

Curriculum Vitae

John P Hughes

Academic Rank

Associate Professor with tenure

Founding chair, Lehigh Department of Biostatistics and Health Data Science, 2025–2027

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

Certificate, Nutrition and Healthy Living, Cornell University, 2024

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

TRUST TEAM project (PCORI funded), 2024–
Good Shepherd Rehabilitation Network, 2024–
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. S. Kolakowsky-Hayner, **J. Hughes**, D. Duerring, N. Keglovits, J. Kelley, and B. Leggin. Social determinants of low back pain in a rehabilitation setting.
2. R. Frounfelker, G. String, V. Napier, S. Vankadari, and **J. Hughes**. The WASHpsych datasets: WASH insecurity and psychosocial wellbeing in Ivory Coast and Nigeria.

Peer-Reviewed Journal Articles

54. R. M. Jones, I. Han, **J. Hughes**, and E. J. Nelson. Assessing residential neighborhood exposomes and their associations with cancer incidence: Rationale, study design, and methods. *American Journal of Epidemiology*, in press.
53. **J. Hughes**. Bayesian Gower agreement for categorical data. *Nature Scientific Reports*, 15:6568, 2025.
52. **J. Hughes**. Review of *Spatial Linear Models for Environmental Data*, by D. L. Zimmerman and J. M. Ver Hoef. *Biometrics*, in press.
51. R. M. Jones, E. R. Kulick, R. Snead, R. T. Wilson, **J. Hughes**, and T. Lillys. Enhanced spatial analysis assessing the association between PFAS-contaminated water and cancer incidence: Rationale, study design, and methods. *BMC Cancer*, 25(1):101, 2025.
50. M. Bahrami, K. Frew, **J. Hughes**, and H. L. Dailey. Reliable and streamlined model setup for digital twin assessment of fracture healing. *Journal of Biomechanics*, 180:112492, 2025.
49. B. Kang, **J. Hughes**, and M. Haran. Measuring sample quality in algorithms for intractable normalizing function problems. *Journal of Machine Learning Research*, 25(286):1–32, 2024.
48. B. Kang, **J. Hughes**, and M. Haran. Fast Bayesian inference for spatial mean-parameterized Conway–Maxwell–Poisson models. *Journal of Computational and Graphical Statistics*, 1–10, 2024.
47. **J. Hughes**. Toward improved inference for Krippendorff’s Alpha agreement coefficient. *Journal of Statistical Planning and Inference*, 233:106170, 2024.
46. **J. Hughes**. A Bayesian tour of binomial inference. *Statistics and Probability Letters*, 205:109974, 2024.
45. 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.
44. **J. Hughes**. A unified Gaussian copula methodology for spatial regression analysis. *Nature Scientific Reports*, 12:15915, 2022.
43. **J. Hughes**. Sklar’s Omega: A Gaussian copula-based framework for assessing agreement. *Statistics and Computing*, 32(3):46, 2022.
42. **J. Hughes**. krippendorffsalpha: An R package for measuring agreement using Krippendorff’s Alpha coefficient. *The R Journal*, 13(1):413–425, 2021.
41. **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.
40. 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.
39. 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.
38. 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.
37. L. McKenzie, B. Blair, **J. Hughes**, W. Allshouse, N. Blake, D. Helmig, P. Milmoie, 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.

36. 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.
35. 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.
34. S. Elwir, A. Shaukat, 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.
33. 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.
32. D. J. Bond, A. C. Andreazza, **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.
31. D. Bond, A. Andreazza, **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.
30. 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.
29. D. Musgrove, **J. Hughes**, and L. E. Eberly. Hierarchical copula regression models for areal data. *Spatial Statistics*, 17:38–49, 2016.
28. 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.
27. 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.
26. D. Musgrove, **J. Hughes**, and L. E. Eberly. Fast, fully Bayesian spatiotemporal inference for fMRI data. *Biostatistics*, 17(2):291–303, 2016.
25. 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.
24. 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.
23. 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.
22. 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.
21. 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.

20. **J. Hughes**. copCAR: A flexible regression model for areal data. *Journal of Computational and Graphical Statistics*, 24(3):733–755, 2015.
19. 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.
18. 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.
17. J. C. Keenan, G. A. Cortes Puentes, **J. Hughes**, A. B. Adams, D. Dries, and J. Marini. Lung compliance response to PEEP in an ARDS model: The effects of position and abdominal pressure. *American Journal of Respiratory and Critical Care Medicine*, 191:A3128, 2015.
16. 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.
15. **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.
14. 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.
13. 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.
12. 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.
11. 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.
10. 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.
9. D. Shrivastava, J. Tian, **J. Hughes**, and J. T. Vaughan. Stepping towards subject specific temperature modeling to improve thermal safety in clinical and ultra-high field MRI. *Frontiers in Biomedical Devices*, 56000:V001T08A002, 2013.
8. **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.
7. **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.
6. 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.
5. **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.

4. **J. Hughes**, M. Haran, and P. C. Caragea. Autologistic models for binary data on a lattice. *Environmetrics*, 22(7):857–871, 2011.
3. **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.
2. **J. Hughes** and J. Fricks. A mixture model for quantum dot images of kinesin motor assays. *Biometrics*, 67(2):588–595, 2011.
1. **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

39. Bayesian Filtering for Big Areal Data

Temple University Department of Biostatistics and Epidemiology; Philadelphia, PA, USA; November 14, 2024

38. Social Determinants of Low Back Pain in a Rehabilitation Setting

Leading Disruption: A Healthcare Innovation Summit; Bethlehem, PA, USA; April 6, 2024

37. Bayesian Filtering for Big Areal Data

Ohio State University Department of Statistics; Columbus, OH, USA; March 21, 2024

36. Bayesian Filtering for Big Areal Data

University of Houston Department of Mathematics; Houston, TX, USA; January 26, 2024

35. Bayesian Filtering for Big Areal Data

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

34. Bayesian Filtering for Big Areal Data

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

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

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

32. 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

31. Spatial Regression and the Bayesian Filter

University of Kentucky Department of Statistics; Lexington, KY, USA; February 9, 2018

30. Spatial Regression and the Bayesian Filter

University of Colorado Denver Department of Mathematical and Statistical Sciences; Denver, CO, USA; November 6, 2017

29. Regression for Binary Outcomes

University of Colorado Denver Department of Radiology; Aurora, CO, USA; October 18, 2017

28. Statistical Models for Spatially Referenced Data

Colorado Summer Institute in Biostatistics; Aurora, CO, USA; July 11, 2017

27. 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

26. T2* Relaxation Time of Acetabular and Femoral Cartilage with and without Intra-Articular Gadopenetate Dimeglumine in Patients with Femoroacetabular Impingement

University of Colorado Denver Department of Radiology; Aurora, CO, USA; February 8, 2017

25. 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

24. Hierarchical Copula Regression Models for Areal Data

2nd International Conference on Statistical Distributions and Applications; Niagara Falls, Canada; October 15–16, 2016

23. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data

XXVIIIth International Biometric Conference (IBC 2016); Victoria, BC, Canada; July 10–16, 2016

22. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data

2016 ICSA Applied Statistics Symposium; Atlanta, GA, USA; June 12–15, 2016

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

Yale University Department of Biostatistics; New Haven, CT, USA; April 12, 2016

20. 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

19. 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

17. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data
MCMSki V; Lenzerheide, Switzerland; January 4–7, 2016
16. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data
WNAR/IMS 2015 Annual Meeting; Boise, ID, USA; June 14–17, 2015
15. Estimating Velocity for Processive Motor Proteins with Random Detachment
St Olaf College; Northfield, MN, USA; May 4, 2015
14. Estimating Velocity for Processive Motor Proteins with Random Detachment
University of California Riverside Department of Statistics; Riverside, CA, USA; December 9, 2014
13. Estimating Velocity for Processive Motor Proteins with Random Detachment
SIAM Conference on the Life Sciences (LS14); Charlotte, NC, USA; August 4–7, 2014
12. 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
11. Estimating Velocity for Processive Motor Proteins with Random Detachment
ENAR 2014 Spring Meeting; Baltimore, MD, USA; March 16–19, 2014
10. Advances in MCMC for Spatial Generalized Linear Mixed Models
2013 Joint Statistical Meetings; Montréal, QC, Canada; August 3–8, 2013
9. Estimating Velocity for Processive Motor Proteins with Random Detachment
Istanbul Medeniyet University Department of Statistics; Istanbul, Turkey; June 13, 2013
8. 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
7. 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
6. 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
5. Dimension Reduction and Confounding in Spatial Generalized Linear Models
Iowa State University Department of Statistics; Ames, IA, USA; March, 2011
4. Dimension Reduction and Confounding in Spatial Generalized Linear Models
Oregon State University Department of Statistics; Corvallis, OR, USA; February, 2011

3. Dimension Reduction and Confounding in Spatial Generalized Linear Models

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

2. Dimension Reduction and Confounding in Spatial Generalized Linear Models

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

1. Dimension Reduction and Confounding in Spatial Generalized Linear Models

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

Contributed Presentations

§ = mentee presentation

31. Bayesian Filtering for Big Areal Data

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

30. § Creating Enhanced Codebooks for the WASHpsych Datasets

Lehigh College of Health Research Symposium; Bethlehem, PA, USA; December 11, 2023

29. § 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

28. § WASH Insecurity and Mental Health in Nigeria

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

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

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

26. § 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

25. § 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

24. § 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

23. § Diagnostics for Monte Carlo Algorithms for Models with Intractable Normalizing Functions

2021 Joint Statistical Meetings; virtual; August 8–12, 2021

22. § 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
21. § A Zero-Inflated Negative Binomial Regression Model for Spatiotemporal Data of US Vaccine Refusal
2021 MIDAS Network Annual Meeting; virtual; May 10–13, 2021
20. 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
19. Krippendorff’s Alpha Agreement Coefficient and R Package `krippendorffsalpha`
Penn State Department of Statistics; July 9, 2020
18. Hierarchical Copula Regression Models for Areal Data
Spatial Statistics 2017; Lancaster, UK; July 4–7, 2017
17. Hierarchical Copula Regression Models for Areal Data
WNAR/IMS 2017 Annual Meeting; Santa Fe, NM, USA; June 25–28, 2017
16. 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
15. Estimating Velocity for Processive Motor Proteins with Random Detachment
The 5th Annual Winter q-bio Meeting; Poipu, HI, USA; February 21–24, 2017
14. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data
5th Nordic–Baltic Biometric Conference; Reykjavik, Iceland; June 8–10, 2015
13. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data
ENAR 2015 Spring Meeting; Miami, FL, USA; March 15–18, 2015
12. Bayesian Inference for Gaussian Copula Regression Models
2014 Joint Statistical Meetings; Boston, MA, USA; August 2–7, 2014
11. Estimating Velocity for Processive Motor Proteins with Random Detachment
XXVIIth International Biometric Conference (IBC 2014); Florence, Italy; July 6–11, 2014
10. Fast, Fully Bayesian Spatiotemporal Inference for fMRI Data
7th Annual Bayesian Biostatistics and Bioinformatics Conference; Houston, TX, USA; February 12–14, 2014
9. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models
Spatial Statistics 2013; Columbus, OH, USA; June 4–7, 2013
8. Time-Varying Copula Models for Longitudinal Data

- ENAR 2013 Spring Meeting; Orlando, FL, USA; March 10–13, 2013
7. 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
 6. Dimension Reduction and Alleviation of Confounding for Spatial Generalized Linear Mixed Models
ISBA 2012 World Meeting; Kyoto, Japan; June 25–29, 2012
 5. copCAR: A Flexible Model for Areal Data
ENAR 2012 Spring Meeting; Washington, DC, USA; April 1–4, 2012
 4. 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
 3. Autologistic Models for Binary Data on a Lattice
MCMSki3; Park City, UT, USA; January 5–7, 2011
 2. Autologistic Models for Binary Data on a Lattice
2010 Joint Statistical Meetings; Vancouver, BC, Canada; July 31–August 5, 2010
 1. 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: 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
2. **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
3. **Role:** Co-Investigator
Title: Risk Factors Between Oral Health Care and Systemic Health Among the Medicare Population

- PI:** Richard J. Manksi
Source: NIH R01
Period: 2023–2027
Award: 5% salary support
4. **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: 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-Principal Investigator**
Title: Assessing Residential Neighborhood Exposome Exposures and Their Associations with Cancer Incidence
PI: Resa Jones (Temple University), Erik Nelson (Brigham Young University), Robert Perera (Virginia Commonwealth University)
Source: National Cancer Institute (R01)
Purpose: In this project we will consider the cumulative effects of historic neighborhood socioeconomic deprivation, racial segregation, environmental pollutants, and built environment exposures at different times over the lifecourse to better represent the neighborhood exposome for individuals in relation to colorectal, lung, and breast (female) cancer incidence.
Period: 2023–2028
Award: \$230,457 (Lehigh subaward)
3. **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

4. **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 `goweragreement` package for R (current version: 1.0-1)
6. The `krippendorffsalpha` package for R (current version: 2.0)
7. The `lazygreedy` package for R (with Bokgyeong Kang, Penn State Department of Statistics) (archived)
8. 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)
9. The `ngspatial` package for R (with Xiaohui Cui, Illumina) (current version: 1.2-2)
10. The `pearson7` package for R (current version: 1.0-3)
11. The `Rmodule` package for R (current version: 1.0)
12. 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 101/102 Population Health Data Science 1, fall 2024 (course numbers changed)

BSTA 402 Biostatistics in Health, fall 2024 (course name changed)

POPH 305 Honors Population Health Capstone (Helen Keetley), spring, fall 2024

BSTA 320 Biostatistics Independent Study (Victoria Napier), fall 2023

BSTA 300 Apprentice Teaching, spring 2023, 2024, fall 2024

BSTA 095 Introduction to Programming in R, spring 2023 (new course)

BSTA 001/002 Population Health Data Science 1, spring 2023, 2024 (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)

Dr Wayne Lee (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

Mehran Bahrami (Mechanical Engineering and Mechanics)

Tian Qin (Mathematics)

Xinshuo Wu (Mathematics, 2024)

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

Undergraduate Academic Mentees

Eyob Abate
Mahlet Abate
Dave Chadha
Shoshana Evans
Liam Hosfeld
Mark Ilodigwe
Jessica Ozzauto
Zoe Paisner
Christyl Yeboah

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, SAT in Admissions Working Group, 2024–2025

Member, Conflict of Interest Review Committee, 2024–

Member, Campus Planning and Operations Committee, 2023–

Member, Faculty Senate Executive Committee, 2023–2024

Member, Faculty Senate Research Environment Subcommittee, 2023–2024

Member, Lehigh Undergraduate Advising Committee, 2023–2024

Member, Faculty Athletics Council, 2022–

Member, HST Building Safety Committee, 2022–2023

College of Health faculty senator, 2022–2024

College of Health representative to College of Business and Economics, 2022–2024

Referee, Global Social Impact Fellowship program, March 22, 2022

College of Health representative, University Safety Committee, 2021–

Lehigh University, College of Health

Member, Health Data Science Graduate Program Working Group, 2024

Member, College of Health Policy Committee, 2023–

Biostatistics Program Committee Lead, 2023–2024

Member, College of Health Undergraduate Committee, 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

Lehigh University, College of Engineering

Member, Data Science for Health Search Committee, fall 2024, spring 2025

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*
- *Lehigh University College of Health Seed Funding Program*
- *PLOS One*

- *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