Graduate Research Assistant**, USC Viterbi
- Developed a web application to test the effectiveness of a preference elicitation algorithm based on robust optimization.
- Worked with Los Angeles Homeless Services Authority to use the web application to help achieve their strategic goals.

**2018-**
**Statistical Consultant**, USC Political Science Department
- Modeled the types of legislation sponsored by immigrant legislators using a latent topic model trained from legislative bill text from all 50 state legislatures.

**2014-2016**
**Senior Research Lab Manager**, SPEC Research Lab, USC School of Intl. Relations
- Taught 20 junior lab members skills such as data cleaning and visualization in R in weekly team meetings.
- Developed a curriculum of the R skills necessary for working in the research lab.

## Teaching Experience

**2019, 2020**
**Instructor and Teaching Assistant**, BUAD 312: Statistics and Data Science for Business

- Core class for business undergraduate students that is an advanced alternative to the regular business statistics core class.

- Instructor rating of 4.2 out of 5 (averaged over two sections).

- Developed a `buad312data` R package to make it easier to share data sets with students.

- Built a tool for grading RMarkdown problem set submissions. Used by teaching assistants in spring 2020.

## Skills

- **Programming Languages**: R, Python, Javascript, SQL, C++, Scala, STATA, Apache Spark