Bikram Karmakar

October 16, 2023

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Department of Statistics,
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Academic Appointments

Aug 2019 –   Assistant Professor, Department of Statistics, University of Florida.

Research Interests

Causal inference; observational studies; application of statistics to social sciences, health sciences, public policy and marketing.

Education

2019 Ph.D. in Statistics, The Wharton School, University of Pennsylvania, USA
      Advisor: Professor Dylan S Small
2019 M.A. in Statistics, The Wharton School, University of Pennsylvania, USA
2013 Master of Statistics, *with distinction*, Indian Statistical Institute, Kolkata, India
2011 Bachelor in Statistics, *with distinction*, Indian Statistical Institute, Kolkata, India

Pre-print articles (* indicates graduate student)

26. Y. Ohnishi*, W. Kar and B. Karmakar. "Inferring causal effect of a digital communication strategy under a latent sequential ignorability assumption and treatment noncompliance." Under review.

25. Y. Ohnishi*, B. Karmakar and A. Sabbaghi. "Degree of interference: A general framework for causal inference under interference." Under review.

24. B. Karmakar. "Regression to the mean in regression discontinuity design: Bias and sensitivity analysis." Under review.

23. B. Karmakar and B. Pareek. "Leaf nodes of decision trees as balancing score in observational studies with multiple treatments." Under review.

22. A. Ghosh*, N. Deb, B. Karmakar, and B. Sen. "Efficiency of regression (un)-adjusted Rosenbaum's rank-based estimator in randomized experiments." *To be submitted.*

Publications (published or revision submitted) (* indicates graduate student)

21. Z. Qin* and B. Karmakar. (2023). "Causal inference with confounded treatment by calibrating resistant population's variance." *Journal of the Royal Statistical Society - Series B*,

Reject and resubmit; revision submitted.

20. B. Karmakar, G. Mukherjee and W. Kar. (2023). "Using penalized synthetic controls on truncated data: A case study on effect of marijuana legalization on direct payments to physicians by opioid manufacturers." *Journal of the American Statistical Association*, *Major revision; revision submitted.*

19. B. Karmakar, A. G. Zauber, A. I. Hahn, Y. K. Lau, D. A. Corley, C. A. Doubeni and M. M. Joffe. (2023). "Bias due to coarsening of time intervals in the inference for the efficiency of colorectal cancer screening." *International Journal of Epidemiology*, *Major revision; revision submitted.*

18. B. Karmakar and D. S. Small. (2023). "Constructing independent evidence from regression and instrumental variables with an application to the effect of violent conflict on altruism and risk preference." *Biostatistics & Epidemiology*, Available from: https://doi.org/10.1080/24709360.2022.2109910.

17. B. Karmakar. (2022). "An approximation algorithm for blocking of an experimental design." *Journal of the Royal Statistical Society - Series B*, 84(5), 1726–1750.

16. A. Zhao, Y. Lee, D. S. Small and B. Karmakar[†]. (2022). "Evidence factors from multiple, possibly invalid, instrumental variables." *The Annals of Statistics*, 50(3), 1266–1296. ([†] indicates the corresponding author).

15. B. Karmakar, P. Liu, G. Mukherjee, H. Che and S. Dutta. (2022). "Improved retention analysis in freemium role-playing games by jointly modeling players' motivation, progression and churn." *Journal of the Royal Statistical Society - Series A*, 185, 102–133.

14. B. Karmakar, D. S. Small, and P. R. Rosenbaum. (2021). "Reinforced designs: Multiple instruments plus control groups as evidence factors in an observational study of the effectiveness of Catholic schools." *Journal of the American Statistical Association*, 116(533), 82–92.

13. B. Karmakar, C. A. Doubeni, and D. S. Small. (2020). "Evidence factors in a case-control study with application to the effect of flexible sigmoidoscopy screening on colorectal cancer." *The Annals of Applied Statistics*, 14, 829–849.

12. B. Karmakar and D. S. Small. (2020). "Assessment of the extent of corroboration of an elaborate theory of a causal hypothesis using partial conjunctions of evidence factors." *The Annals of Statistics*, 48(6), 3283–3311.

11. B. Karmakar, D. S. Small, and P. R. Rosenbaum. (2020). "Using evidence factors to clarify exposure biomarkers." *American Journal of Epidemiology*, 189(3), 243-249.

10. B. Karmakar, B. French, and D. S. Small. (2019). "Integrating the evidence from evidence factors in observational studies." *Biometrika*, 1066, 353–367.

9. B. Karmakar, D. S. Small, and P. R. Rosenbaum. (2019). "Using approximation algorithms to build evidence factors and related designs for observational studies." *Journal of Computational and Graphical Statistics*, 28(3), 698–709.

8. B. Karmakar, S. Das, S. Bhattacharya, R. Sarkar, and I. Mukhopadhyay. (2019). "Tight clustering for large data sets with an application to gene expression data." *Nature, Scientific Reports*, vol. 9, no. 1, 3053.

7. B. Karmakar, R. Heller, and D. S. Small. (2018). "False discovery rate control for effect modification in observational studies." *Electronic Journal of Statistics*, 12(2), 3232–3253.

6. B. Karmakar and N. R. Pal. (2018). "How to make a neural network say "Don't know"?" *Information Sciences*, vol. 430-431, 444–466.

5. B. Karmakar and I. Mukhopadhyay. (2018). "Risk efficient sequential estimation of multi-variate random coefficient autoregressive process." *Sequential Analysis*, 38(1), 26–45.

4. B. Karmakar and I. Mukhopadhyay. (2018). "Risk efficient estimation of fully dependent random coefficient autoregressive models of general order." *Communications in Statistics - Theory and Methods*, 47(17), 4242–4253.

3. B. Karmakar, K. Dhara, K. K. Dey, A. Basu, and A. K. Ghosh. (2015). "Tests for statistical significance of a treatment effect in the presence of hidden sub-populations." *Statistical Methods & Applications*. (2015) 24(1), 97–119.

Book Chapters

2. B. Karmakar (2023) "Evidence factors." In: J.R. Zubizarreta, E.A. Stuart, D.S. Small, P.R. Rosenbaum (Eds.), *Handbook of Matching and Weighting Adjustments for Causal Inference*, Chapman and Hall/CRC, pp. 583–609. doi:10.1201/9781003102670-26.

1. B. Karmakar and I. Mukhopadhyay (2016). "An efficient partition-repetition approach in clustering of big data." In: S. Pyne, B.L.S. Prakasa Rao, S.B. Rao (Eds.), *Big data analytics: Methods and applications*, Springer India, New Delhi, 2016, pp. 75–93. doi:10.1007/978-81-322-3628-3 5.

Grants

Under review:

MMS	Karmakar, B (PI)	7/1/2024-6/30/2027
NSF		TDC: $255,995.00

New Methods for Causal Inference from Observational Panel Studies.
Role: Solo PI.

R01	Wang, Z (PI)	4/1/2024-3/31/2029
NIH/NINDS		TDC: $3,543,387.00

Quantification of the neurocognitive, brain, and plasma biomarkers of dementia in middle-aged autistic adult.
Role: Co-Investigator.

Current support:

DMS-2015250	Karmakar, B (PI)	7/1/2020-6/30/2024
NSF		TDC: $147,856.00

Development of Methodologies to Formalize the Informal Rules of Causal Inference from Observational Studies Using Evidence Factors and Modern Optimization. Additional REU supplemental support.
Role: Solo PI.

R01NS121120	Wang, Z (PI)	09/30/2020-04/30/2026
NIH/NINDS		TDC: $1,225,000

Cerebellar and Basal Ganglia Markers Underlie Neuromotor Impairments in Adults with Autism Spectrum Disorder (ASD).
Role: Co-Investigator.

Completed grants:

| 5R01CA213645 | Doubeni, C (PI) | 04/01/2020-03/31/2022 |
| NIH/NCI | | TDC: $599,148.00 |

Effectiveness of Screening for Colorectal Cancer in Aaverage Risk Adults: Colonoscopy vs FIT.
Role: Co-Investigator (PI of UF subaward).

| R21AG065621 | Wang, Z (PI) | 09/30/2020-08/31/2022 |
| NIH/NIA | | TDC: $150,000.00 |

Cerebellar and Basal Ganglia Contributions to Neuromotor Issues in Adults with Autism Spectrum Disorder (ASD).
Role: Co-Investigator.

Software

Github: https://github.com/bikram12345k includes code to implement the proposed methods in the published papers.

struncatedP	R package for implementing the smoothed truncated product method. [github.com/bikram12345k]
BlockingAlgo	Implementation of approximation algorithms for blocking of an experimental design. [github.com/bikram12345k]
blockingChallenge	R package for creating blocks or strata of units with similar covariates in each stratum. [CRAN, github.com/bikram12345k]
approxmatch	R package for creating approximately optimal fine balance matching with multiple groups. [CRAN]
evidenceFactors	R package for reporting tools for sensitivity analysis of evidence factors in observational studies. [CRAN]

Teaching Experience

Instructor

STA7934	Modern Methods for Causal Inference (Special topics course for Statistics Ph.D. students), Fall 2023 (enrollment 20).
STA6208	Basic Design and Analysis of Experiments (compulsory course for first year Statistics Ph.D. students), Spring 2022, Spring 2023,Spring 2024.
STA6166	Statistical Methods in Research I, Fall 2021, Fall 2022.
STA4322	Introduction to Statistical Theory, Spring 2021, Fall 2022, Spring 2023, Fall 2023.
STA6126	Statistical Methods in Social Research I, Fall 2020, Fall 2021.
STA4321/5325	Fundamentals of Probability, Fall 2019, Spring 2020.
STAT111	Introduction to Statistics, Summer 2017 (at UPenn).

Teaching Assistant

STAT475/920	Sample Survey Design, Spring 2018 and Fall 2018.
STAT521	Applied Econometrics II, Spring 2015 and Spring 2016.
STAT613 (MBA)	Regression Analysis for Business, Fall 2015.
STAT111	Introductory Statistics (recitation), Fall 2016 and Spring 2017.

Professional Experience

2014–2019	Teaching Assistant, Department of Statistics, *The Wharton School*.
Summer 2017	Academic appointment in the *College of Liberal and Professional Studies*, University of Pennsylvania.
2013–2014	Analyst in Algo Analytics group at *Morgan Stanley Advantages Services*.
2012	Trainee Quantitative Analyst at *LetsE e-Business Solutions*.

Awards and Fellowships

New Researcher Travel Award, *Institute of Mathematical Statistics*, 2020.

Student Paper Award, Social Statistics, Government Statistics, and Survey Research Methods Sections (SRMS/GSS/SSS), *American Statistical Association*, 2019.

Donald S. Murray Award for excellence in teaching, *The Wharton School*, 2018.

Deming Student Scholar Award, Deming Conference on Applied Statistics, *American Statistical Association*, 2018.

Student Paper Award, Social Statistics, Government Statistics, and Survey Research Methods Sections (SRMS/GSS/SSS), *American Statistical Association*, 2018.

Student travel award, Wharton Doctoral Programs, *George James Term Fund*, 2016, 2017.

Research and teaching fellowship, *The Wharton School, University of Pennsylvania*, 2015–2019.

Invited Talks

– CMStatistics 2023, Berlin, Germany, 16–18 December, 2023.

– Department of Marketing, University of Florida, Gainesville, 22 September, 2023.

– EcoSta 2023, Tokyo, Japan, 1–3, August 2023.

– International Chinese Statistical Association (ICSA) Applied Statistics Symposium 2023, Ann Arbor, Michigan, 11–14 June, 2023.

– International Indian Statistical Association (IISA) 2022 Conference, Bangalore, India, Dec 26–30, 2022.

– INFORMS Annual Meeting, Indianapolis, IN, Oct 16–19, 2022.

– Joint Statistical Meetings, Washington, DC, Aug 6–11, 2022.

– Understanding early adoption of hybrid cars via a new multinomial probit model with multiple spatial weights, Indian Institute of Management, Bangalore, 18th July 2022.

– Brief Introduction to Modern Causal Inference, Indian Institute of Management, Bangalore, 16th July 2022.

– Department of Biostatistics, University of Florida, Gainesville, FL, April 15, 2022.

– Biostatistics Seminar Series, Ohio State University, Columbus, OH, March 11, 2022.

– CMStatistics 2021, King's College London, UK, 18-20 December 2021.

– Statistics Department, Bowling Green State University, Sep 10, 2021.

– ISI World Statistics Conference (ISI WSC) 2021 Conference, July 16, 2021.

– International Indian Statistical Association (IISA) 2021 Conference, May 20, 2021.

– As Discussant in International Seminar on Selective Inference, organized by Rina Barber, Will Fithian, Daniel Yekutieli, and Lihua Lei, 4 March 2021.

– Causal Inference Working Group, Johns Hopkins University, 25 February 2021.

– IEU Seminar, MRC Integrative Epidemiology Unit, University of Bristol, UK, 27 October 2020.
– CMStatistics 2020, King's College London, UK, 19-21 December 2020.
– EcoSta 2020 Yonsei University, Seoul, South Korea, 20-22 July 2020. (Canceled due to covid)
– Annual Meeting of the Statistical Society of Canada. Ottawa, May 31–June 3, 2020. (Canceled due to covid)
– International Indian Statistical Association (IISA) Conference, Dec. 2019, Mumbai, India.
– INFORMS Annual Meeting, Oct. 2019, Seattle, WA.
– Department of Biostatistics, Penn State University, Hershey, PA, 15 Mar 2019.
– Statistics Group, Data Sciences and Operations, USC Marshall, LA, Jan 2019.
– Statistics Department, University of North Carolina, Chapel-Hill, Jan 2019.
– Department of Biostatistics, Yale University, Jan 2018, New Haven, CT.
– Department of Statistics, University of Florida, Dec 2018, Gainesville, FL.

Advising

Undergraduate students:

– Hannah J Fechtel (Senior thesis advisor, UF, graduated Fall 2021), now researcher at Norman Fixel Institute for Neurological Diseases.
– Samuel Michael Thomas (Research mentor, Senior thesis advisor, UF, graduated Spring 2023), now data scientist at IBM.
– Ali Hussain (Senior thesis advisor, UF, graduated Fall 2022).

Graduate students:

– Zikun Qin (Research supervisor, Statistics Department, UF, Fall 2020–ongoing).
– Jaewoong Joo (Ph.D. co-adviser, with Prof. Doss, ongoing).
– Animesh Mitra (Ph.D. co-adviser, ongoing).

Fulbright Fellow:

– Jana Furstova (Ongoing, previously at Olomouc University Social Health Institute (OUSHI), Czech Republic).

Professional Services

Reviewer:

Journals: *American Journal of Agricultural Economics, Annals of Applied Statistics, Biometrical Journal, Biometrics, Electronic Journal of Statistics, IEEE Journal of Cybernetics, Journal of the American Statistical Association, Journal of the Royal Statistical Society–Series B, Journal of Causal Inference, Journal of Computational and Graphical Statistics, Journal of Machine Learning Research, Lifetime Data Analysis, Operations Research, Observational Studies, PLOS Genetics, Sankhyā A, Stat, Statistical Science, Statistica Sinica, etc.*
Books: *Chapman & Hall/CRC Press (3).*

Academic community:

– Publication Officer of the Statistics in Epidemiology section of the American Statistical Association (2022 –).

– Co-organizer, Winter Workshop 2024 on Causal inference and its applications at UF (19-20 January, 2024).

– Faculty adviser, Indian Graduate Student Association, UF (2020 –).

Internal service:

– Co-organizer, Mark C. K. Yang event on the collaboration of UF Statistics and Biostatistics department (27 October, 2023).

– Organizer, UF statistics department seminar series (Fall 2021, Spring 2022).

– Lecturer search committee, UF statistics department (2021); led to two hires.

– **Thesis committee:** David Lindberg (Doctoral, Department of Statistics, ongoing), Xiran Fan (Doctoral, Department of Statistics, ongoing), Zikun Qin (Doctoral, Department of Statistics, ongoing), Jhonti Chakraborty (Doctoral, Department of Chemistry, graduated spring, 2023, now postdoctoral researcher at the University of California, Riverside), Wei Hsieh (Masters, Statistics Department, UF, graduated 2020), Manan Singh (Doctoral, College of Design Construction and Planning, UF, ongoing, now at the Pacific Northwest National Laboratory), Jaeyoung Park (Doctoral, Industrial and Systems Engineering , UF, graduated 2022, now principal researcher at the University of Chicago Booth School of Business).