Sara A. Stoudt

Contact Information	Evans Hall 331, Department of Statistics Berkeley, CA 94720-3860 http://github.com/sastoudt http://www.stat.berkeley.edu/~sstoudt/ http://sastoudt.github.io/	724-464-3179 sstoudt@berkeley.edu @sastoudt

Research Interests: applied and computational statistics with applications to environmental data

Education

Smith College, Northampton, MA

B.A., Mathematics and Statistics , 2015
Magna Cum Laude with Highest Honors 3.95/4.0
Major GPA: 4.0/4.0

University of California, Berkeley, Berkeley, CA

Ph.D., Statistics, August 2015 - expected 2020
Advisors: Will Fithian and Perry de Valpine

Research Experience

Dissertation Research Fall 2016- ongoing

- UC Berkeley
  - Supervisors: Will Fithian (Department of Statistics) and Perry de Valpine (Department of Environmental Science, Policy and Management)
  - Identifiability in Species Distribution Models
  - Robustness to Model Misspecification in Species Distribution Models

Collaborations in Ecology Fall 2016-ongoing

- Fitting Models with Phylogenetic and Measurement Errors with Soorim Song (GitHub repository pending move from private to public)
- Hierarchical Modeling of Disease in Animals with Dana Seidel
- Research Project with San Francisco Estuary Institute (SFEI) [August 2016]
  - Mentors: David Senn (SFEI), Erica Spotswood (SFEI), Perry de Valpine (UC Berkeley, ESPM), Marcus Beck (EPA)
  - building Generalized Additive Models for understanding the variability in chlorophyll over space and time
  - comparing the use of Generalized Additive Models and Weighted Regression on Time, Discharge, and Season
  - `https://github.com/sastoudt/DS421_summerProject/`

Summer (Undergraduate/Graduate) Research Fellow Summers 2013-2017

- Statistical Engineering Division, National Institute of Standards and Technology
  - Supervisor: Antonio Possolo, Ph.D
  - Measuring Optical Apertures for Solar Irradiance Monitoring (Circles of Best Fit, Uncertainty Quantification)
  - Homogenization of Surface Temperature Records (Time Series Analysis, Uncertainty Quantification)

- Errors in Variables Modeling for Force Calibrations (Errors in Variables, Uncertainty Quantification)
- Errors in Variables Modeling for Force Calibrations, Size Measurement of Nanoparticles, Implementations for Easy Use by Scientists (Shiny applications)
- Interpolation of Atmospheric Greenhouse Gas Fluxes (Lattice Kriging), Evaluation of the accuracy, consistency, and stability of measurements of the Planck constant (meta-analysis), Gas Standard Reference Material Analysis (Shiny application)

Undergraduate Research

- Supervisor: Ben Baumer
  - Using Machine Learning to Predict March Madness (KNN, SVM, Neural Nets, Random Forests)
  - Honors Project: Geostatistical Models for the Spatial Variability of the Abundance of Uranium in Soils and Sediments of the Continental United States (Local Regression, Generalized Additive Models, Gaussian Processes/Kriging)
- Supervisor: Nessy Tania
  - Traffic Generation Model for Telecom Applications (Empirical Copulae)
- Supervisor: Nicholas Horton
  - Roadless America: An Activity for Introduction to Sample Proportions and Their Confidence Intervals (Statistics Education)
- Supervisor: Katherine Halvorsen, Ph.D.
  - Factors Associated With Changes in Academic Performance During the Transition from Elementary to Middle School (Multiple Regression and Analysis of Variance)

Awards

- National Physical Science Consortium Fellow 2015-2018
- Data Sciences for the 21st Century: Environment and Society Graduate Training Program 2015-2017
- Gertrude M. Cox Scholarship 2015
- 2nd Place USPROC Undergraduate Research Project Competition 2015
- Geocomputation Conference Best Poster Award 2015
- Elected to Mu Sigma Rho 2015
- Goldwater Scholar 2014
- Elected to Phi Beta Kappa Society 2014
- First Place: Statistics in Sports Undergraduate Research Competition at JSM 2014
- Honorable Mention Undergraduate CLASS Project Competition 2014
- Best in Show- Five College Data Fest 2014,2015
- Elected to Sigma Xi 2013

Smith College

- Ann Kirsten Pokora Prize for excellence in mathematics 2015
- John Everett Brady Prize for best performance in the beginning Latin course 2013
- Suzan Rose Benedict Prize for excellence in mathematics 2013
- Smith College Dean's List 2011-15
- Smith College STRIDE (Student Research in Departments) Scholarship 2011-15

Publications

- **Stoudt, S.** "Geostatistical Models for the Spatial Distribution of Uranium in the Continental United States" *Advances in Geocomputation: Geocomputation 2015 - The 13th International Conference* Springer Advances in Geographic Information Science, 2017, pp. 325-334. http://www.springer.com/us/book/9783319227856
- **Stoudt, S.**, Badian-Pessot, P., Mahop, B. N., Earley, E., Menter, J., Flores, Y., Williams, D., Zhang, W., Maharajan, L., Bao, Y., Rosenbauer, L., Nguyen, V., Mendiratta, V., Tania, N. "Modeling Internet Traffic Generations Based on Individual Users and Activities for Telecommunication Applications" *American Journal of Undergraduate Research* Volume 13, Issue 3, August 2016, pp. 53-65.
  http://www.ajuronline.org/uploads/Volume_13_3/AJUR%20Vol%2013%20Issue%203 %2008.25.16%20pp.53-65.p
- Possolo, A., Schlamminger, S., **Stoudt, S.**, Pratt, J. R., and Williams, C. J. "Evaluation of the accuracy, consistency, and stability of measurements of the Planck constant used in the redefinition of the International System of Units" *Metrologia* http://iopscience.iop.org/article/10.1088/1681-7575/aa966c
- Bartel, T., Possolo, A., and **Stoudt, S**. "Force Calibrations using Errors-in-Variables Regression and Monte Carlo Uncertainty Evaluations" *Metrologia* Volume 53, Number 3, June 2016, pp. 965-980(16).
  http://iopscience.iop.org/article/10.1088/0026-1394/53/3/965/meta
- **Stoudt, S.**, Cao, Y., Udwin, D., and Horton, N. J. "What Percent of the Continental US is Within One Mile of a Road?" *Statistics Education Web,* 2014.
  http://www.amstat.org/education/stew/pdfs/PercentWithinMileofRoad.pdf
- **Stoudt, S.**, Santana, L., and Baumer, B. "In Pursuit of Perfection: An Ensemble Method for Predicting March Madness Match-Up Probabilities" *JSM 2014 Proceedings*
  http://www.science.smith.edu/b̃baumer/w/pub/jsm2014_perfect_bracket.pdf

Papers in Preparation

- **Stoudt, S.**, de Valpine, P., and Fithian, W. "Clarifying the Identifiability Controversy in Species Distribution Modeling"
- Hong, J., **Stoudt, S.**, and de Valpine, P. "Sampling-Based Approaches to Maximum Likelihood Estimation for Latent Variable Models"
- Kerlo, A. M., **Stoudt, S.**, Hajni, K., Lavoie, T., Shepson, P. B., and Possolo, A. "Improved Interpolation of Atmospheric Greenhouse Gas Fluxes Using Statistical Models"
- **Stoudt, S.**, Udwin, D. , and Francis, K. " 'Cold Enough for You?': Developing Data Science Skills through Exploration of Weather Perceptions on Twitter"
- Calderon Jimenez, B., Sarmanho, G., **Stoudt, S.**, Montoro Bustos, A., Strenge, I.H., Johnson, M.E., Murphy, K.E., Possolo, A., ad Winchester, M.R. "*nanoICP-MS:* a new statistical and interactive web application for the determination and quantification of metallic nanoparticles by single particle ICP-MS"

Programming Languages

- Proficient: R, Matlab, LaTeX
- Experience With: Python, SQL, Mathematica, WinBUGS, Java, GIS, AMPL, NIMBLE, D3, JavaScript, bash

Teaching Experience

Graduate Student Instructor, Statistics, UC Berkeley Fall 2017

- Communicating with Data: The Art of Writing for Data science with Deborah Nolan
- Assist with course development and instruction of new course
- Outstanding GSI award

Teaching Assistant, Mathematics and Statistics, Smith College September 2013–May 2014, September 2014–May 2015

- available for assistance with Calculus, Discrete Mathematics, Linear Algebra, Introductory and Intermediate Statistics
- Introduction to Statistics Grader (Fall 2013)
- Data Science Grader (Fall 2014)
- Mathematical Statistics Grader (Spring 2015)

Relevant Activities

- Attended the 3rd Annual Graduate Workshop on Environmental Data Analytics 2016
- Attended the Google Geospatial Technology Workshop 2015
- Attended the Statistical and Applied Mathematical Science Institute's Summer Program: The International Temperature Initiative 2014
- Editor in Chief of Smith College's Science Journal, Smith Scientific, aimed towards raising awareness of on-campus student and faculty research as well as making the sciences accessible to those in other fields 2013-4
- Participant in the Mathematical Contest in Modeling 2014
- Participant in the Kaggle March Machine Learning Madness Competition *top 20 in stage one* 2014
- Head Writer for Mathematics Section of Smith College's Science Journal 2012
- Writer for Mathematics Section of Smith College's Science Journal 2011

Departmental Service

- Co-president of the Statistics Graduate Student Association, Fall 2017-Spring 2018
- Co-organizer of UC Berkeley DataFest, Spring 2016, 2017, 2018
- Co-organizer of Statistics Graduate Student Association Gender Issues Roundtable Discussion, Fall 2016

  https://bids.berkeley.edu/news/gender-issues-roundtable-discussion-case-study-uncomfortable-conversations
- Co-organizer of Statistics Graduate Student Association Diversity Discussion, Spring 2017
- Statistics Graduate Student Association Hospitality Committee Member, Fall 2016- Spring 2017
- Statistics Graduate Student Association Diversity Affairs Member, Fall 2016-Sprint 2017
- Graduate Student Volunteer: "Roadless America" Interactive Activity for Cal Day 2016 and 2017

Final Class Projects

- Spatio-temporal Relationships of Water Quality Measurements in the Bay Delta: A Time and Frequency Domain Approach, Spring 2017
  https://github.com/sastoudt/stat248project_BayDeltaTS
- Streamlining Climate Model Accessibility for Integration into Site-Specific Life Science Research, Spring 2017
  https://github.com/sastoudt/UCB_DS421_NEX_partnerProject
- Maximum Likelihood Estimation with Latent Variables, Fall 2016 (GitHub repository pending move from private to public)
- Graphical Model Structure Finding, Fall 2016
- Drought Vulnerability in the Continental United States, Spring 2016
  https://github.com/bolliger32/US_drought_vulnerability
- Cluster Randomization, Spring 2016
- Sensitivity Analysis: Random Walker Segmentation, Spring 2014
- Network Centrality, Spring 2014
- Weather Analysis of Smith's Field Station Data, January Term 2014
- WeathR- Perceptions of Weather in Social Media, Fall 2013

- Age Specific Population Dynamics, Fall 2013
- Periodicity and Climate Data: A Look Into the 100,000 Year Problem, Spring 2013
- Implementing the Graph Data Structure in Java, Spring 2013
- What is Associated with United Nation Members' Gross Domestic Product per Capita? Examining Geographical, Environmental, Political, and Social Factors, Fall 2012

R Packages in Progress: Available Upon Request

- **RegionalHomogenization** *(includes a vignette)*: This package provides a way to access data from the International Surface Temperature Initiative (ISTI) and format it in a way that can be used with an algorithm for the homogenization of surface temperature series. This method does not explicitly find change-points but aims to remove the spurious bias that is not related to climate change as well as quantify the uncertainty surrounding this adjustment.
- **ciRcleFits**: Following Nikolai Chernov's MATLAB implementation of various circle fits (http://people.cas.uab.edu/ mosya/cl/MATLABcircle.html), this package contains R implementations of these fits. This package also contains functions for visualizing radial residuals and an application of these visualization techniques for time series data.

Presentations

- Interdisciplinary Graduate Education in Data Science: DS421 NRT
  Poster
  Berkeley Institute for Data Science Data Science Faire, UC Berkeley May 2017
  With DS421 Cohort 1

- Streamlining Climate Model Accessibility for Integration into Site-Specific Life Science Research
  Talk
  Data Science for the 21st Century Annual Symposium, UC Berkeley May 2017
  With Jenna Baughman

- Sampling-Based Approaches to Maximum Likelihood Estimation for Latent Variable Models
  Poster
  BSTARS, UC Berkeley March 2017
  With Johnny Hong and Perry de Valpine

- Uncertainty Quantification and Statistics
  Talk (Invited)
  NIST Presentation to SPIRAL students, July 2016 and July 2017

- Geostatistical Models for the Spatial Distribution of Uranium in the Continental United States
  Plenary Talk (Invited)
  First Electronic Undergraduate Statistics Research Conference, October 2015

- Internet Traffic Generation
  Talk (Invited)
  MAA Mathfest, August 2015
  With Erika Earley, Yadira Flores, and Jordan Menter

- "Big Force" Calibrations: An Errors in Variables Approach

Talk
Summer Undergraduate Research Fellow Colloquia, National Institute of Standards and Technology, August 2015
With Antonio Possolo and Tom Bartel

- Geostatistical Models for the Spatial Distribution of Uranium in the Continental United States
  Poster
  Geocomputation, May 2015

- Correcting Temperature Records for Biases Unrelated to the Climate
  Summer Undergraduate Research Fellow Colloquia, National Institute of Standards and Technology, August 2014
  With Antonio Possolo

- The Perfect Bracket: Machine Learning in NCAA Basketball
  SPEED poster and presentation
  Joint Statistical Meetings, August 2014
  With Loren Santana and Ben Baumer

- Taking a Closer Look at Learning: Factors Associated with Changes in Academic Performance During the Transition from Elementary to Middle School
  Poster
  Women in Statistics Conference, May 2014
  With Dana Hsu, Anna Rockower, and Katherine Halvorsen

- Measuring Optical Apertures for Solar Irradiance Monitoring *Plenary Talk*
  Summer Undergraduate Research Fellow Colloquia, National Institute of Standards and Technology, August 2013
  With Maritoni Litorja, and Antonio Possolo

Smith College

- Geostatistical Models for the Spatial Distribution of Uranium in the Continental United States
  Poster
  Collaborations, April 2015

- Geostatistical Models for the Spatial Distribution of Uranium in the Continental United States
  Talk
  Thesis Defense, April 2015

- Traffic Generation Model for Telecom Applications: Simulating Internet Traffic Using the Empirical Copula Method
  Poster
  Collaborations, April 2015

- Traffic Generation Model for Telecom Applications: Simulating Internet Traffic Using the Empirical Copula Method
  Talk
  Center for Women in Mathematics, April 2015

- Beyond Calculations: Communicating through Statistics

Talk (Invited)
Smith in the World Conference, November 2014

- Correcting Temperature Records for Biases Unrelated to the Climate
  Talk
  WIMIN Conference, September 2014
  With Antonio Possolo

- The Perfect Bracket: Machine Learning in NCAA Basketball
  Talk
  Center for Women in Mathematics, April 2014
  With Loren Santana, and Ben Baumer

- WeathR - Social Media: Changing the Way We Talk About the Weather
  Talk
  Collaborations, April 2014
  With Dana Udwin and Kelly Francis

- The Perfect Bracket: Machine Learning in NCAA Basketball
  Poster
  Collaborations, April 2014
  With Loren Santana, Ben Baumer

- An Objective Ranking of Best College Sports Coaches of all Time
  Poster
  Collaborations, April 2014
  With Maja Milosavljevic and Yu Jin

- Measuring Optical Apertures for Solar Irradiance Monitoring
  Talk
  SMATH Conference, September 2013
  With Maritoni Litorja and Antonio Possolo

- Sampling With Google Maps and R to Estimate Population Proportions
  Poster
  Collaborations, April 2013
  With Yue Cao, Dana Udwin, and Nicholas Horton

Review Service

- Journal of Statistics Education
- NIST Washington Review Editorial Board (Summer '17)

Professional Memberships

- American Statistical Association
- Sigma Xi
- Phi Beta Kappa
- Mu Sigma Rho