Arun Kumar Kuchibhotla

Contact Information

Department of Statistics and Data Science
Carnegie Mellon University
Email: arunku@cmu.edu
Website: https://arun-kuchibhotla.github.io/
ORCID: https://orcid.org/0000-0003-4459-5352

Research Interests

High-dimensional CLT, Conformal Prediction, Concentration Inequalities, Post-selection Inference, Large Sample Theory, Shape-constrained inference, Assumption-lean inference.

Academic Positions

Associate Professor of Statistics & Data Science, Carnegie Mellon University
2025 —

Evergreen Junior Career Professor, Carnegie Mellon University
2024 — 2027.

Assistant Professor, Department of Statistics & Data Science, Carnegie Mellon University
2020 — 2025.

Education

- University of Pennsylvania: Ph.D. in Statistics 2015–2020
  Thesis Advisors: (Late) Lawrence D. Brown, Andreas Buja.
- University of Pennsylvania: Master of Arts in Statistics 2015–2016
- Indian Statistical Institute: Master of Statistics (Distinction) 2013–2015
  Specialization: Mathematical Statistics and Probability
- Indian Statistical Institute: Bachelor of Statistics (Distinction) 2010–2013

Journal Publications

1. Farina, R., Tchetgen Tchetgen, E. J., **Kuchibhotla, A. K.** (2026). "Doubly Robust and Efficient Calibration of Prediction Sets for Censored Time-to-Event Outcomes." *arXiv:2501.04615. Biometrika* (Forthcoming).
2. Chattopadhyay, S., Sarkar, S., and **Kuchibhotla, A. K.** (2026). "Inference for quantile-parametrized families via CDF confidence bands." *arXiv:2511.23086.* Accepted at *Proceedings of the Forty-second Conference on Uncertainty in Artificial Intelligence.*
3. Shi, X., Li, K. Q., Yu, M., Miao, W., **Kuchibhotla, A. K.**, Hu, M., and Tchetgen Tchetgen, E. (2026). "Theory for identification and inference with synthetic controls: a proximal causal inference framework." *Journal of the American Statistical Association, (Forthcoming).*
4. Bong, H., **Kuchibhotla, A. K.**, and Rinaldo, A. (2026). "Dual Induction CLT for High-dimensional m-dependent Data." *arXiv:2306.14299 Annals of Statistics (Forthcoming).*
5. **Kuchibhotla, A. K.** (2025). "Post-selection Inference." In: Lovric, M. (eds) *International Encyclopedia of Statistical Science.* Springer, Berlin, Heidelberg.
6. **Kuchibhotla A. K.**, Balakrishnan S., and Wasserman L. (2024) "The HulC: Confidence Regions from Convex Hulls" *arXiv:2105.14577. Journal of Royal Statistical Society: Series B (Statistical Methodology)* 86(3):586-622.
7. Yang Y., **Kuchibhotla A. K.**, and Tchetgen Tchetgen E. J. (2024) "Doubly Robust Calibration of Prediction Sets under Covariate Shift." *arxiv:2203.01761.* Journal of Royal Statistical Society: Series B (Statistical Methodology) 86(4):943-965.

8. Yang Y., and **Kuchibhotla A. K.** (2024) "Selection and Aggregation of Conformal Prediction Sets" *arXiv:2104.13871. Journal of the American Statistical Association.*
9. Berk R., **Kuchibhotla A. K.**, and Tchetgen Tchetgen E. J. (2024) "Improving Fairness in Criminal Justice Algorithmic Risk Assessments Using Optimal Transport and Conformal Prediction Sets" *arXiv:2111.09211. Sociological Methods & Research* 53(4), 1629-1675.
10. Fogliato, R., **Kuchibhotla, A. K.**, Lipton, Z., Nagin, D., Xiang, A., and Chouldechova, A. (2024) "Estimating the Likelihood of Arrest on Police Records in Presence of Unreported Crimes." *Annals of Applied Statistics* 18(2): 1253-1274.
11. Du, J. H., Patil, P., Roeder, K., and **Kuchibhotla, A. K.** (2024). "Extrapolated cross-validation for randomized ensembles." *arXiv:2302.13511. Journal of Computational and Graphical Statistics* 33(3), 1061–1072.
12. Berk, Richard A., **Kuchibhotla A. K.**, and Tchetgen Tchetgen E. J. (2023) "Fair Risk Algorithms." *Annual Review of Statistics and Its Applications* 10: 165-187.
13. Du J., Patil P., and **Kuchibhotla A. K.** (2023) "Subsample Ridge Ensembles: Equivalences and Generalized Cross-Validation." *arXiv:2304.13016.* Proceedings of the 40th International Conference on Machine Learning 2023.
14. **Kuchibhotla A. K.** and Berk R. A. (2023) "Nested Conformal Prediction Sets for Classification with Applications to Probation Data" *arXiv:2104.09358. The Annals of Applied Statistics* 17.1: 761-785.
15. **Kuchibhotla A. K.**, Balakrishnan S., and Wasserman L. (2023) "Median Regularity and Honest Inference" *Biometrika*, 110(3), 831–838.
16. Patil P., Du J. H., and **Kuchibhotla, A. K.** (2023). "Bagging in Overparameterized Learning: Risk Characterization and Risk Monotonization." *arXiv:2210.11445. Journal of Machine Learning Research* 24(1):15081 - 15193.
17. **Kuchibhotla A. K.**, Brown L. D., Buja A., George E.I., and Zhao L.H. (2023) "Uniform-in-Submodel Bounds for Linear Regression in a Model-Free Framework." *arXiv:1802.05801. Econometric Theory* 39(6): 1202–1248.
18. Gupta C., **Kuchibhotla A. K.**, and Ramdas A. (2022) "Nested Conformal Prediction and Quantile Out-of-Bag Ensemble Methods" *arXiv:1910.10562. Pattern Recognition*, 127, 108496.
19. **Kuchibhotla A. K.**, Kolassa J. E., and Kuffner T. A. (2022) "Post-selection Inference" *Annual Review of Statistics and Its Application*, 9, 505–527.
20. Buja, A., Berk, R.A., **Kuchibhotla, A.K.**, Zhao, L., and George, E. (2022) Discussion of 'Assumption-lean inference for generalised linear model parameters' by Vansteelandt and Dukes. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 84, 703–705.
21. Ogburn, E.L., Cai, J., **Kuchibhotla, A.K.**, Berk, R.A., and Buja, A. (2022) Discussion of 'Assumption-lean inference for generalised linear model parameters' by Vansteelandt and Dukes. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 84, 715–716.
22. **Kuchibhotla A. K.**, Chakrabortty A. (2022) "Moving Beyond Sub-Gaussianity in High-Dimensional Statistics: Applications in Covariance Estimation and Linear Regression" *arXiv:1804.02605. Information and Inference: A Journal of the IMA* 11(4), 1389-1456.
23. **Kuchibhotla A. K.** and Patra R. K. (2022) "On Least Squares Estimation under Heteroscedastic and Heavy-Tailed Errors" *arXiv:1909.02088. The Annals of Statistics*, 50(1):277–302.
24. **Kuchibhotla A. K.**, Patra R. K., and Sen B. (2021) "Semiparametric Efficiency in Convexity Constrained Single Index Model" *arXiv:1708.00145. Journal of American Statistical Association* 118(541), 272–286.
25. **Kuchibhotla A. K.** and Zheng Q. (2021) "Near-Optimal Confidence Sequences for Bounded Random Variables" *arXiv:2006.05022. Proceedings of the 38th International Conference on Machine Learning, PMLR* 139:5827-5837.
26. **Kuchibhotla A. K.**, Banerjee D., and Mukherjee S. (2021) "High-dimensional CLT: Improvements, Non-uniform Extensions and Large Deviations" *Bernoulli*, 27(1): 192-217.

27. **Kuchibhotla A. K.** and Parta R. K. (2020) "Efficient Estimation in Single Index Models through Smoothing Splines" *Bernoulli*, 26(2), 1587–1618.
28. Berk R., Buja A., Brown L. D., George E. I., **Kuchibhotla A. K.**, Su W. J., and Zhao L. H. (2019) "Assumption Lean Regression" *The American Statistician*, 75(1), 76–84.
29. Buja A., Brown L. D., **Kuchibhotla A. K.**, Berk R., George E. I., and Zhao L. H. (2019) "Models as Approximations – Part II: A General Theory of Model-Robust Regression" *Statistical Science*, 34(4), 545–565.
30. Bellec P., and **Kuchibhotla A. K.** (2019) "First Order Expansion of Convex Regularized Estimators" *Advances in Neural Information Processing Systems 32. Pages 3462–3473.*
31. **Kuchibhotla A. K.**, Brown L. D., Buja A., Cai, J., George E.I., and Zhao L.H. (2019) "Valid Post-selection Inference in Model-free Linear Regression." *Annals of Statistics*, 48(5), 2953–2981.
32. **Kuchibhotla A. K.** and Basu A. (2017) "On The Asymptotics of Minimum Disparity Estimation." *TEST*, 26 (3):481–502.
33. **Kuchibhotla A. K.**, Mukherjee S., and Basu A. (2017) "Statistical Inference Based on Bridge Divergences." *Annals of the Institute of Statistical Mathematics, 71 (3), 627-656.*
34. **Kuchibhotla A. K.** and Basu A. (2015) "A General Set Up for Minimum Disparity Estimation." *Statistics and Probability Letters*, Vol. 96, 68-74.

Preprints

1. Wu, W., Le, D., **Kuchibhotla, A. K.**, Rinaldo, A., and Wei, Y. (2026). "Berry-Esseen bounds for multivariate martingale difference sequences in the Kolmogorov distance." *arXiv:2605.03100*.
2. Paul, M. and **Kuchibhotla, A.K.** (2026). "On a Probability Inequality for Order Statistics with Applications to Bootstrap, Conformal Prediction, and more." *arXiv:2604.15229*.
3. Chang, W., and **Kuchibhotla, A. K.** (2026). "Sharp Debiasing for Smooth Functional Estimation in Banach Spaces." *arXiv:2604.01470*.
4. Scharfstein, K. E., and **Kuchibhotla, A. K.** (2026). "Time-uniform conformal and PAC prediction." *arXiv:2602.06297*.
5. Mena, G., **Kuchibhotla, A. K.**, and Wasserman, L. (2025). "Statistical Properties of Rectified Flow." *arXiv:2511.03193*.
6. Paul, M., **Kuchibhotla, A. K.**, and Tchetgen Tchetgen, E. J. (2025). "Multiply Robust Conformal Risk Control with Coarsened Data." *arXiv:2508.15489*.
7. Carter, S., and **Kuchibhotla, A. K.** (2025). "Statistical inference for online algorithms." *arXiv:2505.17300*.
8. Agostinelli, C., Basu, A., Bertagnolli, G., and **Kuchibhotla, A. K.** (2025). "A Weighted Likelihood Approach Based on Statistical Data Depths." *arXiv:2507.16998*.
9. Basu, S., and **Kuchibhotla, A. K.** (2025). "Maximal Inequalities for Independent Random Vectors." *arXiv:2504.17885*.
10. Chakrabortty, A., and **Kuchibhotla, A. K.** (2025). "Tail Bounds for Canonical U-Statistics and U-Processes with Unbounded Kernels." *arXiv:2504.01318*.
11. Paul, M., and **Kuchibhotla, A. K.** (2025). "Finite sample valid confidence sets of mode." *arXiv:2503.23711*.
12. Chang, W., Takatsu, K., Urban, K., and **Kuchibhotla, A. K.** (2025). "The Berry-Esseen Bound for High-dimensional Self-normalized Sums." *arXiv:2501.08979*.
13. Takatsu, K., and **Kuchibhotla, A. K.** (2025). "Bridging Root-n and Non-standard Asymptotics: Dimension-agnostic Adaptive Inference in M-Estimation." *arXiv:2501.07772*.
14. **Kuchibhotla, A. K.** (2024). "On the Missing Factor in Some Concentration Inequalities for Martingales." *arXiv:2412.20542*.
15. Bhowmick, A., and **Kuchibhotla, A. K.** (2024). "On the Symmetry of Limiting Distributions of M-estimators." *arXiv:2411.17087*.

16. Chang, W., and **Kuchibhotla, A. K.** (2024). "Assumption-Lean Honest Inference for Z-functionals." *arXiv:2407.12278*.
17. Takatsu, Kenta, and **Kuchibhotla, A. K.,** (2024). "Generalized van Trees inequality: Local minimax bounds for non-smooth functionals and irregular statistical models." *arXiv:2405.06437*.
18. Paul, M. and **Kuchibhotla, A.K.,** (2024). "Inference for Median and a Generalization of HulC." *arXiv:2403.06357*.
19. Jain, A., and **Kuchibhotla, A.K.,** (2023) "Rectangular Hull Confidence Regions for Multivariate Parameters." *arXiv:2311.16598*.
20. Mallick, S., Sarkar, S., and **Kuchibhotla, A. K.** (2023) "New Asymptotic Limit Theory and Inference for Monotone Regression." *arXiv:2310.20058*.
21. Takatsu, K., Zhang, T., and **Kuchibhotla, A. K.** (2023). "From isotonic to Lipschitz regression: a new interpolative perspective on shape-restricted estimation." *arXiv:2307.05732*. Major revision at the Annals of Statistics.
22. Chang, W., **Kuchibhotla, A. K.**, and Rinaldo, A. (2023). "Inference for Projection Parameters in Linear Regression: beyond $d = o(n^{1/2})$." *arXiv:2307.00795*.
23. Yang, Y., **Kuchibhotla, A. K.**, and Tchetgen, E. T. (2023). "Forster-Warmuth Counterfactual Regression: A Unified Learning Approach." *arXiv:2307.16798*. Major revision at the Journal of American Statistical Association.
24. Sarkar, Siddhaarth, and **Kuchibhotla A. K.** (2023) "Post-selection Inference for Conformal Prediction: Trading off Coverage for Precision." *arXiv:2304.06158*.
25. Bong, H. and **Kuchibhotla, A.K.**, (2023). "Tight Concentration Inequality for Sub-Weibull Random Variables with Generalized Bernstien-Orlicz norm." *arXiv:2302.03850*.
26. Patil P., **Kuchibhotla A. K.**, Wei Y., and Rinaldo, A. (2022) "Mitigating multiple descents: A model-agnostic framework for risk monotonization" *arXiv:2205.12937*.
27. Fogliato R., Shrotriya S., and **Kuchibhotla A. K.** (2021) "maars: Tidy Inference under the 'Models as Approximations' Framework in R" *arXiv:2106.11188*.
28. **Kuchibhotla A. K.** (2021) "Median bias of M-estimators" *arXiv:2106.00164*.
29. **Kuchibhotla A. K.**, Rinaldo A., and Wasserman L. (2020) "Berry-Esseen Bounds for Projection Parameters and Partial Correlations with Increasing Dimension" *arXiv:2007.09751*.
30. **Kuchibhotla A. K.** and Rinaldo, A. (2020) "High-dimensional CLT for Sums of Non-degenerate Random Vectors: $n^{-1/2}$-rate" *arXiv:2009.13673*.
31. **Kuchibhotla A. K.** (2020) "Exchangeability, Conformal Prediction, and Rank Tests" *arXiv:2005.06095*.
32. **Kuchibhotla A. K.** (2018) "Deterministic Inequalities for Smooth M-estimators" *arXiv:1809.05172*.
33. **Kuchibhotla A. K.**, Brown L. D., Buja A. (2018) "Model-free Study of Ordinary Least Squares Linear Regression" *arXiv:1809.10538*.

Teaching

- 46-929, CMU – Financial Time Series (Spring 2022-2026)
- 46-932, CMU – Simulation Methods for Option Pricing (Spring 2023-2026)
- 36-760, CMU – Central Limit Theorems and Concentration of Measure (Fall 2024)
- 36-225, CMU – Introduction to Probability (Fall 2022)
- 36-761, CMU – Modern Theory of Linear Regression (Fall 2021)
- 36-760, CMU – Central Limit Theorems and Resampling (Fall 2021)
- 37-761, CMU – Modern Theory of Linear Regression (Fall 2020)
- 36-760, CMU – Concentration Inequalities and CLTs (Fall 2020)

Presentations

- (Upcoming) Invited talk at EcoSta 2026.
- (Upcoming) Invited talk at ISNPS 2026.
- Department Seminar (2026): University of Texas at Austin.
- Department Seminar (2026): Kent State University.
- Invited talk at IMS ICSDS 2025, Seville, Spain.
- MaLGa Seminar (2025): University of Genova, Machine Learning Group.
- Invited talk at Advancing Statistical Science for a Data-Driven World: NSF@75.
- Department Seminar (2025): ISOR Colloquium, University of Vienna.
- Invited talk at International Indian Statistical Association 2025
- Invited talk at International Conference on Robust Statistics, 2025, Stresa, Italy.
- Department Seminar (2025): Princeton ORFE Wilks Memorial Seminar in Statistics
- Invited talk at IMS ICSDS 2024, Nice, France.
- Invited talk at International Indian Statistical Association 2024.
- Applied Statistics Unit department seminar (2023): Indian Statistical Institute, Kolkata.
- Invited talk at ICSA 2022 China Conference.
- Mathematics and Statistics department seminar (2022): Washington University.
- Invited talk at IMS Annual Meeting 2022, London.
- Biostatistics department seminar (2022): Virginia Commonwealth University.
- Statistics department seminar (2022): The Wharton School, University of Pennsylvania.
- Invited talk at 56th Annual Conference on Information Sciences and Systems (CISS 2022).
- Statistics department seminar (2022): Interdisciplinary Statistical Research Unit, ISI, Kolkata.
- Statistics department seminar (2022): University of Bristol.
- Statistics department seminar (2021): University of Wisconsin–Madison.
- Biostatistics department seminar (2021): Johns Hopkins University.
- Statistics department seminar (2021): McGill University.
- Department seminar (2021): Indian Institute of Management, Bangalore.
- Invited talk at ICSA 2021: Applied Statistics Symposium.
- Invited talk at World Statistics Congress 2021.
- Invited talk at International Indian Statistical Association 2021.
- Invited talk at International Seminar on Selective Inference 2020.
- Statistics department seminar (2020): University of Chicago.
- Department seminar (2020): University of Chicago, Booth School of Business.
- Department seminar (2020): Harvard T.H. Chan School of Public Health.
- Statistics department seminar (2020): University of British Columbia.
- Statistics department seminar (2020): University of California, Irvine.
- Statistics department seminar (2020): Rutgers University.
- Invited talk at MCP 2019, National Taiwan University.
- Invited talk at WHOA-PSI-4, 2019.
- Invited talk at JSM 2019, Denver.
- Invited talk at ICSA 2019, Nankai University.

- Invited talk at young researchers session, Lawrence D Brown memorial workshop.
- Shared a talk with Andreas Buja at WHOA-PSI-3, 2018.
- Invited talk at Workshop Model Selection, Regularization, and Inference 2018 (Represented Larry Brown).
- Shared a talk with Andreas Buja at SLDSC 2018.
- Invited talk at WHOA-PSI-2, 2017 (Represented Larry Brown).
- Special topics session at World Statistics Congress 2015, Rio de Janeiro, Brazil.
- Contributed session presentation at ICORS 2015, Kolkata, India.
- Contributed session presentation at ICORS 2014, Halle, Germany.

Academic Achievements

- 2026 Gottfried E. Noether Early Career Scholar Award.
- Alfred P. Sloan Fellowship (2026-2028, $75,000$).
- NSF grant, DMS–2210662 (2022–2025, $200,000) "Methodology for qualitative constraints in semi-parametric models" (Co-PIs: Eric J. Tchetgen Tchetgen and Rohit K. Patra).
- NSF grant, DMS–2113611 (2021–2024, $300,000), "Central Limit Theorems and Inference in High Dimensions." (Co-PI: Alessandro Rinaldo).
- Student travel award, Wharton Doctoral Programs, George James Term Fund 2019.
- Got second prize in Jan Tinbergen competition for young statisticians in 2015 from developing countries.
- Awarded Kishore Vaigyanik Protsahan Yojana scholarship (2011–2015).
- Inspire Scholar (2011-2015). (From Department of Science and Technology, India)

Committees

- Served as a member of expert panel for U.S. National Science Foundation Directorate for Mathematical and Physical Sciences (NSF MPS).
- Served as one of the judges for International Indian Statistical Association (IISA) student paper competition for the Probability/Theory/Methodology section 2020.
- Served on the Statistical Learning and Data Science (SLDS) 2021 Student Paper Award committee.
- Served/serving as a thesis committee member for
  - Gabriel Moryoussef,
  - Diego Martinez Taboada,
  - Hongjian Wang,
  - Hao Lee,
  - Akshay Prasadan,
  - Nil-Jana Akpinar,
  - Pratik Patil,
  - Shamindra Shrotriya,
  - Natalia Lombardi de Oliveira,
  - Riccardo Fogliato,
  - Junhui Cai

Mentoring (PhD students)

- Xiaoyi Gu (co-advised with Alessandro Rinaldo). Graduated in 2021. Currently at Amazon.
- Yachong Yang (UPenn. Co-advised with Eric J. Tchetgen Tchetgen. Graduated in 2024). Currently at Cubist.
- Siddhaarth Sarkar (July 2025). Currently at Meta in September 2025.
- Woonyoung Chang (May 2026).
- Kayla Scharfstein (expected graduation in 2026)
- Kenta Takatsu (expected graduation in 2026)
- Konrad Urban (expected graduation in 2026)
- Selina Carter (expected graduation in 2026)
- Rebecca Farina (expected graduation in 2027)
- Manit Paul (UPenn, Co-advised with Eric J. Tchetgen Tchetgen. Expected graduation in 2027.)

Mentoring (Masters students and others)

- Arising Banerjee (Summer 2022). Currently pursuing PhD at Cornell University.
- Manit Paul (Fall 2022 –). Currently pursuing PhD at University of Pennsylvania.
- Soham Mallick (Summar 2023). Currently pursuing PhD at University of Pennsylvania.
- Chandramauli Chakraborty (Summer 2023). Currently pursuing PhD at University of Chicago.
- Aniket Jain (Fall 2023). Currently pursuing PhD at Harvard University.
- Supratik Basu (Spring 2023). Currently pursuing PhD at Duke University.
- Arunav Bhowmick (Summer 2024). Will join University of Pennsylvania to pursue PhD.

Journal Review Served as a reviewer for several statistical journals:

- Annals of Statistics;
- Journal of American Statistical Association;
- Biometrika;
- Journal of the Royal Statistical Society: Series B (Statistical Methodology);
- Bernoulli;
- Information and Inference;
- Statistica Sinica;
- Electronic Journal of Statistics;
- Statistical Science;
- Statistical Papers;
- Statistics and Computing;

Also, served as a reviewer for machine learning conferences including COLT (conference on learning theory), UAI (Uncertainty in Artificial Intelligence).

Programming and Scripting

- R – Proficient,
- C – Basic Programming,
- Python – Basic Programming.