Modeling a Center for Spatially Integrated Social Science

Critical Themes in Social Science

+ 

Tools and Concepts for Spatial Thinking

+ 

Infrastructure

= 

Advances in Spatial Social Science
Some Critical Themes in the Social Sciences:

• Space-time accessibility
• Equity
• Externality effects
• Risk assessment
• Small-area analysis
• Sense of place
• Cultural analysis
• Demographic processes
• Health and disease
• Crime mapping and law enforcement
• Community organization
• Governance
• Electoral processes
• Globalization
• International conflict
• Coupling human and environmental systems
• etc
Tools and Concepts for Spatial Thinking:

• Agent-based modeling
• Point-pattern analysis
• Exploratory spatial data analysis
• Bayesian analysis
• Spatial interaction modeling
• Dynamic visualization
• Flow-data analysis
• Analytical cartography
• Spatial econometrics
• Location-allocation modeling
• GIS
• Remote sensing
• etc.
Building National Infrastructure

Programs:
• Learning resources
• Workshop training
• Best practice publications
• Research specialist meetings
• Software development
• Web search engine development
• Place-based search tools
• Conference presentations
• Interdisciplinary orientation

Tactics:
• Inform (I)
• Involve (I²)
• Illustrate (I³)
• Innovate (I⁴)
• Infiltrate (I⁵)
• Integrate (I⁶)
Spatial Analysis

Outcomes

- New NSF Programs
- New Journals
- International Conference(s)
- New Applications
- New Social Science Resources
- Advances in Theory
- Spatial Interaction Modeling
- Spatial Econometrics
- Location-Allocation Modeling
- Agent-Based Modeling
- Flow Data Analysis
- GIS
- Point-Pattern Analysis
- ESDA
- Bayesian Analysis
- Dynamic Visualization
- Spatial Analysis
- Learning Resources
- Virtual Community
- Internet Portal
- Best-Practice Publications
- Interdisciplinary Collaboration
- Specialist Meetings
- Tools Development
- Place-Based Search
- Workshops
- Diffusion of Spatial Analysis

CSISS

Spatial Analysis

Advances in Theory

New NSF Programs

New Journals

International Conference(s)
Center for Spatially Integrated Social Science

1999

SPACE
Spatial Perspectives on Analysis for Curriculum Enhancement

2004 – 2006

GIS
Population Science
UCSB

2005 – 2006

NSF
National Institutes of Health
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.

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<th>Core Programs</th>
<th>Learning Resources</th>
<th>Spatial Resources</th>
<th>Spatial Tools</th>
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<tr>
<td>2005 Workshop Programs: SPACE</td>
<td>These introductory materials include CSISS Classics and select video clips from the CSISS summer workshops.</td>
<td>CSISS has compiled e-journals, bibliographies, and other spatial resources for the social sciences.</td>
<td>Here's where you'll find information about software for the exploration and analysis of spatial data.</td>
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<tr>
<td>Search Engines</td>
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<tr>
<td>Try out one of our custom search engines to find spatial analysis resources on the Internet.</td>
<td>Here's where you'll find information and registration for workshops, conferences and specialist meetings.</td>
<td>Join the forums, or if your organization relates to our mission and goals, register as a CSISS affiliate.</td>
<td>CSISS presentations, news, personnel, and sitemap. Our Strategic Plan and Annual Reports are also found here.</td>
</tr>
</tbody>
</table>
GIS and Population Science

About the Program

The Mission

This GIS Population Science program has a primary mission to signpost and use of spatial methods in population research by the broad population science community, in support of this mission, the Population Research Institute at Penn State, the Center for Spatially Integrated Social Science at UCSB, and the Center for Spatially Integrated Social Science at the University of California, Santa Barbara, have combined their expertise to offer new and unique tools and access to learning and research resources by workshop participants and the international community of population scientists.

The Target Audience

Two-week-long GIS Population Science workshops will be offered in 2009 for intensive training for young researchers in geographic information science, in a setting specifically tailored toward population science. The primary audience for the workshops consists of interdisciplinary pre-doctoral students of demography at NICHD-supported population centers in the United States, institutional members of the wider Association of Population Centers (APC), graduate students in demography-related disciplines from APC institutions (including agricultural economics, anthropology, economics, health, rural sociology, and sociology), as well as young faculty and researchers in subnational and international population agencies.

Host Organizations and Program Funding

The Penn State and UCSB partnership builds on shared expertise in GIS and cartographic visualization, shared experience in web-based management, and complementary expertise in demographic science and digital libraries. See About for more information.

The GIS Population Science program is funded by the National Institute of Child Health and Human Development (NICHD) as an R25 award titled "GIS Training Program for Scientists" (R25 HD047744-01). The support of NICHD is gratefully acknowledged.
Crime Based Analysis and Classification of 729 American Cities (1976)

Authors: Harries, K. D.
Source: Social Indicators Research v2: 467-487.
Category: Spatial Econometrics
Disciplines: Geography; Sociology; Statistics & Operations Research
Database: National Criminal Justice Reference Service Abstracts
Keywords: spatial correlation; spatial cluster
**SPACE** workshops are intended for instructors of undergraduate students in the social sciences. They offer content knowledge in methods of spatial analysis, instructional resources, and professional development opportunities. Participants are expected to commit to implementing new perspectives in their undergraduate courses and to providing feedback and documentation of the workshop program. Details are available at [www.csis.org/SPACE/workshops](http://www.csis.org/SPACE/workshops).

**Summer Workshops 2005**

**Introducing GIS for Undergraduate Social Science Courses**
1-6 August 2005, San Francisco CA

This workshop will introduce social science faculty to GIS and map making. Lectures will cover GIS fundamentals and key concepts, data visualization, and analytical cartography. Labs will consist of step-by-step exercises using material from urban studies, planning, public health, and social policy to teach basic GIS skills. Participants will work collaboratively with workshop leaders and other participants to design course materials for use in their own undergraduate teaching and in learning assessment. This workshop is for undergraduate instructors with no prior experience in using GIS and spatial analysis techniques.

**Instructors:** Richard LeGates (coordinator), XiaoHuang Liu, Barry Nickel, Ayse Panak (all of San Francisco State University), and Keith Clarke (University of California, Santa Barbara)

**Co-sponsor with CSISS:** The University Consortium for Geographic Information Science [www.acgis.org](http://www.acgis.org)

**Host Institution:** Institute for Geographic Information Science, San Francisco State University [gis.sfsu.edu](http://gis.sfsu.edu)

**GIS and Spatial Modeling for the Undergraduate Social Science Curriculum**
10-15 July 2005, Columbus, OH

This workshop focuses on applications of spatial analytic techniques suited for undergraduate social science courses. These techniques include cartographic visualization, space-time modeling of individual behavior, spatial interaction models, and spatial optimization methods. Workshop participants will consider how to integrate these techniques into instructional modules, exercises, and learning assessment approaches. Requirements to benefit from this workshop include prior experience with computer file and data management in applications of quantitative analysis and GIS in the social sciences.

**Instructors:** Mei-Po Kwan (coordinator), Alan Murray, Morton O'Kelly, Kathya Plank, and Ningchuan Xiao (all of The Ohio State University), and Michael Tiefelsdorf

**Co-sponsor with CSISS and Host Institution:** Dept. of Geography, The Ohio State University [www.geography.osu.edu](http://www.geography.osu.edu)

**Spatial Analysis for the Undergraduate Social Science Curriculum**
18-23 July 2005, Santa Barbara CA

This workshop focuses on spatial methods and perspectives suited for applications in the undergraduate social science curriculum, such as spatial statistics, spatial econometrics, spatial pattern analysis, and cartographic visualization, in a GIS framework. Participants will illustrate these methods and design instructional modules and exercises for use in teaching undergraduates. The workshop will also explore strategies for curriculum development and assessment of student learning. Requirements to benefit from this workshop include prior experience with computer file and data management in applications of quantitative analysis and GIS in the social sciences.

**Instructors:** Stuart Sweeney (coordinator), Sam Fabrikant, Fiona Goodchild, Mike Goodchild, Don Janelle, and Waldo Tobler (of UCSB)

**Co-sponsor with CSISS and Host Institution:** Dept. of Geography, University of California, Santa Barbara [www.geog.ucsb.edu](http://www.geog.ucsb.edu), Institute for Social, Behavioral, and Economic Research [www.isber.ucsb.edu](http://www.isber.ucsb.edu)

This program is funded by the National Science Foundation's Division of Undergraduate Education, under its program for Course, Curriculum & Laboratory Improvement – National Dissemination.

[www.csiss.org](http://www.csiss.org)
SPACE
Spatial Perspectives on Analysis for Curriculum Enhancement

- NSF CCLI-National Dissemination Program
  October 2003 – September 2006
- Consortium: UCSB, Ohio State University, UCGIS
- PI: D Janelle / Co-PIs: M Goodchild and R Appelbaum
- Partner PIs: M-P Kwan (OSU) / A Getis (UCGIS)
Why *SPACE*?

- Spatial thinking should be one of the foundations for general undergraduate education (for informed citizenship and for general information analysis and assessment)
- Spatial perspectives provide a means of integrating theory within and across disciplines, and for matching it with evidence
- Spatial analysis can serve as a foundation for interdisciplinary cooperation (e.g., the coupling of environmental and social processes)
SPACE Goals

• Facilitate undergraduate faculty development in spatial social science
• Expand curricula resources in spatial social science
• Provide follow-through professional development
• Achieve diversity in access to educational opportunities
• Establish and encourage support networks
• Foster technology integration
• Promote discipline integration
• National dissemination
SPACE Workshop Content Themes

- Geographic Information Systems
- Spatial Pattern Analysis
- Spatial Econometrics
- Map Making and Cartographic Visualization
- Spatial Interaction
- Agent-Based Modeling
- Place-Based Search
- Remote Sensing
- Applications
CSISS Best Practice
Publications

M.F. Goodchild and D.G. Janelle, eds.

Spatially Integrated Social Science
Oxford University Press, 2004

See preview http://www.csiss.org/best-practices/siss/ for objectives, chapter abstracts, & related resources
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.

Your help is requested in suggesting topics, key papers, and schools of thought that should be represented in this collection - please send these to the CSISS Classics editor, Don Janelle janelle@geoq.ucsb.edu.

Copyright permission has been requested and is still pending on some images used in the CSISS Classics.

CSISS CLASSICS: SPATIAL INNOVATORS AND INNOVATIONS BEFORE 1980

Order by:  → Select ↓, or Discipline:  → Select a discipline ↓, or Spatial Principle:  → Select a Spatial Principle ↓

Charles Booth

Title: Mapping London’s Poverty, 1885-1903
Spatial Concept: Mapping and social surveys, neighborhood effects
Discipline: Criminology, Demography, Geography, History, Law & Society, Political Science, Sociology, Urban & Regional Planning, Urban Studies
Florence Kelley: Slums of the Great Cities Survey Maps, 1893
By Nina Brown

A section of the Hull House Wage Map of Chicago.

The original maps were published in color and the map key appears below.

- [White] Brothers $50 and Less
- [Black] Brothers $50 to $100
- [Blue] Brothers $100 to $150
- [Red] Brothers $150 to $200
- [Green] Brothers $200 and Over
- [Yellow] Brothers Unknown

daughter of Kelley, was one of the social activists of the time. A graduate of Northwestern University, Florence Kelley was active in reform movements after an extended period of study in Europe. She read Karl Marx’s *The Class in London* (1887) and corresponded with Engels about labor rights. When Kelley returned to the United States she married, but the marriage was short-lived. In 1891 Kelley returned to Hull House, where she became a resident of Hull House, the

http://www.csiss.org/GISPopSci/resources/classics/
Henry Mayhew: London Labour and the London Poor, 1861
By Nina Brown

Background
Henry Mayhew (1812-1887)

The Intensity of Criminality
Map showing the number of criminal offenders to every 10,000 of population in each county of England and Wales.
CSISS Classics - Spatial Thinking in Sociology

- Charles Booth, Mapping London’s Poverty, 1885-1903
- Patrick Doreian on Linear Models with Spatially Distributed Data
- 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 US Cities
- Alfred Weber, Theory of the Location of Industries, 1909
- William G Skinner, Marketing and Social Structure in Rural China
Problems Associated with Spatial Pattern Analysis
Art Getis

Introduction to Spatial Pattern Analysis in a GIS Environment

Time: 9:58
Quality: High - 31MB

Time: 9:43
Quality: High - 31MB

Time: 7:29
Quality: Audio Only ** - 2M

http://www.csiss.org/streaming_video/2002/
# CSISS Video Clips of Summer Workshops

## Introduction to Spatial Pattern Analysis in a GIS Environment

<table>
<thead>
<tr>
<th>Subject</th>
<th>Time</th>
<th>Quality</th>
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</thead>
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<tr>
<td>The Nature of Spatial Pattern Analysis</td>
<td>9:58</td>
<td>High - 31MB</td>
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<tr>
<td>Problems Associated with Spatial Pattern Analysis</td>
<td>9:43</td>
<td>High - 31MB</td>
</tr>
<tr>
<td>An Introduction to GIS</td>
<td>7:29</td>
<td>Audio Only - 2MB</td>
</tr>
<tr>
<td>GIS Functionality</td>
<td>9:58</td>
<td>High - 33MB</td>
</tr>
<tr>
<td>Current Technologies in GIS</td>
<td>14:54</td>
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</tr>
<tr>
<td>Spatial Patterns of Birth Data</td>
<td>15:42</td>
<td>Audio Only - 5MB</td>
</tr>
<tr>
<td>Spatial Patterns of Fertility in Egypt</td>
<td>10:18</td>
<td>High - 32MB</td>
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</table>
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.
Download GeoDa 0.9.5-i

- Tutorials
- Sample Data
- Workbook
- Openspace Mailing List

Luc Anselin
Tobler's FlowMapper

http://www.csiss.org/clearinghouse/FlowMapper
The GIS Cookbook is a collection of simple descriptions and illustrations of GIS methods written with minimal GIS jargon. Recipes cover two GIS software platforms, ArcView 3.x and ArcGIS 8/9.x. The target users are social scientists with an interest in introducing spatial thinking into their current research and also having some experience with computers but little to no exposure to GIS. The GIS Cookbook is in its beginning stages and will be expanded to better serve the needs of social scientists. It will be supplemented with recipes for ArcGIS 9.x prior to the start of the 2005 GIS Population Science Workshops.

GIS Cookbook Table of Contents

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<th>1. Getting Started</th>
<th>ArcView 3.x</th>
<th>ArcGIS 8.x</th>
<th>ArcGIS 9.x</th>
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</thead>
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<td>How to Open a Map Document, then Add Data</td>
<td>3.x</td>
<td>8.x</td>
<td>9.x</td>
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<tr>
<td>How to add data after opening a new view</td>
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<tr>
<td>Performing an Attribute Query</td>
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<td>Performing a Spatial Query</td>
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<td>2. Dealing with Data</td>
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<td>Importing an Excel table to your GIS project</td>
<td>3.x</td>
<td>8.x</td>
<td>9.x</td>
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<tr>
<td>Joining a table to an existing table</td>
<td>3.x</td>
<td>8.x</td>
<td>9.x</td>
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</table>
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.
Seminar in Human Ecology:

SPATIAL DATA ANALYSIS FOR SOCIAL SCIENTISTS

Fall Semester, 2003
2:00 – 5:00 p.m., Wednesday
Room 10, Agriculture Hall
(Office hours: Thursday & Friday at
3:00 to 4:00 and by appointment)

SO 8243
Spatial Analysis of Social Data
Semester: TBA

Dr. Frank M. Howell

Office: 324-A Etheredge Hall
Office Hours: TBA
(other times by appointment only; e-mail or call for a time)
Class meetings: Building, Room, Date, Time TBA

TEXTBOOKS (Required):
SPACE Discipline Resources

Categories

- Also see: GIS Syllabi

Links

- **Asian Spatial Information and Analysis (ACAS)** - A multi-disciplinary and applied research institution specializing GIS databases for Asia and the former Soviet Union.
- **Baltic Sea GIS, Maps and Statistical Database** - GIS data for the river, population and other information for the Baltic Sea drainage basin.
- **Colorado Office of Emergency Management: Cartography and GIS** - State and local government oriented GIS data.
- **Digital Chart of the World** - Download the bathymetric data for locations of different countries, in Arc/INFO export format.
- **Freedata.ca** - Dedicated to the issue of public access to government geospatial data across Canada. It is a place to discuss, issues, educate, coordinate and encourage change.
- **GIS Data Depot** - Provides free GIS data downloads and creates custom spatial data CD-ROMs.
- **Hawaii Statewide GIS Program** - Free downloadable GIS spatial data, metadata, and maps.
- **Infoshare: Community Data on New York City** - Profile and compare neighborhoods,
SPACE Teaching Materials

Teaching Materials >> Student Learning Assessment >> College and University

Links

» **Field-tested Learning Assessment Guide (FLAG)** - Offers broadly applicable, self-contained modular classroom assessment techniques (CATs) and discipline-specific tools for STEM instructors interested in new approaches to evaluating student learning, attitudes and performance.

» **Learning Through Technology** - Features information on using technology in the classroom, case studies, assessment tools, glossary, and links. Provided by the National Center for Science Education.

» **Online Evaluation Resource Library** - This library was developed for professionals seeking to design, conduct, document, or review project evaluations. OERL's resources include instruments, plans, and reports from evaluations that have proven to be sound and representative of current evaluation practices.

» **Teaching Goals Inventory Online** - A self-assessment of instructional goals. Its purpose is threefold: (1) to help college teachers become more aware of what they want to accomplish in individual courses; (2) to help faculty locate Classroom Assessment Techniques they can adapt and use to assess how well they are achieving their teaching and learning goals; and (3) to provide a starting point for discussion of teaching and learning goals among colleagues.
Challenges for SPACE Workshop Participants I

SPACE Incentive Awards

– Up to $1500 expense awards to participate in spatial-oriented conference / to present a paper about teaching spatial thinking at the undergraduate level
– Eligibility: SPACE workshop participants
– Based on implementation of course exercises and syllabi, development of educational development resources, or superb example of a student course project
– See www.csiss.org/SPACE/ for details.
Challenges for SPACE Workshop Participants II

• **Academic Conference Courses to Enhance Spatial Science (ACCESS)**
  – **Half-day and full-day workshops at academic discipline conferences**
    • exposure and profile for spatial analysis in undergraduate teaching
    • Follow-up support for prior workshop participants
    • Involve spatial researchers from different disciplines
  – **Proposals encouraged** for organizing and instructing—SPACE provides financial assistance – see [http://www.csiss.org/SPACE/workshops/access.php](http://www.csiss.org/SPACE/workshops/access.php)
Academic Conference Courses to Enhance Spatial Science (ACCESS) funding from SPACE

• Symposium: *Integrating Geospatial Perspectives and Education in Archaeology*, Society for American Archaeology, San Juan, Puerto Rico, April 2006. Veronica Arias, Heather Richards, and Judith van der Elst


• Demonstration Workshop: *GIS, GPS, and Spatial Analysis Tools in Support of Service Learning*, National Technology and Social Science Conference Las Vegas, NV, April 2005. David Padgett

• Panel Session: *GIS and Spatial Analysis Tools to Enhance Social Science Course Content and Research*, Association of Social and Behavioral Scientist, Nashville, TN, March 2005. David Padgett and Nikitah Imani
Challenges for SPACE Workshop Participants III

• **Documenting Results of SPACE Workshops:**
  – **Entry and Exit Surveys** (expectations and evaluations)
  – **Follow-up Survey** (evidence of implementation and long-term influence)

• **Recommending Web Links** to resources for spatial social science undergraduate education:
  – Course syllabi
  – Data and course exercises
  – Resources for curriculum, course, and project development, and evaluation
  – Instruments and resources for learning assessment
  – Examples of teaching and student accomplishments
## Self-report Averages
UCSB Workshop Participants 2005

<table>
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1 = No familiarity  
2 = Familiarity  
3 = Experience with applications  
4 = Good knowledge  
5 = Expert knowledge

### Bar Chart

- **Remote sensing**: 2.1  
- **GPS**: 2.5  
- **Geocoding**: 2.5  
- **Statistics**: 2.6  
- **GIS**: 3.4  
- **Curriculum**: 3.2  
- **Quantitative**: 3.7  
- **Qualitative**: 3.4  
- **Visualization**: 3.5  
- **Search**: 4.2  
- **Data Manage**: 4.0  
- **Cartography**: 2.9  
- **Spatial Thought**: 3.4
The basics of spatial thinking in undergraduate classrooms

At a recent education workshop I attended, we discussed the ideas or concepts that make up spatial thinking. Dr. Phil Gersmehl (Hunter College) suggested a set of concepts and questions that make up spatial thinking. They include:

- Location – Where is the place? Why is it there?
- Condition – What is at the place?
- Connection (Situation) – How is the place linked to other places?
- Comparison – How are places similar or different?
- Aura (Influence) – What effects does a feature have on its neighbors?
- Region – What nearby places are similar to this one?
- Transition – What is the nature of the change between dissimilar places?
- Hierarchy – What larger area is this one inside? What smaller areas are inside it?
- Diffusion – How do things spread through space?
- Analog – What distant places are analogous to this one?
- Pattern – Are there imbalances, clusters, strings, doughnuts, other patterns?
Bonding in SPACE
Challenges for SPACE Workshop Participants IV

Enjoy the Workshop and the Santa Barbara Experience