Paul A. Parker

Department of Statistics
University of California, Santa Cruz
Santa Cruz, CA 95064

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EDUCATION

University of Missouri, Columbia, MO
Ph.D., Statistics, July 2021   Advisor: Dr. Scott H. Holan
Dissertation: Bayesian Unit Level Modeling of
     Non-Gaussian Survey Data Under Informative
     Sampling with Application to Small Area Estimation
M.A., Statistics, December 2018

University of Idaho, Moscow, ID
B.S., Applied Mathematics, May 2014
Minor, Statistics

EXPERIENCE

Assistant Professor   University of California, Santa Cruz
July 2021 - Current
Department of Statistics

Research Mathematical Statistician   U.S. Census Bureau
March 2022 - March 2025
Center for Statistical Research and Methodology

FUNDING

10/24-9/25 Robust small-area estimation strategies for developing accurate stand-level diameter distributions. Role: PI on subaward from University of Idaho, (Prime Sponsor: NCASI Foundation, Prime PI: Jaslam Poolakkal, Prime Award Amount: $150,000), UCSC Portion **$9,794**.

9/22-8/26 Collaborative Research: Randomization Based Machine Learning Methods in a Bayesian Model Setting for Data from a Complex Survey or Census, NSF-NCSES. Role: PI (PI at MU - S.H. Holan): $708,796, UCSC Portion **$337,271**.

9/22-8/23 Objective Bayes 2022 Methodology Conference, NSF. Role: PI (Li, Z., Kottas, A., & Sanso, B. Co-PIs): **$10,000**.

REFEREED PAPERS

1. Veum, K.S., **Parker, P.A.**, Holan, S.H., Pais, N., Wills, S.A., Amsili, J.P., van Es, H.M., Nunes, M.R., Seybold, C.A., and Karlen, D.L. (2025+) Spatially Explicit Heteroskedastic Modeling for the Soil Health Assessment Protocol and Evaluation (SHAPE) version 1.0S. *To Appear - Soil Science Society of America Journal.*

2. Vedensky, D., **Parker, P.A.**, and Holan, S.H. (2025+) Bayesian Unit-level Models for Longitudinal Survey Data under Informative Sampling: An Analysis of Expected Job Loss Using the Household Pulse Survey. *To Appear - Journal of the Royal Statistical Society: Series A.*

   - Honorable mention - ASA GSS/SSS/SRMS 2025 Student Paper Competition

3. **Parker, P.A.** and Sansó, B. (2025+) A Heterogeneous Spatial Model for Soil Carbon Mapping of the Contiguous United States Using VNIR Spectra. *To Appear - Journal of Agricultural, Biological and Environmental Statistics* .

4. Wang, Q., **Parker, P.A.**, and Lund R. (2025) Spatial Deep Convolutional Neural Networks. *Spatial Statistics*, 66, 100883.

5. **Parker, P.A.**, Holan, S.H., and Janicki, R. (2024) Conjugate Modeling Approaches for Small Area Estimation with Heteroscedastic Structure. *Journal of Survey Statistics and Methodology*, 12(4), 1061-1080.

6. Nunes, M.R., Veum, K.S., **Parker, P.A.**, Holan, S.H., Amsili, J.P., van Es, H.M., Wills, S.A., Seybold, C.A., and Karlen, D.L. (2024) SHAPEv1.0 Scoring Curves and Peer Group Benchmarks for Dynamic Soil Health Indicators. *Soil Science Society of America Journal*, 88, 858–875, https://doi.org/10.1002/saj2.20668.

7. **Parker, P.A.** (2024) Nonlinear Fay-Herriot Models for Small Area Estimation using Random Weight Neural Networks. *Journal of Official Statistics*, 40(2), 317-332.

8. **Parker, P.A.**, Janicki, R., and Holan, S.H. (2023) Comparison of Unit Level Small Area Estimation Modeling Approaches for Survey Data Under Informative Sampling. *Journal of Survey Statistics and Methodology*, 11(4), 858-872.

9. **Parker, P.A.**, Janicki, R., and Holan, S.H. (2023) A Comprehensive Overview of Unit Level Modeling of Survey Data for Small Area Estimation Under Informative Sampling. *Journal of Survey Statistics and Methodology*, 11(4), 829-857.

10. **Parker, P.A.**, and Holan, S.H. (2023) Computationally Efficient Bayesian Unit-Level Random Neural Network Modeling of Survey Data under Informative Sampling for Small Area Estimation. *Journal of the Royal Statistical Society: Series A*, 184(4), 722-737.

11. Vedensky, D., **Parker, P.A.**, and Holan, S.H. (2023) A Look Into the Problem of Preferential Sampling Through the Lens of Survey Statistics. *The American Statistician*, 77(3), 313-322.

12. **Parker, P.A.**, and Holan, S.H. (2022) A Bayesian Functional Data Model for Surveys Collected under Informative Sampling with Application to Mortality Estimation using NHANES. *Biometrics* 79(2), 1397-1408.

    - Honorable mention - ASA GSS/SSS/SRMS 2021 Student Paper Competition

13. **Parker, P.A.**, Holan, S.H., and Janicki, R. (2022) Computationally Efficient Bayesian Unit-Level Models for Non-Gaussian Data Under Informative Sampling with Application to Estimation of Health Insurance Coverage. *The Annals of Applied Statistics*, 16(2), 887-904.

14. Sun, A., **Parker, P.A.**, and Holan, S.H. (2022) Analysis of Household Pulse Survey Public-Use Microdata via Unit-Level Models for Informative Sampling. *Stats, Special Issue on "Small Area Estimation: Theories, Methods and Applications"*, 5(1), 139-153.

15. **Parker, P.A.**, Holan, S.H., and Wills, S.A. (2021) A General Bayesian Model for Heteroskedastic Data with Fully Conjugate Full-Conditional Distributions. *Journal of Statistical Computation and Simulation*, 91(15), 3207-3227.

16. Nunes, M.R., Veum, K.S., **Parker, P.A.**, Holan, S.H., Karlen, D.L., Amsili, J.P., van Es, H.M., Wills, S.A, Seybold, C.A., and Moorman, T.B. (2021) The Soil Health Assessment Protocol and Evaluation Applied to Soil Organic C. *Soil Science Society of America Journal*, 85, 1196– 1213.

17. **Parker, P.A.**, Holan, S.H., and Ravishanker, N. (2020) Nonlinear Time Series Classification Using Bispectrum-based Deep Convolutional Neural Networks. *Applied Stochastic Models in Business and Industry*, 36, 877– 890.

18. **Parker, P.A.**, Holan, S.H., Janicki, R. (2020) Conjugate Bayesian Unit-level Modelling of Count Data Under Informative Sampling Designs. *Stat*, 9(1): e267.

19. Veum, K.S., **Parker, P.A.**, Sudduth, K.A., and Holan, S.H., (2018) Predicting Profile Soil Properties with Reflectance Spectra via Bayesian Covariate Assisted External Parameter Orthogonalization. *Sensors*, 18, 3869, doi:10.3390/s18113869.

PAPERS UNDER REVIEW

1. Kawano, S., **Parker, P.A.**, and Li, Z.R. (2025+) Spatially Selected and Dependent Random Effects for Small Area Estimation with Application to Rent Burden. (Under Invited Revision).

2. **Parker, P.A.**, Holan, S.H., Bachmeier, J.D., and Altman, C. (2025+) The Link Between Health Insurance Coverage and Citizenship Among Immigrants: Bayesian Unit-Level Regression Modeling of Categorical Survey Data Observed with Measurement Error. (Under Invited Revision).

3. Slivinsky, A. and **Parker, P.A.** (2025+) Evaluating MLB Umpire Performance using Statistical Period-Constrained Neural Networks. (Under Invited Revision).

4. Wang, Q., **Parker, P.A.**, and Lund R. (2025+) Hierarchical Count Echo State Network Models with Application to Graduate Student Enrollments. (Under Invited Revision)

5. Pais, N.V., Holan, S.H., **Parker, P.A.** (2025+) Topic Modeling for Free-Response Text Data from a Complex Survey. (Submitted)

6. Vedensky, D., **Parker, P.A.**, and Holan, S.H. (2025+) Bayesian Unit-level Modeling of Categorical Survey Data with a Longitudinal Design. (Submitted)

7. Wang, Z., **Parker, P.A.**, and Holan, S.H. (2025+) Variational Autoencoded Multivariate Spatial Fay-Herriot Models. (Submitted)

BOOK CHAPTERS

1. **Parker, P.A.**, Janicki, R., and Holan, S.H. (2023) Bayesian Methods Applied to Small Area Estimation for Establishment Statistics. *Advances in Business Statistics, Methods and Data Collection.* John Wiley & Sons.

INVITED DISCUSSIONS IN REFEREED JOURNALS

1. Maranzano, P. and **Parker, P.A.** (2025) Discussion of "Assessing predictability of environmental time series with statistical and machine learning models" by Bonas, M., Datta, A., Wikle, C.K., Boone, E.L., Alamri, F.S., Hari, B.V., Kavila, I., Simmons, S.J., Jarvis, S.M., Burr, W.S., Pagendam, D.E, Chang, W., and Castruccio, S., *To Appear - Environmetrics.*

TALKS

1. "Spatially Selected and Dependent Random Effects for Small Area Estimation with Application to Rent Burden," Joint Statistical Meetings (Invited Session), Nashville, TN, August 2025.

2. "Spatially Selected and Dependent Random Effects for Small Area Estimation with Application to Rent Burden," Department of Statistics, Texas A&M University, October 2024.

3. "Statistical Deep Learning for Dependent Establishment Data," Joint Statistical Meetings (Invited Session), Portland, OR, August 2024.

4. "Statistical Deep Learning for Dependent Establishment Data," Seventh International Conference on Establishment Statistics (Invited Session), Glasgow, Scotland, June 2024.

5. "Conjugate Modeling Approaches for Heteroskedastic Structure with Application to Small Area Estimation," Small Area Estimation Conference (Invited Session), Lima, Peru, June 2024.

6. "Conjugate Modeling Approaches for Heteroskedastic Structure with Application to Small Area Estimation," ISI International Association for Official Statistics Conference (Invited Session), Mexico City, Mexico, May 2024.

7. "The Link Between Health Insurance Coverage and Citizenship Among Immigrants: Bayesian Regression Modeling of Categorical Survey Data Observed with Measurement Error," Mizzou Statistics 60th Anniversary Conference, Columbia, MO, October 2023.

8. "Bayesian Unit Level Modeling of Non-Gaussian Survey Data Under Informative Sampling with Application to Small Area Estimation," Joint Statistical Meetings, (Savage Award Session), Toronto, Canada, August 2023.

9. "Conjugate Modeling Approaches for Heteroskedastic Structure with Application to Small Area Estimation," Department of Mathematics and Statistics, University of Maryland Baltimore County, March 2023.

10. "Computationally Efficient Bayesian Heteroskedastic Modeling for Small Area Estimation," University of Washington Space-Time Reading Group, October 2022.

11. "Computationally Efficient Bayesian Heteroskedastic Modeling for Small Area Estimation," Joint Statistical Meetings, (Topic Contributed Session), Washington, D.C., August 2022.

12. "A General Bayesian Model for Heteroskedastic Data with Fully Conjugate Full-Conditional Distributions ," University of California Santa Cruz, Santa Cruz, CA, May 2021.

13. "Computationally Efficient Bayesian Unit-Level Modeling of Non-Gaussian Survey Data under Informative Sampling," University of Connecticut, Storrs, CT (held virtually), March 2022.

14. "Computationally Efficient Bayesian Unit-Level Modeling of Non-Gaussian and Complex Survey Data under Informative Sampling," U.S. Census Bureau – Center for Statistical Research and Methodology (CSRM), October 2021.

15. "A Bayesian Functional Data Model for Surveys Collected under Informative Sampling with Application to Mortality Estimation using NHANES," Joint Statistical Meetings, (Topic Contributed Session), Seattle, WA (held virtually), August 2021.

16. "A Bayesian Functional Data Model for Surveys Collected under Informative Sampling with Application to Mortality Estimation using NHANES," Quality and Productivity Research Conference, (Invited Session), Tallahassee, FL (held virtually), July 2021.

17. "Computationally Efficient Bayesian Models for Non-Gaussian and Complex Survey Data under Informative Sampling," Utah State University, Logan, UT (held virtually), March 2021.

18. "Computationally Efficient Bayesian Models for Non-Gaussian and Complex Survey Data under Informative Sampling," University of California Santa Cruz, Santa Cruz, CA (held virtually), February 2021.

19. "Nonlinear Time Series Classification Using Bispectrum-based Deep Convolutional Neural Networks," International Virtual Conference on Advanced Statistical Techniques in Business and Industry, (Invited Session), Cochin University of Science and Technology (CUSAT), India (held virtually), December 2020.

20. "Computationally Efficient Bayesian Models for Non-Gaussian and Complex Survey Data under Informative Sampling," University of Texas at El Paso, El Paso, TX (held virtually), December 2020.

21. "Computationally Efficient Deep Bayesian Unit-Level Modeling of Survey Data Under Informative Sampling for Small Area Estimation," Joint Statistical Meetings, (Topic Contributed Session), Philadelphia, PA (held virtually), August 2020.

22. "Conjugate Bayesian Unit-level Modeling of Count Data Under Informative Sampling Designs," Truman State University, Kirksville, MO, October 2019.

23. "An Overview of Unit-level Models for Survey Data Under Informative Sampling with an Emphasis on Bayesian Methods," University of Missouri Population, Education and Health Center Seminar Series, Columbia, MO, September 2019.

24. "Multivariate Unit-level Models for Non-Gaussian Survey Data Under Informative Sampling Designs," Joint Statistical Meetings, (Topic Contributed Session), Denver, CO, July 2019.

AWARDS	**Honorable Mention - Savage Award in Applied Methodology**	2022
	International Society for Bayesian Analysis	
	International Conference on Establishment Statistics VI Student Competition	2021
	First Prize	
	Joint Statistical Meetings Student Travel Award	2021
	Survey Research Methods Section	
	Honorable Mention - JSM Student Paper Competition	2021
	GSS/SSS/SRMS	
	Census Bureau Dissertation Fellowship	August 2019 - July 2021
	U.S. Census Bureau	
	Interdisciplinary Doctoral Fellowship	August 2018 - May 2019
	University of Missouri Population, Education, and Health Center and Research Data Center	
UNIVERSITY SERVICE	**Seminar Co-Coordinator**	Fall 2024
	University of California Santa Cruz, Department of Statistics	
	Statistics Department Undergrad Proposal Committee Member	2023-2025
	University of California Santa Cruz, Department of Statistics	
	Seminar Coordinator	Winter 2023, Winter 2024
	University of California Santa Cruz, Department of Statistics	
	Graduate Committee Member	Spring 2021, 2022-2023, 2023-2024
	University of California Santa Cruz, Department of Statistics	
	Statistics Department Search Committee Member	2021-2022
	University of California Santa Cruz, Department of Statistics	
	Seminar Co-Coordinator	Winter 2022
	University of California Santa Cruz, Department of Statistics	
	MS Program Committee Member	2021 - 2022
	University of California Santa Cruz, Department of Statistics	
	Member of Sub-committees for Personnel Review	2021-2025
	University of California Santa Cruz, Department of Statistics	
	Colloquium Committee	
	University of Missouri, Department of Statistics	December 2017 - August 2018
	Student Representative	
	University of Missouri Statistics Graduate Student Association	
	Interim Vice President	May 2017 - August 2017
	Secretary	August 2016 - August 2017
SERVICE TO THE PROFESSION	**Program Committee Member**	2025-2028
	International Conference on Establishment Statistics VIII	

Topic Contributed Session Organizer and Chair   August 2025
Joint Statistical Meetings, "Advances in Dependent Data Modeling for Small Area Estimation"

Topic Contributed Session Organizer   August 2025
Joint Statistical Meetings, "Hierarchical Modeling and Machine Learning for Complex Survey Data" (Joint with S.H. Holan)

Topic Contributed Session Organizer and Chair   August 2024
Joint Statistical Meetings, "Navigating Complexity: Recent Advances in Analysis of Data from Complex Surveys" (Joint with S.H. Holan)

Topic Contributed Session Organizer   August 2024
Joint Statistical Meetings, "Innovative Modeling Approaches for Small Area Estimation in the Presence of Complex Dependence Structures" (Joint with S.H. Holan)

Invited Session Organizer   May 2024
IAOS-ISI Conference, "Modern Approaches for Small Area Estimation in Official Statistics"

Modern Survey Statistics Reading Group Coordinator   2023-2024
Joint between University of California, Santa Cruz and University of Missouri

Reviewer   Winter 2023
ASA, Section on Bayeian Statistical Science student paper competition (for *2023 Joint Statistical Meetings*)

Session Chair   September 2022
Objective Bayes 2022 Methodology Conference

Local Organizing Committee Member   2021 - 2022
Objective Bayes 2022 Methodology Conference

Space Time Reading Group Coordinator   August 2020 - December 2020
University of Missouri, Department of Statistics

DataFest Mid-Missouri (American Statistical Association)
Lead Graduate Student Coordinator   August 2018 - April 2021
Workshop Instructor   August 2017 - April 2021
VIP Consultant   August 2017 - April 2021

EDITORIAL ACTIVITIES   Guest Editor, *Data Science in Science*, Special issue on
"Data Science in the Federal Government"   2024-2025

Refereed Articles for:
Advances in Statistical Climatology, Meteorology and Oceanography
Annals of Applied Statistics
Australian & New Zealand Journal of Statistics
Biometrics
Biostatistics
Biostatistics & Epidemiology
Canadian Journal of Statistics
Environmental and Ecological Statistics (2)
International Statistical Review (4)
Journal of Agricultural, Biological, and Environmental Statistics
Journal of the American Statistical Association

Journal of Nonparametric Statistics
Journal of Official Statistics
Journal of the Royal Statistical Society: Series A (2)
Journal of the Royal Statistical Society: Series C (3)
Journal of Statistical Computation and Simulation
Journal of Survey Statistics and Methodology (5)
Metrika
Spatial Statistics (2)
Statistics and Public Policy
Stats
Survey Methodology

STUDENT SUPERVISION

Doctoral Students

Adam Slivinsky, Statistics	Current
Ethan Pawl, Statistics (Joint with Sangwon Hyun)	Current
Qi Wang, Statistics	Current
Sho Kawano, Statistics (Joint with Richard Li)	Current

- Winner of the 2024 Wray Jackson Smith Scholarship

Masters Students

Adam Slivinsky, Statistics	Summer 2024

- Winner of the 2024 UConn Sports Analytics Symposium Student Poster Competition

Jacobo Pereira-Pacheco, Statistics	Summer 2022

- Currently a statistical analyst at RAND

Academic Advising

Vikram Srinivasan, Statistics	2024-2025
Ethan Pawl, Statistics	2023-2024
Adam Slivinsky, Statistics	2023-2024
Qi Wang, Statistics	2021-2022

Supervisory Committee Membership

Zach Horton, Statistics	Fall 2024
Nick Grunloh, Statistics	Summer 2024
Xiaotian Zheng, Statistics	Summer 2022

TEACHING

Stat 208: Linear Statistical Models — Spring 2025
University of California Santa Cruz

Stat 132: Classical and Bayesian Inference — Winter 2025
University of California Santa Cruz

Stat 204: Introduction to Statistical Data Analysis — Fall 2024
University of California Santa Cruz

Stat 208: Linear Statistical Models — Spring 2024
University of California Santa Cruz

Stat 131: Intro to Probability Theory — Winter 2024
University of California Santa Cruz

Stat 80A: Gambling & Gaming — Fall 2023
University of California Santa Cruz

Stat 208: Linear Statistical Models — Spring 2023
University of California Santa Cruz

Stat 7: Statistical Methods for the Biological, Environmental, and Health Sciences Winter 2023
University of California Santa Cruz

Stat 204: Introduction to Statistical Data Analysis Fall 2022
University of California Santa Cruz

Stat 208: Linear Statistical Models Spring 2022
University of California Santa Cruz

Stat 205B: Intermediate Classical Inference Winter 2022
University of California Santa Cruz

Stat 2500: Introduction to Prob. & Statistics I Fall 2016
University of Missouri

TECHNICAL SKILLS	**Languages**: R, SQL, SAS, Python, LaTeX. **Software**: Stan, Keras, ggplot, dplyr.
CONSULTING EXPERIENCE	**Veterans United Home Loans** September 2018 - March 2019
OTHER RELEVANT EXPERIENCE	Guest lecturer, Stat 200 - Research and Teaching in Statistics, University of California, Santa Cruz, November 2024
	Guest lecturer, Stat 204 - Introduction to Statistical Data Analysis, University of California, Santa Cruz, November 2023
	Guest lecturer, Stat 200 - Research and Teaching in Statistics, University of California, Santa Cruz, September 2023
	Guest lecturer, Stat 200 - Research and Teaching in Statistics, University of California, Santa Cruz, September 2022
	Guest lecturer, Stat 200 - Research and Teaching in Statistics, University of California, Santa Cruz, September 2021
	Guest lecturer, Stat 8710 - Intermediate Mathematical Statistics I, University of Missouri, August 2019
	Guest lecturer, Stat 7870 - Time Series Analysis, University of Missouri, August 2019
	Developed an R Shiny app to be used for soil health scoring in conjunction with the USDA Natural Resources Conservation Service https://paparker.shinyapps.io/shape_app/
SECURITY CLEARANCE	**Special Sworn Status** - Title 13, Title 26