

Brian J Reich

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EDUCATION	PhD, Biostatistics, University of Minnesota, 2005 MS, Biostatistics, University of Minnesota, 2002 BS, Mathematics, University of Wisconsin-River Falls, 1999	
POSITIONS	Associate Professor, Department of Statistics, NCSU, 2014–Present Assistant Professor, Department of Statistics, NCSU, 2008–2014 Postdoctoral fellow, Department of Statistics, NCSU, 2005–2008	
AWARDS	Paper read before the Royal Statistical Society, 2018 D.D. Mason Faculty Award, 2017 LeRoy & Elva Martin Teaching Award, 2016 Thank a Teacher, 2015(S), 2016(S), 2016(F), 2017(F) <i>JABES</i> Showcase Session, JSM, 2015 NCSU Faculty Scholar, 2014 ENVR Young Researcher Award, 2013 Advisor of the John Van Ryzin Award winner (Laura Boehm), 2013 Discussion paper in the <i>American Journal of Epidemiology</i> , 2012 <i>Technometrics</i> Invited Lecture, JSM, 2009 ENAR Distinguished Student Paper Award, 2005	
STUDENT AWARDS	PhD adviser to the winners of: JSM ENVR student paper competition, Indranil Sahoo, 2018 JSM student poster competition, Susheela Singh, 2017 JSM HPSS student paper competition, Qian Guan, 2017 JSM ENVR student paper competition, Neal Grantham, 2017 JSM ENVR student paper competition, Ran Wei, 2017 ENAR Distinguished Student Paper Award, Neal Grantham, 2017 ENAR Distinguished Student Paper Award, Qian Guan, 2017 JSM ENVR student paper competition, Sam Morris, 2016 Best poster award for the CMAS Conference, Alex Larsen, 2015 ENAR Distinguished Student Paper Award, Laura Boehm, 2013	
PAPERS	Morris SA, Reich BJ, Thibaud E. Exploration and inference in spatial extremes using empirical basis functions. Accepted, <i>Journal of Agricultural, Biological and Environmental Statistics</i> . Pacifi K, Reich BJ, Miller DAW, Pease B. Resolving misaligned spatial data with integrated species distribution models. Accepted, <i>Ecology</i> . Rekabdarkolae HM, Reich BJ, Fuentes M. Multivariate space-time functional model for hurricane tracks and intensity. Accepted, <i>Spatial Statistics</i> Sahoo I, Guinness J, Reich BJ. A test for isotropy on a sphere using spherical harmonic functions. Accepted, <i>Statistica Sinica</i> . Jhuang AT, Fuentes M, Jones JL, Esteves G, Fancher CM, Furman M, Reich BJ. Spatial signal detection using continuous shrinkage priors. Accepted, <i>Technometrics</i> .	

- Huang YN, Reich BJ, Fuentes M, Sankarasubramanian A. Complete spatial model calibration. Accepted, *Annals of Applied Statistics*.
- Miller D, Pacifici K, Reich BJ, Sanderlin, JL. The recent past and promising future for data integration methods to estimate species distributions. Accepted, *Methods in Ecology and Evolution*.
- Tsai WL, Leung YF, McHale MR, Floyd MF, Reich BJ. Relationships between urban green land cover and human health at different spatial resolutions. Accepted, *Urban Ecosystems*.
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- King MC, Staicu A-M, Davis JM, Reich BJ, Eder B. A functional data analysis of spatiotemporal trends and variation in fine particulate matter. Accepted, *Atmospheric Environment*.
- Wei R, Reich BJ, Hoppin JA, Ghosal S. Sparse Bayesian additive nonparametric regression with application to health effects of pesticides mixtures. Accepted, *Statistica Sinica*.
- Reich BJ, Shaby BA (2018). A spatial Markov model for climate extremes. Accepted, *Journal of Computational and Graphical Statistics*.
- Janko MM, Irish SR, Reich BJ, Peterson M, Doctor SM, Mwandagalirwa MK, Likwela JL, Tshetu AK, Meshnick SR, Emch ME. The links between agriculture, Anopheles mosquitoes, and malaria risk in children under 5 in the Democratic Republic of Congo: A population-based cross-sectional and spatial study. Accepted, *The Lancet Planetary Health*.
- Larsen AE, Reich BJ, Ruminski M, Rappold AG. Impacts of fire smoke plumes on regional air quality, 2006-2013. Accepted, *Journal Of Exposure Science And Environmental Epidemiology*.
- Hazra A, Reich BJ, Reich DS, Shinohara RT, Staicu A-M. A spatio-temporal model for longitudinal image-on-image regression. Accepted, *Statistics in Biosciences*.
- Irizarry A, Pacifici J, Reich BJ, Collazo J. Avian response to shade-layer restoration in coffee plantations in Puerto Rico. *Restoration Ecology*, **26**, 1212–1220.
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- Reich BJ, Guinness J, Vandekar SN, Shinohara RT, Staicu AM (2018). Fully-Bayesian spectral methods for imaging data. *Biometrics*, **74**, 645–652.
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- Kang J, Reich BJ, Staicu A-M (2018). Scalar-on-image regression via the soft-thresholded Gaussian process. *Biometrika*, **105**, 165–184.
- Laber EB, Meyer NJ, Reich BJ, Pacifici KP, Collazo J, Drake J (2018). Optimal treatment allocations in space and time for on-line control of an emerging infectious disease (with discussion). *Journal of the Royal Statistical Society: Series C*, **67**, 1-28.

- Reich BJ, Haran M (2018). Precision maps for public health. *Nature*, **555**, 32-33.
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CHAPTERS

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Singh SP, Paterson AR, Wendelberger LJ, Fancher CM, Reich BJ, Smith RC, Wilson AG, Jones JL (2018). Algorithms in Diffraction Profile Analysis in *Big, Deep, and Smart Data in Physical and Chemical Imaging*, World Scientific Publishers, editors Foster I and Kalinin SV.

Paterson AR, Reich BJ, Smith RC, Wilson AG, Jones JL (2018). Bayesian approaches to uncertainty quantification and structure refinement from x-ray diffraction. Chapter within *Materials Discovery and Design: Data Science and Optimal Learning*, edited by Turab Lookman, Springer publishing.

Fuentes M, Reich BJ, Huang YN (2018). Statistical methods for exposure assessment. *Handbook of Environmental and Ecological Statistics*. Chapman & Hall/CRC.

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INVITED
TALKS

Georg-August University, Statistics and Economics, Gottingen Germany, 2018
Joint Statistical Meetings, Vancouver, BC, 2018
Mayo Clinic, Division of Biomedical Statistics and Informatics, 2018
SAMSU Workshop on Climate Extremes, RTP, NC, 2018
SAMSU Transition Workshop, RTP, NC, 2018
IMA Workshop on “Predictions from complexity”, University of Minnesota, 2018
ENAR, Atlanta, GA, 2018
NASA Jet Propulsion Lab, Pasadena, CA, 2017
Maxpoint, RTP, NC, 2017
Joint Statistical Meetings, Baltimore, MD, 2017
Notre Dame, The Department of Applied and Computational Mathematics and Statistics, 2017
North Carolina State University, Center for Geospatial Analytics, 2017
Purdue University, Department of Statistics, 2017
STATMOS Workshop on Climate Extremes, Penn State University, 2016
Colorado State University, Department of Statistics, 2016
Virginia Commonwealth University, Department of Biostatistics, 2016
Joint Statistical Meetings, Chicago, IL, 2016
The International Environmetrics Society Annual Conference, Edinburgh, UK, 2016
National Center for Atmospheric Research, Boulder, CO, 2016
Extreme Events in Climate and Weather Workshop, Banff, AB, 2016
Statistical Methods and Analysis of Environmental Health Data, Mumbai, India, 2016
CMStatistics Conference, London, UK, 2015
Virginia Tech University, Department of Statistics, 2015
Florida State University, Department of Statistics, 2015
Harvard University, Department of Biostatistics, 2015
Joint Statistical Meetings, Seattle, WA, 2015
Conference on Extreme Value Analysis, Ann Arbor, MI, 2015
SRCOS Summer Research Conference, Wilmington, NC, 2015
Medical University of South Carolina, Division of Biostatistics, 2015
Emory University, Department of Biostatistics and Bioinformatics, 2015
Workshop of Spatial Statistics, Texas A&M University, 2015
Brigham Young University, Department of Statistics, 2014
University of Michigan, Department of Statistics, 2014
Graybill Conference, Fort Collins, CO, 2014
Joint Statistical Meetings, Boston, MA, 2014
Los Alamos National Lab, Statistical Sciences Group, 2014
University of Chicago, Booth School of Business, 2014
ENAR, Baltimore, MD, 2014
Penn State University, Department of Statistics, 2014
University of Southern California, Marshall School of Business, 2013
MD Anderson Cancer Center, Department of Biostatistics, 2013
Harvard University, Department of Statistics, 2013
JSM, Montreal, Canada, 2013
CSU Workshop on Spatial Statistics, Fort Collins, CO, 2013
University of Georgia, Department of Statistics, 2012
JSM, San Diego, CA, 2012

WNAR/Graybill Conference, Fort Collins, CO, 2012
 SAMSI Transition Workshop on Uncertainty Quantification, RTP, NC, 2012
 ENAR, Washington, DC, 2012
 SAMSI Workshop on Uncertainty Quantification, Asheville, NC, 2012
 JSM, Miami, FL, 2011
 Workshop on Environmental Risk and Extreme Events, Ascona, Switzerland, 2011
 The Seventh Conference on Extreme Value Analysis, Lyon, France, 2011
 U.S. EPA, Research Triangle Park, NC, 2011
 IISA Annual Meeting, Raleigh, NC, 2011
 NCSU Scope Lecture Series, Raleigh, NC, 2011
 SAMSI transition workshop, RTP, NC, 2010
 TIES Annual Meeting, Venezuela, 2010
 New England Statistics Symposium, Cambridge, MA, 2010
 Harvard University, Department of Biostatistics, 2010
 SAMSI Workshop on Environmental Risk, RTP, NC, 2010
 Chilean Biometric Conference, Santiago, Chile, 2010
 Chilean Dental Statistics Meeting, Santiago, 2010
 Conference on Geomedical Systems, Charleston, SC, 2009
 The University of South Carolina, Department of Statistics, 2009
 Duke University, Division of Statistical Sciences, 2009
 NCSU, Department of Statistics, 2009
 JSM, Washington, DC, 2009
 NCSU, Undergraduate Statistics Club, 2009
 University of New Mexico, Department of Mathematics and Statistics, 2009
 JSM, Denver, CO, 2008
 IISA Annual Meeting, Storrs, CT, 2008
 NCSU, Department of Statistics, 2006
 TIES Annual Meeting, Kalmar, Sweden, 2006
 NCSU, Department of Statistics, 2005

COURSES

Applied Bayesian Statistics, Spring 2015–2018
 Statistics for Climate Research, Fall 2017 (SAMSI)
 Spatial Statistics, Fall 2016
 Big Data, Fall 2015
 Bayesian Inference, Fall 2008–2012, 2014
 Statistical Theory I, Fall 2012–2013
 Applied Spatial Statistics, Spring 2012–2013
 Statistics for Management and the Social Sciences II, Fall 2007, 2010–2011
 Introduction to Regression Analysis, Fall 2010–2011
 Introduction to Probability and Distribution Theory, Spring 2011
 Preparation for Statistical Research, Spring 2007–2009
 Economics and Business Statistics, Fall 2005–2006

SHORT COURSES

Beyond p-values: Regression analysis, National Center for Atmospheric Research, 2017.
 Bayesian statistics for pharmaceutical applications, Parexcel, 2015.
 Introduction to Bayesian statistics, University of Southern California, 2015.

FUNDING

An advanced spatio-temporal statistical methodology for impact studies on air quality and renewable energy (2019–2023). KAUST, co-PI, \$919,615.

 Data driven discovery of singlet fission materials (2018–2020). National Science Foundation, co-PI, \$237,841.

 Novel statistical methods for estimating the health effects of chemical mixtures (2018–2019). CHHE Pilot Grant, PI, \$37,875.

MATDAT18: Materials and data sciences hackathon (2017-2018). NSF, PI, \$148,810.

Data integration methods for environmental exposures with application in air pollution and asthma morbidity (2017-2021). NIH, co-PI, \$2,722,000.

A spatiotemporal recommendation engine for malaria control (2016-2018). Bill and Melinda Gates Foundation, PI, \$100,000.

NRT-DESE: Data-enabled research traineeships in the science and engineering of atomic structure (SEAS). NSF, co-PI, \$2,999,310.

Forensic geolocation via biological signatures (2016-2018). DOD, co-PI, \$1,164,161.

Designing material-liquid-nanoparticle interfaces for tribological control (2015-2018). NSF, co-PI, \$1,200,000.

Spatiotemporal models for periodontal disease monitoring and recall frequencies (2015-2018). NIH, PI, \$1,145,035

Optimal decision strategies for large spatio-temporal decision problems (2015-2018). NSF, co-PI, \$150,000.

Environmental pesticide exposure and respiratory outcomes in women and children (2015-2017). NIH, co-I, \$351,007.

Estimating fire smoke related health burden and novel tools to manage impacts on urban populations (2014-2018). DOI, PI, \$289,143.

10th Conference on Bayesian Nonparametrics (2015). US Army Research Office, co-PI, \$10,000.

10th Conference on Bayesian Nonparametrics (2015). NSF, co-PI, \$25,000.

Monitoring federal trust avian species in managed shade coffee plantations under the partner for fish and wildlife and coastal programs in Puerto Rico (2014-2015). US Fish & Wildlife Service, co-I, \$30,000.

Research and applications in support of the National GAP Analysis Program (2014-2017). USGS, Co-PI, \$1,616,571.

Advancing the use and application of diverse data sources and species distribution models (2014-2017). USGS, Co-PI, \$300,000.

Exploring tooth survival using Bayesian spatial models (2014-2016). NIDCR, PI, \$319,000.

Optimal sampling of animal communities (2014-2017). USGS, Co-PI, \$300,000.

Conservation design and habitat conservation in Puerto Rico (2013-2017). US FWS, Co-PI, \$1,734,995.

Statistical methods for exposure uncertainty in air pollution and health studies (2013-2016). NIH, Co-PI, \$118,069.

CSUMS: NC State University computation for undergraduates in statistics program (2007-2014). NSF, Joined as PI in 2013, \$770,714.

Molecular simulation: A new paradigm in materials modeling (2012-2015). NSF, Co-PI, \$456,331.

Mapping the distribution, abundance and risk assessment of marine birds in the Northwest Atlantic (2012-2014). US FWS, PI, \$115,000.

Studying the associations between manganese exposure and childhood development in North Carolina (2012-2013). North Carolina Division of Public Health, PI, \$15,000.

Using advanced statistical techniques to identify the drivers and occurrence of historical and future extreme air quality events in the United States from observations and models (2012-2015). US EPA, Co-I, \$749,930.

Collaborative research: RNMS statistical methods for atmospheric and oceanic sciences (2011-2016). NSF, Co-I, \$2,837,003.

Robust spatial models for periodontal data (2011-2014). NIDCR, PI, \$145,390.

Space-time modeling for linking climate change, pollutant exposure, built environments, and health outcomes (2010-2014). NIH, Co-I, \$1,204,878.

Statistical methods for spatiotemporal crime series linkage analysis (2011-2013). NIJ, co-PI, \$234,000.

Multivariate nonstationary spatial extremes in climate and atmospherics (2009-2010). NSF, Co-PI, \$325,000.

A spatial-temporal modeling approach for evaluating the impact of environmental stressors, in conjunction with human activity, on human health outcomes (2007-2010). US EPA, Co-I, \$893,439.

Multivariate space-time models and methods to combine large disparate spatial data and numerical models (2007-2010). NSF, Co-PI, \$260,000.

ADVISING

PhD advisor / co-advisor (*):

Qian Guan (expected, 2018)
Rui Li* (expected, 2018)
Haoyu Wang* (expected, 2018)
Zhao Lan* (expected, 2019)
Dave Huberman (expected, 2019)
Yuan Tian (expected, 2019)
Marschall Furman, (expected, 2020)
Matt Miller, (expected, 2020)
Suman Majumder, (expected, 2020)
Andrew Giffin, (expected, 2021)
Laura Wendelberger, (expected, 2021)

Alexandra Larson (2018). Spatial methods for quantifying the impact of wildfire smoke on air quality in the U.S. First position, Duke University.

Munir Winkel* (2018). New applications of sequential experimental design. First position, Swiss Tropical and Public Health Institute.

Susheela Singh (2018). Bayesian methods for nonlinear and discrete data with complex dependence. First position, YouTube.

Arnab Harza* (2018). Spatiotemporal modeling with biomedical and environmental applications. First position, KAUST.

Indranil Sahoo* (2018). Spatiotemporal Models for Physical Processes. First position, Wake Forest University.

An-Ting Jhuang* (2018). Spatial signal detection using continuous shrinkage priors. First position, United Health.

Jennifer Wei* (2017). Bayesian variable selection using continuous shrinkage priors for non-parametric models and non-Gaussian Data. First position, Eli Lilly.

Neal Grantham (2017). Statistical methods for high-dimensional, spatially-distributed microbiome data from next-generation sequencing. First position, Phylogen.

Colin Peterson* (2016). Mean-dependent spatial statistical prediction methods with applications to material sciences. First position, US Environmental Protection Agency.

Sam Morris (2016). Spatial methods for modeling extreme and rare events. First position, Google, Inc.

Alfredo Farjat* (2015). Optimal seed deployment under climate change using spatial models and prediction of genetic merit in loblolly pine. First position, Duke University Medical Center.

Ryan Parker (2015). Efficient computational methods for large spatial data sets. First position, JMP.

Deidra Coleman* (2015). Advances in significance testing for cluster detection. First position, Philander Smith College.

Beth Ann Tidemann-Miller* (2014). Statistical modeling of multivariate functional data that exhibit complex correlation structures. First position, Biogen Idec.

Luke Smith* (2014). Bayesian quantile regression in biostatistical applications. First position, Amazon.

Yimin Kao (2014). Advances in nonparametric Bayesian methods for clustering and classification. First position, Gogolook.

Ander Wilson (2014). Advances in Bayesian methods for high-dimensional environmental data. First position, Colorado State University.

Laura Boehm* (2013). Bridge models and variable selection methods for spatial data. First position, St Olaf College.

Eric Kalendra* (2010). Space-time modeling of health effects while controlling for spatially varying exposure surfaces. First position, Apple.

Post-doc advisor / co-advisor (*):

Yawen Guan (2017-present)

Margaret Johnson (2017-2018), Current position, NASA Jet Propulsion Laboratory
Yen-Ning Huang* (2015-2016), Current position, Indiana University

Earvin Balderama* (2012-2014). Current position, Fresno State University

SERVICE

Editor-in-Chief:

Journal of Agricultural, Biological, and Environmental Statistics (2019-2021)

Associate Editor:

Technometrics (2018)
Biostatistics (2012-2018)
Journal of the American Statistical Association - Applications & Case Studies (2015-2018)
Journal of the American Statistical Association - Theory & Methods (2014-2017)
Annals of Applied Statistics (2011-2016)
Journal of Agricultural, Biological, and Environmental Statistics (2011-2015)

Guest Co-Editor:

Journal of Agricultural, Biological, and Environmental Statistics, special issue on “Computer models and spatial statistics for environmental science”, 2011.

Journal of Agricultural, Biological, and Environmental Statistics, special issue on “Mathematical and statistical methods for climate and the earth system”, 2019.

Review Panel Member:

NIH, Infectious Disease, Reproductive Health, and Asthma/Pulmonary Conditions (2018)
NSF, Computational and Data-Enabled Science and Engineering (2012, 2018)
NIH, National Institute of Dental and Craniofacial Research (2017)
NSF, Division of Mathematical Sciences (2014)

Conference Co-Organizer:

MATDAT18: Materials and Data Science Hackathon, Washington, DC (2018).
ISBA/BNP Conference on Bayesian Nonparametrics, Raleigh, NC (2015).
SAMSI Summer Program on Bayesian Nonparametrics: Synergies between Statistics, Probability and Mathematics, RTP, NC (2015).
ASA Workshop for the Statistics and the Environment Section, Raleigh, NC (2012).

Conference Committees: ENVR Student Paper Awards Committee Chair (2019); ENVR Student Paper Awards Committee (2016-2018); ENAR representative on the JSM Program Committee (2017-2108); ASA Section on Statistics and the Environment (ENVR) Program Chair (2016); Section on Bayesian Statistical Science Student Award Selection Committee (2011-2013); ENVR representative on the ENAR Program Committee (2012, 2013, 2017); ENAR Student Paper Awards Committee (2013-2015).

Undergraduate research leader: Computation for Undergraduates in Statistics Program (2012-2014).

Standing committees: ASA Advisory Committee on Climate Change (2018-Present).