

COMPUTER SCIENCE
SEMINAR

*Maps and Math: Geographic Information Systems and Spatial
Analysis*

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Abstract: The use of maps to reveal spatial patterns and associations has a long history. More recently, maps and spatial patterns have been used in order to try to understand underlying processes driving the patterns. For example, public health researchers may be interested in investigating whether cases of childhood cancer clustered around toxic waste sites, or conservation biologists may be interested in whether beach construction impacts nesting patterns for endangered sea turtles in Florida. Geographic information systems offer a powerful mechanism for linking spatially referenced data from different sources in order to address questions like these. In this presentation, we will review the basic structure of geographic information systems, central concepts to their use in research, and examples from the fields of epidemiology, disease ecology, conservation biology, and neurology.

Bio:

Dr. Waller received his PhD in Operations Research from Cornell University in 1992. His interests involve statistical analysis of spatially referenced data. Examples include tests of spatial clustering of disease cases, for example around a hazardous waste site; small area estimation; hierarchical models with spatially structured random effects; and spatial point process models. Recent applications include spatiotemporal mapping of disease rates, statistical methods for assessing environmental justice, the analysis of spatial trends in Lyme disease incidence and reporting, spatial modelling of the spread of raccoon rabies, and point process analysis of sea turtle nesting locations in Florida. He is interested in both the statistical methodology, and the environmental and epidemiologic models involved in the analysis of this type of data. He teaches courses in spatial biostatistics, applied linear models, and Geographic Information Systems (GIS) in Public Health.

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