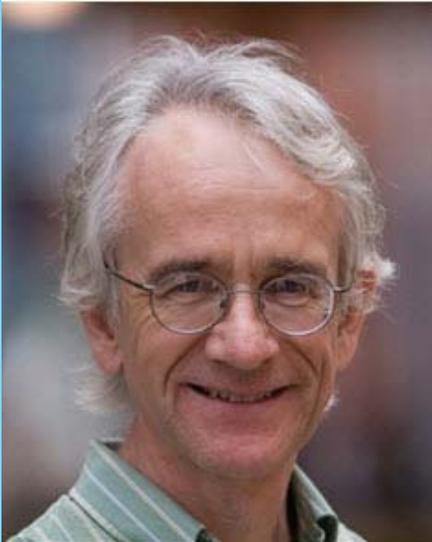


The Department of Applied Mathematics and Statistics presents the
JOHN C. & SUSAN S.G. WIERMAN LECTURE



Attribution of Extreme Climatic Events

Richard L. Smith

Mark L. Reed III Distinguished Professor
University of North Carolina, Chapel Hill



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Superstorm Sandy is merely the most recent high-impact weather event to raise concerns about extreme weather events becoming more frequent or more severe. Previous examples include the western European heatwave of 2003, the Russian heatwave and the Pakistan floods of 2010, and the Texas heatwave of 2011. However, it remains an open question to what extent such events may be “attributed” to human influences such as increasing greenhouse gases. One way to answer this question is to run climate models under two scenarios, one including all the anthropogenic forcing factors (in particular, greenhouse gases) while the other is run only including the natural forcings (e.g. solar fluctuations) or control runs with no forcings at all. Based on the climate model runs, probabilities of the extreme event of interest may be computed under both scenarios, followed by the risk ratio or the “fraction of attributable risk”, which has become popular in the climatology community as a measure of the human influence on extreme events. This talk will discuss statistical approaches to these quantities, including the use of extreme value theory as a method of quantifying the risk of extreme events, and Bayesian hierarchical models for combining the results of different climate models. This is joint work with Xuan Li (UNC) and Michael Wehner (Lawrence Berkeley Lab).

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BIO-SKETCH

Richard L. Smith is Mark L. Reed III Distinguished Professor of Statistics and Professor of Biostatistics in the University of North Carolina, Chapel Hill. He is also Director of the Statistical and Applied Mathematical Sciences Institute, a Mathematical Sciences Institute supported by the National Science Foundation. He obtained his PhD from Cornell University and previously held academic positions at Imperial College (London), the University of Surrey (Guildford, England) and Cambridge University. His main research interest is environmental statistics and associated areas of methodological research such as spatial statistics, time series analysis and extreme value theory. He is particularly interested in statistical aspects of climate change research, and in air pollution including its health effects. He is a Fellow of the American Statistical Association and the Institute of Mathematical Statistics, an Elected Member of the International Statistical Institute, and has won the Guy Medal in Silver of the Royal Statistical Society, and the Distinguished Achievement Medal of the Section on Statistics and the Environment, American Statistical Association. In 2004 he was the J. Stuart Hunter Lecturer of The International Environmetrics Society (TIES). He is also a Chartered Statistician of the Royal Statistical Society.



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This lecture series features talks on developments in air quality data analysis that are relevant for policy development. It seeks to bring together faculty and researchers in engineering and sciences with state and local air quality officials, to enhance understanding and stimulate collaboration on important air quality issues. The lectures are intended to showcase new developments, to encourage the quantitative analysis of scientific issues related to air quality, and to elucidate the policy implications of recent research.

The Sponsors:

John C. Wierman, a professor of Applied Mathematics and Statistics at Johns Hopkins University since 1981, served as department chair from 1988 to 2000. The founder of the W.P. Carey Program in Entrepreneurship and Management, he was director of the program and its successor, the Center for Leadership Education, from 1996 until 2009. His mathematical research is published in probability, discrete mathematics, and statistics, with applied articles in physics, computer science, microbiology, education, and business. He received his B.S. and Ph.D. degrees from the University of Washington.

Susan S.G. Wierman, the Executive Director of the Mid-Atlantic Regional Air Management Association, works to improve regional air quality. She is a fellow of the Air and Waste Management Association, with planning degrees from the University of Washington and a certificate in Continuing Engineering Studies from Johns Hopkins University.