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## **Research Interests**

Spatial small area analysis and methods, Spatial disease mapping models, Bayesian hierarchical methods, Measurement error, Statistical demography, Global and Population Health, Population dynamics and projections.

## **Educational Experience**

- Emory University, Atlanta, GA. 2020-2021. Post-Doctoral Fellowship. Postdoctoral Mentor: Dr. Lance Waller.
- University of Massachusetts Amherst, Amherst, MA. 2019. Doctor of Philosophy in Biostatistics. Adviser: Dr. Leontine Alkema.
- Vanderbilt University, Nashville, TN. 2015. Master of Science in Biostatistics. Adviser: Dr. Tatsuki Koyama.
- Penn State University, Hershey, PA. 2013. Master of Science in Public Health Sciences. Adviser: Dr. Vernon Chinchilli.
- Davidson College, Davidson, NC. May 2006. Bachelor of Science in Psychology. With a research focus in Cognitive and Neuroscience Psychology.

## **Employment Experience**

Research Assistant Professor- Department of Biostatistics, Emory University, Atlanta, GA. Jul 2022-Present

- Developing a Bayesian spatial small area disease risk estimation model accounting for uncertainty in population at risk estimates. In collaboration with Harvard T.H.Chan School of Public Health, and UK Small Area Health Statistics Unit
- Developing a Bayesian hierarchical small area misclassification model to account for misreporting errors in Pregnancy Mortality Surveillance Systems. In collaboration with the CDC Maternal Mortality Prevention Team.
- Evaluation of the efficacy of NICU Care Intervention Program on maternal health outcomes in Georgia. In collaboration with NICU Cares and Emory Department of Epidemiology.
- Statistical Support Supervisor. Training Core for the Center of Excellence. Emory University.

Post-Doctoral Fellow- Department of Biostatistics, Emory University, Atlanta, GA. Feb 2020-Jun 2022

- Developed a Bayesian hierarchical small area misclassification model to estimate extent of misclassification errors of maternal mortality by U.S. Pregnancy Mortality Surveillance Systems. In collaboration with CDC Maternal Mortality Surveillance Group and Michael Kramer at Emory University Epidemiology Department.
- Developed Bayesian methods to estimate reporting errors in the reporting of age-cohort specific adult survival probabilities in sibling survival histories using a two stage approach. In collaboration with University of Massachusetts Amherst and Stephane Helleringer at New York University Abu Dhabi Social Research and Public Policy Department.

- Developed Bayesian spatial-temporal methods to estimate population size of blue whales using multiple data sources, accounting for data source specific biases. In collaboration with Oregon State Marine Mammal Institute.
- Developed a Bayesian hierarchical small area population model to estimate true population size accounting for data source specific methodologies in U.S. Census data. In collaboration with Harvard T.H.Chan School of Public Health, and UK Small Area Health Statistics Unit (corresponding publication listed).
- Developed a Bayesian approach to estimate maternal mortality using national civil registration vital statistics data accounting for reporting errors. In collaboration with the World Health Organization.

Research Assistant - Department of Biostatistics, University of Massachusetts Amherst, Amherst, MA. Sep 2015-Dec 2019.

- Developed a Bayesian hierarchical model to estimate the extent of reporting errors of maternal mortality by national vital registration systems. (Corresponding publication listed)
- Developed and implemented a data extraction framework for a large-scale systematic search of scientific literature related to misclassification of maternal deaths within countries, which is currently used by the WHO Maternal Mortality Interagency Group.
- Developed R packages to automate the data collection, cleaning, and compilation processes of maternal mortality data from article reviews, and WHO published surveys.
- Completed coursework in the following:
  - Bayesian Methodology and Theory
  - Machine Learning
  - Modern Applied Methods
  - Probability Theory and Statistical Inference
  - Longitudinal and Mixed Models
  - Time Series Analysis
  - Causal Inference
  - Spatio-Temporal Modeling
  - Survival Analysis
  - Clinical Trials
  - Population Research and Demography
  - Advanced R
- Completed workshops
  - STAN NESS 2018 led by Michael Betancourt

Research Associate- Department of Biostatistics, Vanderbilt University Medical Center, Nashville, TN. Jan 2014-Aug 2015.

- Data Analyst for Physical Medicine and Rehabilitation of Rotator Cuff Tears in older populations
- Performed exploratory and regression analyses to compare surgical and non-surgical treatment outcomes of rotator cuff tears
- Developed methods on the use of propensity scores with over-parametrized regression models
- Worked as data analyst and research assistant for ROW Outcomes Study
- Managed Vanderbilt REDcap data collection for rotator cuff tear surveys
- Created mock data for testing error checks.
- Prepared statistical analysis plan for subsequent studies on treatment efficacy.

## Independent Contracts

- Consulted on work sponsored by the WHO on maternal mortality misclassification methods. Dec 2020-current.
  - Provide expert input on specifications for data inputs for the maternal mortality database of specialized studies to ensure it aligns and functions well with the R code package.
  - Publication of journal article that makes substantive contribution toward improving misclassification of maternal mortality within vital statistics systems.
- Consulted on work sponsored by the WHO on global maternal mortality estimation. Apr -Sept 2016-2019.
  - Developed an R package for maternal mortality specialized study data compilation.
  - Developed a framework for data collection and compilation of studies reporting on national levels of maternal mortality.
  - Reported and presented statistical methods for measuring data quality metrics of vital statistics reporting of maternal mortality.

## Teaching

- “Introduction to Geographic Information Systems”. Emory University. INFO 530. Spring 2023.
- “Advanced Geographic Information Systems”. Emory University. INFO 532. Spring 2023.
- “Introduction to Geographic Information Systems”. Emory University. INFO 530. Fall 2021.
- “Advanced Geographic Information Systems”. Emory University. INFO 532. Fall 2021.
- “Introduction to Bayesian Statistics”. University of Massachusetts. BIOS 697. Spring 2017.
- “Introduction to Biostatistics”. University of Massachusetts. BIOSTATS 540. Spring 2016.

## Publications

- **EN Peterson**, G Guranich, J Cresswell, L Alkema. A Bayesian approach to estimate maternal mortality using national civil registration vital statistics data accounting for misclassification errors. (In progress).
- **EN Peterson**, RC Nethery, T Padellini, JT Chen, BA Coull, FB Piel, J Wakefield, M Blangiardo, L Waller. A Bayesian hierarchical small-area population model accounting for data source specific methodologies from American Community Survey, Population Estimates Program, and Decennial Census data. *Annals of Applied Statistics* (submitted).
- **EN Peterson**, AB Moller, A Gemmill, D Chou, L Alkema. A Bayesian temporal hierarchical model to assess levels of misclassification error in national vital registration maternal mortality data. *Statistics in Medicine* (accepted).
- RC Nethery, JT Chen, N Krieger, PD Waterman, **EN Peterson**, LA Waller, BA Coull. Statistical implications of endogeneity induced by residential segregation in small-area modelling of health inequities. *The American Statistician* (accepted).
- NB Jain, JE Kuhn, GD Ayers, A Song, **EN Peterson**. Geographical Variation in Rates of Shoulder and Knee Arthroscopy in U.S. States and Relationship to Orthopedist Density in Surgeon Volume. *JAMA*. 2019. 11; 2(12). doi: [10.1001/jamanetworkopen.2019.17315](https://doi.org/10.1001/jamanetworkopen.2019.17315)
- NB Jain, GD Ayers, **EN Peterson**, MB Harris, L Morse, KC O'Connor, E Garshick. Traumatic spinal cord injury in the United States, 1993-2012. *JAMA*. 2015. 9;313(22). 2236-43.
- A Morandi, LM Solberg, R Habermann, P Cleeton, **EN Peterson**, EW Ely, J Schnelle. Documentation and Management of Words Associated with Delirium Among Elderly Patients in Postacute Care: A Pilot Investigation. *JAMDA*. 2009. 34-339.

- SF Simmons, **EN Peterson**, C You. The Accuracy of Monthly Weight Assessments in Nursing Homes: Implications for the Identification of Weight Loss. *Journal of Nutrition, Health and Aging*. 2009. 13, 3, 284-288.
- JF Schnelle, SF Simmons, L Beuscher, **EN Peterson**, R Habermann, F Leung. Prevalence of Constipation Symptoms in Nursing Home Residents. *Journal of Gerontology*. 2009.

### **Invited and conference presentations**

- Upcoming PAA 2023 Session Chair to the Bayesian Methods Section.
- Upcoming PAA 2023: “A Bayesian Spatial Berkson Error approach to estimate small area disease rates accounting for population-at-risk uncertainty.” Oral presentation to be given to the “Incorporating Concepts of Space into Mortality Analyses” Section.
- Southern Regional Council on Statistics 2022: “Bayesian methods for the assessment of measurement errors with the use of multiple data sources with application to small area estimation.”
- PAA 2022: “A Bayesian hierarchical small area population model accounting for data source specific methodologies from U.S. Census data.” Oral presentation given to the “Statistical Methods for Measurement Error and Small Area Estimation” Section.
- Maynooth University Biostatistics Seminars: “A Bayesian hierarchical model framework to estimate measurement error in data sparse settings: Application in maternal mortality and U.S. Census data.”
- University of Massachusetts Bayesian Working Group: “A Bayesian hierarchical small area population model accounting for data source specific methodologies from U.S. Census data.”
- University of Massachusetts Bayesian Working Group: “Incorporating population-at-risk uncertainty into spatial disease mapping models.”
- NESS 2019 Student Paper Competition: “A Bayesian temporal hierarchical model for the assessment of misclassification errors in maternal mortality count data: Application in sparse data settings”
- JSM 2018 Poster: “Counting Maternal Deaths? You Better Bayes It! A systematic assessment of underreporting and misclassification in registration of maternal deaths in high- and middle-income countries using a Bayesian modeling approach”
- PAA 2018 Poster: “Counting Maternal Deaths? You Better Bayes It! A systematic assessment of underreporting and misclassification in registration of maternal deaths in high- and middle-income countries using a Bayesian modeling approach”
- NESS 2018 Poster: A Bayesian approach to modeling CRVS reporting errors of maternal mortality”
- UMASS SPH Environmental Health Science research day Poster: “Counting Maternal Deaths? You Better Bayes It! A Bayesian Approach to modeling incorrect reporting of maternal deaths”
- World Health Organization Maternal Mortality Interagency Group (WHO-MMEIG). Report on estimation of reporting errors of vital registration (VR) maternal mortality data.

### **Committee Memberships**

- Member of the Admission Committee, Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University
- Member of Emory Diversity, Equity, and Inclusion Committee, Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University
- Member of Population Association of America
- Member of the American Statistical Association

## **Reviewer Work**

- Annals of Epidemiology
- Journal of Survey Statistics and Methodology
- Population of Health Metrics
- Ecology

## **Other Academic Experience**

- Member of weekly Spatial statistics working group with Lance Waller's Lab, Emory University
- Member of weekly Bayesian Statistics Working Group with Leontine Alkema's Lab at University of Massachusetts Amherst
- Member of weekly Statistics reading club at Vanderbilt University
- Proficient in ArcGIS, R, RShiny, Nimble, STAN, INLA, JAGS, STATA statistical analyses and database design.