John L. Paige

Contact Information

Department of Mathematical Sciences
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Education

University of Washington, Seattle, Washington
Ph.D., Statistics, December 2020)

- *Advisor*: Prof. Jon Wakefield
- *Dissertation Title*: Statistical Methods for Geospatial Modeling with Stratified Cluster Survey Data
- GPA: 3.7
- Research interests: spatial statistics, computational statistics, survey statistics, statistical validation

Macalester College, St. Paul, MN
B.A. Major: Honors Applied Mathematics & Statistics *magna cum laude*), May 2014
B.A. Minor: Computer Science (*magna cum laude*), May 2014

- GPA: 3.8 (*magna cum laude*); GPA in Major and Minor: 3.9

Research Experience

Norwegian University of Science and Technology, Trondheim, Norway
Postdoctoral Fellow, January 2021–Present

- *Title*: Spatial Aggregation with Respect to a Population Distribution
- *Supervisors*: Prof. Andrea Riebler, Prof. Geir-Arne Fuglstad
- Assisting with supervision of Ph.D. student Umut Altay on accounting for locational uncertainty, including editing papers, suggesting research directions, editing code, contributing code, academic writing
- Studying effects of finite population variability on spatial models and their predictions of areal/population aggregates
- Planning curricula, lectures, grading, designing exercises and exams
- Grading Master's students exams and projects, and Ph.D. students' independent study oral exams
- I plan to supervise a Master's project

University of Washington, Seattle, Washington
Research Assistant, October 2017–December 2020

- *Title*: Effects of Stratified Sampling on Kenya Neonatal Mortality Rate
- *Advisors*: Prof. Jon Wakefield, Prof. Geir-Arne Fuglstad, Prof. Andrea Riebler
- Testing biasing effect of not accounting for preferential sampling for spatial statistical models of Under Five Mortality Rates in Kenya
- Implemented and compared small area estimation spatial statistical models, explored effects of survey stratification (published in *Journal of Survey Statistics and Methodology*)
- Extended ground-breaking spatial statistical package (LatticeKrig) for large datasets to non-Gaussian responses in Bayesian framework using INLA R package (submitted to *Computational Statistics and Data Analysis*)
- Developed new spatial model accounting for finite population distributions and fine scale variability in areally aggregated predictions (will submit to *Spatial Statistics*)

University of Washington, Seattle, Washington
Research Assistant, October 2015–September 2017

- *Title*: Assessing Cascadia Subduction Zone Earthquake Uncertainty—Past, Present, and Future
- *Advisor*: Prof. Peter Guttorp
- Created novel spatial statistical model for Cascadia subduction zone M9 earthquakes
- Flexible model that can infer what past earthquakes looked like and predict future earthquakes
- Presented at the 2017 workshop: "Challenges in the Statistical Modeling of Stochastic Processes for the Natural Sciences"
- Collaborated with Seismologists, Applied Mathematicians, and Paleogeologists in multidisciplinary M9 research group
- Submitted manuscript to Mathematical Geosciences awaiting reviews

National Center for Atmospheric Research, Boulder, Colorado
Visiting Scientist, March 2015–August 2015

- *Supervisor*: Dr. Doug Nychka
- Contributed code to 'fields', a major spatial statistics package for R
- Developed faster optimization methods and streamlined main functions
- Created new methods for data visualization and for spatial correlation analysis

Lawrence Berkeley National Laboratory, Berkeley, California
Research Associate, September 2014–March 2015

- *Supervisor*: Dr. Daniel Feldman
- Used dimension reduction techniques to analyze arctic temperature feedbacks
- Published in *Geoscientific Model Development*: https://doi.org/10.5194/gmd-8-1943-2015
- Created MATLAB program for use with climate model remote sensing simulator

National Center for Atmospheric Research, Boulder, Colorado
Research Intern, May 2015–August 2015

- *Supervisor*: Dr. Doug Nychka
- Intern in Summer Internships in Parallel Computational Sciences
- Developed GPU-accelerated methods for 'fields', a major spatial statistics package for R
- Parallelized likelihood calculations with Message Passing Interface (MPI) in C and R

Macalester College Department of Statistics, St. Paul, Minnesota
Statistics Honors Thesis, September 2013–May 2014

- *Title*: A Comparison of Arctic Temperature Feedbacks in CMIP5 Climate Models
- *Advisor*: Prof. Chad Topaz
- Studied climate model predictions of Arctic cloud and albedo feedbacks using MATLAB and BASH
- Wrote efficient, robust MATLAB code to perform power analysis of terabytes of climate simulation data with autoregressive order one model
- Presented work at American Geophysical Union conference in 2013

Lawrence Berkeley National Laboratory, Berkeley, California
Research Intern, Summer 2013

- *Supervisor*: Dr. Daniel Feldman
- Studied climate model predictions of Arctic cloud and albedo feedbacks using MATLAB and BASH
- Wrote efficient, robust MATLAB code to perform power analysis of terabytes of climate simulation data with autoregressive order one model

- Presented work at American Geophysical Union conference in 2013

Macalester College Department of Statistics, St. Paul, Minnesota
Student Researcher, Summer 2011–Spring 2013

- *Advisor*: Prof. Chad Topaz
- Developed a model to automatically predict mode of transportation using smartphone sensor data
- Created stochastic models for aphid nonlinear swarm dynamics using data from multi-particle tracking software
- Wrote code in MATLAB, Mathematica, and R for modeling, exploratory analysis, image transformations
- Presented research at Macalester College and Joint Mathematics Meetings in 2013
- Work published in *PLOS one* with DOI 10.1371/journal.pone.0083343

Teaching Experience

Norwegian University of Science and Technology, Trondheim, Norway
Lecturer, Spring 2022–Autumn 2024

- TMA4300: Computer Intensive Statistical Methods, Spring 2023 (planned)
- TMA4625: Stochastic Modeling, Autumn 2024 (planned)

Co-Lecturer, Spring 2022, Autumn 2023

- TMA4300: Computer Intensive Statistical Methods, Spring 2022
- TMA4625: Stochastic Modeling, Autumn 2023 (planned)

University of Washington, Seattle, Washington
Teaching Assistant, June 2017–December 2017, September 2020–December 2020

- Statistics 220: Principles of Statistical Reasoning (twice)
- Statistics 502 (graduate level): Experimental Design

Data Analytics Bootcamp for High Schoolers, Boulder, Colorado
Statistics Teacher, Summer of 2015, 2016

- Taught concepts in Statistics and R in a multi-day workshop for high school students

Private Practice, Multiple Locations
Statistics Tutor, Spring 2015–Spring 2018

- Privately tutored students coming from many different backgrounds one-on-one introductory to advanced undergraduate level statistics

University of Washington, Seattle, Washington
Statistics Tutor, September 2015–Spring 2018

- Drop-in tutoring for undergraduate as well as some graduate statistics students in a variety of departments

Peer Reviewed Publications

Altay, U., **Paige, J.**, Riebler, A., Fuglstad, G.-A., (2022). "Acounting for Spatial Anonymization in DHS Household Surveys". In: *In Preparation for Spatial and Spatio-temporal Epidemiology*. Expected submission in February.

Paige, J., Fuglstad, G.-A., Riebler, A., Wakefield, J., (2022). "Bayesian Multiresolution Modeling of Georeferenced Data: An Extension of 'LatticeKrig'". In: *Under revision in Computational Statistics and Data Analysis*. Available on arXiv at https://arxiv.org/abs/2005.11805.

Li, Z. R., Martin, B. D., Dong, T. Q., Fuglstad, G.-A., **Paige, J.**, Riebler, A., Clark, S., Wakefield, J., (2020). "Space-time smoothing of demographic and health indicators using the R package SUMMER". In: *arXiv preprint arXiv:2007.05117*.

Paige, J., Fuglstad, G.-A., Riebler, A., Wakefield, J., (2020). "Design- and Model-Based Approaches to Small-Area Estimation in a Low and Middle Income Country Context: Comparisons and Recommendations". In: *Journal of Survey Statistics and Methodology*.

Feldman, D., Collins, W., **Paige, J.,** (2015). "Pan-spectral observing system simulation experiments of shortwave reflectance and long-wave radiance for climate model evaluation". In: *Geoscientific Model Development* 8.7, p. 1943.

Nilsen, C., **Paige, J.**, Warner, O., Mayhew, B., Sutley, R., Lam, M., Bernoff, A. J., Topaz, C. M., (2013). "Social aggregation in pea aphids: experiment and random walk modeling". In: *PloS one* 8.12, e83343.

Peer Reviewed Technical Reports

Wu, Y., Li, Z. R., Mayala, B. K., Wang, H., Gao, P., **Paige, J.**, Fuglstad, G.-A., Moe, C., Godwin, J., Donohue, R. E., Croft, T. N., Wakefield, J., (2021). *Spatial Modeling for Subnational Administrative Level 2 Small-Area Estimation*. Tech. rep. DHS Spatial Analysis Reports No. 21. URL: https://dhsprogram.com/publications/publication-SAR21-Spatial-Analysis-Reports.cfm.

Paige, J., Lyngaas, I., Ramakrishnaiah, V., Hammerling, D., Kumar, R., Nycha, D., (2015). *Incorporating MAGMA into the 'fields' spatial statistics package*. Tech. rep. National Center for Atmospheric Research.

Paige, J., Nychka, D., Hammerling, D., (2015). *'fieldsMAGMA': A MAGMA-accelerated extension to the 'fields' spatial statistics R package*. Tech. rep. National Center for Atmospheric Research.

Other Work

Li, Z. R., Martin, B. D., Hsiao, Y., Godwin, J., **Paige, J.**, Wakefield, J., Clark, S. J., Fuglstad, G.-A., Riebler, A., (2021). *SUMMER: Small-Area-Estimation Unit/Area Models and Methods for Estimation in R*. R package version 1.2.0. URL: https://github.com/richardli/SUMMER.

Paige, J. (2020). "Statistical Methods for Geospatial Modeling with Stratified Cluster Survey Data". PhD thesis. University of Washington.

Nychka, D., Furrer, R., **Paige, J.**, Sain, S., (2005). *fields: Tools for spatial data*. National Center for Atmospheric Research.

Talks and Presentations

- Colorado School of Mines, October 2021
  - Title: Bayesian Multiresolution Modeling of Georeferenced Data: An Extension of 'LatticeKrig'
  - Gave 40 minute **invited** talk at the Graduate Spatial Statistics Seminar about work extending LatticeKrig spatial model for large datasets to non-Gaussian responses with updates for more recent improvements such as large dataset application, and nonlinear covariate and parallelization support
- University of Washington, June 2021
  - Sole Ph.D. graduation speaker for the UW Statistics Department
- NTNU, February 2020
  - Gave 40 minute **invited** talk at the Graduate Spatial Statistics Seminar about work extending LatticeKrig spatial model for large datasets to non-Gaussian responses
- Seismological Society of America, April 2019
  - Title: Characterizing the Spatial Uncertainty of Coseismic Slip for Past and Future CSZ Full-Margin Events
  - Gave 15 minute presentation summarizing work with Prof. Peter Guttorp in poster presentation to professors, and scientists at SSA 2019 conference
- Banff International Research Station (BIRS), Summer 2017
  - Workshop title: Challenges in the Statistical Modeling of Stochastic Processes for the Natural Sciences

  - Presented work with Prof. Peter Guttorp in poster presentation to students, professors, and scientists

- National Center for Atmospheric Research, Summer 2014
  - Presented for 15 minutes to college and graduate students as well as scientists
  - Presentation available for viewing at: https://www2.cisl.ucar.edu/siparcs/calendar/accelerating-fields-package-theory-and-computation-kriging-surfaces
  - Assisted Dr. Doug Nychka in accelerating the 'fields' spatial statistics package in R using multi-GPU and multi-CPU computing libraries
- Macalester College, April 2014
  - Performed 20 minutes presentation of Honors Thesis and 35 minute thesis defense to students and professors
- American Geophysical Union (AGU), December 2013
  - Presented at poster session on work from the previous summer at Lawrence Berekeley National Laboratory continued in my Honors Thesis
- Lawrence Berkeley National Lab, Summer 2013
  - Presented summer research at Lawrence Berkeley National Laboratory poster session in front of student and scientists alike
  - Studied climate model predictions of Arctic cloud and albedo feedbacks using MATLAB and BASH with Dr. Daniel Feldman
- Joint Mathematics Meetings (JMM), December 2012
  - Poster presentation of aphid swarming research conducted at Macalester College
- Macalester College, Fall 2011, 2012
  - Poster presentation of summer research to Macalester students and faculty
  - Analyzed aphid group swarm behavior using multi-particle tracking software, MATLAB, Mathematica, and R
  - Created stochastic mathematical model for swarm behavior using nonlinear fits, statistically analyzed interacting and non-interacting swarm models

Honors and Awards

June 2021	Sole Ph.D. Graduation Speaker, University of Washington Department of Statistics
2016 – 2020	NSF Graduate Research Fellow
July 2017	Selected Attendee, Challenges in the Statistical Modeling of Stochastic Processes for the Natural Sciences
March 2016 – March 2017	Co-Director, University of Washington Spatial Statistics Reading Group
Fall 2014 – Spring 2014	Mac IT Scholar
Spring 2011 – Spring 2012	Co-Webmaster, Macalester Development Group

Skills

Advanced: R, INLA, TMB, LaTeX, MATLAB, Git
Intermediate: C, C++, BASH, tcsh, parallel and cluster computing, MPI, Python, Stan, Mathematica, Scala, ImageJ, Java, GIMP

Public Software

- *SUMMER*
  - SUMMER: Small-Area-Estimation Unit/Area Models and Methods for Estimation in R
  - https://cran.r-project.org/web/packages/SUMMER/index.html
  - https://github.com/paigejo/SUMMER
  - Monthly downloads: 284 (as of 13 Feb., 2022)
- *ELK*
  - Extended Lattice Krig: A Bayesian Extension of LatticeKrig to Non-Gaussian Responses
  - https://github.com/paigejo/ELK
- *fields*
  - Spatial Statistics software in R
  - https://cran.r-project.org/web/packages/fields/index.html
  - Monthly downloads: 39,946 (as of 13 Feb., 2022)
- *fieldsMAGMA*
  - Multi-GPU accelerated Spatial Statistics software in R using MAGMA computing library
  - https://bitbucket.org/jpaige/fieldsmagma_all/src/master/
- *RShiny Web Applications*
  - Dirichlet Process and Pólya Tree visualization RShiny web application
    - https://rstudio.stat.washington.edu/shiny/jp/shinyJP/ (RShiny server no longer running)
- *Github profile*
  - https://github.com/paigejo

On the Web

- Personal website
  - http://jpaigestats.com/
- Github profile
  - https://github.com/paigejo
- Google Scholar
  - https://scholar.google.com/citations?user=bNtwV_AAAAAJ&hl=en
- Dirichlet Process and Pólya Tree visualization RShiny web application
  - https://rstudio.stat.washington.edu/shiny/jp/shinyJP/ (RShiny server no longer running)
- Presentation and research at the National Center for Atmospheric Research
  - https://www2.cisl.ucar.edu/siparcs/calendar/accelerating-fields-package-theory-and-computation-kriging-surfaces
- Macalester College front page web feature on some members of the class of 2014
  - http://www.macalester.edu/news/2014/11/the-class-of-2014-after-mac/
- Macalester College Mathematics, Statistics, and Computer Science department front page on winning the math scavenger hunt in 2011
  - http://www.macalester.edu/news/2014/01/death-devastation-math/

Interests	Audiobooks, chess, basketball, squash, skiing, hiking, music, microbrews