Arun Kumar Kuchibhotla

Contact Information

Department of Statistics and Data Science
Carnegie Mellon University
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Research Interests

Post-selection Inference, Large Sample Theory, Conformal Prediction, Concentration Inequalities.

Academic Positions

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

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. **Kuchibhotla A. K.** and Basu A. (2015) "A General Set Up for Minimum Disparity Estimation." *Statistics and Probability Letters*, Vol. 96, 68-74.
2. **Kuchibhotla A. K.** and Basu A. (2017) "On The Asymptotics of Minimum Disparity Estimation." *TEST*, 26 (3):481–502.
3. **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.*
4. Berk R., Buja A., Brown L. D., George E. I., **Kuchibhotla A. K.**, Su W. J., Zhao L. H., (2019) "Assumption Lean Regression" *The American Statistician, 1-17.*
5. Buja A., Brown L. D., **Kuchibhotla A. K.**, Berk R., George E. I., Zhao L. H. (2019) "Models as Approximations – Part II: A General Theory of Model-Robust Regression" *Statistical Science, 34(4), 545–565.*
6. Bellec P., and **Kuchibhotla A. K.**, (2019) "First order expansion of convex regularized estimators" *Advances in Neural Information Processing Systems 32. Pages 3462–3473.*
7. **Kuchibhotla A. K.**, Brown L. D., Buja A., Cai, J., George E.I., Zhao L.H. (2019) "Valid Post-selection Inference in Model-free Linear Regression." *Annals of Statistics*, 48(5), 2953–2981.
8. **Kuchibhotla A. K.** and Parta R. K. (2020) "Efficient Estimation in Single Index Models through Smoothing splines" *Bernoulli, 26(2), 1587–1618.*
9. **Kuchibhotla A. K.**, Banerjee D., Muhkerjee S. (2020) "High-dimensional CLT: Improvements, Non-uniform Extensions and Large Deviations" *arXiv:1806.06153.* Accepted at *Bernoulli.*
10. **Kuchibhotla A. K.**, Patra R. K., Sen B. (2021) "Semiparametric Efficiency in Convexity Constrained Single Index Model" *arXiv:1708.00145.* Accepted at *Journal of American Statistical Association.*
11. **Kuchibhotla A. K.**, Brown L. D., Buja A., George E.I., Zhao L.H. (2021) "A Model Free Perspective for Linear Regression: Uniform-in-model Bounds for Post Selection Inference" *arXiv:1802.05801.* Accepted at *Econometric Theory.*

12. Gupta C., **Kuchibhotla A. K.**, and Ramdas. A. (2021) "Nested conformal prediction and quantile out-of-bag ensemble methods" *arXiv:1910.10562.* Accepted at *Pattern Recognition.*
13. **Kuchibhotla A. K.** and Patra R. K. (2021) "On Least Squares Estimation under Heteroscedastic and Heavy-Tailed Errors" *arXiv:1909.02088.* Accepted at *Annals of Statistics.*
14. **Kuchibhotla A. K.** and Zheng Q. (2021) "Near-Optimal Confidence Sequences for Bounded Random Variables" *arXiv:2006.05022.* Accepted at *International Conference on Machine Learning (ICML).*

Preprints

1. **Kuchibhotla A. K.**, Chakrabortty A. (2018) "Moving Beyond Sub-Gaussianity in High-Dimensional Statistics: Applications in Covariance Estimation and Linear Regression" *arXiv:1804.02605.*
2. Chakrabortty A. and **Kuchibhotla A. K.** (2018) "Tail Bounds for Canonical U-Statistics and U-Processes with Unbounded Kernels"
3. **Kuchibhotla A. K.**, Brown L. D., Buja A. (2018) "Model-free Study of Ordinary Least Squares Linear Regression" *arxiv:1809.10538.*
4. **Kuchibhotla A. K.** (2018) "Deterministic Inequalities for Smooth M-estimators" *arxiv:1809.05172.*
5. **Kuchibhotla A. K.** (2020) "Exchangeability, Conformal Prediction, and Rank Tests" *arXiv:2005.06095.* Submitted to Statistical Science.
6. **Kuchibhotla A. K.**, Rinaldo A., and Wasserman L. (2020) "Berry-Esseen Bounds for Projection Parameters and Partial Correlations with Increasing Dimension" *arXiv:2007.09751.*
7. Berk R. and **Kuchibhotla A. K.** (2020) "Improving Fairness in Criminal Justice Algorithmic Risk Assessments Using Conformal Prediction Sets" *arXiv:2008.11664.*
8. **Kuchibhotla A. K.** and Rinaldo, A. (2020) "High-dimensional CLT for Sums of Non-degenerate Random Vectors: $n^{-1/2}$-rate" *arXiv:2009.13673.*
9. **Kuchibhotla A. K.** and Berk R. A. "Nested Conformal Prediction Sets for Classification with Applications to Probation Data" *arXiv:2104.09358.*
10. Yang Y., and **Kuchibhotla A. K.** (2021) "Finite-sample Efficient Conformal Prediction" *arXiv:2104.13871.*
11. **Kuchibhotla A. K.**, Wasserman L., and Balakrishnan S. (2021) "The HulC: Confidence Regions from Convex Hulls" *arXiv:2105.14577.*
12. **Kuchibhotla A. K.** (2021) "Median bias of M-estimators" *arXiv:2106.00164.*
13. Fogliato R., Shrotriya S., and **Kuchibhotla A. K.** "maars: Tidy Inference under the 'Models as Approximations' Framework in R" *arXiv:2106.11188.*

Working Papers

1. Yang Y., **Kuchibhotla A. K.**, and Tchetgen Tchetgen E. J. (2021) "Double Robust Conformal Prediction for Covariate Shift."
2. Hong A., and **Kuchibhotla A. K.** (2021) "Statistical Practice: Examples and Issues of Reproducibility."
3. **Kuchibhotla A. K.**, and Mukherjee S. S. (2021) "Sharp Maximal Inequalities."

Teaching

- 37-761, CMU – Modern Theory of Linear Regression (Fall 2020)
- 36-760, CMU – Concentration Inequalities and CLTs (Fall 2020)
- STAT991, UPenn – Topics in Linear Models (Fall 2017)
- STAT111, UPenn – Introductory Statistics (Summer 2018)

Presentations

- 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

- NSF grant, DMS-2113611 (2021–2024, $300,000), "Central Limit Theorems and Inference in High Dimensions." (Joint with Alessandro Rinaldo).
- Student travel award, Wharton Doctoral Programs, George James Term Fund 2019.
- Got second prize in Jan Tinbergen competition for young statisticians from developing countries.
- Awarded Kishore Vaigyanik Protsahan Yojana scholarship (2011–2015).
- Inspire Scholar since April 2011. (From Department of Science and Technology, India)

Committees

- 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.

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.