

# John Cherian

Email: [jcherian@stanford.edu](mailto:jcherian@stanford.edu) Website: <https://jjcherian.github.io>

## Education

**Ph.D. in Statistics** 2020 - 2025 (anticipated)

*Stanford University*

Supported by the John and Fannie Hertz Foundation Fellowship

Advisor: Emmanuel Candès

**B.S. in Mathematical and Computational Science** 2013 - 2017

**M.S. in Statistics**

*Stanford University*

Graduated with University Distinction and inducted into Phi Beta Kappa

## Professional Experience

**Consulting Witness** 2023 - 2024

*Jenner & Block LLP*

- Consulting witness on recently concluded gerrymandering litigation
- Work accounts for uncertainty in election outcomes when sampling “fair” redistricting plans

**Consultant** 2020 - present

*The Washington Post*

- Designed and implemented night-of election model that forecasts state results from early returns
- 2024 model based on conformal prediction methods developed in PhD research
- Press coverage: [Stanford Report](#), [Axios](#), [The Washington Post \(2022\)](#), [The Washington Post \(2024\)](#)

**Scientific Associate** 2017 - 2020

*D.E. Shaw Research*

- Researcher on team developing polarizable force fields for all-atom simulation
- Developed an asynchronous, stochastic least-squares optimizer that outperforms Levenberg-Marquardt based full-batch optimizers on all SciPy benchmarks
- Extended PAC-Bayes generalization bounds to hyperparameter optimization: bound minimization yields efficient algorithm that achieves superior performance on held-out validation data
- Created an efficient method for force field model selection by defining a distance metric for SMARTS patterns (i.e., regular expressions that identify molecular subgraphs) and applying a fused LASSO penalty

**Research Assistant** 2015 - 2017

*Holmes Lab, Stanford University*

- Longitudinal analysis of microbiome data tracing the development of oral bacterial samples
- Developed a novel M-(IN)GARCH model for Poisson and Negative Binomial-distributed count data

## Research

Research interests: Model-free inference; Algorithmic fairness; Conformal inference; Statistical methods for political science.

## Papers

3. Cherian, J.J., Gibbs, I. and Candès, E. J. (2024) Large language model validity via enhanced conformal prediction methods. *NeurIPS*. [arXiv:2406.09714](https://arxiv.org/abs/2406.09714)
2. Gibbs, I., Cherian, J.J. and Candès, E.J. (2023) Conformal prediction with conditional guarantees. *Accepted at Journal of the Royal Statistical Society: Series B*. [arXiv:2305.12616](https://arxiv.org/abs/2305.12616)
1. Cherian, J.J. and Candès, E.J. (2024). Statistical inference for fairness auditing. *Journal of Machine Learning Research*. [arXiv:2305.03712](https://arxiv.org/abs/2305.03712)

## Technical reports and posters

6. Cherian, J.J., Bronner, L., Candès, E. (2024). Election night modeling in 2024: a conformal inference approach. *Technical report forthcoming*. Presented at *Stanford-Berkeley Joint Colloquium and USC SEEDS 2025*.
5. Cherian, J.J., Bronner, L. Lei, L. (2022). Night-of election modeling: a conformal prediction approach. Presented at *Safe Anytime-Valid Inference Workshop*.
4. Cherian, J.J., Bronner, L. (2021). An update to The Washington Post election night model. [2021 technical report](#).
3. Cherian, J.J., Bronner, L. (2020). How The Washington Post estimates outstanding votes for the 2020 presidential election. [2020 technical report](#).
2. Cherian, J.J., Taube, A.G., McGibbon, R.T., Angelikopoulos, P., Blanc, G., Snarski, M., Richman, D.D., Klepeis, J.L., Shaw, D.E. (2020). Efficient hyperparameter optimization by way of PAC-Bayes bound minimization. [arXiv:2008.06431](https://arxiv.org/abs/2008.06431).
1. Cherian, J.J., McGibbon, R.T., Taube, A.G., Angelikopoulos, P., Klepeis, J.L., Cole, B., Shaw, D.E. (2019). LASSO-ing the atomtyping problem: a statistical method for ligand force field selection. Presented at *American Chemical Society National Meeting*.

## Invited and Contributed Talks

### Conformal prediction and bias estimation

*University of Pennsylvania (CS Theory)* January 2025

### Large language model validity via enhanced conformal prediction methods

*University of Chicago Booth School of Business (Econometrics and Statistics)* January 2025

*International Conference on Statistics and Data Science (Student Travel Award)* December 2024

*CFE-CMStatistics* December 2024

*UC Berkeley Statistics* December 2024

*Stanford Statistics* October 2024

*INRIA Montpellier* October 2024

*Joint Statistical Meetings* August 2024

*Hertz Foundation Summer Workshop* July 2024

### Night-of election modeling: a conformal inference approach

*UCLouvain Applied Statistics Workshop* April 2024

*STATS305A: Applied Statistics I Lecture* October 2020

## Conformal prediction with conditional guarantees

*UCLouvain Statistics*

*Stanford Fairness Seminar*

April 2024

October 2023

## Statistical inference for fairness auditing

*MIT Fairness Seminar*

*Joint Statistical Meetings (contributed)*

*Hertz Foundation Summer Workshop*

*Stanford Fairness Seminar*

*CS229M: Machine Learning Theory Lecture*

September 2023

August 2023

July 2023

May 2023

November 2022

## Software

- **conditionalconformal**, developer, <https://github.com/jjcherian/conditionalconformal>  
Python package for the conditional conformal method developed in my work.
- **fairaudit**, developer, <https://github.com/jjcherian/fairaudit>  
Python package for the fairness auditing methods developed in Cherian & Candès (2023).
- **elex-live-model**, contributor, <https://github.com/washingtonpost/elex-live-model>  
**elex-solver**, contributor, <https://github.com/washingtonpost/elex-solver>  
Python packages for The Washington Post's night-of election modeling team.

## Service and Teaching Experience

### Instructor

*STATS 390: Consulting Workshop*

*STATS 302: Qualifying Exam Workshop (Theory)*

Summer 2023, 2024

Summer 2022

### Teaching Assistant

*STATS 300B: Asymptotic Statistics*

*STATS 200: Introduction to Statistical Inference*

*CS229M: Machine Learning Theory*

*STATS 363: Modern Statistics for Modern Biology*

*STATS 202: Data Mining and Analysis*

Winter 2022, 2024, 2025

Autumn 2023

Autumn 2021, 2022

Spring 2021

Autumn 2020

- Recipient of Departmental Teaching Assistant Award for 2023-24

### Service

*Open Directions in Statistics*

2024 - present

- Co-leading project with Prof. Rob Tibshirani and another PhD student
- Organizing teams of early-career researchers to produce "open problems" documents for their subfields
- Articles will be published in a special issue of *Statistical Science* that we will co-edit

*Stanford Statistics PhD Admissions Committee*

2024 - 2025

- Reviewed applications for first two rounds

*Stanford Department of Statistics Diversity, Equity, Inclusion & Belonging Committee*

2023 - 2024

- One of the first two PhD students to join the committee

- Helped design and set up feedback form for department members

*Stanford Inclusive Mentoring in Data Science*

Winter 2021, 2022, 2023, 2024

- Supervised by Prof. Chiara Sabatti
- Mentored undergraduate attending non-research university in data science research

*East Palo Alto Tennis & Tutoring*

2013 - 2017, 2020 - Present

- Tutor student from under-served school in East Palo Alto twice weekly
- Elementary School Group Tutor of the Year (2014-15)

*The Petey Greene Program*

2019 - 2020

- Tutor detainees at Rikers Island weekly to prepare them for high school equivalency (TASC) exam

*Reading Partners*

2018 - 2020

- Tutor students twice weekly in reading at under-served Brooklyn elementary school

## References

Available upon request.

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