

Curriculum Vitae

Surya T Tokdar

(Updated: March 27, 2022)

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<http://scholar.google.com/citations?user=NQcWoJAAAAAJ>

Education

Ph.D. in Statistics (2006) Purdue University, W Lafayette, IN
M.Stat. (2002) Indian Statistical Institute, Kolkata, India
B.Stat. (2000) Indian Statistical Institute, Kolkata, India

Appointments

2016- *Associate Professor, Statistical Science, Duke University*
Faculty Member of Duke Institute of Brain Sciences, 2014-
Associate Chair of Statistical Science, 2020-

2009-16 *Assistant Professor, Statistical Science, Duke University*

2011-12 *Faculty Fellow, Statistics and Applied Mathematical Sciences Institute*

2006-09 *Morris H. DeGroot Visiting Assistant Professor,*
Statistics, Carnegie Mellon University

Awards

Young Researcher Award in Theory & Methods, International Indian Statistical Association,
Hyderabad, India 2017

Visiting Fellowship, Collegio Carlo Alberto, Moncalieri, Italy, 2010

Leonard J. Savage Dissertation Award (Theory and Methods), ISBA, ASA-SBSS and
NBER/NSF Seminars on Bayesian Inference in Econometrics and Statistics, 2006

William J. Studden Publication Award, Purdue University, 2006

Best Poster Award. Fifth International Workshop on Objective Bayes Methodology,
Branson, Missouri, 2005

Purdue Research Foundation Fellowship, Purdue University, 2005 - 2006

University Service

2020- *Natural Sciences Space Advisory Committee*

2020- *Arts & Sciences Funding Graduate Education Committee*

2019-20 *Re-Imagining Doctoral Education at Duke (RIDE) Committee*

2018-19 *Probability Tenure Track Joint Search Committee*

Departmental Service

2018-21 First Year/Qualifying Exam Committee
2020 MS Director Search Committee
2018-19 Tenure Track Search Committee
2015-18 Director of Graduate Studies
2013-15 MS Director
2013 Special Target Search Committee
2011-13 PhD First Year Exam Coordinator
2012-13 Seminar Series Coordinator

Professional Service

Program Chair of SBSS, American Statistical Association (2019-20, Elect 2018-19, Past 2020-21)
Elected Member of Board of Directors, International Society of Bayesian Analysis (2017-20)
Organizer, SAMSI Workshop on Bayesian Nonparametrics: Synergies between Statistics, Probability and Mathematics, Research Triangle, NC, 2015
Member of the Scientific Committee and the Local Organizing Committee for the 10th Conference on Bayesian Nonparametrics, Raleigh NC, 2015
Secretary, ISBA Section on Bayesian Nonparametrics, 2013-14
Organizer, Invited Session on Nonparametric Bayesian Predictive Models for Causal Inference, JSM 2013
Local Organizing Committee, IISA Conference on Probability, Statistics & Data Analysis, Raleigh NC, 2011

Editorial Activity

Associate Editor of *JASA (Theory & Methods)*, *Sankhyā Series A*.
Guest Editor for *Sankhyā Series A Special Volume Honoring JK Ghosh*.
Associate Editor of *Bayesian Analysis*, 2012-18

Reviewed articles for: *The Annals of Applied Statistics*, *The Annals of Statistics*, *Bayesian Analysis*, *Bernoulli*, *Biometrika*, *Biometrics*, *Electronic Journal of Statistics*, *Journal of the American Statistical Association*, *Journal of the Royal Statistical Society (Series B)*, *Neural Computation*, *Neural Information Processing Systems*, *Sankhyā*, *Statistics and Computing*, *Technometrics*.

Peer Reviewed Publication in Journals (in chronological order)

1. **Tokdar, S. T.** (2006). Posterior Consistency of Dirichlet Location-scale Mixture of Normals in Density Estimation and Regression. *Sankhyā*, 68, 90–110.
2. Bogdan, M., Ghosh, J. K., Ochman, A. and **Tokdar, S. T.** (2007). On the Empirical Bayes Approach to the Problem of Multiple Testing. *Quality and Reliability Engineering International (a Wiley Journal)*, 23, 727–739.
3. **Tokdar, S. T.** (2007). Towards a Faster Implementation of Density Estimation with Logistic Gaussian Process Priors. *Journal of Computational and Graphical Statistics*, 16, 633–655.

4. **Tokdar, S. T.** and Ghosh, J. K. (2007). Posterior Consistency of Logistic Gaussian Process Priors in Density Estimation. *Journal of Statistical Planning and Inference*, 137, 34–42.
5. Martin, R. and **Tokdar, S. T.** (2009). Asymptotic Properties of Predictive Recursion: Robustness and Rate of Convergence. *Electronic Journal of Statistics*, 3, 1455–1472.
6. **Tokdar, S. T.**, Martin, R. G. and Ghosh, J. K. (2009). Consistency of a Recursive Estimate of Mixing Distributions. *The Annals of Statistics*, 37, 2502–2522.
7. **Tokdar, S. T.** and Kass, R. E. (2010). Importance Sampling: A Review. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2, 54–60.
8. **Tokdar, S. T.**, Xi, P., Kelly, R. C. and Kass, R. E. (2010). Detection of Bursts in Extracellular Spike Trains Using Hidden Semi-Markov Point Process Models. *Journal of Computational Neuroscience*. 29, 203–212.
9. **Tokdar, S. T.**, Zhu, Y. M. and Ghosh, J. K. (2010). Bayesian Density Regression with Logistic Gaussian Process and Subspace Projection. *Bayesian Analysis*, 5, 316–344.
10. Martin, R. G. and **Tokdar, S. T.** (2011). Semiparametric Inference in Mixture Models with Predictive Recursion Marginal Likelihood. *Biometrika*, 98, 567–582.
11. Bisi, A., Dada, M. and **Tokdar, S. T.** (2011). A Censored-Data Multiperiod Inventory Problem with Newsvendor Demand Distribution. *Manufacturing & Service Operations Management*, 13, 525–533.
12. **Tokdar, S. T.**, Grossman, I., Kadane, J. B., Charest, A.-S. and Small, M. J. (2011). Impact of Beliefs About Atlantic Tropical Cyclone Detection on Conclusions About Trends in Tropical Cyclone Numbers. *Bayesian Analysis*, 6, 547–572.
13. Martin, R. G. and **Tokdar, S. T.** (2012). A Nonparametric Empirical Bayes Framework for Large-scale Significance Testing. *Biostatistics*, 13, 427–439.
14. **Tokdar, S. T.** and Kadane, J. B. (2012). Simultaneous Linear Quantile Regression: A Semiparametric Bayesian Approach. *Bayesian Analysis*, 7, 51–72.
15. Montagna, S., **Tokdar, S. T.**, Neelon, B. and Dunson, D. (2012). Bayesian Latent Factor Regression for Functional and Longitudinal Data. *Biometrics*, 68(4), 1064–1073.
16. Pati, D., Dunson, D. and **Tokdar, S. T.** (2012). Posterior Consistency in Conditional Distribution Estimation. *Journal of Multivariate Analysis*, 116, 456–472.
17. Banerjee, A., Dunson, D. and **Tokdar, S. T.** (2013). Efficient Gaussian Process Regression for Large Data Sets. *Biometrika*, 100, 75–89 .
18. Shen, W., **Tokdar, S. T.** and Ghosal, S. (2013). Adaptive Bayesian Multivariate Density Estimation with Dirichlet Mixtures. *Biometrika*, 100, 623–640
19. Yang, Y. and **Tokdar, S. T.** (2015). Minimax-Optimal Nonparametric Regression in High Dimensions. *The Annals of Statistics*, 43, 652–674.
20. Montagna, S. and **Tokdar, S. T.** (2016). Computer Emulation with Non-stationary Gaussian Processes. *Journal of Uncertainty Quantification*, 4, 26–47.

21. Yang, Y. and **Tokdar, S. T.** (2017). Joint Estimation of Non-Crossing Quantile Planes over Arbitrary Predictor Spaces. *Journal of the American Statistical Association (Theory and Methods)*, 112, 1107–1120.
22. Klemish, D., Ramger, B., Vittetoe, K., Reiter, J., **Tokdar, S. T.** and Applebaum, L. G. (2018). Visual Abilities Distinguish Pitchers from Hitters in Professional Baseball. *Journal of Sports Science*, 36, 171–179.
23. Burris, K., Vittetoe, K., Ben, R., Suresh, S., **Tokdar, S. T.**, Reiter, J. R. and Appelbaum, L. G. (2018). Sensorimotor abilities predict on-field performance in professional baseball. *Nature Scientific Reports*, 8(1), p.116.
24. Caruso, V.C., Mohl, J.T., Glynn, C., Lee, J., Willett, S.M., Zaman, A., Ebihara, A.F., Estrada, R., Freiwald, W.A., **Tokdar, S.T.** and Groh, J.M. (2018). Single neurons may encode simultaneous stimuli by switching between activity patterns. *Nature communications*, 9(1), p.2715.
25. Glynn, C., **Tokdar, S.T.**, Howard, B. and Banks, D.L. (2019). Bayesian Analysis of Dynamic Linear Topic Models. *Bayesian Analysis*, 14, 53–80.
26. Mohl, J. T., Caruso, V. C., **Tokdar, S. T.** and Groh, J. M. (2020). Sensitivity and specificity of a Bayesian single trial analysis for time varying neural signals. *Neurons, Behavior, Data Analysis, and Theory*, 3(1). bioRxiv:690958.
27. **Tokdar, S. T.** and Martin, R. G. (2021). Bayesian Test of Normality versus a Dirichlet Process Mixture Alternative. *Sankhyā, Series B*, 83, 66–96.
28. Glynn, C. G., **Tokdar, S. T.**, Zaman, A. M., Caruso, V. C., Mohl, J. T., Willett, S. M. and Groh, J. M. (2021), Analyzing Second Order Stochasticity of Neural Spiking Under Stimuli-Bundle Exposure. *The Annals of Applied Statistics* 15(1), 41–63. arXiv:1911.04387.
29. Jiang, S. and **Tokdar, S. T.** (2021). Variable Selection Consistency of Gaussian Process Regression. *The Annals of Statistics* 49(5) 2491–2505.
30. Chen, X. and **Tokdar, S. T.** (2021+). Joint Quantile Regression for Spatial Data. *Journal of the Royal Statistical Society, Series B (Theory & Methods)* 83(4), 826-852..

Publication in Edited Volumes

31. Ghosh, J. K. and **Tokdar, S. T.** (2006). Convergence and Consistency of Newton’s Algorithm for Estimating Mixing Distribution. In *Frontiers in Statistics (eds. J. Fan and H. L. Koul)*, pp. 429–443.
32. Bogdan, M., Ghosh, J. K., **Tokdar, S. T.** (2008). A Comparison of the Benjamini-Hochberg Procedure with some Bayesian Rules for Multiple Testing. In *Festschrift for P. K. Sen. IMS Lecture Notes-Monograph Series (N. Balakrishnan, Edsel A. Peña and Mervyn J. Silvapulle, eds.) (Beachwood, Ohio, USA: Institute of Mathematical Statistics, 2008)*, pp. 211-230.
33. **Tokdar, S. T.**, Chakrabarti, A. and Ghosh, J. K. (2010). Bayesian Nonparametric Goodness of Fit Tests. In *Frontiers of Statistical Decision Making and Bayesian Analysis, (Eds: M.-H. Chen, D.K. Dey, P. Müller, D. Sun and K. Ye)*, pp. 185–193.
34. Cunningham, E. L., **Tokdar, S. T.** and Clark, J. S. (2020). A Vignette on Model-Based Quantile Regression: Analysing Excess-Zero Response. In *Flexible Bayesian regression modelling (eds. Y. Fan, D. Nott, M.S. Smith and J.-L. Dortet-Bernadet)*, pp. 27–64.

Published Comments

35. **Tokdar, S. T.** (2013). Contributed Discussion on Article by Müller and Mitra. *Bayesian Analysis*, 8, 354–356.

Articles Submitted for Peer Review

36. Jun, N.-Y., Ruff, D. A., Kramer, L. E., Bowes, B., **Tokdar, S. T.**, Cohen, M. R., and Groh, J. M. (2022+). Coordinated Multiplexing of Information about Separate Objects in Visual Cortex. Under review.
37. **Tokdar, S. T.**, Jiang, S., and Cunningham, E. L. (2021+). Heavy-Tailed Density Estimation. Revision invited by *Journal of the American Statistical Association (Theory & Methods)*.
38. Jiang, S. and **Tokdar, S. T.** (2021+). Consistent Bayesian Community Detection for Assortative Networks. Under review.

Technical Reports

1. Qamar, S. and **Tokdar, S. T.** (2014) Bayesian Additive Gaussian Process Regression. arXiv:1411.7009 [stat.ME].
2. **Tokdar, S. T.** (2012). Adaptive Convergence Rates of a Dirichlet Process Mixture of Multivariate Normals. Duke University Department of Statistical Science Discussion Paper #2012-02.
3. **Tokdar, S. T.** (2011). Dimension Adaptability of Gaussian Process Models with Variable Selection and Projection. arXiv:1112.0716 [math.ST]
4. **Tokdar, S. T.** (2011). Adaptive Gaussian Predictive Process Approximation. arXiv:1108.0445

R Software Package Released Through CRAN

qrjoint: R-package for joint estimation of quantile planes over arbitrary predictor spaces. <https://CRAN.R-project.org/package=qrjoint>.

neuromplex: Neural Multiplexing Analysis. <https://cran.r-project.org/web/packages/neuromplex/index.html>.

Other Software (Available for free at www.stat.duke.edu/~st118/Software/)

burstHSMM: R-package for burst detection in neural spike trains

prmlMTest: R-software for fast multiple testing with a hierarchical mixture model

s1qr: R-software for Bayesian simultaneous linear quantile regression

splgp: R-software for logistic GP density regression with subspace projection

dpmgof: R-software for Bayes testing of normality of multivariate data

Research Grants

PI, Analyzing Dependent Extremes via Joint Quantile Regression, *National Science Foundation*; 2020-2023.

Co-PI, Spatial Information Codes (PI: Jennifer Groh), *National Institutes of Health*; 2017-22.

PI, Understanding Regression Heterogeneity Through Joint Estimation of Conditional Quantiles, *National Science Foundation*; 2016-19.

Co-PI, Information in Limited-Capacity Neural Codes (PI: Jennifer Groh), *National Institutes of Health*; 2014-19.

Investigator, Bayesian Methods for Assessing Gene by Environment Interactions (PI: David Dunson), *National Institutes of Health*; 2009-14.

Co-PI, Advanced Statistical Analysis of High-Dimensional Nervous-System Data (PI: Larry Carin), *Defense Advanced Research Projects Agency*; 2010-13.

Teaching at Duke University

STA 532: *Theory of Inference* (MS Core), Spring '22, '21

STA 240: *Probability for Statistics* (Undergraduate Major), Fall '21, '20 & Spring '20

STA 790: *Special Topics: Advanced Regression* (PhD Elective), Spring '21

STA 641: *Short Course on Nonparametric Smoothing* (MS Elective), Spring '20

STA 701S: *Graduate Student Seminar* (PhD), Fall '18, Spring '19.

STA 961: *Stochastic Processes* (PhD Advanced), Spring '18.

STA 941: *Bayesian Nonparametrics* (PhD Advanced), Fall '18, Spring '15, '17.

STA 732 (old 215): *Statistical Inference* (PhD Core), Spring '11, '12, '13, '14, '16

STA 250 (old 114): *Statistics* (Undergraduate Major), Spring & Fall '10, Fall '11, '12, '13

STA 213: *Statistical Methods* (Graduate), Fall 2009

Earlier Teaching

Applied Bayesian Methods (Graduate), Carnegie Mellon University, Spring 2007-09

Statistical Computing (Graduate), Carnegie Mellon University, Fall 2007, 2008

Data Mining (Undergraduate), Carnegie Mellon University, Fall 2006

Probability (Undergraduate), Purdue University, Spring 2005

Invited Presentations

Joint Statistical Meetings, (held virtually) 2021

ISBA World Meeting, (held virtually) 2021

Texas A&M University, Statistics Virtual Seminar, 2021

CMStatistics 2020, Virtual Conference, 2020

University of Arkansas Spring Lecture Series, Virtual Conference, 2020

UC Santa Cruz, Statistics Virtual Seminar, 2020

Rice University, Statistics Seminar, Houston, TX, 2019

University of California, Irvine, Statistics Seminar, Irvine, CA, 2019

Joint Statistical Meetings, Denver, CO, 2019

12th International Conference on Bayesian Nonparametrics, Oxford, UK, 2019

ICSA Applied Statistics Symposium, Raleigh, NC, 2019

University of Texas, Austin, Statistics Seminar, Austin, TX, 2019

2nd International Conference on Econometrics and Statistics, Hong Kong, 2018

9th International Purdue Symposium, West Lafayette, IN, 2018

SAMSI Workshop on Extremes, Research Triangle, NC, 2018

12th Annual Probability and Statistics Day, UMBC, Baltimore, MD, 2018

Siam Conference on Uncertainty Quantification, Orange County, CA, 2018

BIRS-CMO Workshop on Bayesian Nonparametric Inference, Oaxaca, Mexico, 2017
Joint Statistical Meetings, Baltimore, MD, 2017
Mathematical Models for Modern Statistics, Luminy, France, 2017
11th Conference on Bayesian Nonparametrics, Paris, France, 2017
Adobe Research, San Jose, CA, 2016
Indian Statistical Institute, Kolkata, India 2016
University of Michigan, Ann Arbor, MI, 2015
7th International Conference of the ERCIM WG on Computational and Methodological Statistics, Pisa, Italy, 2014
ISBA World Meeting, Cancún, Mexico, 2014
IMS World Meeting, Sydney, Australia, 2014
University of North Carolina, Statistics Colloquium, Chapel Hill, NC, 2013
Joint Statistical Meetings, Montreal, Canada, 2013
9th Workshop on Bayesian Nonparametrics, Amsterdam, Netherlands, 2013
ISBA Regional Meeting, Varanasi, India 2013
University of South Carolina Statistics Colloquium, Columbia, SC, 2012
ICERM BNP Workshop, Providence, RI, 2012
Joint Statistical Meetings, San Diego, CA, 2012
ISBA World Meeting, Kyoto, Japan, 2012
University of Illinois at Chicago Statistics Seminar, Chicago, IL 2011
58th World Statistics Congress of the International Statistical Inst., Dublin, Ireland, 2011
8th Workshop on Bayesian Nonparametrics, Veracruz, Mexico, 2011
ENAR, Miami FL, March 2011
NC State University Bayesian Statistics Seminar, Raleigh, NC, 2010
University of Connecticut Statistics Colloquium, Storrs, CT, 2010
University of Pavia, Economics and Quantitative Methods Seminar, Pavia, Italy, 2010
Carlo Alberto Stochastics Workshop. Collegio Carlo Alberto, Moncalieri, Italy, 2010
NIPS 2009 Workshop on Nonparametric Bayes. Whistler, Canada, 2009
7th Workshop on Bayesian Nonparametrics, Torino, Italy, 2009
The 1st Institute of Mathematical Statistics Asia Pacific Rim Meeting, Seoul, Korea, 2009
Duke University Statistical Science Seminar Series, Durham, NC, 2008

Other Presentations

Joint Statistical Meetings, Vancouver, Canada, 2010
Joint Statistical Meetings, Salt Lake City, UT, 2007
6th Workshop on Bayesian Nonparametrics, Cambridge, UK, 2007 (Poster)
Fifth International Workshop on Objective Bayes Methodology, Branson, MO, 2005 (Poster)
Second Cape Cod Workshop on Monte Carlo Methods, Harvard University, 2004 (Poster)

Doctoral Student Mentoring

Yunran Chen (Role: *PhD prelim advisor*, graduation expected 2023)
Xu Chen (Role: *Doctoral thesis advisor*, graduated 2021)
Sheng Jiang (Role: *Doctoral thesis advisor*, graduated 2021)
Erika Cunningham (Role: *Doctoral thesis advisor*, graduated 2020)
Michael Lindon (Role: *Doctoral thesis advisor*, graduated 2018)
Christopher Glynn (Role: *Doctoral thesis advisor*, graduated 2016)

Shaan Qamar (Role: *Co-author, secondary advisor of doctoral thesis*, graduated 2015)
Yun Yang (Role: *Co-author, secondary advisor of doctoral thesis*, graduated 2014)
Silvia Montagna (Role: *Doctoral thesis advisor*, graduated 2013)
Anjishnu Banerjee (Role: *Prelim and thesis committee member and co-author*, graduated 2013)
Debdeep Pati (Role: *Prelim and thesis committee member and co-author*, graduated 2012)

Master's Student Mentoring

Haoliang Zheng (Role: *MS thesis advisor*, graduation expected 2022)
Aihua Li (Role: *MS thesis co-advisor*, graduation expected 2022)
Yunran Chen (Role: *MS thesis advisor*, graduated 2019)
Shuangjie Zhang (Role: *MS thesis advisor*, graduated 2019)
Xu Chen (Role: *MS thesis advisor*, graduated 2017)
Azeem Zaman (Role: *MS thesis advisor*, graduated 2017)
Wenli Shi (Role: *MS thesis advisor*, graduated 2017)
Sheng Jiang (Role: *MS thesis advisor*, graduated 2015)

Undergraduate Thesis Advising

Yue Dai (2015), Travis Byrum (2014), Jack Fu (Co-advisor with Fan Li, 2013), Melanie Fan (2012),
Young-su Kang (2012).

Society Membership

American Statistical Association,
International Society for Bayesian Analysis,
Institute of Mathematical Statistics
International Indian Statistical Association