

## Computer Science Seminar Series, 2011

### National Capital Region

# Detecting Global Clustering Patterns and Outliers on Spatially Correlated data for Disease Surveillance

**Speaker: Prof. Monica Jackson**

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**Friday, April 15, 2011**

**1:00PM-2:00PM, NVC 325**

#### **Abstract**

The ability to evaluate geographic heterogeneity of cancer incidence and mortality is important in cancer surveillance. Exploring the relationships between cancer rates and associated regional environmental factors, health care, and social economic status has proven to be beneficial in understanding cancer risk and providing preventable measures. Many statistical methods are available for spatial heterogeneity. In this talk, we focus on two aspects: global clustering evaluation and local anomaly (outlier) detection. We compare methods for global clustering evaluation including Tango's Index, Moran's  $I$ , and Oden's  $I_{pop}$ ; and cluster detection methods such as local Moran's  $I$  and SaTScan elliptic version on simulated count data that mimic global clustering patterns and outliers for cancer cases in the continental United States. We examine the power and precision of the selected methods in the purely spatial analysis. We also illustrate Tango's MEET and SaTScan elliptic version on a 1987-2004 HIV and a 1950-1969 lung cancer mortality data in the United States. Finally, we present a modified version of Moran's  $I$  that we developed which has a higher power than the original Moran's  $I$  and  $I_{pop}$ .

#### **Biography**

Monica Christine Jackson was born and raised in Kansas City, Missouri. She obtained a B.S. and M.S. degree in mathematics from Clark Atlanta University. She completed a PhD in applied mathematics and computational science from University of Maryland. After completing her degree at the University of Maryland, she was a post doctoral researcher at Emory University in the department of Biostatistics under the direction of Lance A. Waller. She has held visiting research positions at the National Cancer Institute and the Statistical and Applied Mathematical Sciences Institute. Currently, she is an Assistant Professor of Statistics at American University in Washington, DC. Her current research interests are in the areas of spatial statistics and disease surveillance with applications to developing and investigating methods for detecting cancer clusters, global clustering patterns, and developing simulation algorithms for spatially correlated data.