

John Cherian

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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](#)
2. Gibbs, I., Cherian, J.J. and Candès, E.J. (2023) Conformal prediction with conditional guarantees. *Major revision at Journal of the Royal Statistical Society: Series B*. [arXiv:2305.12616](#)
1. Cherian, J.J. and Candès, E.J. (2024). Statistical inference for fairness auditing. *Journal of Machine Learning Research*. [arXiv: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](#).
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](#).
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

Large language model validity via enhanced conformal prediction methods

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| University of Pennsylvania CS Theory | 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

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| UCLouvain Applied Statistics Workshop | April 2024 |
| STATS305A: Applied Statistics I Lecture | October 2020 |

Conformal prediction with conditional guarantees

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| UCLouvain Statistics | April 2024 |
| Stanford Fairness Seminar | October 2023 |

Statistical inference for fairness auditing

MIT Fairness Seminar

September 2023

Joint Statistical Meetings (contributed)

August 2023

Hertz Foundation Summer Workshop

July 2023

Stanford Fairness Seminar

May 2023

CS229M: Machine Learning Theory Lecture

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

Summer 2023, 2024

STATS 302: Qualifying Exam Workshop (Theory)

Summer 2022

Teaching Assistant

STATS 300B: Asymptotic Statistics

Winter 2022, 2024, 2025 (assigned)

STATS 200: Introduction to Statistical Inference

Autumn 2023

CS229M: Machine Learning Theory

Autumn 2021, 2022

STATS 363: Modern Statistics for Modern Biology

Spring 2021

STATS 202: Data Mining and Analysis

Autumn 2020

- Recipient of Departmental Teaching Assistant Award for 2023-24

Service

Stanford Statistics PhD Admissions Committee

2024 - 2025

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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