Map-ematically Messing with Maps:

Extending Traditional Math/Stat to Grid-based Map Analysis and Modeling

Hosted by **WCNR GIS Seminar Series** and **Geospatial Centroid, Colorado State University**

Monday, January 30, 2011 – 4-5pm, Natural Resources Building, Room 109

Presentation by **Joseph K. Berry**

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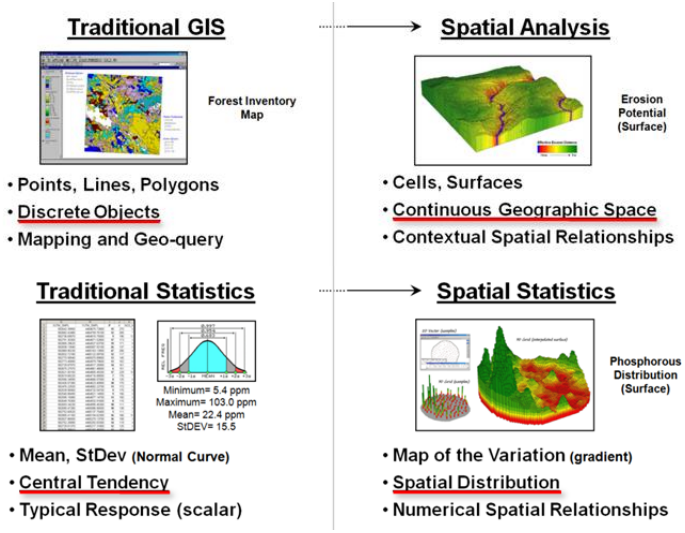
This presentation describes the idea of ***spatial*STEM for teaching map analysis and modeling fundamentals within a mathematical/statistical context** that resonates with science, technology, engineering and math/stat communities. The premise is that "maps are numbers first, pictures later" and we do mathematical things to mapped data for insight and better understanding of spatial patterns and relationships within decision-making contexts …from *Where* is *What* graphical inventories to a *Why*, *So What* and *What If* problem solving environment.



The map-*ematical* approach focuses on analytical tools used in spatial reasoning by non-GIS communities instead of traditional "GIS mechanics" of data acquisition, storage, retrieval, query and display of map features directed toward GIS specialists. The goal is to get the STEM communities to "think with maps" and infuse direct consideration of spatial patterns and relationships into their endeavors, as an alternative for spatially-aggregated math/stat procedures that assume uniform or random distribution in geographic space.

Topics:

Quantitative Nature of Modern Maps – conceptual approach, mathematical framework and data structure supporting a mathematical treatment of mapped data

Spatial Analysis Operations – extensions of traditional mathematics that focus on "contextual" geographic relationships (map math, algebra, calculus, plane and solid geometry, unique map analytics)

Spatial Statistics Operations – extensions of traditional statistics that focus on "numerical" relationships of map values (map descriptive statistics, normalization, comparison, classification, surface modeling, predictive statistics)

About the Presenter: Dr. Berry is a leading consultant and educator in the application of GIS technology. He is the principal of Berry and Associates // Spatial Information Systems (*BASIS*), consultants and software developers in geotechnology and the author of the "Beyond Mapping" column for GeoWorld magazine since 1989, several books and over 200 papers on GIS theory and applications. He conducted basic research and taught courses in GIS for twelve years at Yale University's Graduate School of Forestry and Environmental Studies, and is currently an Adjunct Faculty member in Geosciences at the University of Denver and in Natural Resources at Colorado State University.

Additional Information:

SpatialSTEM Has Deep Mathematical Roots — *provides a conceptual framework for the mathematical treatment of mapped data, GeoWorld Beyond Mapping column, January 2012. J.K. Berry.*
http://www.innovativegis.com/basis/MapAnalysis/MA_Intro/MA_Intro.htm#sSTEM1

Map-ematically Messing with Mapped Data — *discusses the nature of grid-based mapped data and spatial analysis operations (Math), GeoWorld Beyond Mapping column, February 2012. J.K. Berry.*
http://www.innovativegis.com/basis/MapAnalysis/MA_Intro/MA_Intro.htm#sSTEM2

Painting by the Numbers outside the Traditional Statistics Box — *discusses the nature of spatial statistics operations (Stat), GeoWorld Beyond Mapping column, March 2012. J.K. Berry.*
http://www.innovativegis.com/basis/MapAnalysis/MA_Intro/MA_Intro.htm#sSTEM3

Beyond Mapping III — *an online book containing Introduction, 28 Chapters and Epilog as a compilation of the popular Beyond Mapping columns published in GeoWorld magazine from 1996 through present, BASIS, Fort Collins, Colorado, 2012. J.K. Berry.*
http://www.innovativegis.com/basis/MapAnalysis/

(PowerPoint and materials used in the presentation are posted at ***www.innovativegis.com/basis/Present/CSU_winter2012/****)*