The Role of Geostatistics in Environmental Epidemiology

Invited Speaker: Prof. Dr. Pierre Goovaerts (BioMedware Inc; the University of Florida)

Abstract: Geostatistics provides a set of statistical tools for the analysis of data distributed in space and time. It allows the description of spatial patterns in the data, the incorporation of multiple sources of information in the mapping of attributes, the modeling of the spatial uncertainty and its propagation through decision-making. Since its development in the mining industry, geostatistics has emerged as the primary tool for spatial data analysis in various fields, ranging from earth and atmospheric sciences, to agriculture, soil science, environmental studies, and more recently exposure assessment. In the last few years, these tools have been tailored to the field of medical geography or spatial epidemiology, which is concerned with the study of spatial patterns of disease incidence and mortality and the identification of potential "causes" of disease, such as environmental exposure or socio-demographic factor. This paper provides an overview of geostatistical methods available for the analysis of environmental and health data, with a focus on the mapping of groundwater arsenic in Michigan and its relationship to the incidence of prostate cancer.

Short Curriculum Vitae: Dr. Pierre Goovaerts studied at the Catholic University of Louvain-la-Neuve (Belgium) and at Stanford University, where he wrote the textbook entitled Geostatistics for Natural Resources Evaluation published by Oxford University Press in 1997. After five years on the Faculty at the University of Michigan, he became in 2002 Chief Scientist for the R&D Company, Biomedware, Inc, where he conducts NIH funded research on the development of geostatistical methodology for the analysis of health and environmental data. He has been developing and implementing in the software SpaceStat new techniques for mapping, cluster and boundary analysis of health outcomes, with a particular focus on cancer. Dr. Goovaerts has authored more than 130 refereed papers in the field of theoretical and applied geostatistics, and he is a reviewer for 50 international journals. He has taught numerous short courses in the US and Europe, which were attended by academics, consultants and federal employees. He has also been teaching in India and Africa.

Dr. Goovaerts created in 2001 his own consulting

company, PGeostat, LLC. He now acts as a consultant for the Environmental Protection Agency, the Nuclear Regulatory Commission, and he is bringing his expertise to numerous projects in US and Europe dealing with the characterization of air, soil and water pollution and its impact on human health. Since 2009 he is an off-site employee for the international company CSC (Computer Sciences Corporation), providing expertise on the geostatistical modeling of contaminated sediments in rivers and lakes. He is also working on the preparation of a best practice document for the geostatistical characterization of contaminated sites.

For the last five years, Dr. Goovaerts has been a Courtesy Associate Professor at the University of Florida, Soil and Water Science Department. In 2009, he was appointed Associate Editor of the international journal Mathematical Geosciences. For more information about Dr. Goovaerts, visit his home page at: goovaerts.pierre.googlepages.com.