# Resources for Spatial Social Science

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American Sociological Association

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the question of culture

# What is CSISS?

- NSF Funding to support national infrastructure for *Spatial Social Science*
- Oct 1999 to Sept 2004 (~$4.5 million)
- NCGIA / ISBER, University of California, Santa Barbara
- PI – M.F. Goodchild, Co-PI – R.P. Appelbaum
- PI – tools development, Luc Anselin, UIUC
- Chair of Advisory Board – B.J.L. Berry
- Program Director – D.G. Janelle

# Consortium of Social Science Associations

- **Anthropology**
- **Economics**
- **History**
- **Political Science**
- **Psychology**
- **Criminology**
- **Sociology**
- **Geography**
- **Law**
- **Linguistics**
- **Communications**
- **Statistics**

- **History of Science**
- **Agricultural Economics**
- **Public Opinion Research**
- **Operations Research and Management Science**
- **Public Affairs and Administration**
- **Regional Science**
- **Area Studies**
- **Population Studies**
- **Women's Studies**
- **Child Development**
- **Religious Studies**

# Social Science Infrastructure

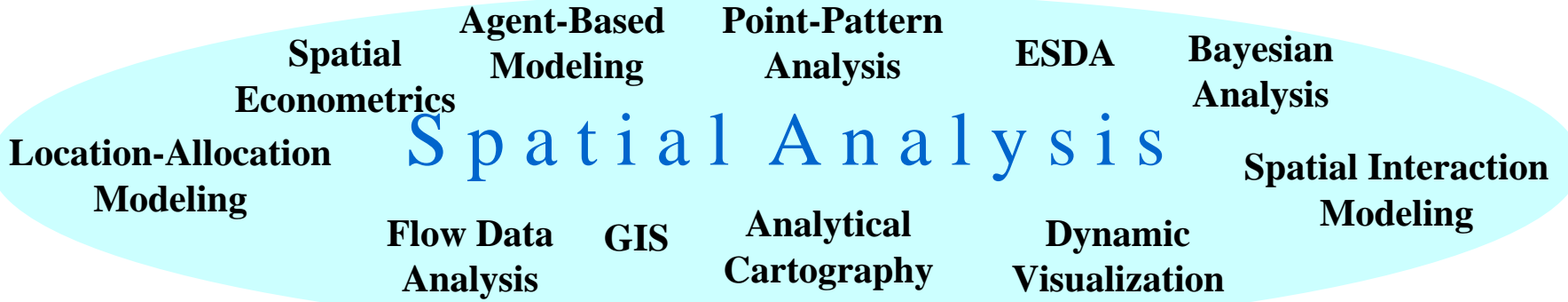Enhancing shared resources for research and learning — **the NSF View**

- Data and tools
- Human resources - training, education
- Communication - linkages, networks, collaboration
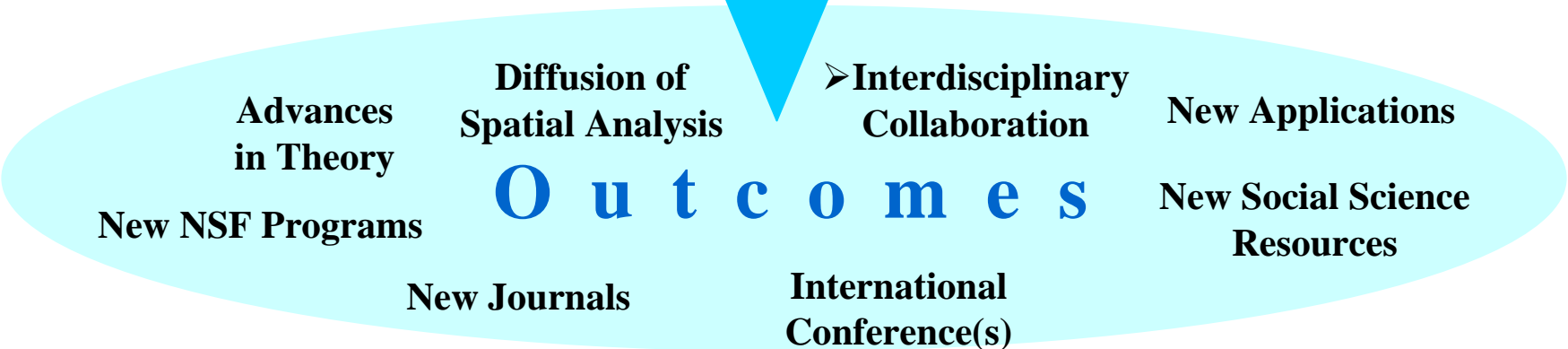- Outreach - accessibility and dissemination

# Spatial Social Science
# The CSISS Perspective

- **Views space as integrating social processes**
- **Sees social science problems as processes in place**
- **Uses GIS to integrate data by location**
- **Uses spatial analysis to integrate multi-discipline views**

Crime & Law Enforcement

Space-Time Accessibility

Urban & Regional Issues

Cultural Analysis

Health & Disease

Biophysical-Human Interface

## Critical Themes in Social Science

Equity

Externalities

Globalization

International Conflict

Community Organization

Electoral Processes

## Key Investigators

Risk Theory

Small-Area Analysis

Population & Demographic Issues

Governance

## CSISS Specialist Meetings

Tools Development

Workshops

Learning Resources

Best-Practice Publications

# Human and Social Dynamics
NSF Directorate for Social, Behavioral, and Economic Sciences Funding Priorities 2003 - 2008

1. Enhancing human performance (2003)

2. Decision making under uncertainty (2003)

3. Agents of change

4. Modeling human and social dynamics (Empirical Implications of Theoretical Models (2003)

## 5. Spatial Social Science

6. Instrumentation and data resource development

2003 NSF Guidelines:
http://www.nsf.gov/pubs/2003/nsf03552/nsf03552.htm

# Center for Spatially Integrated Social Science
## Spatial Resources for the Social Sciences

**The CSISS Mission** recognizes the growing significance of space, spatiality, location, and place in social science research. It seeks to develop unrestricted access to tools and perspectives that will advance the spatial analytic capabilities of researchers throughout the social sciences. CSISS is funded by the National Science Foundation under its program of support for infrastructure in the social and behavioral sciences.

**CSISS News**     CSISS Workshop at ASA 2003 Annual Meeting

| Core Programs | Learning Resources | Spatial Resources | Spatial Tools |
|---|---|---|---|
| These six infrastructure programs form the core of the Center's activities. | CSISS Classics<br>GIS Cookbook<br>ARGUS Activities & Readings<br>NCGIA Core Curriculum ▶<br>Course Syllabi ▶<br>Workshop Video Clips ▶<br>Presentations ▶ | CSISS has compiled e-journals, bibliographies, and other spatial resources for the social sciences. | Here's where you'll find information about software for the exploration and analysis of spatial data. |

| Search Engines | | Community Center | About CSISS |
|---|---|---|---|
| Try out one of our custom search engines to find spatial analysis resources on the Internet. | and specialist meetings. | Join the forums, or if your organization relates to our mission and goals, register as a CSISS affiliate. | CSISS personnel, news, site map and FAQ. Our Strategic Plan and Annual Reports are also found here. |

## Learning Resources

CSISS Classics

GIS Cookbook

ARGUS Activities & Readings

NCGIA Core Curriculum ▶

Course Syllabi ▶

Workshop Video Clips ▶

Papers & Presentations ▶

# Center for Spatially Integrated Social Science

## CSISS Classics

The foundations of spatial analysis span many disciplines over many generations of researchers and practitioners. *CSISS Classics* provides summaries and illustrations of major contributions to spatial thinking in the social sciences. Primary emphasis is given to research before 1980, with an attempt to capture and acknowledge the repository of spatial thinking in the social sciences for the last few centuries. The summaries, along with key references, are intended as guides for those interested in exploring intellectual inheritance from previous generations.

# Charles Booth: Mapping London's Poverty, 1885-1903
## By David Fearon

*Background*

Between 1886 and 1903 Charles Booth produced a remarkable series of maps of London carefully coded for social class with data gathered by visiting, literally, every street in London. Equally remarkable, Booth devised, funded a research team, and conducted the study in his spare time while running a successful international leather trade and steamship company. In the 1880s, the question of increasing poverty in an increasingly wealthy Industrial-age Britain was becoming more central to citizens, politicians and philanthropists. A series of riots and sensational journalism sparked fears of social unrest. Booth encountered the squalid conditions of London neighborhoods while campaigning for an unsuccessful Parliamentary bid in 1865. His continuing involvement in social services left Booth dismayed, in particular, at the lack of basic knowledge about the extent and distribution of poverty in London. In 1885, Booth contested the results of a report on poverty by Henry Hyndman of the Social Democratic Federation, who reported
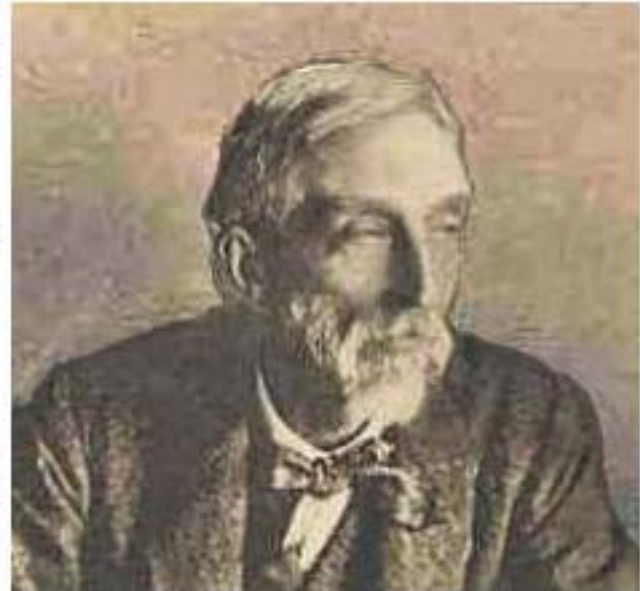
## Publications

Booth, Charles. "The Inhabitants of the Tower Hamlets (School Board Division), Their Condition and Occupations." Journal of the Royal Statistical Society 50 (1887): 326 401.

Booth, Charles. "Condition and Occupations of the People of East London and Hackney, 1887." Journal of the Royal Statistical Society 51 (1888): 227-45.

Booth, Charles. Labour and Life of the People (2 volumes, plus maps under

# Colin Loftin and Sally K. Ward: Application of Spatial Autocorrelation in Sociology
## By Sam Ying

*Background*    In 1972, three sociologists, Omer R. Galle, Walter R. Gove, and Miller McPherson, developed a model (the GGM model) that displayed the correlation between population density and pathology (Galle et al., 1972). The article was published in *Science* and has since been discussed thoroughly. Using statistical tests, including least-squares estimates, Galle et al. produced results that seemed to suggest that "density has effects on pathology independent of other causes of pathology, notably social class and ethnicity" [Loftin and Ward, 1983]. The study area included "community areas" in Chicago, Illinois, constructed by modifying 1970 census tracts. The GGM model concluded that high population density has a great effect on human behavior and that overcrowding should be taken into consideration when sociologists research pathological behaviors. Table 1 displays the results of the least-squares estimates of the GGM model). According to the table, population density has an influence on the fertility rate within each study area. Although, the GGM model uses geographically defined units, the effects of spatial processes were not included in their analysis. The article, "A spatial autocorrelation model of the effects of population density on fertility" authored by Colin Loftin and Sally K. Ward, disputes the GGM model by introducing spatial autocorrelation as a way to take spatial interaction into consideration, introducing an alternative to the GGM model to study the relationship between population density and fertility.

*Innovation*    Spatial autocorrelation

In the simplest terms, spatial autocorrelation is based on the first law of geography: near things are more similar than things that are more distant. Positive spatial autocorrelation is exhibited when neighboring areas are similar or

## Table 1. Least-Squares Estimates of the GGM Model

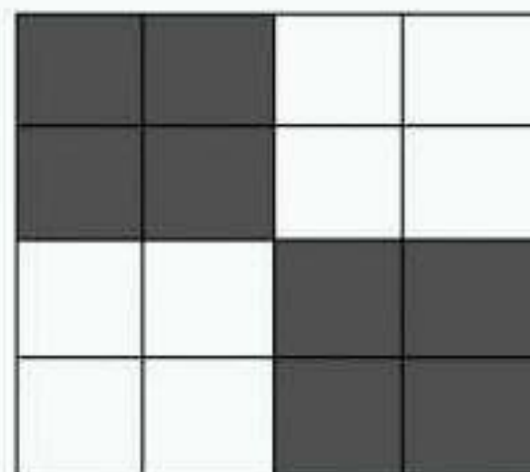| Variable | B-hat | S(B-hat) | B-hat/S(B-hat) |
|---|---|---|---|
| Intercept | 46.04 | 37.96 | 1.21 |
| ln Persons per Room | 96.89 | 29.66 | 3.27 |
| ln Rooms per Unit | 65.88 | 26.47 | 2.49 |
| ln units per Structure | 18.94 | 8.72 | 2.17 |
| Structures per Acre | 7.12 | 4.01 | 1.78 |
| Class Index | -.065 | .020 | -3.22 |
| Ethnicity index | .003 | .0038 | .70 |
| S.E. | 15.08 | --- | --- |
| $R^2$ | .75 | --- | --- |



Fig. 1



Fig. 2

# *CSISS Classics* - examples of Spatial Thinking in Sociology

- Charles Booth, Mapping London's Poverty, 1885-1903
- Florence Kelly, Slums of the Great Cities Survey Maps, 1893
- Colin Loftin and Sally K. Ward, Application of Spatial Autocorrelation in Sociology
- Henry Mayhew, London Labour and the London Poor, 1861
- Robert Park and Ernest Burgess, Urban Ecology Studies, 1925
- Clifford R. Shaw and Henry D. McKay, Social Disorganization Theory
- Georg Simmel, The Sociology of Space
- Alma and Karl Taeuber, Residential Segregation in U.S. Cities
- Alfred Weber, Theory of the Location of Industries, 1909

Under development:

- William G. Skinner, Marketing and Social Structure in Rural China
- Patrick Doreian on Linear Models with Spatially Distributed Data
- Shevky, Williams, and Bell, Social Area Analysis and Factorial Ecology

http://www.csiss.org/cookbook/
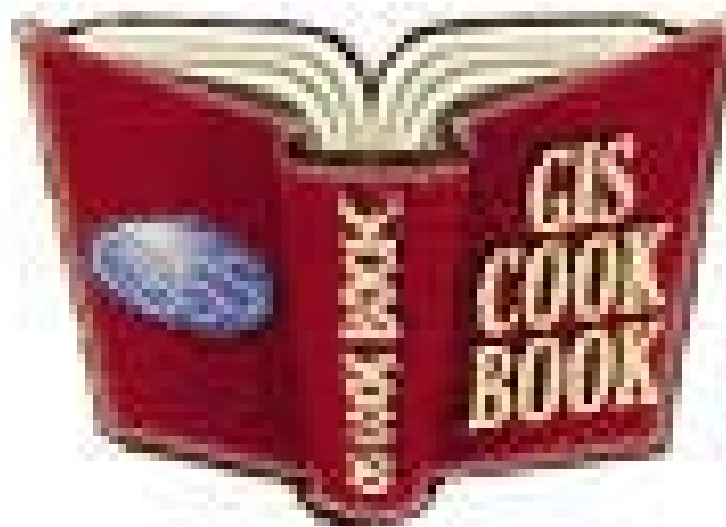
# GIS Cookbook: Contents

- **Backgrounds** provide brief statements about when to use different GIS tools, the components of each tool, and discussions on the pros and cons of using the tool.

- **Getting Started** recipes are intended to help users who are unfamiliar with the basics of GIS software. They include short explanations on how to complete common tasks, such as how to add data or open a new view.

- **Recipes** are step-by-step lessons that guide users through basic spatial analysis and mapping procedures. Screen shots and examples are provided for clearer instruction. Recipes cover six of the most basic elements of spatial analysis and mapping -- geocoding, buffers, projections, datums, density estimation, and census tracts.

- **Glossary Terms** are GIS terms used within recipes that may be unfamiliar to new users of GIS. Underlined terms are hyperlinked to definitions that appear in

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# GIS Cookbook: Recipes

- Buffering an Area (ArcView 3.2)
- Selecting From Geocoded Addresses (ArcView 3.2)
- Classifying Data (ArcView 3.2)
- Reprojecting Data (ArcView 3.2)
- How to Geocode Addresses (ArcGIS 8.1)
- How to Geocode Addresses (ArcView 3.2)
- Creating a Report (ArcView 3.2)
- Buffering an Area (ArcGIS 8.1)

# Center for Spatially Integrated Social Science
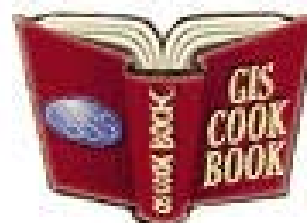
## GIS Cookbook: Recipe - Classifying Data (ArcView 3.2)

**Keywords:** Census tract, census data, classification, reclassification, nominal data, interval data, null value
**Category:** Census Data
**Software:** ArcView 3.2

**Problem:** I have a shapefile of census tracts with attributes, how do I classify the data?

**Description:** When a shapefile is being displayed on your view, it usually displays in one color. This is because the information has not been classified by any one category. When information has been classified, it means it will display different colors to represent different values within a category in its attribute table. For example, if a census tract were to be displayed according to age, it may result in an image where red would stand for a tract with average age >60, orange is 50-60, yellow is 40-50, etc. When classifying data, you can also choose what range you would like to display in what colors.

**Scenario:**
In this recipe, you will learn how to classify and display census tracts according to average age within each tract.
**Methodology:**
**1)** Create a new View and add your census tract shapefile to your View by using the Add Data button

# GIS Cookbook: Recipe - Buffering an Area (ArcGIS 8.1)

**Keywords:** buffers, impact, assessment
**Category:** Buffers
**Software:** ArcInfo 8

**Problem:** You want to buffer an area of influence around an object at a given distance.

**Description:** A buffer is an area around a geographic object and is used to portray an influence boundary, which allows an analyst to perform analysis on what is contained inside and outside of a specified radius. Buffers can be spheres of influence around geographic objects or zones of protection.
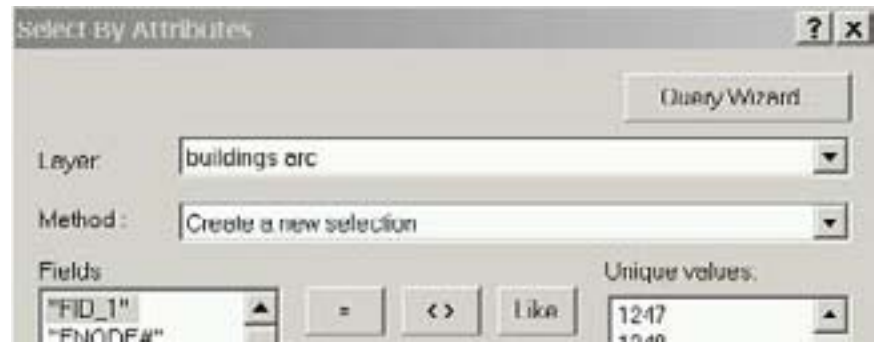
**Methodology:**
**1)** Open ArcMap.

**2)** Add your datasets. If you need assistance with adding your data, see Add Data.

**3)** Click to hightlight the layer that contains the feature to be buffered.

To buffer a feature in a layer without buffering the entire layer go to **Selection**. Scroll down to **Select by Attributes**.

Enter the **Fields** and **Unique Values**.

# Center for Spatially Integrated Social Science

## Course Syllabi From Leading Researchers in Spatial Social Science

Anthropology • Archaeology • Criminology • Demography • Economics
Environment & Resources • Geographical Information Science
Human Geography • History • Political Science • Public Health • Sociology
Spatially Integrated Social Science • Urban Studies & Urban Planning

This page provides links to reading lists of courses taught by leading researchers in spatial social science, organized by discipline. The links are provided with the permission of the researchers themselves. In most cases these researchers are not directly affiliated with CSISS; in all cases the researchers are considered by CSISS to be leaders in the analysis of space within their discipline.

Know of a course in the social sciences related to the analysis of space? Let us know.

# SOCIOLOGY 977
## Seminar in Human Ecology

## SPATIAL DATA ANALYSIS FOR SOCIAL SCIENTISTS
### Paul R. Voss
## University of Wisconsin - Madison

Twelve-week course syllabus – Fall Semester 2003 – use of ArcView, GeoDa, SpaceStat, LISA, GWR

- Introduction and Motivation
- Computers and Spatial Data Analysis
- Spatial Autocorrelation
- Model Specification
- Testing for Spatial Heterogeneity and Spatial Dependence
- Estimation
- Local Forms of Spatial Analysis
- Advanced Topics

http://www.csiss.org/learning_resources/content/syllabi/#demography

## Search Engines

Internet Search

Site Search

Social Science Data
Search

Spatial Tools Search
Engine

Literature Search

# CSISS Web Search Engines

- Building databases of web sites – Thunderstone's Texis Webinator – web walking and indexing software (seeded with ~1500 terms related to spatial social science)

- About 36,000 websites / updated weekly

- User Searchable via keyword entries or access via directories

- Spatial-Social-Science-relevant: web sites / literature / spatial analytic tools / data

**You Searched** Spatial Resources on the Web ▼ for :

rural-migration    Search

**Find Publications Related to:**

**rural-migration**

1-10 of 44 results for rural-migration

**1) Part 4: Discussion-The Population Dynamics Behind Suburban Sprawl**
Another example is the VMT per person and any increases in this measure. Since two year olds do not drive, is it a valid argument to assess vehicle miles traveled to said two year old? Logic would say that a two year old does require specific trips by a licensed...
http://envstudies.brown.edu/thesis/2001/tbolioli/thesis/html/part4.html

**2) Part 2: Research Design and Methods-The Population Dynamics Behind Suburban Sprawl**
Urban and Non-Urban as well as Urban Core, Urban Ring, Sub-Urban and Rural. These classifications were made based on the municipality in the 1990's and were not changed throughout the entire time period covered by the study. Note again that the US Census definitions...
http://envstudies.brown.edu/thesis/2001/tbolioli/thesis/html/part2.html

**3) Work and Mobility: Recent Labour Migration Issues in China - Working Paper 6**
The papers in this volume were originally presented at a series of migration research workshops funded by the Japan Foundation in 1997 and 1998. The workshops were organised by members of the Asia Pacific Migration Research Network in the People's Republic of China...
http://www.unesco.org/most/apmrpap6.htm

**4) Queen's University Belfast - School of Geography**
Your browser does not support these. However, the site may still be accessed (but with reduced functionality) by clicking here....

**5) Abstract-The Population Dynamics Behind Suburban Sprawl**
Abstract No clear consensus has been reached with regards to the causes of suburban sprawl and those that have ventured ideas mostly settle on some type of behavioral change as the reason. The research presented here seeks to determine if demographic factors have...
http://envstudies.brown.edu/thesis/2001/tbolioli/thesis/html/abstract.html

**6) Population Index - Volume 56 - Number 1**
Studies that treat quantitative data on migration analytically. Methodological studies concerned primarily with migration are coded in this division and cross-referenced to N. Methods of Research and Analysis Including Models , as appropriate. Includes some consideration...
http://popindex.princeton.edu/browse/v56/n1/h.html

Center for Spatially Integrated Social Science

Site Search

## CSISS Tools Clearinghouse

The **CSISS Tools Clearinghouse** is intended to grow into a robust collection of spatial analysis software, software links, and links to information about tools for spatial analysis. The development of these tools is a lively research area and the goal of this clearinghouse is to provide up-to-date information on available tools. The clearinghouse is comprised of:

○ **Search Engine**
Search a continuously updated, comprehensive index of the CSISS Select Tools and Links to Portals.

○ **Select Tools**
Browse through tools particularly suited to the analysis of spatial phenomena.

○ **Portal Links**
A listing of useful collections of software tools for anyone interested in Spatial Analysis, or those looking for specific tools.

○ **CSISS Tools** (offsite)
The home of the software tools development efforts under CSISS, carried out in the Spatial Analysis Laboratory of the Department of Agricultural and Consumer Economics at the University of Illinois, Urbana-Champaign.

*New* - GeoDa 0.9, beta release software for ESDA with dynamically linked windows.
*New* - R-Geo, a developing effort to promote spatial data analysis software in the R language

# Spatial Tools Search Engine

```
'spatial autocorrelation'
```
Submit

Word count: 'spatial autocorrelation': 35
Documents 1 - 10 of about 35 matching the query, best matches first.

## Analysis of spatial autocorrelation of USGS 1:250000 digital elevation models

Jay Lee and Louis K. Marion Department of Geography Kent State University Kent, OH 44242-0
paper describes the results of performing numerical analyses of spatial autocorrelation on 1:250,000
*http://spatialodyssey.ursus.maine.edu/gisweb/spatdb/gis-lis/gi94064.html - size 14K -*

## Analysis of spatial autocorrelation of U.S.G.S 1:250,000 Digi...

Analysis of spatial autocorrelation of U.S.G.S 1:250,000 Digital Elevation Models Author: Jay Lee
Elevation Models) Format: html Date: 18/09/01 Time: 13:52:57 Remote Name: 202.28.179.1 Rem
*http://www.ai-geostats.org/online_papers/_papers/0000004d.htm - size 1K -*

## Globals

Moran s I and Geary s c are well known tests for spatial autocorrelation. They represent two specia
measures spatial autocorrelation. Moran s I is produced by standardizing the spatial autocovariance
*http://xerxes.sph.umich.edu:2000/ppa/doc/globals/Globals.htm - size 6K -*

## Nearest Neighbor Analysis

See Anselin(1995) for a complete discussion of Local Moran s I and LISAs. Input Input data file, v
each point. The maximum study distance (d). The number of bands within d. The weights matrix file
*http://xerxes.sph.umich.edu:2000/ppa/doc/LocalI/LocalI.htm - size 7K -*

# GeoDa

- About GeoDa
- Tutorials
- Sample Data
- New in GeoDa 0.9.3
- Upgrade to GeoDa 0.9.3
- Download Geoda 0.9.3

# CSISS Summer Workshops 2003

- **Population Science and GIS**

  19-23 May, Pennsylvania State University (Stephen Matthews)

- **Accessibility in Space and Time: A GIS Approach**

  7-11 July,  Ohio State University (Mei-Po Kwan)

- **Introduction to Spatial Pattern Analysis in a GIS Environment**, 28 July – 1 August, UCSB (Arthur Getis)

- **Geographically Weighted Regression**,

  4-8 August, UCSB (Stewart Fotheringham)


http://csiss.org/events/workshops/ – to apply and to learn more about the workshops.

**2004 workshops** will be announced in January

# Video clips of CSISS summer workshops
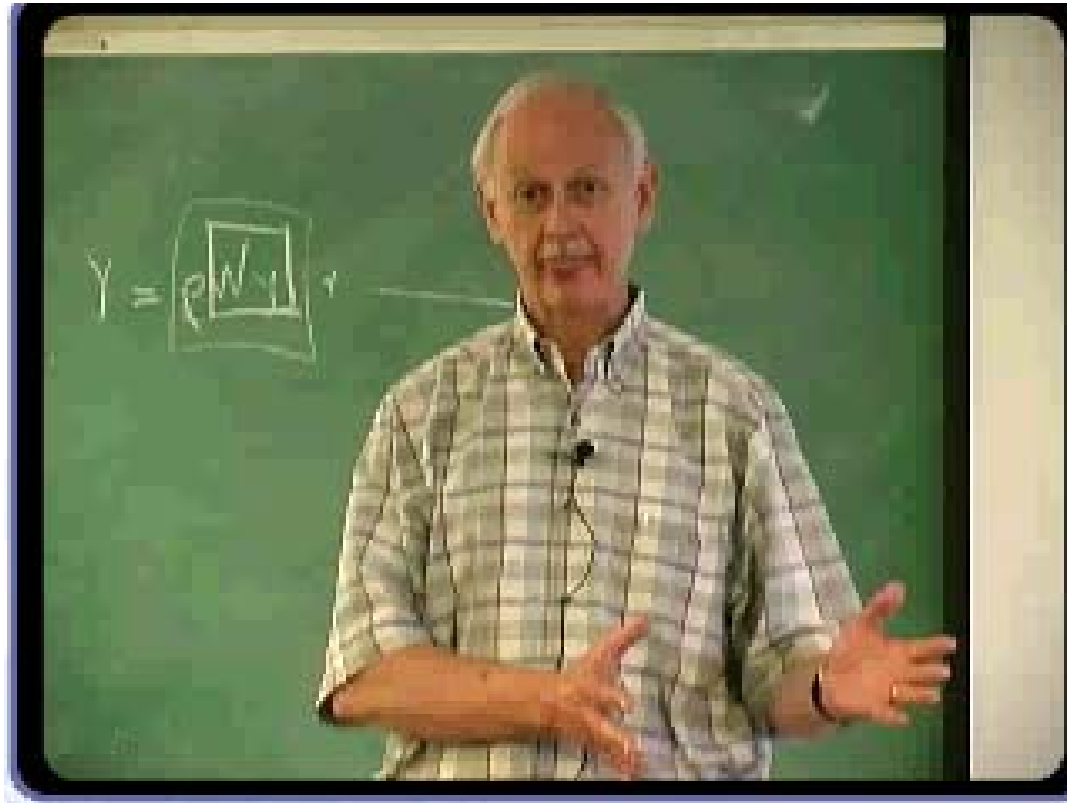


**John Weeks**, lecturing on fertility in rural areas of Egypt
CSISS summer workshop 2002

# CSISS Video Clips of Summer Workshops

Download Flash player now.

## Introduction to Spatial Pattern Analysis in a GIS Environment

The Nature of Spatial Pattern Analysis
Art Getis

Time: 9:58
Quality: High - 31MB

Problems Associated with Spatial Pattern Analysis
Art Getis

Time: 9:43
Quality: High - 31MB

An Introduction to GIS
Mike Goodchild

Time: 7:29
Quality: Audio Only - 2MB

GIS Functionality
Mike Goodchild

Time: 9:58
Quality: High - 33MB

Current Technologies in GIS
Mike Goodchild

Time: 14:54
Quality: High - 48MB

Spatial Patterns of Birth Data
John R. Weeks

Time: 15:42
Quality: Audio Only - 5MB

Spatial Patterns of Fertility in Egypt
John R. Weeks

Time: 10:18
Quality: High - 32MB

# CSISS Best Practice Publications

- *Spatially Integrated Social Science*

  MF Goodchild and DG Janelle, eds.

  Oxford University Press, 2003

  For details, See www.csiss.org/best-practices/siss

- *Advances in Spatial Econometric Modeling*

  L Anselin, RJGM Florax, and SJ Rey, eds.

  Springer-Verlag, 2003

# *SPACE*

## *Spatial Perspectives on Analysis for Curriculum Enhancement*

- Funded under NSF CCLI-National Dissemination Program
- Consortium: UCSB, Ohio State University, UCGIS
- Funding: ~$1.4 m over 3 years (2004-2006)
- PI: D Janelle / Co-PIs: M Goodchild and R Appelbaum
- Subcontract PIs: M-P Kwan (OSU) / A Getis (UCGIS)
- Focus: Teach the Teachers / Undergraduate Learning

# The *SPACE* Program

- National Education Workshops
- Academic Conference Courses to Enhance Spatial Science (ACCESS)
- On-line Clearing House for Lab Exercises, Data Sets, and Test Items

# Center for Spatially Integrated Social Science

UCSB / Principal Investigator: M.F. Goodchild
Co-PI: R.P. Appelbaum
Program Director: D.G. Janelle

**Building resources for spatial analysis in the social sciences**

# www.CSISS.org

- Internet Gateway to Spatial Analysis
- Virtual Community for Spatial Social Science
- Learning Resources for Researchers
- Summer National Workshop Program
- Spatial Analytic Tools Development L. Anselin