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Symposium on Frontiers of Statistics

The Committee on Applied and Theoretical Statistics

June 22, 2023
2:00 - 5:00 p.m. ET

Register for this virtual symposium:
https://events.nationalacademies.org/39831_06-2023_frontiers-of-statistics-symposium

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2:00 PM[1] **Introduction & Welcome**
Dr. Lance Waller
Co-Chair for the Committee on Applied and Theoretical Statistics

2:05 PM **The Role of Statistical Thinking**
Dr. Joel Greenhouse (Carnegie Mellon University)

2:35 PM **Bayesian Thinking and Analysis for Complex Problems**
Dr. Marina Vannucci (Rice University)

3:05 PM **BREAK**

3:20 PM **The Role of Statistical Thinking**
Dr. Tyler McCormick (University of Washington)

3:50 PM **New Challenges and Opportunities for Statistics**
Dr. Helen Hao Zhang (University of Arizona)

4:20 PM **Closing Panel**
Moderator: Dr. Nick Horton
Co-Chair for the Committee on Applied and Theoretical Statistics
Panelists will discuss topics such as:

- Developments in deep learning, artificial intelligence, and data science, as well as the statistical questions that motivate this growth;
- Fostering interactions with other domains that are enriched by the statistical sciences
- Areas of growth and new trends in statistics

5:00 **ADJOURN**

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[1] All times ET

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Speaker and Moderator Biographies

Joel Greenhouse, Ph.D

Joel B. Greenhouse is professor of statistics & data science at Carnegie Mellon University and adjunct professor of psychiatry and epidemiology at the University of Pittsburgh. His statistical research interests include applications of Bayesian methods in practice and issues related to combining information from multiple data sources, especially as used to synthesize evidence for making policy and for scientific discovery. Greenhouse's collaborative research has included applications in mental health, communication disorders, education, and transportation safety. Greenhouse has served on several National Academies' committees and panels, including the Committee on National Statistics, the Panel on Combining Information, and the Institute of Medicine's Committee on the Assessment of Family Violence Interventions. He is an elected fellow of the American Statistical Association and the American Association for the Advancement of Science, and an elected member of the International Statistical Institute. In 2020 he was recognized as a National Associate of the National Research Council. He has also served on numerous data and safety monitoring boards and scientific advisory committees for the NIH and the Veterans Administration. Greenhouse received a PhD and an MPH in biostatistics from the University of Michigan and a BS in mathematics from the University of Maryland.

Nicholas Horton, Sc.D

Dr. Horton is Beitzel Professor of Technology and Society (Statistics and Data Science) at Amherst College. He teaches courses in statistics, data science, and related fields. He is passionate about improving quantitative and computational literacy for students with a variety of backgrounds and has worked to deepen engagement and mastery of higher-level concepts and data acumen. As an applied biostatistician, Dr. Horton's work is based squarely within the mathematical and computational sciences, but spans other fields in order to ensure that research is conducted on a sound footing. The real-world research problems that these investigators face often require the use of novel solutions and approaches, since existing methodology is sometimes inadequate. Bridging the gap between theory and practice in interdisciplinary settings is often a challenge, and has been a particular focus of Dr. Horton's work in missing data methods and longitudinal regression. He served as the chair of the Committee of Presidents of Statistical Societies, as a member of the Roundtable on Data Science Postsecondary Education, and on the Data Science for Undergraduates consensus study. Dr. Horton has published more than 170 papers in statistics and biomedical research and four books on statistical computing and data science. He has been the recipient of a number of teaching awards and the American Statistical Association Founders Award. Dr. Horton is a fellow of the American Statistical Association and the American Association for the Advancement of Science.

He earned his A.B. from Harvard College and his Sc.D. in biostatistics from the Harvard School of Public Health.

Tyler McCormick, Ph.D

Tyler McCormick is an Associate Professor (Professor effective September 2023) of Statistics and Sociology at the University of Washington, where he is also a core faculty member in the Center for Statistics and the Social Sciences. He is also a Senior Data Science Fellow at the eScience Institute, UW's data science center. Tyler's work develops statistical models that infer dependence structure in scientific settings where data are sparsely observed or observed subject to error. His recent projects include estimating features of social networks (e.g. the degree of clustering or how central an individual is) using data from standard surveys, inferring a likely cause of death (when deaths happen outside of hospitals) using reports from surviving caretakers, and quantifying & communicating uncertainty in predictive models for global health policymakers. He holds a PhD in Statistics (with distinction) from Columbia University and is the recipient of an NIH New Innovator (DP2) Award, NIH Career Development (K01) Award, Army Research Office Young Investigator Program Award, and a Google Faculty Research Award. Tyler is the former Editor for the Journal of Computational and Graphical Statistics (JCGS) and was elected as a Fellow of the American Statistical Association in 2023. More information is available on his website: thmccormick.github.io.

Lance Waller, Ph.D

Lance A. Waller is Rollins Professor of the Department of Biostatistics and Bioinformatics in the Rollins School of Public Health at Emory University. He received a Ph.D. in Operations Research from Cornell University in 1992. Dr. Waller's research involves the development of statistical methods to analyze spatial and spatio-temporal patterns. Past research involves the assessment of spatial clustering of disease, linking spatial statistics and geographic information systems, statistical assessments of environmental justice, and hierarchical Bayesian methods for modeling small-area health statistics. Recent areas of interest include spatial point process methods in alcohol epidemiology, conservation biology, and hierarchical models in disease ecology. Dr. Waller was the recipient of the 2004 Abdel El- Shaarawi Young Researcher’s Award. Dr. Waller has served on multiple National Academies committees including the National Research Council Committee on the Review of Existing and Potential Standoff Explosives Detection Techniques, the Institute of Medicine Committee on the Utility of Proximity-based Herbicide Exposure Assessments in Epidemiologic Studies in Vietnam Veterans, the National Academies Committee To Assess Potential Health Effects from Exposures to PAVE PAWS Low-level Phased-array Radiofrequency Energy, and the National Academies Committee on Analysis Of Cancer Risks in Populations Near Nuclear Facilities: Phase 1. In addition, Dr. Waller currently co-chairs the Committee on Applied and Theoretical Statistics.

Marina Vannucci, Ph.D

Dr. Vannucci is currently Noah Harding Professor of Statistics at Rice University and holds an Adjunct appointment with the Department of Biostatistics at the UT MD Anderson Cancer Center. She received a Laurea (B.S.) degree in Mathematics in 1992 and a Ph.D. degree in Statistics in 1996, both from the University of Florence, Italy. Dr. Vannucci is generally interested in the development of Bayesian statistical models for complex problems and applications to Science. She has contributed methodological innovations to wavelet-based modeling of functional data; variable selection approaches for linear settings, model-based clustering and models for non-Gaussian data; and methods for multiple graphs estimation. Her research is often motivated by real problems that need to be addressed with suitable statistical methods. She has a solid history of scientific collaborations and is particularly interested in applications of Bayesian statistics in high-throughput genomics, neuroimaging and neuroscience. Dr. Vannucci was the recipient of an NSF CAREER award in 2001 and won the Mitchell prize from the International Society for Bayesian Analysis in 2003. She is an elected Member of the International Statistical Institute and an elected Fellow of the American Statistical Association, the Institute of Mathematical Statistics, the American Association for the Advancement of Science and the International Society for Bayesian Analysis (ISBA). In 2020, she was awarded the Zellner Medal by ISBA for exceptional service over an extended period of time with long-lasting impact.

Helen Hao Zhang, Ph.D

Dr. Hao Helen Zhang is a statistician and professor in mathematics at the University of Arizona. Dr. Zhang's research interest includes statistical machine learning, high-dimensional data analysis, nonparametric smoothing, and biomedical data analyses. She has more than 15 years of research and teaching experiences in machine learning for predictive data analytics and is co-author of the textbook Principles and Theory for Data Mining and Machine Learning. Additionally, she serves as Chair of the University of Arizona Statistics and Data Science Graduate Interdisciplinary Program, and was associate editor of the Journal of the American Statistical Association, Journal of Royal Statistical Society, Journal of Computational and Graphical Statistics, and Statistical Analysis and Data Mining, and as the Editor-in-chief of the journal STAT. She is a fellow of the American Statistical Association, fellow of the Institute of Mathematical Statistics, and the 2019 IMS Medallion Lecturer.

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The Committee on Applied and Theoretical Statistics (CATS) advises stakeholders in government, academia, industry, and nonprofit organizations on statistics and data science, and their many applications.

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