

# Curriculum Vitae

John Hughes

## **Academic Rank**

Associate Professor with tenure

## **Education**

PhD, Statistics, The Pennsylvania State University, 2011

MS, Statistics, The Pennsylvania State University, 2009

MS, Applied Computer Science, Frostburg State University, 2002

BS, Mathematics and Computer Science, Frostburg State University, 1995

## **Employment**

### **Lehigh University, Bethlehem, PA**

Associate Professor of Biostatistics and Health Data Science (and Mathematics by courtesy), 2021–  
Member, Lehigh Institute for Data, Intelligent Systems, and Computation (I-DISC)

### **The Pennsylvania State University, University Park**

Associate Research Professor of Statistics, 2020–2021

### **University of Colorado, Denver**

Associate Professor of Biostatistics, 2016–2018

### **University of Minnesota, Twin Cities**

Assistant Professor of Biostatistics, 2011–2016

### **The Pennsylvania State University, University Park**

Research Assistant to John Fricks, 2008–2011

Teaching Assistant to Manfred Denker, MATH/STAT 416 Stochastic Modeling, fall 2008

### **Frostburg State University, Frostburg, MD**

Lecturer of Computer Science, 1995–2007

## Consulting

Minnesota Center for Chemical and Mental Health, 2015–2016

TRE Los Angeles, 2015–2016

Courage Kenny Research Center, 2011–2015

## Honors and Awards

Student Travel Award; MCMSki V; Lenzerheide, Switzerland; January 4–7, 2016

NSF Early Career Researchers Travel Grant; ISBA 2012 World Meeting; Kyoto, Japan; June 25–29, 2012

Student Travel Award; MCMSki III; Park City, UT, USA; January 5–7, 2011

University Graduate Fellowship, The Pennsylvania State University, 2007–2008

## Publications

### Books or Monographs

1. **J. Hughes**. *A Concise Introduction to Object-Oriented Data Structures and Algorithm Analysis*. Pearson Custom Publishing, 2006.

### Book Chapters

1. M. Haran, **J. Hughes**, and B. S. Lee. Latent Gaussian models and computation for large spatial data. In S. Brooks, A. Gelman, G. Jones, and X. L. Meng, editors, *Handbook of Markov Chain Monte Carlo*, Handbooks of Modern Statistical Methods. Chapman & Hall/CRC, 2024.
2. D. Musgrove, D. Young, **J. Hughes**, and L. E. Eberly. A sparse areal mixed model for multivariate outcomes, with an application to zero-inflated Census data. In N. Diawara, editor, *Modern Statistical Methods for Spatial and Multivariate Data*. Springer, 2019.
3. M. Bezener, L. E. Eberly, **J. Hughes**, G. Jones, and D. R. Musgrove. Bayesian spatiotemporal modeling for detecting neuronal activation via functional magnetic resonance imaging. In W. K. Härdle, H. H.-S. Lu, and X. Shen, editors, *Handbook of Big Data Analytics*, Springer Handbooks of Computational Statistics. Springer, 2018.

### Journal Articles Under Consideration

1. B. Kang, **J. Hughes**, and M. Haran. Fast Bayesian inference for spatial mean-parameterized Conway–Maxwell–Poisson models.
2. **J. Hughes**. Toward improved inference for Krippendorff’s Alpha agreement coefficient.
3. B. Kang, **J. Hughes**, and M. Haran. Measuring sample quality in algorithms for intractable normalizing function problems.

## Peer-Reviewed Journal Articles

1. **J. Hughes**. A Bayesian tour of binomial inference. *Statistics and Probability Letters*, 205:109974, 2024.
2. B. Kang, S. Goldlust, E. Lee, **J. Hughes**, S. Bansal, and M. Haran. Spatial distribution and determinants of childhood vaccination refusal in the United States. *Vaccine*, 41(20):3189–3195, 2023.
3. **J. Hughes**. A unified Gaussian copula methodology for spatial regression analysis. *Nature Scientific Reports*, 12:15915, 2022.
4. **J. Hughes**. Sklar’s Omega: A Gaussian copula-based framework for assessing agreement. *Statistics and Computing*, 32(3):46, 2022.
5. **J. Hughes**. krippendorffsalpha: An R package for measuring agreement using Krippendorff’s Alpha coefficient. *The R Journal*, 13(1):413–425, 2021.
6. **J. Hughes**. On the occasional exactness of the distributional transform approximation for direct Gaussian copula models with discrete margins. *Statistics and Probability Letters*, 177:109159, 2021.
7. B. Blair, S. Brindley, **J. Hughes**, E. Dinkeloo, L. McKenzie, and J. Adgate. Measuring environmental noise from airports, oil and gas operations, and traffic with smartphone applications: Laboratory and field trials. *Journal of Exposure Science and Environmental Epidemiology*, 28:548–558, 2018.
8. B. Blair, **J. Hughes**, W. Allshouse, L. McKenzie, and J. Adgate. Truck and multi-vehicle truck accidents with injuries near Colorado oil and gas operations. *International Journal of Environmental Research and Public Health*, 15(9):1861, 2018.
9. M. Bezener, **J. Hughes**, and G. Jones. Bayesian spatiotemporal modeling using hierarchical spatial priors, with applications to functional magnetic resonance imaging (with discussion). *Bayesian Analysis*, 13(4):1261–1313, 2018.
10. L. McKenzie, B. Blair, **J. Hughes**, W. Allshouse, N. Blake, D. Helmig, P. Milmo, H. Halliday, D. Blake, and J. Adgate. Ambient non-methane hydrocarbon levels along Colorado’s Northern Front Range: Acute and chronic health risks. *Environmental Science & Technology*, 52(8):4514–4525, 2018.
11. P. Morgan, M. J. Nissi, **J. Hughes**, S. Mortazavi, and J. Ellermann. T2\* mapping provides information that is statistically comparable to an arthroscopic evaluation of acetabular cartilage. *Cartilage*, 9(3):237–240, 2018.
12. E. Kürüm, **J. Hughes**, R. Li, and S. Shiffman. Time-varying copula models for longitudinal data. *Statistics and Its Interface*, 11(2):203–221, 2018.
13. S. Elwir, A. Shaikat, M. Shaw, **J. Hughes**, and J. Colton. Variability in, and factors associated with, sizing of polyps by endoscopists at a large community practice. *Endoscopy International Open*, 5(08):E742–E745, 2017.
14. L. Henn, **J. Hughes**, E. Iisakka, J. Ellermann, S. Mortazavi, C. Ziegler, M. J. Nissi, and P. Morgan. Disease severity classification using quantitative magnetic resonance imaging data of cartilage in femoroacetabular impingement. *Statistics in Medicine*, 36:1491–1505, 2017.
15. D. J. Bond, A. C. Andreatza, **J. Hughes**, T. Dhanoa, I. J. Torres, J.–M. Kozicky, L. T. Young, A. Morgan, R. W. Lam, and L. N. Yatham. A longitudinal study of the relationships between mood symptoms, body mass index, and serum adipokines in bipolar disorder. *Journal of Clinical Psychiatry*, 78(4):441–448, 2017.
16. D. Bond, A. Andreatza, **J. Hughes**, T. Dhanoa, I. Torres, J. Kozicky, L. Young, R. Lam, and L. Yatham. Relationships between inflammation, elevated body mass index, and depressive relapse in bipolar disorder. *European Neuropsychopharmacology*, 27:S566–S567, 2017.

17. A. E. Bantle, L. S. Chow, L. M. Steffen, Q. Wang, **J. Hughes**, N. H. Durant, K. H. Ingram, J. P. Reis, and P. J. Schreiner. The association of Mediterranean diet and cardiorespiratory fitness with development of prediabetes and diabetes: The coronary artery risk development in young adults (CARDIA) study. *BMJ Open Diabetes Research and Care*, 4(1):e000229, 2016.
18. D. Musgrove, **J. Hughes**, and L. E. Eberly. Hierarchical copula regression models for areal data. *Spatial Statistics*, 17:38–49, 2016.
19. L. S. Chow, A. O. Odegaard, T. A. Bosch, A. E. Bantle, Q. Wang, **J. Hughes**, M. Carnethon, K. H. Ingram, N. Durant, C. E. Lewis, J. Ryder, C. M. Shay, A. S. Kelly, P. J. Schreiner. Twenty year fitness trends in young adults and incidence of prediabetes and diabetes: the CARDIA study. *Diabetologia*, 1–7, 2016.
20. D. Bond, A. Andreazza, **J. Hughes**, J.–M. Kozicky, D. Taj, I. Torres, L. T. Young, R. Lam, and L. Yatham. Association of peripheral inflammation with body mass index and depressive relapse in bipolar disorder. *Psychoneuroendocrinology*, 65:76–83, 2016.
21. D. Musgrove, **J. Hughes**, and L. E. Eberly. Fast, fully Bayesian spatiotemporal inference for fMRI data. *Biostatistics*, 17(2):291–303, 2016.
22. E. Kürüm, **J. Hughes**, and R. Li. A semivarying joint model for longitudinal binary and continuous outcomes. *Canadian Journal of Statistics*, 44(1):44–57, 2016.
23. P.–Y. Iroh Tam, J. S. Menk, **J. Hughes**, and S. L. Kulasingam. An ecological analysis of pertussis disease in Minnesota, 2009–2013. *Epidemiology and Infection*, 144(4):847–855, 2016.
24. D. Bond, A. Andreazza, **J. Hughes**, T. Dhanoa, I. Torres, J. Kozicky, L. Young, R. Lam, and L. Yatham. Relationships between mood symptoms, weight, and serum adipokines in early-stage bipolar disorder. *Bipolar Disorders*, 17, 2015.
25. D. Bond, A. Andreazza, **J. Hughes**, T. Dhanoa, I. Torres, J. Kozicky, L. Young, R. Lam, and L. Yatham. A measure of total peripheral inflammation is associated with weight and depressive relapse in early-stage bipolar disorder. *Bipolar Disorders*, 17, 2015.
26. E. J. Nelson, **J. Hughes**, J. M. Oakes, J. S. Pankow, and S. L. Kulasingam. Geospatial patterns of human papillomavirus vaccine uptake in Minnesota. *BMJ Open*, 5(8), 2015.
27. **J. Hughes**. copCAR: A flexible regression model for areal data. *Journal of Computational and Graphical Statistics*, 24(3):733–755, 2015.
28. N. Kohli, **J. Hughes**, C. Wang, C. Zopluoglu, Y. Chang, and M. Davison. Fitting a linear–linear piecewise growth mixture model with unknown knots: A comparison of two common approaches to inference. *Psychological Methods*, 20(2):259–275, 2015.
29. M. Nissi, S. Mortazavi, **J. Hughes**, P. Morgan, and J. Ellermann. T2\* relaxation time of acetabular and femoral cartilage with and without intra-articular gadopentetate dimeglumine in patients with femoroacetabular impingement. *American Journal of Roentgenology*, 204(6):W695–W700, 2015.
30. E. J. Nelson, **J. Hughes**, J. M. Oakes, J. S. Pankow, and S. L. Kulasingam. Estimation of geographic variation in human papillomavirus vaccine uptake in men and women: An online survey using Facebook recruitment. *Journal of Medical Internet Research*, 16(9):e198, 2014.
31. **J. Hughes**. ngspatial: An R package for fitting the centered autologistic and sparse spatial generalized linear mixed models for areal data. *The R Journal*, 6(2):81–95, 2014.
32. N. B. Paulson, A. J. Gilbertsen, J. J. Dalluge, C. W. Welchlin, **J. Hughes**, W. Han, T. S. Blackwell, T. A. Laguna, and B. J. Williams. The arginine decarboxylase pathways of host and pathogen interact to impact inflammatory pathways in the lung. *PLOS ONE*, 9(10):e111441, 2014.

33. E. J. Nelson, **J. Hughes**, J. M. Oakes, B. Thyagarajan, J. S. Pankow, and S. L. Kulasingam. Human papillomavirus infection in women who submit self-collected vaginal swabs after internet recruitment. *Journal of Community Health*, 1–8, 2014.
34. E. J. Nelson, S. L. Kulasingam, and **J. Hughes**. Spatial patterns of human papillomavirus-associated cancers within the state of Minnesota, 1998–2007. *Spatial and Spatiotemporal Epidemiology*, 9:13–21, 2014.
35. C. Ziegler, J. Ellermann, M. Nissi, R. Goebel, **J. Hughes**, M. Benson, P. Holmberg, R. Frei, and P. Morgan. Acetabular cartilage assessment in patients with femoroacetabular impingement using T2\* mapping with arthroscopic verification. *Radiology*, 271(2):512–523, 2014.
36. D. Shrivastava, L. Utecht, J. Tian, **J. Hughes**, and J. T. Vaughan. In vivo radiofrequency heating in swine in a 3T (123.2 MHz) birdcage whole-body coil. *Magnetic Resonance in Medicine*, 72(4):1141–1150, 2014.
37. **J. Hughes**, S. Shastry, W. O. Hancock, and J. Fricks. Estimating velocity for processive motor proteins with random detachment. *Journal of Agricultural, Biological, and Environmental Statistics*, 18(2):204–217, 2013.
38. **J. Hughes** and M. Haran. Dimension reduction and alleviation of confounding for spatial generalized linear mixed models. *Journal of the Royal Statistical Society, Series B*, 75(1):139–159, 2013.
39. D. Shrivastava, A. Abosch, **J. Hughes**, U. Goerke, L. DelaBarre, R. Visaria, N. Harel, and J. T. Vaughan. Heating induced near deep brain stimulation lead electrodes during magnetic resonance imaging with a 3T transceive volume head coil. *Physics in Medicine and Biology*, 57:5651–5665, 2012.
40. **J. Hughes**, W. O. Hancock, and J. Fricks. Kinesins with extended neck linkers: A chemomechanical model for variable-length stepping. *Bulletin of Mathematical Biology*, 74:1066–1097, 2012.
41. **J. Hughes**, M. Haran, and P. C. Caragea. Autologistic models for binary data on a lattice. *Environmetrics*, 22(7):857–871, 2011.
42. **J. Hughes**, W. O. Hancock, and J. Fricks. A matrix computational approach to kinesin neck linker extension. *Journal of Theoretical Biology*, 269(1):181–194, 2011.
43. **J. Hughes** and J. Fricks. A mixture model for quantum dot images of kinesin motor assays. *Biometrics*, 67(2):588–595, 2011.
44. **J. Hughes**, J. Fricks, and W. Hancock. Likelihood inference for particle location in fluorescence microscopy. *The Annals of Applied Statistics*, 4(2):830–848, 2010.

## Presentations

### Invited Presentations

1. Bayesian Filtering for Big Areal Data

Muhlenberg College Department of Mathematics and Computer Science; Allentown, PA, USA; November 9, 2023

2. Bayesian Filtering for Big Areal Data

University of South Carolina Department of Statistics; Columbia, SC, USA; September 7, 2023

3. Sklar’s Omega Agreement Coefficient and an Objective New Agreement Scale

Lehigh University College of Health; Bethlehem, PA, USA; May 10, 2021

4. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging  
Bayesian Statistics: A Paradigm for 21st Century Science; Tucson, AZ, USA; April 20, 2018
5. Spatial Regression and the Bayesian Filter  
University of Kentucky Department of Statistics; Lexington, KY, USA; February 9, 2018
6. Spatial Regression and the Bayesian Filter  
University of Colorado Denver Department of Mathematical and Statistical Sciences; Denver, CO, USA; November 6, 2017
7. Regression for Binary Outcomes  
University of Colorado Denver Department of Radiology; Aurora, CO, USA; October 18, 2017
8. Statistical Models for Spatially Referenced Data  
Colorado Summer Institute in Biostatistics; Aurora, CO, USA; July 11, 2017
9. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging  
Arizona State University School of Mathematical and Statistical Sciences; Tempe, AZ, USA; April 7, 2017
10. T2\* Relaxation Time of Acetabular and Femoral Cartilage with and without Intra-Articular Gadopentetate Dimeglumine in Patients with Femoroacetabular Impingement  
University of Colorado Denver Department of Radiology; Aurora, CO, USA; February 8, 2017
11. Disease Severity Classification Using Quantitative Magnetic Resonance Imaging Data of Cartilage in Femoroacetabular Impingement  
University of Colorado Denver Department of Radiology; Aurora, CO, USA; December 8, 2016
12. Hierarchical Copula Regression Models for Areal Data  
2nd International Conference on Statistical Distributions and Applications; Niagara Falls, Canada; October 15–16, 2016
13. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data  
XXVIIIth International Biometric Conference (IBC 2016); Victoria, BC, Canada; July 10–16, 2016
14. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data  
2016 ICSA Applied Statistics Symposium; Atlanta, GA, USA; June 12–15, 2016
15. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging  
Yale University Department of Biostatistics; New Haven, CT, USA; April 12, 2016
16. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging

University of Colorado Denver Department of Biostatistics and Informatics; Aurora, CO, USA;  
February 4, 2016

17. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging

Colorado State University Department of Statistics; Fort Collins, CO, USA; January 28, 2016

18. Bayesian Spatiotemporal Modeling for Detecting Neuronal Activation via Functional Magnetic Resonance Imaging

Virginia Tech Department of Statistics; Blacksburg, VA, USA; January 14, 2016

19. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data

MCMSki V; Lenzerheide, Switzerland; January 4–7, 2016

20. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data

WNAR/IMS 2015 Annual Meeting; Boise, ID, USA; June 14–17, 2015

21. Estimating Velocity for Processive Motor Proteins with Random Detachment

St Olaf College; Northfield, MN, USA; May 4, 2015

22. Estimating Velocity for Processive Motor Proteins with Random Detachment

University of California Riverside Department of Statistics; Riverside, CA, USA; December 9, 2014

23. Estimating Velocity for Processive Motor Proteins with Random Detachment

SIAM Conference on the Life Sciences (LS14); Charlotte, NC, USA; August 4–7, 2014

24. Disease Severity Classification Using Quantitative Magnetic Resonance Imaging Data of Cartilage in Femoroacetabular Impingement

University of Minnesota Summer Institute in Biostatistics; Minneapolis, MN, USA; June 27, 2014

25. Estimating Velocity for Processive Motor Proteins with Random Detachment

ENAR 2014 Spring Meeting; Baltimore, MD, USA; March 16–19, 2014

26. Advances in MCMC for Spatial Generalized Linear Mixed Models

2013 Joint Statistical Meetings; Montréal, QC, Canada; August 3–8, 2013

27. Estimating Velocity for Processive Motor Proteins with Random Detachment

Istanbul Medeniyet University Department of Statistics; Istanbul, Turkey; June 13, 2013

28. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models

University of Miami Spatial Statistics Conference 2012; Miami, FL, USA; December 13–15, 2012

29. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models

ENVR Workshop on Environmetrics 2012: Spatial Modeling and Inference for Environmental Science; Raleigh, NC, USA; October 4–6, 2012

30. Autologistic Models for Binary Data on a Lattice

International Chinese Statistical Association 2011 Applied Statistics Symposium; New York City, NY, USA; June 26–29, 2011

31. Dimension Reduction and Confounding in Spatial Generalized Linear Models

Iowa State University Department of Statistics; Ames, IA, USA; March, 2011

32. Dimension Reduction and Confounding in Spatial Generalized Linear Models

Oregon State University Department of Statistics; Corvallis, OR, USA; February, 2011

33. Dimension Reduction and Confounding in Spatial Generalized Linear Models

Los Alamos National Laboratory Statistical Sciences Group; Los Alamos, NM, USA; February, 2011

34. Dimension Reduction and Confounding in Spatial Generalized Linear Models

Virginia Tech Department of Statistics; Blacksburg, VA, USA; February, 2011

35. Dimension Reduction and Confounding in Spatial Generalized Linear Models

University of Minnesota Division of Biostatistics; Minneapolis, MN, USA; January, 2011

## Contributed Presentations

§ = mentee presentation

1. Bayesian Filtering for Big Areal Data

Future of Information and Communication Conference (FICC) 2024; Berlin, Germany; April 4–5, 2024

2. § Is WASH Insecurity Related to Happiness or Life Satisfaction? Evidence from MICS5 Surveys

UNC Water and Health Conference; Chapel Hill, NC, USA; October 23–27, 2023

3. § WASH Insecurity and Mental Health in Nigeria

Lehigh College of Health Research Symposium; Bethlehem, PA, USA; September 13, 2023

4. § A Spatial Zero-Inflated Conway–Maxwell–Poisson Model for US Vaccine Refusal

ENAR 2023 Spring Meeting; Nashville, TN, USA; March 19–22, 2023

5. § A Zero-Inflated Conway–Maxwell–Poisson Regression Model with Spatially-Varying Dispersion for Spatiotemporal Data of US Vaccine Refusal

ENVR 2022 Workshop; Provo, UT, USA; October 6–8, 2022

6. § A Zero-Inflated Conway–Maxwell–Poisson Regression Model with Spatially-Varying Dispersion for Spatiotemporal Data of US Vaccine Refusal

2022 Joint Statistical Meetings; Washington, DC, USA; August 6–11, 2022

7. § A Zero-Inflated Conway–Maxwell–Poisson Regression Model with Spatially-Varying Dispersion for Spatiotemporal Data of US Vaccine Refusal



- 2022 World Meeting of the International Society for Bayesian Analysis; Montreal, QC, Canada; June 26–July 1, 2022
8. § Diagnostics for Monte Carlo Algorithms for Models with Intractable Normalizing Functions  
2021 Joint Statistical Meetings; virtual; August 8–12, 2021
  9. § Diagnostics for Monte Carlo Algorithms for Models with Intractable Normalizing Functions  
2021 World Meeting of the International Society for Bayesian Analysis; virtual; June 28–July 2, 2021
  10. § A Zero-Inflated Negative Binomial Regression Model for Spatiotemporal Data of US Vaccine Refusal  
2021 MIDAS Network Annual Meeting; virtual; May 10–13, 2021
  11. On the Occasional Exactness of the Distributional Transform Approximation for Direct Gaussian Copula Models with Discrete Margins  
Penn State Department of Statistics; September 2, 2020
  12. Krippendorff’s Alpha Agreement Coefficient and R Package `krippendorffsalpha`  
Penn State Department of Statistics; July 9, 2020
  13. Hierarchical Copula Regression Models for Areal Data  
Spatial Statistics 2017; Lancaster, UK; July 4–7, 2017
  14. Hierarchical Copula Regression Models for Areal Data  
WNAR/IMS 2017 Annual Meeting; Santa Fe, NM, USA; June 25–28, 2017
  15. Disease Severity Classification Using Quantitative Magnetic Resonance Imaging Data of Cartilage in Femoroacetabular Impingement  
3rd Annual Conference for Statistical Methods in Imaging; Pittsburgh, PA, USA; May 31–June 2, 2017
  16. Estimating Velocity for Processive Motor Proteins with Random Detachment  
The 5th Annual Winter q-bio Meeting; Poipu, HI, USA; February 21–24, 2017
  17. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data  
5th Nordic–Baltic Biometric Conference; Reykjavik, Iceland; June 8–10, 2015
  18. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data  
ENAR 2015 Spring Meeting; Miami, FL, USA; March 15–18, 2015
  19. Bayesian Inference for Gaussian Copula Regression Models  
2014 Joint Statistical Meetings; Boston, MA, USA; August 2–7, 2014
  20. Estimating Velocity for Processive Motor Proteins with Random Detachment  
XXVIIth International Biometric Conference (IBC 2014); Florence, Italy; July 6–11, 2014
  21. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data

- 7th Annual Bayesian Biostatistics and Bioinformatics Conference; Houston, TX, USA; February 12–14, 2014
22. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models  
Spatial Statistics 2013; Columbus, OH, USA; June 4–7, 2013
23. Time-Varying Copula Models for Longitudinal Data  
ENAR 2013 Spring Meeting; Orlando, FL, USA; March 10–13, 2013
24. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models  
2012 Joint Statistical Meetings; San Diego, CA, USA; July 28–August 2, 2012
25. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models  
ISBA 2012 World Meeting; Kyoto, Japan; June 25–29, 2012
26. copCAR: A Flexible Model for Areal Data  
ENAR 2012 Spring Meeting; Washington, DC, USA; April 1–4, 2012
27. A Mixture Model for Quantum Dot Images of Kinesin Motor Assays  
Gordon Research Conference: Stochastic Physics in Biology; Ventura, CA, USA; January 23–28, 2011
28. Autologistic Models for Binary Data on a Lattice  
MCMSki3; Park City, UT, USA; January 5–7, 2011
29. Autologistic Models for Binary Data on a Lattice  
2010 Joint Statistical Meetings; Vancouver, BC, Canada; July 31–August 5, 2010
30. A Mixture Model for Quantum Dot Images of Kinesin Motor Assays  
Eastern North American Region of the International Biometric Society 2010 Spring Meeting; New Orleans, LA, USA; March 21–24, 2010

## Grant Proposals Submitted

1. **Role:** Co-Investigator  
**Title:** The Impact of Forced Displacement on Aging Adult Mental Health: Implications for Developing Interventions  
**PI:** Rochelle Frounfelker  
**Source:** National Institute on Aging (R01)  
**Purpose:** This exploratory sequential mixed methods community-based participatory research study will examine the mental health of older ethnic-Nepali Bhutanese refugees in central Pennsylvania. This study will improve our understanding of the impact of forced displacement and immigration on long-term mental health and inform multi-level interventions to address the psychosocial functioning of aging refugees resettled in the US.  
**Period:** 2024–2029  
**Award:** variable salary support

2. **Role:** **Co-Investigator**  
**Title:** Next Generation MRI for Virtual Mechanical Testing of Bone Fracture Healing  
**PI:** Michael Hast and Hannah Dailey  
**Source:** National Institute of Biomedical Imaging and Bioengineering (R01)  
**Purpose:** The goals of this study are to use magnetic resonance imaging and computer modeling to measure bone healing over time and develop a diagnostic test for poor bone healing in a clinical setting.  
**Period:** 2023–2028  
**Award:** 0.75 calendar months per year salary support
  
3. **Role:** **Co-Investigator**  
**Title:** Identification of Causal Pathways Between Oral Health and Alzheimer’s Disease or Alzheimer’s Disease Related Dementias  
**PI:** Richard J. Manski  
**Source:** NIH R01  
**Period:** 2023–2027  
**Award:** 5% salary support
  
4. **Role:** **Co-Investigator**  
**Title:** Risk Factors Between Oral Health Care and Systemic Health Among the Medicare Population  
**PI:** Richard J. Manski  
**Source:** NIH R01  
**Period:** 2023–2027  
**Award:** 5% salary support
  
5. **Role:** **Principal Investigator and sole author of proposal**  
**Title:** Gaussian Mutual Information as a Context-Adaptive Linear Measure of Agreement  
**Source:** National Institute of Biomedical Imaging and Bioengineering (R03)  
**Purpose:** The aim of the proposed research is to develop a new statistical measure of agreement that is easy to interpret and can be adapted for use in any domain of inquiry. New, user-friendly software will enable a diverse community of practitioners to apply the new methodology to data.  
**Period:** 2023–2025  
**Award:** summer salary support

## Active Grants

1. **Role:** **Co-Investigator**  
**Title:** Water, Sanitation, and Hygiene (WASH) Insecurity and Mental Health  
**PI:** Rochelle Frounfelker and Gabrielle String  
**Source:** Lehigh University Faculty Innovation Grant Program  
**Purpose:** The aim of this study is to use mixed methods to understand the relationship between WASH insecurity and psychosocial well-being in low resource settings and humanitarian contexts.  
**Period:** 2023–2024  
**Award:** \$30,000
  
2. **Role:** **Co-Investigator**  
**Title:** Tiny Talks: Formulating Home-Based Intervention to Promote Native Children’s Communication and Language Skills Through Community-Based Participatory Research  
**PI:** Patti Manz

**Source:** Lehigh University Accelerator Grants Program  
**Purpose:** The aim of this project is to utilize community-based participatory research to adapt *Little Talks* for Native children and families, creating the *Tiny Talks* intervention for tribal maternal infant and early childhood home visiting programs.  
**Period:** 2022–2024

## Previous Grants

1. **Role:** **Co-Investigator**  
**Title:** Routes to Sustainability for Natural Gas Development and Water and Air Resources in the Rock Mountain Region  
**PI:** John Adgate and Joseph Ryan  
**Source:** NSF  
**Purpose:** The goals of this study are to assess the sustainability of natural gas development and its impacts on environmental media and health in the Rocky Mountain Region.  
**Period:** 2012–2018  
**Award:** 10% salary support
2. **Role:** **Co-Investigator**  
**Title:** Colorado Clinical and Translational Sciences Institute  
**PI:** Ronald Sokol  
**Source:** NIH/NCATS UL1 TR001082  
**Purpose:** The major goals of this project are to enhance clinical and translational research and science, training of clinical and translational scientists, and collaboration with the communities of Colorado and the surrounding region.  
**Period:** 2016–2018  
**Award:** 20% salary support
3. **Role:** **Co-Investigator**  
**Title:** Genetic Epidemiology of COPD (COPDGene)  
**PI:** James Crapo and Edwin Silverman  
**Source:** NIH/NHLBI  
**Purpose:** The goals of this study are to discover what heritable or genetic factors contribute to the development of COPD in some people and to use this information to develop new therapeutic approaches to control this disease.  
**Period:** 2016–2017  
**Award:** 25% salary support
4. **Role:** **Co-Investigator**  
**Title:** Develop a Center for Excellence for Mental Health Workforce  
**PI:** Piper Meyer–Kalos  
**Source:** MN Department of Human Services  
**Purpose:** The major goal of this project is to develop an individual practitioner certification for co-occurring mental health and substance use disorders, provide training and consultation in evidence-based practices, and pilot an intervention for co-occurring disorders.  
**Period:** 2014–2016  
**Award:** 12.5% salary support
5. **Role:** **Co-Investigator**  
**Title:** Mental Health Quality Improvement Project for Assertive  
**PI:** Piper Meyer–Kalos  
**Source:** MN Department of Human Services

- Purpose:** The major goals of this project are to pilot an intervention for integrated mental health and medical disorders on assertive community treatment teams.
- Period:** 2014–2015
- Award:** 12.5% salary support
6. **Role:** **Principal Investigator**
- Title:** Copula Models for Spatial Epidemiology of Cancer
- Source:** National Cancer Institute (R03)
- Purpose:** The aim of the proposed research is to develop a new class of statistical models that could potentially provide a more accurate description of cancer risk. New, user-friendly software will enable a diverse community of practitioners to apply the new models to spatially aggregated cancer data.
- Period:** 2014–2016
- Award:** 20% salary support
7. **Role:** **Co-Investigator**
- Title:** University of Minnesota Clinical and Translational Science Institute (UMN CTSI)
- PI:** Bruce Blazar
- Source:** NIH/NCATS UL1 TR000114 and KL2 TR000113
- Purpose:** The two major CTSI goals are to (1) create an academic home and a flexible infrastructure to coordinate and integrate CTS research and foster transparent communications and interactions between UMN and the community for the purpose of maximizing health outcome impact statewide, and (2) train and reward interdisciplinary CTS teams at UMN and in the community.
- Period:** March 2013–February 2016
- Award:** 20% salary support
8. **Role:** **Principal Investigator and sole author of proposal**
- Title:** New Methods for Spatial Statistics and Processive Motor Proteins
- Source:** Simons Foundation
- Purpose:** This award supports mathematical collaboration by funding travel and visitors.
- Period:** September 2012–December 2015
- Award:** \$35,000
9. **Role:** **Co-Investigator**
- Title:** RF Safety for Brain MRI at Ultra-High Fields
- PI:** Thomas Vaughn
- Source:** NIH R01
- Purpose:** The overall objective of this proposal is to investigate high frequency RF heating in order to improve RF safety for high field MRI.
- Period:** April 2012–January 2015
- Award:** 9% salary support
10. **Role:** **Principal Investigator and sole author of proposal**
- Title:** Open-Source Software for New Methods in Spatial Statistics
- Source:** Grant-in-Aid of Research, Artistry, and Scholarship
- Purpose:** The aim of this project is to design, develop, document (including a journal article), and freely distribute a new software package called `ngspatial` 1.0, which will support the use of several new spatial models.
- Period:** January 2012–June 2013
- Award:** \$26,072

## Software

### **R (nearly 350,000 downloads)**

1. The `batchmeans` package for R (with Murali Haran, Penn State Department of Statistics) (current version: 1.0-4)
2. The `CellularAutomaton` package for R (archived)
3. The `copCAR` package for R (with Emily Goren, Seagen) (current version: 2.0-4)
4. The `hash` package for R (authored by Christopher Brown, maintained by me) (current version: 2.2.6.3)
5. The `krippendorffsalpha` package for R (current version: 2.0)
6. The `lazygreedy` package for R (with Bokgyeong Kang, Penn State Department of Statistics) (archived)
7. The `mcmcse` package for R (with James Flegal, University of California Riverside Department of Statistics; Dootika Vats, Indian Institute of Technology Department of Mathematics and Statistics; Ning Dai, University of Minnesota School of Statistics; Kushagra Gupta, Indian Institute of Technology, Kanpur; and Uttiya Maji, JPMorgan Chase) (current version: 1.5-0)
8. The `ngspatial` package for R (with Xiaohui Cui, Illumina) (current version: 1.2-2)
9. The `pearson7` package for R (current version: 1.0-3)
10. The `Rmodule` package for R (current version: 1.0)
11. The `sklarsomega` package for R (current version: 3.0-2)

### **Perl (millions of downloads)**

1. The `Crypt::RC6` extension for Perl
2. The `Crypt::Serpent` extension for Perl

## Teaching, Advising, and Mentoring

### **Lehigh University**

#### **Courses Taught**

- BSTA 320 Biostatistics Independent Study (Victoria Napier), fall 2023
- BSTA 300 Apprentice Teaching, spring 2023
- BSTA 095 Introduction to Programming in R, spring 2023 (new course)
- BSTA 001 Population Health Data Science 1, spring 2023 (new course)
- BSTA 402 Health Data and Computational Science, fall 2022, 2023 (new course)
- BSTA/STAT 397 Nonparametric Statistics, spring 2022
- BSTA 396 Advanced R Programming, spring 2022 (new course)
- BSTA 101 Population Health Data Science 2, fall 2021 (new course)

### **Junior Faculty Mentored**

Interdisciplinary Networking Committee program

Dr David Rea (Department of Decision and Technology Analytics, College of Business)

Dr Rochelle Frounfelker (College of Health)

Dr Tom McAndrew (College of Health)

Dr Gabrielle String (College of Engineering and College of Health)

### **Doctoral Students Advised**

Bokgyeong Kang (Penn State Statistics, 2023; co-advisor Murali Haran)

Alyssa Hu (Penn State Statistics; co-advisor Matt Beckman)

### **Doctoral Committees Served on**

Tian Qin (Mathematics)

Xinshuo Wu (Mathematics, 2023)

### **Graduate Research Mentees**

EJ Rovella (Population Health)

Shashank Vankadari (Data Science)

### **Undergraduate Research Mentees**

Pennsylvania Asthma Surveillance System (PASS), 2022–2023

Joyce Park (co-mentor Hyunok Choi)

Rishika Gunda (co-mentor Hyunok Choi)

Tracy Zhang (co-mentor Hyunok Choi)

Energy, Air, and Birth in Kazakhstan, 2022–2023

Fabian Hernandez (co-mentor Hyunok Choi)

Kevin Simons (co-mentor Hyunok Choi)

### **Undergraduate Academic Advisees**

Lauren Hamamoto

Olivia Hammond

Kareem Hargrove

Blake Hartman

Evan Hasson

Sarah Lucey

Ellen Malone

Julia McDougall

Victoria Napier

Alexa Pil

Katherine Weiss

## **The Pennsylvania State University**

### **Courses Taught**

STAT 544 Categorical Data Analysis 1, spring 2021

### **Doctoral Students Advised**

Bokgyeong Kang (Statistics; co-advisor Murali Haran)

### **Doctoral Committees Served on**

Rebeka Yocum (Transportation Engineering, 2022)

## **University of Colorado**

### **Courses Taught**

BIOS 7717 Bayesian Inference, spring 2018

Statistical Literacy for Radiologists, spring 2017

BIOS 6611 Biostatistical Methods 1, fall 2016

### **Master's Projects Directed**

Sarah Ryan (Biostatistics, 2017; co-advisor Nichole Carlson)

### **Doctoral Committees Served on**

Alexandria Jensen (Biostatistics)

Lauren Hall (Statistics)

Manish Dalwani (Biostatistics, 2017)

Chris Czaja (Public Health)

### **Master's Committees Served on**

Andrea Fidell (Public Health)

Logan Langholz (Bioengineering)

## **University of Minnesota**

### **Courses Taught**

PubH 8422 Modern Nonparametrics, fall 2012, 2013, 2014, 2015

PubH 7406 Advanced Regression and Design, spring 2012, 2013, 2014, 2015



**Doctoral Students Advised**

Donald Musgrove (Biostatistics, 2016; co-advisor Lynn Eberly)

Martin Bezener (Statistics, 2015; co-advisor Galin Jones)

Lisa Henn (Biostatistics, 2015; co-advisor Jim Hodges)

**Master's Projects Directed**

Xu Guo (Biostatistics, 2015)

Jeremiah Aakre (MPH, 2014)

Michelle Warren (Biostatistics, 2014)

Eleena Iisakka (Biostatistics, 2014)

Emily Goren (Biostatistics, 2014)

Xiaohui Cui (Biostatistics, 2013)

**Doctoral Committees Served on**

Yang Yang (Statistics)

Dootika Vats (Statistics, 2017)

– also Dootika's co-mentor (with Charles Geyer) for Google Summer of Code 2015

Emre Eftelioglu (Computer Science)

Christina Knudson (Statistics, 2016)

Felipe Acosta (Statistics, 2015)

Erik Nelson (Epidemiology, 2014)

Ethan Van Norman (School Psychology, 2014)

Harrison Quick (Biostatistics, 2013)

Wenjun Kang (Biostatistics)

**Master's Committees Served on**

Tyler Kinzy (Biostatistics, 2016)

Andrew Nicklawsky (Biostatistics, 2014)

Stephanie Stoway (MPH, 2014)

Logan Stuck (Biostatistics, 2013)

Bryan McCauley (Statistics, 2013)

**PhD Student Academic Advisees**

Brian Hart

Rosalia Alcoser (transferred)

### **Master's Student Academic Advisees**

Xiaoyue Ma (Biostatistics, 2016)

Tyler Kinzy (Biostatistics, 2016)

Stephanie Stoway (MPH, 2014)

### **Frostburg State University**

#### **Courses Taught**

COSC 100 Introduction to Computer Science

COSC 220 Introduction to Software Applications

COSC 240 Computer Science 1

COSC 241 Computer Science 2

COSC 310 Data Structures and Algorithm Analysis

COSC 330 Web Design and Development

COSC 350 Low-Level Programming Concepts

COSC 489 Capstone Course

COSC 491 Seminar in Computer Science: Perl + Web Development

COSC 491/591 Seminar in Computer Science: Java Certification Preparation

COSC 499 Individual Problems in Computer Science

### **Service to the Profession**

Member, WNAR Regional Advisory Board, 2017–2018

External Reviewer for Faculty Promotion and Tenure at Robert Morris University, 2017

Member, Byar Award Committee, 2017

Member, Applications Subcommittee, Midwest Statistics Research Colloquium, 2013

### **Service to the University/College/Department**

#### **Lehigh University**

Member, Campus Planning and Operations Committee, 2023–

Member, Faculty Senate Executive Committee, 2023–

Member, Faculty Senate Research Environment Subcommittee, 2023–

Member, Lehigh Undergraduate Advising Committee, 2023–

Member, Faculty Athletics Council, 2022–

Member, HST Building Safety Committee, 2022–2023

College of Health faculty senator, 2022–2026

College of Health representative to College of Business and Economics, 2022–  
Referee, Global Social Impact Fellowship program, March 22, 2022  
College of Health representative, University Safety Committee, 2021–

### **Lehigh University, College of Health**

Member, College of Health Policy Committee, 2023–  
Biostatistics Program Committee Lead, 2023–  
Chair, Health Data Science Teaching Faculty Search Committees (2), fall 2023  
Member, Biostatistics Curriculum Committee, fall 2022, spring 2023  
Chair, AI Search Committee, fall 2022, spring 2023  
Chair, Telehealth Search Committee, fall 2022, spring 2023  
Chair, Visualization Search Committee, fall 2022, spring 2023  
Faculty Facilitator, Yale–Lehigh Summer Biostatistics Primer, summer 2022  
Member, Strategic Planning Team, spring 2022  
Member, Ellen and Vincent Forlenza '75 Endowed Chair in Health Innovation and Technology Search Committee; spring 2022, summer/fall 2022

### **Lehigh University, Department of Mathematics**

Member, Statistician Search Committee, fall 2021

### **University of Colorado**

Coordinator, Biostatistics Workshop Series 2017  
Member, Compass Steering Committee, 2016–2018

### **University of Colorado, Department of Biostatistics and Informatics**

Coordinator, Imaging Working Group, fall 2017–2018  
Member, MS Exam Committee, 2017  
Chair, CBC Research Associate Search Committee, spring, fall 2017, spring 2018  
Member, Informatics Search Committee, spring 2017

### **University of Colorado, Department of Radiology**

Coordinator, Radiology Pilot Research and Faculty Development Grant Program, fall 2017  
Judge, 2017 Spring Research Symposium  
Member, Research Committee, 2017–2018  
Member, Biostatistician Search Committee, fall 2017  
Member, Psychometrician Search Committee, spring 2017

## **University of Minnesota**

Member, OVPR Research Misconduct Investigation Panel, 2014–2015

## **University of Minnesota, School of Public Health**

Team for Environment/Water, SPH 2030 Strategic Plan

## **University of Minnesota, Division of Biostatistics**

Member, Computing Committee, 2014–2015 (Chair, 2015)

Member, Exam Committee, 2015

Member, Search Committee, spring 2013, fall 2013, fall 2014

Member, Seminar Committee, 2011–2012 (Chair, 2012–2015)

## **The Pennsylvania State University, Department of Statistics**

Vice President, Student Advisory Committee, 2009–2010

## **Frostburg State University, Department of Computer Science**

Chair, Curriculum Committee

Member, Equipment Committee

Member, Search Committee

## **Editorial Work**

Associate Editor, *Nature Scientific Reports*, 2023–

Associate Editor, *Journal of Computational and Graphical Statistics*, 2022–

International Advisory Board, *Medeniyet Medical Journal*, 2013–

Associate Editor, *Journal of Agricultural, Biological, and Environmental Statistics*, 2014–2018

Reviewer,

- *The American Statistician*
- *The Annals of Applied Statistics*
- *Bayesian Analysis*
- *Biometrics*
- *Biostatistics*
- *Clinical Trials*
- *Environmental and Ecological Statistics*
- *Environmetrics*
- *Frontiers in Applied Mathematics and Statistics*
- *Journal of Agricultural, Biological, and Environmental Statistics*
- *Journal of the American Statistical Association*
- *Journal of Computational and Graphical Statistics*

- *Journal of Evaluation in Clinical Practice*
- *Journal of Pediatric Rehabilitation Medicine*
- *Journal of the Royal Statistical Society, Series A*
- *Journal of the Royal Statistical Society, Series C*
- *Spatial and Spatiotemporal Epidemiology*
- *Spatial Statistics*
- *Statistics in Medicine*
- *Statistical Methodology*
- *Statistical Methods in Medical Research*
- *Statistica Sinica*
- University of Wisconsin ICTR Novel Methods Translational Research Pilot Program

## **Career Enrichment**

Best Practices in Faculty Recruitment workshop; Lehigh University ADVANCE; July 25, 2022

Speaking Up: How Bystanders Can Change the Conversation about Social Bias and Incivility; Lehigh University; February 17, 2022

Inclusive Excellence in Teaching workshop; Lehigh University; January 18–19, 2022

College of Health teaching workshop facilitated by Greg Reihman of the Lehigh Center for Innovation in Teaching and Learning; November 8, 2021

Cornell Interactive Theater Ensemble: Your Story, My Story; October 5, 2021