An Introduction to GIS and Spatial Statistics for Environmental Health Applications

Carol A. Gotway Crawford
National Center for Environmental Health
Centers for Disease Control and Prevention
Atlanta, GA

Tuesday, July 13:

Morning:

Module 1:
       What is a GIS?
       Why do spatial analysis?
       Maps
       Visualization
       Geodesy
       GIS terminology

Module 2:
       Basic GIS operations
       Location reference methods
       Census geography

Module 3:
       Advantages and Disadvantages of GIS
       Software
       Spatial statistics.

Afternoon:

Module 1:
       Overview of Spatial Statistics in Environmental Health

Module 2:
       Analyzing Regional Data
              Challenges (small number problem, MAUP, ecological inference)
              Smoothing
              Clustering
                     Indices of spatial autocorrelation: Moran's I
                     Other methods
              Clusters:
                     Local Moran's I
                     Scan Statistics
              Focused Tests

Wednesday, July 14 (1/2 day):

Regression Modeling with Spatial Data

    Spatially-continuous data
           OLS
           Regression diagnostics
           GLS
    Regional data analysis
           Spatial autoregressive models
    Generalized linear models

Thursday, July 15 (1/2 day):

Change of support
           Definition of support;
           Why it matters
           MAUP
           Statistical Solutions;
           Geostatistical Solutions;
           Comparison of Methods