Statistics Research and Consulting

in the

Department of Mathematics & Statistics

http://www.uncg.edu/mat/statistics

Research Expertise

- High-Dimensional Data Analysis
- Sampling Designs for Sensitive Topics
- Multivariate and Nonparametric Statistics
- Survival Analysis
- Spatial Statistics

The Statistics faculty and students are active in research in areas including survey sampling, nonparametric methods, spatial statistics and high dimensional data analysis. Faculty and students also engage extensively in interdisciplinary collaborations with researchers both on and off campus.

The Department offers PhD, MA and BS degrees with concentrations in statistics, including new MA concentrations in Actuarial Mathematics and Data Analytics.

Statistics Programs at UNCG

- PhD in Computational Mathematics: Statistics Track (Teaching Assistantships available at $18,000 + tuition waivers)

- Doctoral Minor in Statistics

- M.A. in Mathematics: Concentrations in Applied Statistics, Actuarial Mathematics, Data Analytics

- Post-Baccalaureate Certificate in Statistics

- B.S. in Mathematics: Concentration in Statistics

Meet the Statistics Faculty

Dr. Xiaoli Gao (Associate Professor of Statistics)
Email: x_gao2@uncg.edu
Webpage: http://www.uncg.edu/~x_gao2
Office: Petty 130

Dr. Gao received her B.S. in Probability and Statistics from Anhui University, China in 2000 and her M.S. and Ph.D. in Statistics from the University of Iowa in 2005 and 2008, respectively. Her primary research areas of interest include high-dimensional data analysis, change point, copy number analysis, and survival analysis. With the development of technology, more and more big data sets arise from health sciences, social sciences, and biological sciences. One important question is to find those important features from tens of thousands potential ones. Dr. Gao has special expertise in handling those large-p-small-n problems. She is also looking forward to having a big-data science research group in Triad area. Before joining UNCG, Dr. Gao held an Assistant Professor position at Oakland University in Michigan. She also served as an intern biometrician at Merck & Co., Inc. in summer 2007 and a research assistant in the Statistical Consulting Center at the University of Iowa in Summer 2005. Some of her publications on high-dimensional data analysis and statistical genetics are shown on the right.

Dr. Xiaoli Gao, Recent Publications

Gao, X.L. and Feng, Y. (2018). Penalized weighted least absolute deviation regression, *Statistics and Its Interface,* 11(1), pp 79 – 89.
DOI: http://dx.doi.org/10.4310/SII.2018.v11.n1.a7

Gao, X.L., Ahmed, S.E. and Feng, Y. (2016). Post selection shrinkage estimation for high-dimensional analysis (Discussion Paper). *Applied Stochastic Models in Business and Industry,* DOI:10.1002/asmb.2193.

Gao, X.L. (2016). A flexible shrinkage operator for fussy grouped variable selection, *Statistical Papers,* Springer, 59(3), pp 985-1008.

Dr. Sat Gupta, Recent Publications

Gupta, S., Khan, Z., and Shabbir, J. (2018): Modified Systematic Sampling with Multiple Random Starts. *REVSTAT.,* Vol. 16, No. 2, 187 – 212

Khan, Z., Shabbir, J., **Gupta, S**. (2015): Generalized systematic sampling. *Communications in Statistics – Simulation and Computation,* Vol. 44, No. 9, 2240 – 2250.

Gupta, S., Shabbir, J. and Sehra, S. (2010). Mean and sensitivity estimation in optional randomized response models. *Journal of Statistical Planning and Inference,* Vol. 140, 2870-2874.

Dr. Sat Gupta
(Professor of Statistics)
Email: sngupta@uncg.edu
Webpage: www.uncg.edu/~sngupta
Office: Petty 126

Dr. Gupta is a Fellow of the American Statistical Association. He received a PhD in Mathematics from University of Delhi (1977) and a PhD in Statistics from Colorado State University (1987). He taught at University of Delhi for 6 years, at University of Southern Maine for 18 years, and has been at UNC Greensboro since 2004. He became a Full Professor in 1997. His main research area is sampling designs, particularly designs needed for collecting information on sensitive topics where there is a greater likelihood of respondent evasiveness and untruthfulness. He has collaborated with researchers from many fields including biology, marine biology, education, anthropology, psychology, medicine, nursing, and computer science. Some of these collaborative works have been funded by NSF, NIH and other funding agencies.
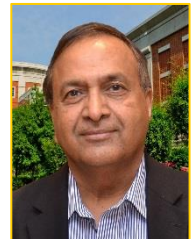
The Journal of Statistical Theory and Practice
http://www.tandfonline.com/toc/ujsp20/current

Dr. Gupta started this journal at UNCG in 2007. The main mission of the journal is to make an effort to advance the frontiers of knowledge in statistical sciences through expeditious publication of original scholarly articles covering statistical theory and its multifaceted applications. Due to extraordinary success of the journal in a very short period of time, it has drawn attention from eminent researchers in statistics as well as prominent publishers and indexers. The journal is indexed by many publishers including Emerging Sources Citation Index, Scopus, MathSciNet, and Zentralblatt. Legendary researchers like C. R. Rao have published in JSTP and have guest edited a special issue of the journal. The journal has been published by Taylor and Francis since 2012.

Dr. Scott Richter, Recent Publications

Richter, S. J. and McCann M. H. (2016) Permutation tests of scale using deviances. *Communications in Statistics: Simulation and Computation*.

Saari, S., Higgins, M**., Richter, S**. & Faeth, S. (2016) Urbanization does not increase abundance nor decrease richness of terrestrial animals – dissecting the literature through meta-analysis. *Urban Ecosystems* 19(3) 1251-1264.

Bhatt, I. S., Phillips, S. L**., Richter, S. J**., Tucker, D., Lundgren, K., Morehouse, R. & Henrich, V. (2016) A polymorphism in human estrogen-related receptor beta (ESRRβ) predicts audiometric temporary threshold shift. *International Journal of Audiology*, 55(10) 571-579.

Dr. Scott Richter (Professor of Statistics)
Email: sjricht2@uncg.edu
Webpage: http://www.uncg.edu/~sjricht2
Office: Petty 107

Dr. Richter received his PhD in Statistics from Oklahoma State University in 1997, and spent four years as an Assistant Professor at Western Kentucky University before coming to UNCG in 2001. His research interests are in multivariate and nonparametric statistics, especially in developing more robust procedures for linear models using resampling methods. Recent work has focused on multiple comparisons using permutation tests. Dr. Richter is Director of the Statistical Consulting Center, and has consulted extensively with faculty and graduate student researchers from biological, health and social sciences, education and business, and has delivered workshops on designing research studies. Some of these collaborations have led to co-authored publications and externally funded projects.

Dr. Jianping Sun (Assistant Professor of Statistics)
Email: j_sun4@uncg.edu
Office: Petty 105

Dr. Sun received her Ph.D. in Statistics from the Pennsylvania State University in 2011, and then had two postdoc experiences at Fred Hutchinson Cancer Research Center in Seattle and McGill University in Canada, respectively. Her research interests include both statistical methodology and applied research in analyzing high-dimensional complex genomic data. Her methodology research interests include, but not limit to, hierarchical modeling, multivariate analysis, and composite likelihood on complex data. She also has rich experiences in statistical genetics, especially in rare-variant association study, gene by environment interaction, next generation sequencing data, and analysis of gene expression and DNA methylation data. She has been collaborating with medical and biological researchers by providing statistical consulting and data analysis for multidisciplinary projects.

Dr. Jianping Sun, Recent Publications

Sun, J., Oualkacha, K., Forgetta, V., Zheng, H.F., Richards, J.B., Evans, D.S., Orwoll, E., and Greenwood, C. (2018). Exome-wide rare variant analyses of two bone mineral density phenotypes: the challenges of analyzing rare genetic variation. *Scientific Reports*, volume 8, Article number: 220. DOI: 10.1038/s41598-017-18385-9

Sun, J., Oualkacha, K., Forgetta, V., Zheng, H., Richards, B., Ciampi A., Greenwood, C., and the UK10K Consortium (2016). A method for analyzing multiple continuous phenotypes in rare variant association studies allowing for flexible correlations in variant effects. *European Journal of Human Genetics*, 24(9), p.1344-1351. DOI: 10.1038/ejhg.2016.8

Sun, J., Zheng, Y., and Hsu, L. (2013). A Unified Mixed Effects Model for Rare Variant Association in Sequencing Studies. *Genetic Epidemiology*, 37(4), p.334-344. DOI: 10.1002/gepi.21717

Dr. Haimeng Zhang, Recent Publications

Huang, C., **Zhang, H**., and Robeson, S. (2016). Intrinsic random functions and universal kriging on the circle. *Statistics and Probability Letters*, 108, 33 – 39.

Zhang, H., and Huang, C. (2014). A note on processes with random stationary increments, *Statistics and Probability Letters*, 94, 153 - 161.

Huang, C., **Zhang, H**., and Robeson, S. (2011). On the validity of commonly used covariance and variogram functions on the sphere, *Mathematical Geosciences*, 43, 721-733.

Dr. Haimeng Zhang (Professor of Statistics)
Email: h_zhang5@uncg.edu
Webpage:
www.uncg.edu/mat/faculty/h_zhang5
Office: Petty 139

Dr. Zhang received his Master's degree in Computer Engineering in 1996 and his Ph.D. degree in Applied Mathematics with Concentration in Statistics in 1998, both from the University of Southern California at Los Angeles, CA. He was Assistant Professor and then Associate Professor in Concordia College at Moorhead, MN from 1998 to 2008. He was Associate Professor of Statistics at Mississippi State University from 2008 to 2013. His research interests are in the fields of spatial statistics, survival analysis, and applied probability. He has been collaborating with researchers from many fields such as geography, biology, computer science, and health science. His current NSF-supported research focuses on the statistical analysis of global-scale processes and phenomena using spatio-temporal data collected from global networks and satellite sensors.

The staff of the Statistical Consulting Center can provide advice and assistance to researchers, including:

- Design of research studies
- Grant proposal preparation
- Advice on the choice and application of statistical methods, as well as the presentation of results
- Assistance with statistical and graphical analysis of data, including the use of statistical software

Recent Collaborations

- Sat Gupta with Debra Wallace and Patricia Crane (School of Nursing), on an NIH funded project: *Comparing Risk of Myocardial Infarction Reoccurrence in Whites and Blacks.*
- Sat Gupta with Susan Letvak (Nursing) and Chris Ruhm (Economics) on a Robert Wood Johnson Foundation funded project: *The Effects of Nurse Presenteeism on Quality of Care and Patient Safety.*
- Scott Richter with Jigna Dharod (Nutrition), on an NC TraCS Institute funded project: *Food Insecurity Among African American Women.*
- Scott Richter with S. Phillips (Communication Sciences and Disorders), V. Henrich (Center for Biotechnology, Genomics and Health Research), S. Mace (Music Research Institute), on an NIH funded project: *Genetic Bases of Noise-Induced Hearing Loss.*
- Xiaoli Gao with Christine Murray (Counseling and Educational Development) and Rick Bunch (Geography) on UNCG Strategy Grant: *Identifying High-Risk and Underserved Neighborhoods for Interpersonal Violence and Abuse in Greensboro Using Geographic Information Systems (GIS) and Big Data Analyses.*

USING THE CENTER

Faculty and staff
General consultation is provided to faculty and staff free of charge. However, researchers routinely list consultants as co-authors on journal publications or paper presentations, and as co-PIs on research grants, as recognition for their contributions. Researchers are encouraged to interact with a consultant as early as possible in a study, preferably at the planning stage.

Graduate students
Graduate students who wish to use the SCC must register for STA 667. The student will then be entitled to one hour of consulting per week for that semester. STA 667 is designed to be a learning experience for both the consultants and their clients. Every attempt is made to increase the understanding of using statistics to help answer research questions.

More information
Contact the Director at scc@uncg.edu, or visit the SCC web page at www.uncg.edu/mat/sta/consulting.html