**Spatial Perspectives on Analysis for Curriculum Enhancement**

**NSF DUE 0231263**

**NSF 02-043 CCLI National Dissemination**

# Annual Report
## October 2005 – September 2007

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# Research and Education Activities

SPACE seeks to achieve systemic change within undergraduate education in the social sciences. Funding from NSF was for three years (October 2003 through September 2006), however a fourth year of workshops (summer 2007) was permitted through a no-cost extension. The SPACE approach is based on the value of spatial thinking, and associated technologies (geographic information systems, and tools for spatial analysis), as the basis for greater integration among the social science disciplines, greater motivation for students, greater relevance to societal problems, greater integration of technology into undergraduate instruction, and greater employment prospects for graduates. In this program, knowledge in spatial analysis is linked with CCLI objectives for national dissemination of curricula and assessment resources.

The program is centered on a series of professional development workshops, with extensive follow-on activities; and it features additional programs designed to leverage these workshops to achieve high rates of participation among traditionally under-represented groups and to bridge the gap between research and teaching in the social sciences. SPACE is organized by a consortium led by the University of California, Santa Barbara (Project PI, Donald Janelle; co-PIs, Michael Goodchild and Richard Appelbaum). Other participants in the consortium, under contract to UCSB, include The Ohio State University (PI, Mei-Po Kwan), and the University Consortium for Geographic Information Science (UCGIS PI, Arthur Getis).

SPACE focuses primarily on National Education Workshops to provide undergraduate instructors with basic skills in GIS and spatial analysis, and to introduce them to the latest techniques, software, and learning resources. SPACE is also committed to organizing sessions at major conferences to provide instructors with basic introductions to using spatial technologies in the classroom, to maintain engagement with participants in the national workshops, and to reach wider audiences than the workshops. The project includes a website (www.csiss.org/SPACE) that provides an on-line clearinghouse for lab exercises, guidance for finding data sets, test items, examples of syllabi, and assessment instruments. Many of these resources represent the contributions of workshop participants.

# SUMMARY OF PRIMARY ACTIVITIES IN YEARS 3 AND 4

In years three (Oct 2005 ─ Sept 2006) and four (Oct 2006 ─ Sept 2007), the project team carried out the following activities to achieve program implementation:

- The last of three Annual Planning Meetings was held in Santa Barbara in December 2005. It provided an opportunity to assess the first two years of workshop results and to make adjustments in the program for 2006. This provided an opportunity to share ideas from the different workshop experiences and to acquaint the new UCGIS team from the University of Oklahoma with the objectives of SPACE. A planning meeting was not held for the 2007 workshops in order to protect funds needed to administer the workshops at Ohio State University and at the University of California, Santa Barbara. Since this was the fourth workshop at each institution, email and telephone communication proved adequate.
- The Website was enhanced with resources (syllabi, exercises, data links, assessment instruments, discipline resources) for workshop participants and for site visitors interested in implementing spatial analysis perspectives to undergraduate education. Site usage has increased steadily over the course of the project, as documented in the "Findings" section.
- Workshop-advertising included the production and distribution of fliers and intensive email solicitation of applications. A brochure describing the SPACE program was developed in 2004 and has been used since with inserts describing the most current workshop offerings. It describes resources to help enable social science instructors to introduce spatial analysis in their undergraduate teaching.
- Following assessments from the December 2005 Planning Meeting, the Web-administered application and adjudication procedures, information resources for prospective participants, and the workshop Entry, Exit, and Follow-up surveys were revised for 2006. Only minor changes were needed for 2007.
- Three 6-day-long workshops were organized and hosted at UCSB, OSU, and the University of Oklahoma (for UCGIS) in 2006 and two 6-day-long workshops were hosted by UCSB and OSU in 2007.  In 2007 (a no-cost extension year), UCGIS contributed funds from its subcontract to help co-sponsor the workshops at UCSB and OSU.
- Significant efforts were made to encourage a greater number of applicants from designated minorities and from minority serving institutions – as a result, 25 percent of all participants were of minority status in 2005. In 2006, designated minorities represented 30% of all participants.  For 2007 workshops, they accounted for 18%. Since the inception of the program, designated minorities have represented 22% of SPACE workshop participants.
- The Follow-up surveys of 2004, 2005, and 2006 participants have provided additional guidance for fine-tuning workshop offerings -- see results "Findings" section.
- The UCGIS / San Francisco State University workshop coordinator for 2005 (Richard Le Gates) presented a panel session at the 2006 Spring Summer Assembly of UCGIS in

Vancouver WA (involving three 2005 workshop participants) and provided presentations for the SPACE website. The SFSU workshop also featured the development of a video interview of workshop instructors and participants. The video has been featured at several conference presentations and is accessible via the SPACE website.

- The SPACE Educational Development incentive awards program was continued for 2005 and 2006 workshop cohorts. A total of 25 awards since the start of the program have enabled an expansion of website resources and have permitted workshop participants to further the development of spatial analysis for their teaching. Their web resource contributions have been used during the workshops to illustrate how prior participants have promoted spatial thinking in undergraduate education.
- The SPACE ACCESS program (Academic Conference Courses to Enhance Social Science) / see http://www.csiss.org/SPACE/workshops/access.php) was initiated in 2005. Since then, financial and technical support has been provided for prior workshop participants to organize conference-based sessions, panels, and short workshops for the following associations: Society for American Archaeology; Association of Collegiate Schools of Planning; the National Technology and Social Science Conference; Association of Social and Behavioral Scientists; the American Sociological Association; the American Political Science Association; the Minorities in Agriculture, Natural Resources, and Related Sciences; the National HBCU Faculty Development Symposium; the UCGIS Summer Assembly; and the Association of American Geographers.
- In the past two years, the PI and other SPACE personnel have given presentations on the SPACE program to several workshops and conferences.
- The PI, with cooperation from workshop coordinators and the Educational Development Coordinator (Fiona Goodchild), completed the Annual Report to NSF for submission in mid October 2007.

# SPACE Planning Meeting

The Planning Meeting in Santa Barbara (December 8-9, 2005) was a key event for making informed changes in program offerings in years three and four.

### Objectives for the Third SPACE Planning Meeting    8 – 9 December 2005

The **primary objectives** of this meeting were to:

- Evaluate the 2005 program for guidance on what can be improved for 2006;
- Review strategies to fulfill NSF program goals for professional development and learning assessment;
- Invigorate professional development concepts within the agenda for SPACE workshops and for evaluation of their impact and value for workshop participants and their students;
- Identify new resources and tools for national dissemination to the broadly interdisciplinary set of social science participants in the SPACE workshops;
- Assess and modify, as needed, the basic objectives, content, and client audience of each workshop;
- Review the instructional teams and venues for each workshop for representation and value to a range of social science disciplines and for adequately addressing issues of professional development;
- Consider SPACE participation in disciplinary association meetings (e.g., special didactic workshops) for 2006 and possibly 2007 [these events require considerable advanced preparation, committed organizers, and excellent presenters]. See descriptions and resources from past conference activities: http://www.csiss.org/SPACE/workshops/sessions.php;
- Consider plans to enhance workshop applications from under-represented populations;
- Enhance advertising about workshops broadly across the social sciences;
- Consider possible interest in proposing a new SPACE program for implementation in 2007 and beyond. (Note: proposals for STILE (Spatial Thinking in LEarning) were submitted in the January 2006 and 2007 NSF DUE CCLI competitions – without success);
- Review budget for possible no-cost extension proposal to NSF for use after September 2006 (Note: this was accomplished and provided for two workshops in 2007); and
- Share ideas on other objectives.

**Thursday, December 8, Garden Room, Upham Hotel**
8:30    Welcome / Introductions
8:50    **Review of 2004 and 2005 Programs – Planning Issues and Objectives for 2006**, Don Janelle
9:10    **Evaluation Summary on Pedagogic Issues**, Fiona Goodchild and Stacy Rebich-Hespanha

9:30 **Reflections on 2005: Panel on Participant Experiences and the Translation to Undergraduate Teaching** Fiona Goodchild (moderator), Christopher Holoman, Mei-Po Kwan, Richard LeGates, Carla Popa, Heather Richards, Glenwood Ross, Stuart Sweeney

10:30 Coffee (8-minute video on the 2005 SFSU SPACE Workshop, R. LeGates)

10:45 **Breakout Discussions:**
**Educational Development Consultants and Workshop Participants**
Fiona Goodchild (chair), Don Cartwright, Eric Fournier, Christopher Holoman, Rick Johnson, John Pedersen, Kathryn Plank, Carla Popa, Stacy Rebich-Hespanha, Heather Richards, and Glenwood Ross

- How can workshops be structured to demonstrate the benefits of alternative teaching formats that participants might use to enhance the learning of their undergraduate students?
- How can workshops encourage and equip participants to adopt learning assessment practices with their students?
- How can workshops engage participants in useful strategies for finding and manipulating relevant data for use in their undergraduate teaching?
- What strategies might be used to encourage greater use of SPACE website resources by workshop participants and their students?

**Workshop Team Leaders/Instructors/Project PIs**
Mike Goodchild (chair), Rich Appelbaum, Sarah Battersby, Kathryn Grace, Jeff Hemphill, Don Janelle, Mei-Po Kwan, Richard LeGates, Victor Mesev, Rebecca Powell, Tarek Rashed, Stuart Sweeney, Waldo Tobler, John Wilson, Enki Yoo, May Yuan

- How can/should workshop instructional teams share classroom/lab exercises and related data sets? (e.g., a CD or web resource that each workshop coordinator could contribute to – for distribution to all workshop participants, including those from 2004 and 2005)?
- How should the 2006 SPACE workshops at UCSB, OSU, and OU be differentiated from one another (by level of participant background, technical themes, and discipline orientation)?
- What is the appropriate balance between technical content and educational development and how might this vary by workshops?
- Other questions?

11:45 **Reports from Working Groups**
1:30 **Reports on Related Programs and Issues:**
- John Wilson, UCGIS Education Initiatives (see http://ucgis.org/priorities/education/strawmanreport.htm)

2:15 **Technical Session:**
- Evidence and Issues of GeoDa (exploratory spatial data analysis software) Use in Undergraduate Education (Stuart Sweeney) and Demo of GeoDa Applications (go to www.sal.uiuc.edu to access the GeoDa homepage)
- Evidence of FlowMapper use in Undergraduate Education, Waldo Tobler (see http://www.csiss.org/clearinghouse/FlowMapper/)

- Potential Uses of Earth Browsers in the Undergraduate Classroom – New Candidates for SPACE Workshops? Alan Glennon and Andrea Nuernberger (for example, see http://earth.google.com/)

3:45   **Implementing the SPACE ACCESS and Awards Programs**
- **ACCESS** – Rich Appelbaum
    - SPACE support for conference sessions/demonstrations at social science association conferences in 2005
    - Plans for 2006
    - Drawing on social scientists and prior workshop participants
    - Building web resources for instructors
- **Awards Program** – Janelle
    - Expansion of 2005 awards program
    - Building web resources from applicant contributions
    - The 2006 Awards program
6:00   **Dinner** at the a local Restaurant (5 minute walk from hotel)


**Friday, December 9, Garden Room**
9:00   **Implementing Professional Development within SPACE** – possibilities and examples
- Overview and Evaluation of Resources Used in the 2005 **UCSB Workshop** for Learning Assessment and for Demonstrating Instructional Approaches.  Fiona Goodchild, Stacy Rebich-Hespanha (seehttp://www.csiss.org/SPACE/workshops/2005/UCSB/agenda.php), To access postings to the agenda – Username/ password _____ _____
- Overview and Evaluation of Resources Used in the 2005 **OSU Workshop** for Learning Assessment and for Demonstrating Instructional Approaches, Kathryn Plank (see http://www.csiss.org/SPACE/workshops/2005/OSU/agenda.php), To access resources – Username/ password_____ _____
- Observations on the Value of SPACE and CSISS Website Resources for Workshop Participants and Social Science Instructors (see www.csiss.org/SPACE ), Eric Fournier
- Instructional Strategies for Large Classes, Don Cartwright
10:00   **Plans for 2006 Workshops**: Objectives, Personnel, Structure, Content, Resources, and Concerns (Breakout Working Groups):
- OSU Kwan (chair), Janelle, Johnson, Plank, Popa, Richards, Tobler, Yoo
- UCSB Sweeney (chair), Appelbaum, Battersby, Cartwright, F Goodchild, M Goodchild, Grace, Ross
- UCGIS/Oklahoma Rashed (chair), Fournier, Hemphill, Holoman, LeGates, Mesev, Pedersen, Rebecca Powell, Wilson, Yuan
10:45   Coffee / Continue breakout groups: prepare recommendations for 2006 workshops
1:30   **Reports from Working Groups**
- OSU (Kwan)
- UCSB (Sweeney)
- UCGIS/Oklahoma (Rashed)
- UCGIS short SPACE workshops/sessions at 2006 UCGIS Assembly (LeGates, Wilson)

Discussion

3:00   **Applicant Solicitation and Workshop Follow-Up, What Next?** Janelle

- Advertising SPACE and selecting participants – flyers, web-based application and evaluation procedures
- Increasing diversity among participants
- Links with HBCUs
- Financial incentives
- Follow-up Survey of 2005 workshop participants

3:15   **2007 and Beyond: A No-cost Extension program? New Proposal to NSF?**

(**Note**: proposals for STILE (Spatial Thinking in Learning) were submitted in the January 2006 and 2007 NSF DUE CCLI competitions – without success)

4:00   **Adjourn  /**  Dinner (on one's own in Santa Barbara)

# ADVERTISING THE PROGRAM AND SOLICITING APPLICIANTS

The advertising plans for years 3 and 4 were based on improving the level of information provided to likely applicants on the website and the distribution of fliers (approximately 1,000 through departments, academic associations, and meetings). List-severs and email listings were used for wide-spread exposure.

Advertising to tribal colleges and universities, historically Black colleges and universities, and Hispanic serving institutions included fliers to academic administrators. However, we also made direct contact with representatives from some of these institutions, with a special focus on HBCU institutions. Dr. David Padgett (participant at the 2004 UCSB workshop) provided special support for this initiative). Other prior HBCU participants also contributed to spreading information about workshop opportunities. In 2007, progress was made in securing applicants from Tribal Colleges.

The SPACE brochure was provided for distribution at conferences where SPACE workshop participants gave presentations on their pedagogic achievements.

The SPACE website (http://www.csiss.org/SPACE) was improved significantly in year three, with the addition of more resources to aid instructors and a consolidation of discipline-related instructional resources. Stacy Rebich-Hespanha and Andrea Nuernberger (graduate students at UCSB) worked closely with the Webmaster on this project. Data on the use of this site are presented in the section on 'Findings.'

Two primary enhancements to the website (begun in 2005) were the inclusion of pages for Workshop Participant Contributions http://www.csiss.org/SPACE/materials/participants/ and for ACCESS conference presentations http://www.csiss.org/SPACE/workshops/sessions.php. These provide examples of what SPACE participants have achieved in teaching and in student learning assessment.

**Criteria for Applicant Selection (this statement appeared on the website to guide applicants):**
The selection committee is looking for workshop participants who:
- Teach undergraduate courses in social science disciplines and programs in community colleges, colleges, and universities. Although individuals with faculty appointments are preferred for this program, a limited number of Ph.D. candidates (who give evidence of significant commitment to teaching undergraduate students) will be considered.
- Agree to include spatial perspectives and analysis in their undergraduate courses.
- Agree to complete follow-up surveys on their uses of the workshop experience to enhance their undergraduate courses and curriculum.
- Provide evidence of commitment to undergraduate teaching and to developing curricula that expose students to the methodologies of spatial thinking.

- Are comfortable with computer file and data management and are experienced in searching for research data over the Internet. For the workshops at UC Santa Barbara and Ohio State University, we seek applicants who have experience in applications of quantitative analysis and GIS in the social sciences.

**Scholarship Support**
- There are no fees required to participate in a SPACE workshop.
- Participants may apply for awards of up to a maximum of $1000.
- Participants from designated minority institutions in the United States, and participants of Hispanic American, African American, or Native American background may be eligible for additional scholarship support.

In most cases, the SPACE scholarship award will not cover all of the costs for transportation, accommodations, and meals incurred by participants. You are encouraged to contact chairs of departments and deans at your institutions to seek funds to supplement the SPACE award. Participants within daily travel distance of the host institution may be admitted without scholarship support.

# AGENDA FOR 2006 - 2007 WORKSHOPS

Outlines are provided for the 2007 workshops at OSU and UCSB (similar programs were offered in 2006) and for the 2006 workshop at the University of Oklahoma (offered on behalf of UCGIS).

## Spatial Analysis in the Social Science Curriculum: Enhancing Undergraduate Learning

*July 15-20, 2007: Santa Barbara, CA*

This workshop focuses on spatial methods and perspectives suited for applications in the undergraduate social science curriculum, such as exploratory spatial data analysis and cartographic visualization. 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 for quantitative analysis and/or basic GIS applications in the social sciences.

**Instructors:** Stuart Sweeney (coordinator), Fiona Goodchild, Michael Goodchild, Don Janelle, and Waldo Tobler (all of UC Santa Barbara)

**Co-sponsor with CSISS and host institution:** Department of Geography, University of California, Santa Barbara, and the Institute for Social, Behavioral, and Economic Research.

### Overview of Workshop Goals

The UCSB workshop introduces social science instructors to the potential added value provided by spatial perspectives. The workshop engages participants with opportunities to learn spatial theory, methods of spatial analysis, and pedagogic strategies for integrating spatial perspectives into lectures, labs, and demonstrations in undergraduate instruction. The training in spatial analytic tools is not presented as an end in itself, but instead as a means to facilitate undergraduate learning within the context of existing social science theory.

The UCSB workshop focuses on: (1) Implementing core spatial concepts through exploratory spatial data analysis and cartographic visualization; (2) Integrating social science theory and spatial analysis; and (3) Visualizing social science data. These basic themes are intended to transcend disciplinary boundaries. Small-group discussions and teamwork will be used throughout the workshop to facilitate the integration of lectures and lab work with pedagogical development.

### The Ideal Candidate

The ideal candidate for this workshop will recognize the importance of integrated spatial social science as a worthy goal in both teaching and research. Even if they have novice skills in spatial analysis, they are driven to learn by their own teaching and research goals. This ideal candidate will also have a solid grounding in one of the social sciences, a minimum of one year as a primary undergraduate classroom instructor, and a competency with PC computing that includes moderate to advanced familiarity with Microsoft Excel (or comparable spreadsheet software), prior use of software for statistical analysis (e.g., SPSS, Stata, SAS, S-Plus, or Matlab) and/or GIS, and ability to execute basic file administration

tasks (e.g., locating, copying, and renaming files). The candidate's statement of goals on the application form should document their objectives and preparation for the workshop.

## Workshop Agenda

Participants should arrive in Santa Barbara on Saturday, July 14th. The first class is in Ellison Hall, Room 2620 at 9:15am on Sunday, July 15th.

All background readings will be displayed in a separate browser window

| *Sunday, July 15: Introduction, Motivation, and Project Planning* | | |
|---|---|---|
| 9:15 | **Welcome and Introductions** | Don Janelle |
| 10:15 | **Integrating Spatial Perspectives into Undergraduate Social Science Education** | Stuart Sweeney |
| 11:30 | **Project Planning and Student Assessment** | Fiona Goodchild Stacy Rebich-Hespanha Stuart Sweeney |
| 12:15 | *Lunch with Instructors* | |
| 1:30 | **The Challenge of Spatial Social Science**<br><br>• GIS methods in social science research and education.<br>• Thinking spatially in the social sciences.<br>• **Discussion** | Mike Goodchild |
| 3:30 | **Introducing GIS and Peer Interaction**<br>*Exercises*:<br>Introduction to ArcGIS | Kirk Goldsberry Jeff Howarth |
| 5:30 | **Workshop Dinner with Instructors** (Carrillo Dining Hall) | |
| 6:30 | **Reception and Poster Session ***<br>(West Campus Commons) | |
| *Monday, July 16: Spatial Social Science and GIScience* | | |
| 9:15 | **Geographic Information Systems/Science: Basic Concepts of GIS**<br><br>• Nature of spatial processes and their representation in GIS | Mike Goodchild |
| 10:45 | **Learning and Assessing Spatial Thinking** | Fiona Goodchild Stacy Rebich-Hespanha |

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|---|---|---|
| After Lunch | **Computer Lab** (laptop software checks, data checks, lab logistics) | |
| 1:15 | **Structured Lab:** ArcGIS I: Data Structures / Data Sources / Mapmaking | Kirk Goldsberry Jeff Howarth |
| 4:00 | **Parallel Electives \***<br><br>**Open Computer Lab** | Staffed by: Kirk Goldsberry Jeff Howarth |
| | **Choropleth Maps with ArcGIS** | |
| 8:00pm | **Open Discussion** - *location to be determined* | |
| *Tuesday, July 17: Spatial Analytic Methods in Social Science Instruction* | | |
| 9:15 | **Spatial Analytic Methods (exploratory / descriptive / inferential)**<br><br>• Point data: SS methods / applications<br>• Area data: SS methods / applications<br>• Interaction data: SS methods / applications | Stuart Sweeney |
| 10:45 | **Spatial Analytic Methods (exploratory / descriptive / inferential)**<br><br>• Spatial analytic methods in social science research and education.<br>• Added-value from spatial analytic methods<br>• Spatial autocorrelation and relation to social science theories<br>• Classroom demos versus student assignments / labs<br>• **Discussion** | Stuart Sweeney |
| 12:00 | *Lunch with Instructors* | |
| 1:15 | **Structured Lab:** GeoDa: Exploratory Spatial Data Analysis<br><br>• Reading ESRI Shape files and variable construction<br>• EDA and ESDA utility and interpretation<br>• Inferential pattern analysis / spatial autocorrelation. | Stuart Sweeney Kathryn Grace David Folch |
| 4:00 | **Parallel Electives \***<br><br>**Open Computer Lab** | staffed by: Kirk Goldsberry Jeff Howarth |
| | **R Language and STARS** (space-time analysis of regional systems)<br><br>• Spatial econometric theory; Spatial error and spatial lag models<br>• Specification tests and model interpretation | Stuart Sweeney Kathryn Grace David Folch |

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|---|---|---|
| | • GeoDa application: Hedonic real estate model | |
| 5:00 | **Workshop Debriefing** | |
| | | |

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|---|---|---|
| *Wednesday, July 18: Cartography / Visualization in Social Science Instruction* | | |
| 9:15 | **Cartographic Visualization in Social Science Instruction** | Kirk Goldsberry |
| 11:00 | **Structured Lab:** ArcGIS II: Topics in Cartographic Communication<br><br>• Classification | Kirk Goldsberry<br>Jeff Howarth |
| Afternoon | **Free Time in Santa Barbara** (options depending on interest; consult with Stacy Rebich-Hespanha) | |
| | **Open Computer Lab** | Limited Staff Support |
| | **Consultation with Faculty** | To be arranged |
| 8:00pm | **Open Discussion** - Location to be determined | |
| *Thursday, July 19: Spatial Interaction, Pedagogy, and Project Development* | | |
| 9:15 | **Issues in Teaching and Learning**<br>Chair: Fiona Goodchild<br>Panel: Stuart Sweeney, and three workshop participants | |
| 11:00 | **Movement and Flows**<br><br>• Flow representation and mapping<br>• **Discussion** | Waldo Tobler |
| 12:15 | *Lunch with Instructors* | |
| 1:30 | **Introducing Spatial Perspectives in Undergraduate Teaching: Institutional Opportunities and Constraints** | Discussion with Mike Goodchild |
| 2:30 | **Parallel Electives \***<br><br>**Open Computer Lab** | Kathryn Grace<br>David Folch<br>Kirk Goldsberry<br>Jeff Howarth |
| | **Flow Mapper Implementation** | Waldo Tobler |

| 3:30 | **Consultations with Instructors** | F. Goodchild<br>M. Goodchild<br>S. Sweeney<br>W. Tobler |
|------|-----------------------------------|---------------------------------------------------------|

### Friday, July 20: Project Presentations / Closing Session

| 9:15 | **Participant Presentations and Peer Feedback**<br><br>• 8 minute presentation, 4 minute discussion (maximum of 10 PowerPoint slides)<br>• Peer review for each participant | |
|------|------|------|
| 1:15 | **Participant Presentations and Peer Feedback**<br><br>• 8 minute presentation, 4 minute discussion.<br>• Peer review for each participant | |
| 3:30 | **Participant Presentations and Peer Feedback**<br><br>• 8 minute presentation, 4 minute discussion.<br>• Peer review for each participant | |
| 4:30 | **Closing Comments** | Don Janelle<br>Stuart Sweeney<br>Fiona Goodchild |
| 6:00 | **BBQ Dinner and Workshop Certificates** (Location to be arranged) | |

### Saturday, July 21: Participants Depart Santa Barbara

## * Definitions

**Project Planning / Goal Setting** - Workshop participants are expected to work on a project related to their curriculum and course development. This will be the basis of a final presentation from each participant towards the end of the workshop.

**Poster Session** - Describe who you are and your role at your home institution. Discuss your interest in spatial analysis and provide examples of how you may have or would like to incorporate spatial analytic perspectives in the undergraduate curriculum. Posters will be the focus for participant and instructor interaction at the reception on the first day of the workshop.

**Parallel Electives** - Participants may choose options that best reflect their interests and needs. Topics for parallel sessions are flexible and may be suggested by participants at any time during the workshop. These will allow for small-group and more in-depth treatment of topics than would be possible in larger groups.

## GIS and Spatial Modeling for the Undergraduate Social Science Curriculum

*June 18-23, 2007, Columbus, OH*

This workshop focuses on spatial thinking, spatial analytic methods and their applications suited for undergraduate social science courses. These methods include cartographic visualization, space-time modeling of individual behavior, spatial interaction models, spatial point pattern analysis and spatial optimization methods. The workshop will also cover curriculum development, pedagogy and student learning assessment. Workshop participants will consider how to integrate these methods 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/or GIS in the social sciences.

**Instructors:** Mei-Po Kwan (coordinator), Ola Ahlqvist, Desheng Liu, Alan Murray, Morton O'Kelly, Kathryn Plank, and Ningchuan Xiao (all of The Ohio State University), and Sara McLafferty (University of Illinois at Urbana-Champaign).

**Co-sponsor with CSISS and host institution:** Department of Geography, The Ohio State University.

## Workshop Agenda

| | | |
|---|---|---|
| *Monday, June 18:* | | |
| 8:30am | *Coffee and Bagels* | |
| 9:00 | **Optional Lab Sessions:** *ArcGIS and GeoDa* | |
| 2:00 | **Welcome** (Derby Hall 1080) | D. Janelle, Mei-Po Kwan |
| 3:00 | **Pedagogy issues:** *Planning your Students' Learning* | Kathryn Plank |
| 6:00 | **Reception and Dinner** *(Buckeye Cafe)* | |
| *Tuesday, June 19:* | | |
| 9:00 | **Lecture** *Spatial Analysis Using Census Data* | Ningchuan Xiao |
| 1:00 | **Introduction and Space-Time Analysis Census Data** | Mei-Po Kwan |
| 4:00 | **Guest Lecture:** *Spatial Perspectives on Health and Social Issues* | Sara McLafferty |
| 5:00 | **Extra Lab Sessions** | |
| 6:00 | *Break* Dinner on your own | |
| *Wednesday, June 20:* | | |

| Time | Session | Presenter |
|---|---|---|
| 9:00 | **Introduction to GIS and Cartographic Visualization** | Ola Ahlqvist |
| 1:00 | **Lecture** *Spatial Optimization Modeling* | Alan Murray |
| 4:00 | **Panel Session on Pedagogy Issues** *(interdisciplinary panel* | Linda Lobao<br>Philip Brown |
| 5:00 | **Group Discussion on Pedagogy Issues** | |
| 6:00 | *Break* Dinner hosted by Department of Geography, the Ohio State University | |
| *Thursday, June 21:* | | |
| 9:00 | **Lecture** *Spatial Interaction Modeling: Space- Price Equilibrium* | Morton O'Kelly |
| 1:00 | **Lecture** *Exploratory Spatial Data Analysis* | Desheng Liu |
| 4:00 | **Pedagogy issues:** *Evaluation of Your Students' Learning,* | Kathryn Plank |
| 6:00 | *Dinner on your own* | |
| *Friday, June 22:* | | |
| 9:00 | **Pedagogy Discussion** *and Group Project* | |
| 10:30 | **Concurrent Lab Sessions on all topics**<br>• Cartographic Visualization (Ahlqvist)<br>• Space-Time Analysis (Kwan)<br>• Spatial Analysis Using Census Data (Xiao)<br>• Spatial Optimization Modelling (Murray)<br>• Spatial Interaction Modeling (O'Kelly)<br>• Exploratory Spatial Data Analysis (Liu) | |
| 1:00 | **Concurrent Lab Sessions continues** | |
| 4:00 | **Group Project:** *Instructors hold office hour* | |
| 5:00 | *Break* Dinner on your own | |
| *Saturday, June 23:* | | |
| 8:30-12:00 | **Group Presentations** | |
| 12:00-1:00 | *Box Lunch* | |

## Remote Sensing and GIS Technologies for Undergraduate Curricula in the Social Sciences

*July 23-28, 2006, Norman, OK*

This workshop will explore the uses of geographic information technologies for undergraduate curricula in the social sciences and offer guidance on the uses of these technologies to enhance spatial understanding for undergraduate social science students. Participants will acquire understanding of the utility of remotely sensed data - how they provide nontraditional, and otherwise unobtainable, measures of social phenomena, and how these measures are used with a wide range of population-related data in GIS for the visualization, analysis, and understanding of social dynamics at micro, macro, and global levels. Lectures, demonstrations, tutorials, and group investigations will foster open discussions to stimulate spatial thinking and problem-solving skills, and to translate these into resources for teaching at the undergraduate level. Applicants should already have basic GIS knowledge since GIS will provide the integrated platform for introducing remote sensing and spatial statistics.

**Instructors:** Tarek Rashed (coordinator), May Yuan, Jon Pedersen (all of The University of Oklahoma), Victor Mesev (Florida State University), and Rebecca Powell (UC Santa Barbara)

**Co-sponsor with CSISS:** The University Consortium for Geographic Information Science www.ucgis.org

**Host institution:** Department of Geography and the Center for Spatial Analysis, The University of Oklahoma

## Workshop Agenda

| Sunday, July 23: Introduction and Motivation | | |
|---|---|---|
| 8:30 | **Workshop Registration** | Melissa Brown |
| 9:00 | **Orientation and Ice Breaker** | Group |
| 9:30 | **Welcome and overview of remote sensing multidisciplinary education and research initiatives at OU** | Lee Williams VP of Research OU |
| 10:00 | **The Objectives of SPACE and Resources from the Center for Spatially Integrated Social Science** | Don Janelle |
| 10:45 | **Private Universe** | Video |
| 11:15 | **Science Teaching and the Learner: The Learning Cycle** | Jon Pederson |
| 1:00 | **Remote sensing and social sciences: A gallery of applications** | Tarek Rashed, Katy Rich, Victor Mesev, May Yuan, Lab Consultants |

| 2:15 | **Computer lab orientation: Login information, overview of software** | Chris Cook |
|---|---|---|
| 2:45 | **Computer exercise: Linking remotely sensed measures and population data to analyze socioeconomic implications of machine space in Los Angeles, CA** | Tarek Rashed, Katy Rich, Victor Mesev, May Yuan, Lab Consultants |
| 4:15 | **Group Discussion: Pedagogy discussion (reflections on the Machine Space exercise)** | Jon Pedersen, May Yuan, Tarek Rashed, Victor Mesev |
| 5:30 | **Catered reception & Poster Session (Goal setting for the workshop)** | Group |
| *Monday, July 24: Remote Sensing Classification for Social Science* | | |
| 9:00 | *Computer exercise: Introduction to image processing software and RS data warehouses* | Tarek Rashed, Mang Lung Cheuk, Victor Mesev, Lab Consultants |
| 10:45 | **Introduction to Remote Sensing**<br><br>• Basic RS principles<br>• Types of RS imagery, Data availability | Victor Mesev |
| 11:30 | *Group Reflections* | |
| 12:45 | *Computer exercise: Incorporation of social data in image classification* | Victor Mesev, Mang Lung Cheuk, Tarek Rashed, Lab Consultants |
| 2:15 | **RS classification for social science applications**<br><br>• Hard and soft classification<br>• Incorporation of social/economic data in urban image classification | Victor Mesev |
| 3:15 | *Open computer lab and consultation with Faculty* | Victor Mesev, Tarek Rashed, May Yuan |
| *Tuesday, July 25: Syllabus Design for Social Science Courses Integrating RS and GIS Technologies* | | |
| 9:00 | *Small Group Discussions I: Pedagogic considerations in incorporating remote sensing and GIS in undergraduate* | Jon Pederson, Dustin Howard, May Yuan, |

| | | |
|---|---|---|
| | *curricula* | Tarek Rashed, Victor Mesev, Becky Powell |
| 10:30 | ***Small Group Discussions II: Technical considerations in incorporating remote sensing and GIS in undergraduate curricula***<br><br>• ***Develop group syllabi, by interest area, including technical challenges based on the exercise and lectures presented July 23-24*** | May Yuan, Dustin Howard, Jon Pederson, Tarek Rashed, Victor Mesev, Becky Powell |
| 11:45 | ***Synthesis of group discussion & reflections*** | Jon Pederson, May Yuan |
| 1:30 | ***Field Trip and dinner in Oklahoma City*** | |
| *Wednesday, July 26: Regional and Nighttime RS data for social applications* | | |
| 9:00 | ***Computer exercise: Regional land-cover change*** | Becky Powell, Matt Collier, Tarek Rashed, Lab Consultants |
| 10:45 | **Integrating RS and social science for land-cover change studies**<br><br>• Linking human decisions to landscape outcomes<br>• Scales of analysis | Becky Powell |
| 11:30 | ***Group Reflections*** | |
| 12:45 | ***Computer exercise: Nighttime imagery*** | Becky Powell, Matt Collier, Tarek Rashed, Lab Consultants |
| 2:15 | **Nighttime imagery for social sciences**<br><br>• Estimating population<br>• Modeling the spatial distribution of economic activities<br>• Measuring human impact on the environment | Becky Powell |
| 3:15 | ***Group Reflections*** | |
| 3:45 | ***Open computer lab and consultation with Faculty*** | Becky Powell, Tarek Rashed, May Yuan |
| | | |

| | | |
|---|---|---|
| | | |
| **Thursday, July 27: GIS as integration platform for RS and social data** | | |
| 9:00 | *Computer exercise: Socioeconomic and population dynamics in response to large-scale natural hazardous events* | May Yuan, James Bothwell, Becky Powell, Tarek Rashed, Lab Consultants |
| 10:45 | **GIS Analysis and Modeling with RS and Social Data**<br>• **Integration of RS and social data in GIS**<br>• **GIS tools for spatial analysis**<br>• **GIS procedures for spatial modeling**<br>• **Incorporating spatial thinking, analysis, and modeling into social science curricula** | May Yuan |
| 11:45 | *Group Reflections* | |
| 1:00 | *Research case studies and general discussion* | Becky Powell, Tarek Rashed, May Yuan |
| 2:15 | *Group Reflections* | |
| 2:45 | *Open computer lab and consultation with Faculty* | Becky Powell, Tarek Rashed, May Yuan |
| **Friday, July 28: Project presentation and wrapping up** | | |
| 9:00 | *Session I: Participant Presentations and Peer Feedback* | Group |
| 10:45 | *Session II: Participant Presentations and Peer Feedback* | Group |
| 1:00 | *Comments on pedagogic elements in the projects* | Jon Pederson |
| 1:30 | *Comments on technical elements in the projects* | May Yuan |
| 2:15 | *Keynote lecture and commentary*<br>**"What Does Google Earth Mean for the Social Sciences?"** | Mike Goodchild |
| 3:45 | *Closing and workshop certificates* | Tarek Rashed |

# PARTICIPANTS IN THE SUMMER 2006 - 2007 SPACE WORKSHOPS

**Ohio State University 2006**

- **Babette Audant,** CUNY Kingsborough Community College, Human Geography
- **Laura Blanciforti,** WVU/NIOSH/CDC, Economics
- **Lincoln D. Chandler,** Florida Memorial University, Criminology
- **Ke Chen,** University of Cincinnati, Geography
- **Joe D. Francis.** Cornell University, Sociology
- **Peng Gao,** Syracuse University, Statistics
- **Jamie Griffiths,** University of South Florida, Public Health
- **Iris Hui,** University of California, Berkeley, Political Science
- **Andres Jauregui,** Columbus State University, Economics
- **Changjoo Kim,** Minnesota State University, Geographic Information Science
- **Enrique Lopez,** UPR-Cayey Instituto Investigaciones Interdisciplinarias, Statistics
- **Rolin Mainuddin,** North Carolina Central University, Political Science
- **Timothy Miller,** Denison University, Economics
- **Brian Nicholls,** University of Wisconsin-Milwaukee, Archaeology
- **Nancy Obermeyer,** Indiana State University, Human Geography
- **Sunhee Sang,** Minnesota State University, Geographic Information Science
- **Michael Strager,** West Virginia University
- **Michele Villinski,** DePauw University, Economics
- **Khodr Zaarour,** Shaw University, Political Science

**Ohio State University 2007**

- **Gregory Bohr,** California Polytechnic State University, Environmental Studies & Policy; Geography
- **Olga Bychkova,** The Ohio State University, Political Science
- **Marlese Durr,** Wright State University, Sociology
- **Fazlay Faruque,** University of Mississippi Medical Center, Public Health; GI Science
- **John Gossom,** The Ohio State University, Human Geography
- **Diana Grigsby-Toussaint,** University of Illinois Chicago, Public Health
- **Elizabeth Groff,** Temple University, Criminology; Geography
- **Randolph Horn,** Samford University, Political Science
- **Antwan Jones,** Bowling Green State University, Demography
- **Ranbir Kang,** Oklahoma State University, Geographic Information Science
- **Yushim Kim,** The Ohio State University, Criminal Justice; Geographic Information Science
- **Katherine King,** University of Michigan, Demography
- **Marilyn Krogh,** Loyola University Chicago, Sociology; Urban Studies
- **Zhe Li,** Clark University, Geographic Information Science
- **L Joe Morgan,** UNC Greensboro, Geographic Information Science
- **Kenyatta Phelps,** Bowling Green State University, Sociology; Criminology
- **Claudia Scholz,** Trinity University (TX), Sociology; International Development

- **Sarah Smith,** Delta College (MI), Sociology
- **Jeffery Strickland**, Montclair State University, History; Historical Geography
- **Wei Tu, Georgia Southern University,** Geographic Information Science
- **Xi Zhang,** University of Pittsburgh, Sociology
- **Jennifer Ziemke,** University of Wisconsin-Madison, Political Science

## University of Oklahoma 2006

- **Adegoke Ademiluyi,** Fayetteville State University, Human Geography
- **Veronica Arias,** University of New Mexico, Archaeology
- **Joe Bowersox,** Willamette University, Political Science
- **William Brown,** Texas Southern University, Human Geography
- **Hongmian Gong,** Hunter College, Human Geography
- **Daikwon Han,** Morehead State University, Institute for Regional Analysis & Public Policy
- **Ge Lin,** West Virginia University, Geographic Information Science
- **Chris Mayda,** Eastern Michigan University, Human Geography
- **Iheanyichukwu Osondu,** Fort Valley State University, Human Geography
- **Jungyul Sohn,** University of Memphis, Regional Science
- **Shobha Sriharan,** Virginia State University, Environmental Studies & Policy
- **Judith van der Elst,** University of New Mexico, Archaeology

## University of California, Santa Barbara 2006

- **Adriana Abdenur,** The New School, Sociology and urban studies
- **Kishi Animashaun,** Syracuse University, Environmental sociology and African-American studies
- **Marit Berntson,** Roanoke College, Sociology
- **Neil Carlson,** Calvin College, Political science and research methods
- **Jon Christensen,** Stanford University, History
- **Alexandra Cole,** California State University, Northridge, Political science
- **Charlotte Cooper,** University of California, Santa Cruz, Archaeology
- **Laurel Cornell,** Indiana University, Demography, sociology, East Asian culture
- **Albert Esteve-Palos,** Universitat Autonoma de Barcelona, Spatial demography
- **Steve Graves,** California State University, Northridge, Human geography
- **Daikwon Han,** Morehead State University, Spatial demography and epidemiology, regional analysis
- **Yamuranai Kurewa,** Bennett College, Social work
- **Jean LaVigne,** Gustavus Adolphus College
- **Linda Loubert,** Morgan State University, Urban studies and GIS
- **James Loucky,** Western Washington University, Anthropology, international migrations and borderlands
- **Susan Maguire,** University at Buffalo, Historical archaeology
- **Lisa Oliver,** Simon Fraser University, Human geography

- **Jacqueline Olvera,** Connecticut College, Urban sociology
- **Claudia Scholz,** University of Texas - San Antonio, Environmental sociology and community development
- **Sue Steiner,** Arizona State University, Social work and community change
- **Wei Tu,** Georgia Southern University, Geographic information science
- **Ming Wen,** University of Utah, Medical sociology and social epidemiology
- **Zhirong Zhao,** Eastern Michigan University, Political science and public administration

**University of California, Santa Barbara 2007**
- **Sean Anderson,** California State University Channel Islands, Environmental Studies & Policy
- **Wesley Bernardini.** University of Redlands, Archaeology
- **Kevin Byrne,** Minneapolis College of Art and Design, Visualization and creative management
- **Valentina David,** Bethune-Cookman College, Environmental Science
- **Alex De Pinto,** University of Redlands, Economics
- **Joshua Dyck,** University at Buffalo, SUNY, Political Science
- **Jill Grigsby,** Pomona College, Sociology
- **Hiroyuki Iseki,** University of Toledo, Urban and Regional Planning
- **Esther John,** Northwest Indian College, Education and Curriculum Development
- **Rajrani Kalra,** University of Central Arkansas/Kent State University, Human Geography
- **Sharla Lair,** Florida State University, Geographic Information Science
- **Lillian Larsen,** University of Redlands, Religious Studies, History
- **Allan Joseph Medwick,** Kean University, Education Management; Asian and Chinese studies
- **Sookhee Oh,** Brown University, Sociology
- **Kerry Pannell,** DePauw University, Economics
- **Jen Petersen,** New York University, Sociology; Urban Studies
- **Ana Simão,** University of Coimbra, Resources Management and GIS
- **Shobha Sriharan**, Virginia State University, Environmental Science
- **Jun Sunseri,** University of California, Santa Cruz. Anthropology
- **William Van Lopik,** College of Menominee Nation, Geographic Information Science
- **Steve Wuhs,** University of Redlands, Political Science
- **Li Yin,** University at Buffalo (SUNY), Urban and Regional Planning

# FOLLOW-UP ACTIVITIES FOR WORKSHOP PARTICIPANTS

The call for applications for the SPACE Awards and for ACCESS conference proposals are provided below. Consistent with standards of good science, the adjudication panel of the SPACE project's PI, Co-PIs, and workshop instructors were assigned the task of achieving a balanced distribution of awards across disciplines and across topical research domains.

These programs were started in 2005, drawing primarily on participants in the 2004 workshop program. Year 2005 and Year 2006 workshop participants were added to the invitation list for applications in subsequent announcements.

## Call for Applications for SPACE Instructional Development Awards

SPACE invites applications from faculty at four-year colleges and universities for instructional development awards (up to four), to fund (up to $1500 of verified expenses) program activities for spatial thinking in undergraduate social science education. Examples of eligible award uses:

- Present a conference paper about teaching spatial thinking at the undergraduate level in the social sciences.
- Participate in a workshop or training program on uses of spatial analysis/GIS software (e.g., a GIS vendor workshop, ICPSR workshop, or GeoDa workshop with Luc Anselin).
- Participate in a professional workshop dedicated to instruction and student learning of spatial analysis concepts and technology.

To apply, you must have attended a SPACE workshop. **Please submit**:
- Evidence of achievement in meeting instructional goals to implement spatial approaches in your undergraduate course(s) or programs. Examples might include a new syllabus, curriculum development or assessment resources, a superb example of a student course project, and efforts to enhance the diversity of students who benefit from spatial perspectives. Please specify how your instructional development initiatives have benefited the advancement of spatial perspectives in undergraduate education.
- A statement of how the SPACE workshop inspired and / or supported your achievement.
- Commitment to prepare a short case study or example of your achievement for posting on the SPACE website.
- A description of how you would use the expense allocation of up to $1500 to enhance your instruction of spatial approaches or to help in the dissemination of spatial methodologies to students and colleagues.

# Call for Proposals for ACCESS
## Academic Conference Courses to Enhance Spatial Science

The ACCESS program is described on the website as follows:

SPACE sponsors special sessions, short courses, and short workshops on spatial methodologies and curricula development at annual conferences of academic associations. When appropriate, these sessions and short workshops will feature instructors and participants from prior SPACE workshop and symposia programs, and involve educators from the host disciplines of the conference. These may feature demonstrations of how spatial analysis brings added value to instructional programs; others might focus on hands-on instruction in specific spatial methodologies (e.g., spatial visualization of geo-referenced data), or will address issues regarding student needs, expectations, and assessment of learning. These conference-related events are intended to broaden exposure to the availability of SPACE programs - an opportunity to advertise workshops, and to alert instructors to hardcopy and online resources that might assist their classroom offerings and professional development. In addition, the conference setting exposes SPACE personnel to the interests, culture, and needs of scholars from diverse disciplinary backgrounds, enabling more informed and responsive programs for the annual workshop program.

For previously funded ACCESS sessions, see
http://www.csiss.org/SPACE/workshops/sessions.php

**Instructions on Applying for Sponsorship of Conference Programs**
If you are interested in seeking modest financial support from SPACE, you will need to profile the conference/organization and explain why it provides an appropriate venue for SPACE outreach, and also demonstrate that the workshop plan is consistent with the objectives of SPACE. In a 2-page proposal, please describe the following:

- The Organization (description, objectives, membership)
- The Conference (where, when, purpose / general themes, number of participants, disciplinary mix)
- The Proposed Workshop:
    - Title, duration (half-day / full-day?)
    - Instructors (brief profile)
    - Objectives (see: http://www.csiss.org/SPACE/about/mission.php)
    - Agenda
    - Advertising strategy to attract participants
    - Anticipated attendance and disciplinary background of participants
    - Estimated Budget

Organizers who are supported by SPACE agree to the following:
- to provide SPACE with a brief report on the outcomes of the workshop: list of attendees

(discipline), contact information, and details on any workshop-related follow-through activities;

- to include a representative from SPACE in the organization and presentation of the workshop;
- to post an announcement about the workshop on the SPACE site, borrowing heavily from the proposal;
- to post appropriate workshop PowerPoint presentations (pdf format) and workshop-related instructional resources; and
- to provide documentation for assessing participant evaluations (from a short post-workshop survey).

The SPACE financial commitment to conference workshop organizers/instructors is to cover travel, conference registration, lodging (only 2 nights) and per diem; SPACE will support the workshop instruction period rather than the full conference participation of workshop leaders. If you are bringing in a special guest presenter for the workshop, a modest honorarium may be considered. SPACE reserves the right to modify this formulation based on the cost considerations of meeting venues and on the availability of funds.

## Workshop Follow-up Survey

A follow-up survey of workshop participants (approximately 10 to 12 months following annual workshops) was administered over a secure website in spring 2005, 2006, and 2007. The results are presented in the "Findings" section of this report. The survey will be administered to 2007 workshop participants in spring 2008.

**NSF Proposal 0231263: NSF 02-043 CCLI National Dissemination**
## Annual Report for October 2005 to September 2007

# Findings

The SPACE program effectively recruited young faculty from a range of social science disciplines for the 2006 and 2007 workshops. As in prior years, the application pool was impressive and diverse, especially in terms of the range of disciplines institutions that were represented. Not only were these faculty interested in learning about spatial analysis and technology, but they were active in exploring how to integrate spatial approaches into their undergraduate courses. Several comments on the final surveys indicated that the SPACE program provides a unique opportunity for faculty to improve their credibility and potential to make innovations at their home institutions.

SPACE has a specific goal to assist faculty in using new approaches to spatial analysis, including databases and software packages. Each of the summer workshops provided outstanding facilities and instruction that enabled the participants to the get hands-on experience that is critical for preparing them to be innovative teachers. At the end of the summer sessions, participants made presentations that reflected their current interest in engaging students in new exercises and projects. Some of these were better developed than others in terms of providing specific examples. Most of them indicated that they had gained confidence in being able to introduce GIS, GeoDa (spatial econometrics software), and other spatial tools to their undergraduates. The Results of the third- and fourth-year activities of the SPACE project reveal significant success, as summarized under the following headings:

I.      **Applicant Selection and Participation**
II.      **Results: Application / Entry / Exit Surveys**
III.      **Commentary by Workshop and Educational Development Coordinators**
IV.      **Follow-up Survey of 2005 and 2006 Workshop Participants**
V.      **Educational Development Awards and ACCESS Programs**
VI.      **Use of SPACE Website Oct 2006 –- Sept 2007**
**APPENDIX. Survey forms (application, entry, exit, and follow-up)**

Both participants and instructors evaluated the year-three and year-four workshops favorably. The critiques from participants from each successive workshop year have enabled refinements in offerings. The primary areas of control over workshop outcomes relate to the selection of participants, the structuring of workshop content (see agenda outlines under Activities), and the balance between content learning and education development initiatives.

# I. APPLICANT SELECTION AND PARTICIPATION

Advertising yielded 115 applicants for three workshops in 2006 and 64 applicants for two workshops in 2007. The evaluation criteria stressed experience with computers and a favorable disposition to rigorous analysis, enthusiasm and commitment to teaching undergraduate students, representation from across the social science disciplines, and incentives for the selection of designated minority candidates. We were also seeking a reasonable level of homogeneity in prior experience with spatial methods for each workshop. Offers to 68 applicants resulted in 53 final participants in 2006; offers to 55 applicants resulted in 44 final participants in 2007. Individuals who declined offers cited scheduling as the primary factor, along with health issues, and unanticipated family and work obligations. Tables 1 and 2 provide specific details for each year.

The discipline breakdown reflects prevailing patterns of academic activity in spatial analysis. Acceptance patterns reflected a desire for broad representation of the social sciences, focusing on those with high potential for new dissemination. In general, the aim was to have participants with prior experience in using GIS in each to the 2006 and 2007 workshops, however, allowances were made to accept some participants in each workshop with little or no prior experience but who showed commitment and potential to influence undergraduate curriculum changes. Extra resources were made available to assist these individuals.

Owing to their potential for achieving greater immediate dissemination, existing university faculty members with PhDs, were favored (77% of final participants for both years) over applicants still in student status. Women (56% in 2006 / 80% in 2007) were admitted at a higher rate than men (50% in 2006/ 59% in 2007). All workshops had both male and female instructors.

Success in reaching designated minority individuals continued to exceed our expectations – resulting in 22 of 115 applicants from Hispanic American, Native American, and African American communities in 2006 (10 of 64 applicants in 2007). An extra financial stipend was available to assist their participation, and the acceptance rates were higher than for other cohorts. They constituted 30% of final participants in 2006 and 18% of participants in 2007.

Surveys were designed to permit (a) selecting participants from the applicant pool, (b) refining the design of workshops based on the experience and aspirations of those selected, and (c) evaluating the overall success of the workshop program from the perspectives of participants. Copies of the Application, Entry and Exit surveys for 2006 and 2007 are provided in the Appendix. The application survey provided the primary information for selecting participants, including quantitative indicators of their self-assessed background in dealing with curricula issues and with spatial approaches to analysis. The design of the exit survey was intended to provide a close match to the workshop goals that participants cited in their entry surveys. The Entry and Exit surveys included questions about (a) the barriers that participants perceive to the adoption of spatial analysis in undergraduate teaching, (b) their aspirations for gaining technical content knowledge and insights for teaching and assessment, (c) what they hope to learn from engagement with fellow workshop participants, and (d) what they hope to learn from workshop lecturers regarding spatial analysis concepts and pedagogical strategies. Results are presented section III.

Table 1

**SPACE Applicants and Participants by Discipline, Gender, Degree (2006)**

| | Participants by Workshop | | | Totals | | Percent Applicants Participated |
|---|---|---|---|---|---|---|
| | UCSB | OSU | OU | Participants | Applicants | |
| **Anthropology** | 2 | | | 2 | 4 | 50 |
| **Archaeology** | 1 | 1 | 2 | 4 | 5 | 80 |
| **Computer Science** | | | | 0 | 2 | 0 |
| **Criminology** | | 1 | | 1 | 2 | 50 |
| **Demography** | 3 | | | 3 | 4 | 75 |
| **Economics** | | 4 | | 4 | 7 | 57 |
| **Environ Studies/Policy** | | 1 | 1 | 2 | 10 | 20 |
| **GIS** | 1 | 2 | 1 | 4 | 29 | 14 |
| **Geography** | 3 | 3 | 5 | 11 | 12 | 92 |
| **History** | 1 | | | 1 | 1 | 100 |
| **Political Science** | 3 | 3 | 1 | 7 | 10 | 70 |
| **Psychology** | | | | 0 | 2 | 0 |
| **Public Administration** | | | | 0 | 1 | 0 |
| **Public Health** | 3 | 1 | | 4 | 4 | 100 |
| **Regional Science** | | | 2 | 2 | 2 | 100 |
| **Statistics** | | 2 | | 2 | 3 | 67 |
| **Sociology** | 4 | 1 | | 5 | 9 | 56 |
| **Urban Studies** | 1 | | | 1 | 8 | 13 |
| **Totals:** | 22 | 19 | 12 | 53 | 115 | 46 |
| **Male** | 8 | 11 | 7 | 26 | 52 | 50 |
| **Female** | 14 | 8 | 5 | 27 | 48 | 56 |
| **Desig Minority Offered** | 6 | 4 | 6 | 16 | 22 | 73 |
| **Attended** | 5 | 3 | 5 | 13 | 22 | 59 |
| | | | | | | |
| **PhD** | 18 | 13 | 10 | 41 | 76 | 54 |
| **PhD Candidate** | | 2 | | 2 | 4 | 50 |
| **MSc** | | | | 0 | 12 | 0 |
| **MA/ME/MBA** | 4 | 4 | 2 | 10 | 21 | 48 |
| **BA/BSc** | | | | 0 | 1 | 0 |
| **No information** | | | | 0 | 1 | 0 |
| | | | | | | |
| **Offered / Did Not attend** | 2 | 6 | 7 | – | 15 | |
| **Applicants – Workshop as First Choice** | 64 | 25 | 26 | | | Percent Completion |
| **Completion:** | | | | | | |
| **– Workshop** | 22 | 19 | 12 | 53 | | 100 |
| **– Entry Survey** | 22 | 19 | 12 | 53 | | 100 |
| **– Exit Survey** | 21 | 19 | 9 | 49 | | 92 |

Table 2

**SPACE Applicants and Participants by Discipline, Gender, Degree (2007)**

| | Participants by Workshop | | Totals | | Percent Applicants Participated |
|---|---|---|---|---|---|
| | **UCSB** | **OSU** | **Participants** | **Applicants** | |
| **Anthropology** | 1 | | 1 | 1 | 100 |
| **Archaeology** | 1 | | 1 | 1 | 100 |
| **Art and Design** | 1 | | 1 | 1 | 100 |
| **Criminology** | | 3 | 3 | 3 | 100 |
| **Demography** | | 2 | 2 | 2 | 100 |
| **Economics** | 2 | | 2 | 2 | 100 |
| **Education** | 2 | | 2 | 2 | 100 |
| **Environ Studies/Policy** | 3 | 1 | 4 | 6 | 67 |
| **GIS** | 2 | 4 | 6 | 11 | 55 |
| **Geography** | 1 | 1 | 2 | 2 | 100 |
| **History** | | 1 | 1 | 2 | 50 |
| **Political Science** | 2 | 3 | 5 | 5 | 100 |
| **Public Administration** | | | 0 | 1 | 0 |
| **Public Health** | | 2 | 2 | 3 | 67 |
| **Regional Science** | | | 0 | 2 | 0 |
| **Religious Studies** | 1 | | 1 | 1 | 100 |
| **Sociology** | 4 | 5 | 9 | 13 | 69 |
| **Urban & Reg Planning** | 2 | | 2 | 4 | 50 |
| **Other** | | | 0 | 2 | 0 |
| **Totals:** | 22 | 22 | 44 | 64 | 69 |
| **Male** | 10 | 10 | 20 | 34 | 59 |
| **Female** | 12 | 12 | 24 | 30 | 80 |
| **Desig Minority Offered** | 6 | 4 | 10 | 10 | 100 |
| **Attended** | 4 | 4 | 8 | 10 | 80 |
| **PhD** | 13 | 12 | 25 | 34 | 74 |
| **PhD Candidate** | 2 | 3 | 5 | 5 | 100 |
| **MSc** | 2 | | 2 | 5 | 40 |
| **MA/ME/MBA/MEd/…** | 5 | 7 | 12 | 18 | 67 |
| **BA/BSc** | | | 0 | 2 | 0 |
| **Offered /Did Not attend** | 6 | 5 | 11 | | |
| **Applicants – Workshop as First Choice** | 37 | 27 | | | **Percent Completion** |
| **Completion:** | | | | | |
| **– Workshop** | 22 | 22 | 44 | | 100 |
| **– Entry Survey** | 22 | 22 | 44 | | 100 |
| **– Exit Survey** | 19 | 22 | 41 | | 93 |

# II.  RESULTS: APPLICATION / ENTRY / EXIT SURVEYS

The results from the quantitative questions on the entry and exit surveys (scaled values from 1 to 4) are presented in a set of tables. Copies of the web-administered survey forms are provided in the appended NSF Fastlane file to permit comparison of tabulated results with the actual survey items. Consistency in questions over the four workshop years has been retained to permit analysis of trends.

In the **participant/applicant self-assessments** (Table 3 for 2006 / 4 for 2007), key observations include:

- As in prior years, male applicants were more confident than female applicants in their skill levels. Exceptions included facility for curriculum development and for qualitative analysis (at least among 2006 applicants).
- In 2006, participants in the OSU and OU workshops had higher levels of self-assessed skills than those attending the UCSB workshop. This reflected a deliberate strategy to have strong familiarity with GIS for those wishing to acquire skills in remote sensing (OU workshop). The OSU workshop has generally been favored by applicants with a strong technological orientation (the case for 2006). In 2007, with only two workshops, the values for UCSB and OSU were very similar. Each workshop favored applicants with some prior knowledge in spatial methods in order to permit a stronger focus on pedagogy, curriculum design, and learning assessment.

In the **entry surveys** (Table 5 for 2006 / 7 for 2007), we tried to gauge the **perceived barriers and expectations** of those who actually participated in the workshops, so that workshop instructors could be responsive to their needs. Key observations follow:

- In general, entering participants minimize the significance of barriers (average values ranging from 1.8 to 2.9 on the various survey items). Barriers were seen as more significant among participants at Oklahoma. For applications of remote sensing technology in teaching, issues of student readiness, availability of local technical support, and access to resources were seen as important concerns.
- Across all survey items and workshops, expectations were high for skill development in techniques and for pedagogical insights (average values in the 3.5 range for nearly all survey items).

Interpretations of ratings from the **exit surveys** (Table 6 for 2006/ 8 for 2007) suggest:

- All of the 2006 and 2007 workshops succeeded in reducing the perceptions of technical and pedagogic barriers for participants. The ratings for the University of Oklahoma and the Ohio State University workshops in 2006 are especially notable.
- Across nearly all survey items for all three workshops, average scores are seldom below 3.00. In 2006, the UCSB workshop scored well on most items, but did not fare as well as

in previous years on discussions related to assessment of student learning (2.95) and pedagogical strategies (2.85). The lowest values in 2007 were for meeting expectations in GIS (2.95) for UCSB and 2.76 on housing evaluation for OSU.

- Average scores for the OSU and UCSB workshops in 2007 are very similar and are generally high. Each workshop scored values marginally below 3.00 on only 2 or 29 survey items.

In **a comparison of entry and exit surveys**, Tables 9 (for 2006) and 10 (for 2007) provide a picture of how well the SPACE workshops have addressed the needs of participants. Responses for all workshop participants in a given year are grouped to provide paired average scores on survey items across the entry and exit surveys. General interpretations include:

- There is a strong reduction of barrier effects that might impede instructors form implementing spatial technologies in undergraduate teaching in the social sciences.
- The workshops have generally fared done less well in meeting the high expectations of participants in mastering the technologies. Interpreting comments from participants, this relates to the mix of participants with different levels of prior knowledge, and divergent interests in GIS, spatial econometrics, and geo-visualization methodologies. It also relates to the very high time commitment required to achieve competency in these methodologies. The 2006 workshops did a better job than those in2007.

Table 3
## APPLICANT SELF-ASSESSMENT FOR 2006 SPACE WORKSHOPS
(Average Values – 1= no familiarity to 5 – expert.  See application form in Appendix)

| Experience Indicators | Participants | | | Not Admitted | | Accepted | |
|---|---|---|---|---|---|---|---|
| | UCSB | OSU | OU | Female | Male | Female | Male |
| Spatial Thought | 3.27 | 3.72 | 3.38 | 3.60 | 3.76 | 3.08 | 3.69 |
| Cartography | 3.00 | 3.22 | 3.31 | 3.16 | 3.27 | 2.72 | 3.50 |
| Data Management | 3.77 | 4.06 | 3.54 | 3.96 | 4.05 | 3.56 | 4.00 |
| Internet Search | 4.14 | 4.22 | 3.92 | 4.12 | 4.11 | 4.08 | 4.15 |
| Visualization | 3.45 | 3.72 | 3.54 | 3.36 | 3.62 | 3.44 | 3.62 |
| Qualitative | 3.27 | 3.17 | 2.77 | 3.28 | 3.22 | 3.16 | 2.96 |
| Quantitative | 3.95 | 3.94 | 3.38 | 3.80 | 3.49 | 3.64 | 3.96 |
| Curriculum | 3.23 | 2.72 | 2.85 | 3.04 | 3.35 | 3.04 | 2.85 |
| GIS | 3.27 | 3.89 | 3.92 | 3.48 | 3.70 | 3.40 | 3.88 |
| Spatial Statistics | 3.00 | 3.39 | 3.31 | 2.88 | 3.03 | 2.64 | 3.69 |
| Geo-coding | 2.59 | 3.22 | 3.23 | 2.96 | 2.78 | 2.64 | 2.35 |
| GPS | 1.95 | 3.06 | 3.00 | 2.64 | 3.03 | 2.32 | 2.81 |
| Remote Sensing | 1.59 | 2.61 | 2.54 | 2.20 | 2.84 | 1.92 | 2.35 |

Table 4
## APPLICANT SELF-ASSESSMENT FOR 2007 SPACE WORKSHOPS
(Average Values – 1= no familiarity to 5 – expert.  See application form in Appendix)

| Experience Indicators | Participants | | Not Admitted | | Accepted | |
|---|---|---|---|---|---|---|
| | UCSB | OSU | Female | Male | Female | Male |
| Spatial Thought | 3.27 | 3.27 | 3.00 | 2.71 | 3.00 | 3.60 |
| Cartography | 3.18 | 3.09 | 2.17 | 2.43 | 2.63 | 3.75 |
| Data Management | 3.82 | 3.77 | 4.17 | 3.57 | 3.71 | 3.90 |
| Internet Search | 4.32 | 4.23 | 4.00 | 3.86 | 4.25 | 4.30 |
| Visualization | 3.68 | 3.55 | 3.67 | 3.14 | 3.58 | 3.65 |
| Qualitative | 3.18 | 3.55 | 3.67 | 2.71 | 3.33 | 3.40 |
| Quantitative | 3.59 | 3.82 | 3.83 | 3.36 | 3.79 | 3.60 |
| Curriculum | 3.32 | 3.00 | 2.67 | 3.07 | 3.04 | 3.30 |
| GIS | 3.32 | 3.18 | 2.83 | 2.93 | 3.00 | 3.55 |
| Spatial Statistics | 2.68 | 2.68 | 2.33 | 2.57 | 2.38 | 3.05 |
| Geo-coding | 2.45 | 2.68 | 2.00 | 2.71 | 2.33 | 2.85 |
| GPS | 2.55 | 2.45 | 2.17 | 2.50 | 2.04 | 3.05 |
| Remote Sensing | 1.95 | 2.05 | 2.17 | 2.64 | 1.63 | 2.45 |

Table 5
**WHAT DID THOSE ACCEPTED INTO 2006 SPACE WORKSHOPS PERCEIVE AS BARRIERS**
**AND EXPECT AS WORKSHOP OUTCOMES?**
Averages 1 (not an obstacle / not important) to 4 (very significant obstacle / very important)
See entry survey in Appendix

| **Year 2006** | **Averages by Workshop** | | |
|---|---|---|---|
| **BARRIERS:** | **UCSB** | **OSU** | **OU** |
| Pedagogical Knowledge | 2.75 | 2.73 | 2.21 |
| GIS Experience | 2.54 | 2.50 | 1.93 |
| Data Access | 2.13 | 1.95 | 2.64 |
| Software Access | 1.88 | 1.82 | 2.71 |
| Technical Support | 2.67 | 1.95 | 2.86 |
| Student Readiness | 2.58 | 2.41 | 2.79 |
| **WORKSHOP EXPECTATIONS:** | | | |
| Spatial Statistics | 3.21 | 3.73 | 3.43 |
| Data Visualization | 3.42 | 3.64 | 3.36 |
| GIS Software Use | 2.96 | 3.32 | 3.21 |
| Data for Classes | 3.38 | 3.59 | 3.50 |
| **EXPECTATIONS FROM DISCUSSION WITH OTHER PARTICIPANTS:** | | | |
| Student Learning Assessment | 3.17 | 3.45 | 3.29 |
| Strategies for Teaching | 2.96 | 3.32 | 3.21 |
| Curricula/Class Activities | 3.42 | 3.82 | 3.71 |
| Discuss Student Projects | 3.17 | 3.45 | 3.07 |
| **EXPECTATIONS FROM WORKSHOP INSTRUCTORS:** | | | |
| Spatial Analysis Tools | 3.25 | 3.55 | 3.43 |
| Data Visualization Theory | 3.13 | 3.23 | 2.79 |
| Answers to Problems in Spatial Analysis | 2.42 | 2.86 | 2.79 |
| Learn Pedagogical Strategies | 3.33 | 3.73 | 3.36 |

Table 6
**HOW DID SPACE WORKSHOP PARTICIPANTS RATE THE 2006 SPACE WORKSHOPS?**
Averages 1(did not help at all / of no value) to 4 (helped significantly / exceeded my expectations)
See exit survey in Appendix

| Workshop: | UCSB | OSU | OU |
|---|---|---|---|
| **REMOVED BARRIERS IN:** | | | |
| Knowledge | 2.81 | 3.85 | 3.33 |
| GIS | 3.60 | 3.70 | 3.78 |
| Data Access | 3.19 | 3.60 | 3.78 |
| Software Use | 3.57 | 3.75 | 3.78 |
| Spatial Teaching | 3.19 | 3.65 | 3.44 |
| **MET EXPECTATIONS IN:** | | | |
| Spatial Statistics | 3.47 | 3.42 | 3.13 |
| Data Visualization | 3.47 | 3.35 | 3.67 |
| GIS | 3.57 | 3.40 | 3.67 |
| Data for Classes | 3.40 | 3.58 | 3.57 |
| **GAINED IDEAS FORM DISCUSSIONS ABOUT:** | | | |
| Student Learning | 3.29 | 3.80 | 3.67 |
| Assessment of Student Learning | 2.95 | 3.70 | 2.88 |
| Spatial Methods for Teaching | 3.57 | 3.79 | 3.44 |
| Pedagogical Strategies | 2.85 | 3.70 | 3.33 |
| Developing Curricula | 3.57 | 3.89 | 3.89 |
| Student Projects | 3.43 | 3.74 | 3.78 |
| **FROM INSTRUCTORS:** | | | |
| Expanded Knowledge of Spatial Tools | 3.67 | 3.79 | 3.67 |
| Learned Theory of Data Visualization | 3.15 | 3.58 | 3.22 |
| Answered Problems in Spatial Analysis | 3.26 | 3.45 | 3.44 |
| Learned Strategies to Help Students | 3.20 | 3.70 | 3.67 |
| **QUALITY ASSESSMENT:** | | | |
| Workshop Lab Facilities | 3.52 | 4.00 | 3.89 |
| Workshop Organization | 3.67 | 4.00 | 3.88 |
| Level of Instruction | 3.67 | 3.85 | 3.89 |
| Exercises | 3.38 | 3.80 | 3.67 |
| Guest Presenters | 3.81 | 3.85 | 3.89 |
| Social Events | 3.62 | 3.95 | 3.75 |
| Housing | 3.68 | 2.82 | 3.67 |
| On-line Application | 3.90 | 3.68 | 3.89 |
| Pre-workshop Information | 3.86 | 3.89 | 3.78 |
| Adequacy of Funding | 3.76 | 3.82 | 3.67 |

Table 7
**WHAT DID THOSE ACCEPTED INTO 2007 SPACE WORKSHOPS PERCEIVE AS BARRIERS AND EXPECT AS WORKSHOP OUTCOMES?**
Averages 1 (not an obstacle / not important) to 4 (very significant obstacle / very important)
See entry survey in Appendix

| **Year 2007** | **Averages by Workshop** | |
| **BARRIERS:** | **UCSB** | **OSU** |
| --- | --- | --- |
| Pedagogical Knowledge | 2.73 | 2.73 |
| GIS Experience | 2.59 | 2.32 |
| Data Access | 2.23 | 2.23 |
| Software Access | 2.00 | 1.77 |
| Technical Support | 2.23 | 2.23 |
| Student Readiness | 2.59 | 2.64 |
| **WORKSHOP EXPECTATIONS:** | | |
| Spatial Statistics | 364 | 3.50 |
| Data Visualization | 3.59 | 3.59 |
| GIS Software Use | 3.09 | 3.23 |
| Data for Classes | 3.32 | 3.41 |
| **EXPECTATIONS FROM DISCUSSION WITH OTHER PARTICIPANTS:** | | |
| Student Learning Assessment | 2.91 | 3.00 |
| Strategies for Teaching | 2.77 | 3.00 |
| Curricula/Class Activities | 3.50 | 3.86 |
| Discuss Student Projects | 3.18 | 3.55 |
| **EXPECTATIONS FROM WORKSHOP INSTRUCTORS:** | | |
| Spatial Analysis Tools | 3.55 | 3.68 |
| Data Visualization Theory | 3.14 | 3.50 |
| Answers to Problems in Spatial Analysis | 2.77 | 2.73 |
| Learn Pedagogical Strategies | 3.18 | 3.45 |

Table 8
**HOW DID SPACE WORKSHOP PARTICIPANTS RATE THE 2007 SPACE WORKSHOPS?**
Averages 1 (did not help at all / of no value) to 4 (helped significantly / exceeded my expectations)
See exit survey in Appendix

| Workshop: | UCSB | OSU |
|---|---|---|
| **REMOVED BARRIERS IN:** | | |
| Knowledge | 3.32 | 3.59 |
| GIS | 3.50 | 3.10 |
| Data Access | 3.33 | 3.29 |
| Software Use | 3.47 | 3.35 |
| Spatial Teaching | 3.22 | 2.95 |
| **MET EXPECTATIONS IN:** | | |
| Spatial Statistics | 3.11 | 3.00 |
| Data Visualization | 3.16 | 3.10 |
| GIS | 2.95 | 3.05 |
| Data for Classes | 3.25 | 3.18 |
| **GAINED IDEAS FORM DISCUSSIONS ABOUT:** | | |
| Student Learning | 3.33 | 3.64 |
| Assessment of Student Learning | 3.00 | 3.41 |
| Spatial Methods for Teaching | 3.39 | 3.64 |
| Pedagogical Strategies | 2.89 | 3.59 |
| Developing Curricula | 3.56 | 3.68 |
| Student Projects | 3.35 | 3.45 |
| **FROM INSTRUCTORS:** | | |
| Expanded Knowledge of Spatial Tools | 3.53 | 3.41 |
| Learned Theory of Data Visualization | 3.21 | 3.24 |
| Answered Problems in Spatial Analysis | 3.13 | 3.25 |
| Learned Strategies to Help Students | 3.11 | 3.41 |
| **QUALITY ASSESSMENT:** | | |
| Workshop Lab Facilities | 3.42 | 3.77 |
| Workshop Organization | 3.26 | 3.73 |
| Level of Instruction | 3.47 | 3.59 |
| Exercises | 3.21 | 3.50 |
| Guest Presenters | 3.71 | 3.64 |
| Social Events | 3.67 | 3.90 |
| Housing | 3.50 | 2.76 |
| On-line Application | 3.79 | 3.91 |
| Pre-workshop Information | 3.68 | 3.91 |
| Adequacy of Funding | 3.79 | 3.84 |

Table 9

| Average Values for Entry and Exit Surveys for Participants in 2006 SPACE Workshops | | | |
|---|---|---|---|
| *What Did Those Accepted into 2006 SPACE Workshops Perceive as Barriers and Expect as Outcomes for Teaching Spatial Analysis?* | **Entry**[1] | **Exit**[2] | *How Did SPACE Workshop Participants Rate the 2006 Workshops?* |
| Pedagogical Knowledge **Barrier – (B)** | 2.62 | 3.32 | **Removed Barriers (RB)** – Knowledge |
| GIS Experience – **B** | 2.38 | 3.67 | **RB** – GIS |
| Data Access – **B** | 2.18 | 3.46 | **RB** – Data Access |
| Software Access – **B** | 2.05 | 3.68 | **RB** – Software Use |
| Technical Support – **B** | 2.45 | 3.42 | **RB** – Spatial Teaching |
| **Workshop Expectation** – **(WS Exp)** | | | **Met Expectations – (ME)** |
| **WS Exp –** Spatial Statistics | 3.45 | 3.39 | **ME –** Spatial Statistics |
| **WS Exp** – Data Visualization | 3.48 | 3.46 | **ME** – Data Visualization |
| **WS Exp** – GIS Software Use | 3.15 | 3.52 | **ME** – GIS |
| **WS Exp** – Data for Classes | 3.48 | 3.50 | **ME** – Data for Classes |
| **Discuss (D)** – Learning Assessment | 3.30 | 3.56 | **Gained Ideas (GI)** about Student Learning |
| | – | 3.24 | **GI** – Assess Student Learning |
| **D –** Strategies for Teaching | 3.15 | 3.63 | **GI** – Spatial Methods for Teaching |
| | – | 3.29 | **GI** – Pedagogical Strategies |
| **D –** Curricula/Class Activities | 3.63 | 3.76 | **GI** – Develop Curricula |
| **D –** Student Projects | 3.25 | 3.61 | **GI** – Student Projects |
| **Learn (L) –** Spatial Analysis Tools | 3.40 | 3.71 | **Expanded Knowledge (EK)** – Spatial Tools |
| **L** – Data Visualization Theory | 3.08 | 3.33 | **EK** – Theory of Data Visualization |
| **L** – Answers to Problems in Spatial Analysis | 2.67 | 3.38 | **EK** – Problems in Spatial Analysis |
| **L** – Pedagogical Strategies | 3.48 | 3.49 | **EK** – Strategies to Help Students |

[1] 1 = not an obstacle at all / not important; 4 = very significant obstacle / very important
[2] 1 = did not help at all / of no value; 4 = helped significantly / exceeded expectations

Table 10

| Average Values for Entry and Exit Surveys for Participants in 2007 SPACE Workshops | | | |
|---|---|---|---|
| *What Did Those Accepted into 2007 SPACE Workshops Perceive as Barriers and Expect as Outcomes for Teaching Spatial Analysis?* | **Entry**[1] | **Exit**[2] | *How Did SPACE Workshop Participants Rate the 2007Workshops?* |
| Pedagogical Knowledge **Barrier – (B)** | **2.73** | **3.46** | **Removed Barriers (RB)** – Knowledge |
| GIS Experience – **B** | **2.45** | **3.28** | **RB** – GIS |
| Data Access – **B** | **2.23** | **3.31** | **RB** – Data Access |
| Software Access – **B** | **1.89** | **3.41** | **RB** – Software Use |
| Technical Support – **B** | **2.23** | **3.08** | **RB** – Spatial Teaching |
| **Workshop Expectation** – **(WS Exp)** | | | **Met Expectations – (ME)** |
| **WS Exp –** Spatial Statistics | **3.57** | **3.05** | **ME –** Spatial Statistics |
| **WS Exp** – Data Visualization | **3.59** | **3.13** | **ME** – Data Visualization |
| **WS Exp** – GIS Software Use | **3.16** | **3.00** | **ME** – GIS |
| **WS Exp** – Data for Classes | **3.36** | **3.21** | **ME** – Data for Classes |
| **Discuss (D)** – Learning Assessment | **2.95** | **3.50** | **Gained Ideas (GI)** about Student Learning |
| | **-** | **3.23** | **GI** – Assess Student Learning |
| **D –** Strategies for Teaching | **3.89** | **3.53** | **GI** – Spatial Methods for Teaching |
| | **–-** | **3.28** | **GI** – Pedagogical Strategies |
| **D –** Curricula/Class Activities | **3.68** | **3.63** | **GI** – Develop Curricula |
| **D –** Student Projects | **3.36** | **3.41** | **GI** – Student Projects |
| **Learn (L) –** Spatial Analysis Tools | **3.61** | **3.46** | **Expanded Knowledge (EK)** – Spatial Tools |
| **L** – Data Visualization Theory | **3.32** | **3.23** | **EK** – Theory of Data Visualization |
| **L** – Answers to Problems in Spatial Analysis | **2.75** | **3.19** | **EK** – Problems in Spatial Analysis |
| **L** – Pedagogical Strategies | **3.32** | **3.27** | **EK** – Strategies to Help Students |

[1] 1 = not an obstacle at all / not important; 4 = very significant obstacle / very important

[2] 1 = did not help at all / of no value; 4 = helped significantly / exceeded expectations

# III. COMMENTARY BY WORKSHOP AND EDUCATIONAL DEVELOPMENT COORDINATORS

## OSU SPACE Workshop Report for 2006 and 2007

**Mei-Po Kwan,** Workshop Coordinator

**Overview:**
Funded by an NSF-supported grant from the Center for Spatially Integrated Social Science (CSISS), the Department of Geography at Ohio State University conducted third and fourth workshops on Spatial Perspectives on Analysis for Curriculum Enhancement (SPACE) during the periods June 18 to June 23, 2006 and June 18 to June 23, 2007. The PI was Mei-Po Kwan, professor of geography at OSU.

The 2006 workshop had 19 participants, primarily faculty members in the social sciences from a variety of large and small universities and colleges in the United States, including representatives from anthropology, economics, public health, urban and regional planning, urban studies, geography, sociology, and regional science. In 2007, the workshop had 22 participants, coming from a wide variety of disciplines, including health studies, communications, demography, economics, geography, environmental studies, sociology, urban and regional planning.

*SPACE PI's Note: Being the seventh workshop coordinated by Mei-Po, she has the routine down well, including her famous Barbeque picnic in Derby Hall and buffet dinner at the Buckeye Hall of Fame Cafe. Social events such as these help generate interactions among workshop participants, guests, geography and non-geography faculty, and graduate students.*

**Workshop Objectives:**
The goal of OSU workshops has been to provide participating social scientists with tools and concepts for spatial thinking and analysis that can be used in their teaching. The workshop was designed for social scientists who have a methodological focus and who have a strong potential to incorporate spatial analysis and techniques in their teaching. In general, most participants had some prior knowledge in GIS and spatial analysis.

The workshops provided participants with a set of tools/exercises that can be readily incorporated into their teaching. Based on the examples illustrated in the workshop, participants also developed examples for their disciplines and worked on projects with a focus on education and professional development. The workshops provided a basic background in spatial analytic techniques suited for undergraduate social science courses, such as cartographic visualization, space-time modeling of individual behavior, spatial interaction modeling, spatial pattern analysis, and spatial optimization methods. The workshop also gave attention to developing undergraduate course outlines, instructional modules, exercises, and learning assessment tools.

**The Instructors:**
The core instructional Team (Mei-Po Kwan, Ola Ahlqvist, Alan Murray, Morton O'Kelly, and Ningchuan Xiao) was joined by Darla Munroe in 2006 and by Desheng Liu in 2007.  The core instructors used lectures to introduce spatial concepts and techniques, discussion to address how they are useful to the participants' courses, and lab exercises to provide examples for use in their classes. The lecturers provided practical examples on using spatial concepts and techniques in teaching.

**Guest Lecturers:**
Four guest lecturers for each year included: Philip Brown (Ohio State History), Don Janelle (UC Santa Barbara), Linda Lobao (Ohio State Sociology), and Sara McLafferty (U Illinois), plus Jiyeong Lee (University of North Carolina@Charlotte) for the 2006 workshop. They represented different application areas and gave presentations on historical issues, societal issues, health-related issues, and environmental and transportation issues. Graduate student Eric Boschmann was the primary day-to-day facilitator in 2006 and Tim Hawthorne carried out this important work in 2007. They were assisted by Guoxiang Ding for lab sessions and workshop logistics.

**Pedagogy:**
The Associate Director of the Office of Faculty and TA Development at OSU, Kathryn Plank, provided pedagogical sessions on "How students learn" and on "Planning and assessing students' learning." She also helped with many group discussions on pedagogy and on group projects by participants.

A list of participants and the agenda for the 2006 and 2007 workshops are provided in the "Activities" section.

**Group Project Presentations for 2006 Workshop**:
- Introduction to Cartographic Visualization
    - Babette Audant, Nancy Obermeyer, Michele Villinski
- GIS and Census Data
    - Enrique López, Sunhee Sang, and Changjoo Kim
- Introduction to spatial price equilibrium
    - Laura Blanciforti, Ke Chen, Andres Jauregui
- Spatial Optimization Modeling: A Course Component, Pedagogic Design and Student Assessment
    - Jamie Lynn Griffiths, Brian Nicholls, Mike Strager
- How I Became a Buckeye!: A Spaced Out Group of GIS Addicts
    - Joe Francis, Peng Gao, Iris Hui, Rolin Mainuddin
- Spatial science as related to Economics, Criminology, and Political Science, respectively.
    - Tim Miller, Lincoln Chandler, Khodr Zaarour

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**Group Project Presentations for 2007 Workshop**:

- Geovisualization

  Ranbir Kang, L. Joe Morgan, Sarah Smith, Kenyatta Phelps

- MAUP-ing Up the Social Sciences

  Marlese Durr, Marilyn Krogh, Randolph Horn, Jeff Strickland

- Exploratory Spatial Data Analysis

  Greg Bohr, Zhe Li, Claudia Scholz

- Spatial Optimization Modelling

  John Gossom, Antwan Jones, Wei Tu

- Using Space-Time Analysis in the Undergraduate Classroom

  Elizabeth Groff, Yushim Kim, Xi Zhang, Diana Grigsby-Toussaint

**Facilities:**

OSU Geography contributed a teaching laboratory with 50 PCs running all the GIS and statistical software needed for the workshops. This software includes ESRI software (ArcGIS, ArcView), GeoDa, TransCAD, SPSS, GeoMedia, IDRISI, and others. The department has also reserved three additional teaching laboratories each with about 10 seats of computers and three classrooms (including one classroom with a capacity of 75, and two seminar rooms) exclusively for the workshop. The departmental Xerox and fax machines were also available for the workshop participants.

**Resources Disseminated in the Workshop:**

The following instructional resources were disseminated to workshop participants:

• PowerPoint presentations of all lectures

• Reading materials related to lectures and pedagogy sessions

• All lab exercises used in the workshop

• A CD copy of the free software GeoDa

• For 2005 and 2006 workshops, only, a copy of the book "Spatially Integrated Social Science," edited by Michael F. Goodchild and Donald G. Janelle

• A CD copy of ArcGIS (one-year license)

**The OSU PI's Evaluation of the OSU SPACE Workshops:**

Overall, the quality of the participants and instructors are very high. Our ratings by the participants have attained a very high level. We feel that the participants have gained a lot of knowledge and experience from the workshop and will impact undergraduate education in their institutions. See Sections II and IV in Findings.

# University of Oklahoma SPACE Workshop Report for 2006
**Tarek Rashed,** Workshop Coordinator

**Structure and Objectives:**
The workshop on **Remote Sensing and GIS Technologies for Undergraduate Curricula in the Social Science**s explored the uses of geographic information technologies for undergraduate curricula in the social sciences and offered guidance on the uses of these technologies to enhance spatial understanding for undergraduate social science students. The workshop was intended to enhance participant understanding about the utility of remotely sensed data – how they provide nontraditional, and otherwise unobtainable, measures of social phenomena, and how these measures are used with a wide range of population-related data in GIS for the visualization, analysis, and understanding of social dynamics at micro, macro, and global levels. Lectures, demonstrations, tutorials, and group investigations fostered open discussions about spatial thinking and problem-solving skills, and on how to translate these into resources for teaching at the undergraduate level.

**Instructors:** Tarek Rashed, May Yuan, Victor Mesev, Rebecca Powell, and Jon Pedersen.

**Logistical/Financial Support**: Melissa Brown.

**Technical/Organizational Support**: Ann James.

**Student Consultants**: Katy Rich, Mang Lung Cheuk, Marcie Kuehl, Dustin Howard, Matthew Collier, and James Bothwell.

**Participation:**
There were 27 applications considered for the workshop. A total of 19 were offered positions in the workshop and 14 confirmed their participation. However, two had to withdraw at the last moment for personal reasons. The participants' areas of interest included urban/regional studies, GIS, environmental policy, archeology, human geography, health, and sociology.

**Support:**
The workshop team and SPACE succeeded in securing substantial support for the workshop, including the following:

- The University Consortium for Geographical Information Science (UCGIS), a partner in the NSF-supported SPACE project, provided primary funding for the program, including summer salary for the OU workshop coordinator (Tarek), the logistical and organizational coordinators (Melissa and Ann), honorarium and travel support for instructors (Victor, Becky, and Jon), and social activities. Participant support stipends were provided by SPACE (administered through UCSB).

- The OU Office of the Vice President for Research provided a total of 22% cost share to support salary for three student consultants (Katy, Marcie and Dustin) and the airfare of Mike Goodchild.

- The Center for Spatial Analysis at OU provided a cost share for instructor May Yuan and for three CSA full-time students (Mang, Matt, and James).

- The Sasaki Institute and the College of Atmospheric and Geographic Sciences at OU contributed $1,000 and $500 respectively toward social activities.

- ITT Visual Information Solutions donated a full version lab license of ENVI to use during the workshop and an evaluation single-user version for each of the participants.

- ESRI provided a 6-month evaluation version of ArcGIS ArcView for each of the participants, two permanent versions of ArcGIS ArcView for project winners, and several books from ESRI Press.

- Intergraph Inc provided a one-year evaluation version of GeoMedia Professional for each of the participants. .

- SPACE provided copies of the Goodchild-and-Janelle book "Spatially Integrated Social Science" for all participants, purchased at a substantial discount from Oxford University Press and a relinquishing of all royalties by the authors.

- Arc2Earth provided all participants and instructors with a 30-day evaluation license of its product.

**Pre-workshop Activities:**
In addition to workshop advertising on the SPACE webpage, fliers were distributed across a number of group-email lists. A planning meeting and a number of teleconferences were held between members of the instruction team in late June. A list of selected readings and related resources were posted on the website one month prior to the workshop. A forum for exchange of ideas about projects that needed to be carried out by participants was established. Discussions focused on project ideas and data needs. Each participant was assigned to a student consultant to assist them in project work prior to and during the workshop and during the hands-on exercises. The rate was one student consultant to three participants.

**During- and Post-Workshop Activities:**
Overall, 12 projects were presented on the final day of the workshop; all of them emphasized the use of remote sensing techniques in the social sciences, and plans for incorporation in undergraduate teaching. Two received an award for best project. Nine of the participants completed an exit survey and a number of participants indicated interest in applying for incentive SPACE awards to further develop their workshop projects. A DVD, including all readings, power point presentations of lectures, lab exercises and data, minutes of group discussions, and additional resources, was compiled and made available to all participants through the SPACE website. Throughout the workshop, there were discussions about joint projects, uses of workshop materials in teaching, and access to remote-sensing data for student projects.

**Participant Presentations:**
On the final day of the workshop, presentations included the following:
- Adegoke Ademiluyi: Incorporating Remote Sensing Data and Methods within a GIS Environment in Fayetteville State University

- Veronica Arias: Prototype Module – Photo Interpretation and Non-Terrestrial Remote Sensing for Archaeology Students

- I.N. Osondu: Developing a Syllabus for a Certificate Course in GIS (With Some Aspects of Remote Sensing)

- Ge Lin: A Consistency Analysis of Different Area Calculations for Urban Sprawl

- Hongmian Gong: Defining the Urban Extent of the New York Metro Area

- Shobha Sriharan: Correlation of Cover with Build-Up of Mosquito Population in Selected Regions of Virginia

- Judith van der Elst: Integrating Geospatial Technologies into the Arts & Sciences Curriculum at the University of New Mexico

- Joe Bowersox: Utilizing Remote Sensing in a Field-based Seminar in Forest Science and Policy: Some Preliminary Ideas

- Daikwon Han: Redesigning Courses by Incorporating "Spatial" Perspectives

- Jungyul Sohn: Urban Geography Lab X: Measuring Urban Sprawl using Remote Sensing

- William Brown: Opportunities and Challenges for use of Remote Sensing in teaching at Texas Southern University

A full listing of participants and the agenda for the OU workshop appear in the Activities section of the report. The success of the OU SPACE workshop is verified by the highly favorable results from participant exit and follow-up surveys (sections II and IV of Findings).

# UC Santa Barbara SPACE Workshop Report for 2006 and 2007

**Fiona Goodchild**, SPACE Education Development Coordinator

The design of the 2006 workshop at UCSB was based on the positive feedback from exit surveys by the participants in 2005.  As a result, the basic agenda was similar to that of 2005, with minor changes to expand the times that participants could work on their own projects. The departure of Dr. Sara Fabricant to the University of Zurich following the 2005 workshop required staffing changes for instruction on the cartographic visualization of social science data. She was replaced by Sarah Battersby in 2006 (then a PhD candidate but now a professor at the University of South Carolina). In 2007, cartographic visualization was handled by Kirk Goldsberry (then a PhD candidate but now a professor at Michigan State University).  In addition, the 2007 workshop had to adjust for the departure of two graduate student consultants for the workshops: Jeff Hemphill was replaced by Jeff Howarth (then a PhD candidate but now a professor at Middlebury College) and Enki Yoo (then a PhD Candidate but now a professor at the University of Texas at Dallas. These personnel changes altered the continuity of SPACE workshops at UCSB but all of the replacements were of advanced standing, as demonstrated by their success in the academic job market. They were all committed to excellence in teaching and to the mission of SPACE. As young academics, they gained significantly from the opportunity to work with workshop participants.

**Agenda:**

The primary goals of the 6 day workshop were to:

1. *Integrate spatial theory and technology training as relevant to teaching undergraduates in social science disciplines.*
   Short presentations by faculty and workshop staff addressed principles, conceptual frameworks and examples of curricula that include spatial analysis techniques and applications. Two general sessions and one optional session also looked at how to assess spatial learning.

2. *Promote exchange of experience and ideas between academic faculty in the social sciences about the value of spatial analysis in undergraduate courses.*
   Participants were organized into small groups according to discipline and across disciplines, so that they could find out about the range of experience amongst them. Two of the participants who had special assignments with regard to curriculum and teaching also made significant contributions to this exchange.

   Another mechanism for exchange was the reception held on the evening of the first day to which participants brought posters that outlined their current teaching and research interests.  In the middle of the week an informal discussion at a local pizza parlor provided a chance for participants to reflect on the group sessions and to ask questions of the faculty instructors.

3. *Provide conceptual and technical support to enable participants to develop a teaching module that includes assessment tools for student learning.*

Teaching assistants and graduate students from the Department of Geography started the week with structured assignments at both the novice and the intermediate level. They provided practice in using Geoda, Flowmapper and GIS software, as requested by participants. They also encouraged the faculty participants to bring their own data sets and provided help with the design of a teaching assignment. Stacy Rebich-Hespanha, a geography graduate student who is specializing in spatial thinking also provided advice and resources about how to plan the student assessment component.
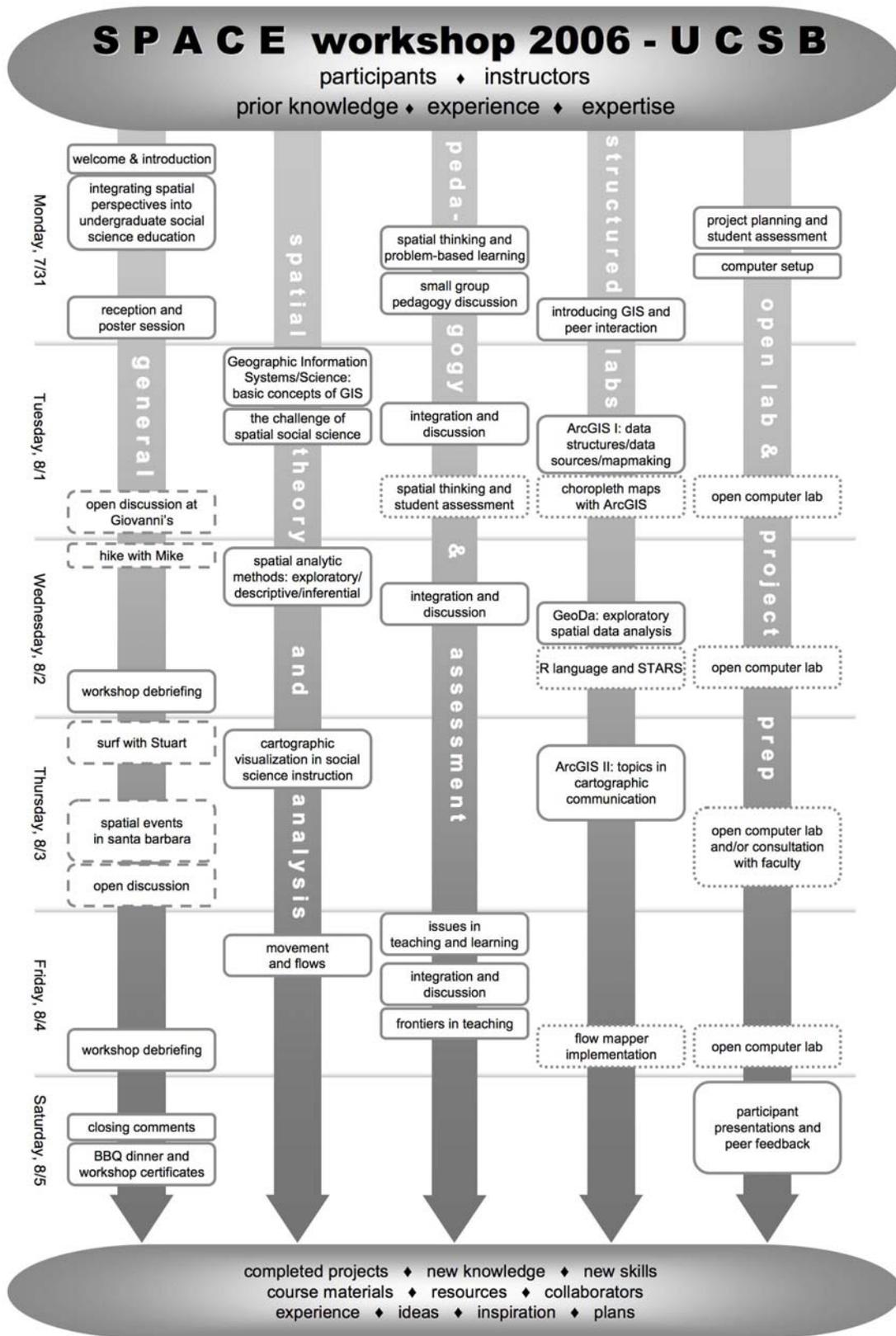
Stacy designed the SPACE **graphic syllabus** that appears on the next page. It was done to convey the structure of the 2006 workshop around SPACE goals, content, and expectations, but also to serve as an example of the value of graphic illustration in course design and pedagogy. A similar graphic was developed for the 2005 and 2007 workshops and are available on the SPACE website. The primary elements of the workshop, as portrayed by the graphic syllabus, are:

**Inputs**:  participants and instructors and their respective prior knowledge, experience, and expertise.

**Outputs:** the expectations for workshop participants for new knowledge and skills; completed projects; course materials and resources, new collaborators; and new experiences, ideas, and plans.

**Pathways:** represented as simultaneous columnar paths through the six days of the workshop; these include general workshop events, spatial theory and analysis, pedagogy and assessment, structured lab exercises, and open labs for project preparation.

Pedagogic resources developed for the UCSB workshop include sets of questions for guiding discussions on teaching philosophy and pedagogy, guidelines for implementing strategies to enhance student motivation for learning, suggestions for project goal setting and curriculum design, and project review guidelines. These resources, though reviewed and modified for each successive workshop, have remained fairly stable. They were included in the Annual Report to NSF for the period October 2004 – 2005 and are not attached to this report.

# S P A C E  workshop 2006 - U C S B

participants ♦ instructors

prior knowledge ♦ experience ♦ expertise

**Columns (top to bottom labels):** general ♦ spatial theory and analysis ♦ peda-gogy & assessment ♦ structured labs ♦ open lab & project prep

**Monday, 7/31**

- welcome & introduction
- integrating spatial perspectives into undergraduate social science education
- reception and poster session
- spatial thinking and problem-based learning
- small group pedagogy discussion
- introducing GIS and peer interaction
- project planning and student assessment
- computer setup

**Tuesday, 8/1**

- Geographic Information Systems/Science: basic concepts of GIS
- the challenge of spatial social science
- integration and discussion
- spatial thinking and student assessment
- ArcGIS I: data structures/data sources/mapmaking
- choropleth maps with ArcGIS
- open computer lab
- open discussion at Giovanni's

**Wednesday, 8/2**

- hike with Mike
- spatial analytic methods: exploratory/descriptive/inferential
- integration and discussion
- GeoDa: exploratory spatial data analysis
- R language and STARS
- open computer lab
- workshop debriefing

**Thursday, 8/3**

- surf with Stuart
- cartographic visualization in social science instruction
- ArcGIS II: topics in cartographic communication
- spatial events in santa barbara
- open discussion
- open computer lab and/or consultation with faculty

**Friday, 8/4**

- issues in teaching and learning
- movement and flows
- integration and discussion
- frontiers in teaching
- flow mapper implementation
- open computer lab
- workshop debriefing

**Saturday, 8/5**

- closing comments
- BBQ dinner and workshop certificates
- participant presentations and peer feedback

completed projects ♦ new knowledge ♦ new skills

course materials ♦ resources ♦ collaborators

experience ♦ ideas ♦ inspiration ♦ plans

**Final Presentations:**
The final presentations reflected both the faculty research interest and their specific teaching assignment.  Some of those who addressed an introductory course indicated an interest in using Google Earth to motivate student questions and to focus on local issues such as neighborhood and health.

Those participants who talked about plans for an upper level class often outlined the structure of a student project that required students to engage in data collection, representation and analysis. At the graduate level, one participant discussed how to encourage critical thinking by using environmental and cultural datasets.  She articulated some of the principles that the graduate students should use in starting on their own research.

Some of the faculty who already had some experience in teaching GIS, made interesting comments about the fact that they intended to spend more time in developing the spatial awareness that their students needed before being able to understand the capabilities and constraints of using GIS. The idea that students should not be sent off to work in a lab exercise without concept understanding was reflected in several talks. One participant, for example, suggested that such a course might require students to learn about scale, route-finding and topographical representation and transformation and explained how she would design exercises to assess these competencies.

Participants again provided feedback to each other using the real-time feedback mechanism outlined by Don Janelle at the start of the presentations. They also provided valuable questions to each other that reflected substantive collaboration during the short week-long workshop.

**Real-time Review of Presentations:**
A new feature of the workshop allowed allows participants to provide real-time feedback to their colleagues about the strengths and weaknesses of their presentations that they made on the final day. This provided results in a comprehensive set of comments and suggestions to each of the participants. This procedure was is Web-based – participants had access to a custom-designed web entry form. Using wireless access from their laptops, they could make entries simultaneously for eachduring each presentation. Presenters would then receive an email with 10 or more submissions on their presentation. Peer reviewers were are anonymous, unless they revealed their names.

**UCSB *SPACE* Workshop Presentations – 2006**
- Foreign Direct Investment: Global Flows and Mapping the Global Commodity Chains – Adriana Abdenur
- Evaluating Assumptions for Spatial Weights Modeling – Albert Esteve
- A Spatial Representation of Survey Data from the San Fernando Valley – Alexandra Cole
- Quantitative Methods in Archaeology: Students' Final Project for Mapping Prehistoric Economy in Central California – Charlotte Cooper
- Interpretation of Visual Representation of Global Irregularities – Claudia Scholz

- Understanding the Geography of Disease in the US – Daikwon Han
- Spatial Properties Of Poverty – Jackie Olvera
- Visualizing Borders and Diasporas – James Loucky
- Mapping New Orleans: Spatial Variation in the Impact of Hurricane Katrina – Jean Lavigne
- How the West was Shaped – Jon Chrsitensen
- Spatial "Sociopoly," – Kishi Animashaun
- Interpreting Landscape – Laurel Cornell
- Baltimore Public Schools: Structure, Place, and Outcomes – Linda Loubert
- Spatial Units, Urban Environments, and Health Outcomes – Lisa Oliver
- Urban Inequalities in Health: Spatial Perspectives – Ming Wen
- Spatial Patterns and Flows in Congressional Campaign Conditions – Neil Carlson
- Mapping Retail Landscapes - "Predatory"? – Steve Graves,
- Infusing Basic Spatial Thinking through Exercises and a Final Student Project – Sue Steiner
- Spatial Patterning of Artifacts – Susan Maguire
- HIV / AIDS around the World – Wei Tu
- Disparities in Infant Mortality Rates in Greensboro, NC – Yamu Kurewa
- Spatial Thinking in Public Affairs: The Outline and an Example Module – Zhirong Zhao

**UCSB *SPACE* Workshop Presentations – 2007**

- Historical Fisheries – Sean Anderson
- Problems in Teaching Spatial Social Science – Wesley Bernardini and Steve Wuhs
- Spatial Interplay of Two Key Indicators of Sustainability Among Mäori of New Zealand – Kevin Byrne
- Ranking Florida Counties Infested with Major Invasive Species – Valentina David
- Senior Seminar Spatial Economics – Alex De Pinto
- Filling in the Blanks in Patchwork Nation – Joshua Dyck
- Mapping Inequality – Jill Grigsby
- Spatial Analysis for Transportation and Land Use Planning in the DAFT context, using GeoDa and FlowMapper – Hiroyuki Iseki
- From Ancient Waters Flow Life and Knowledge – Esther John
- Demonstration of Spatial Auto-Correlation – Rajrani Kalra and Li Yin
- Minds On GIS: Encouraging Spatial Thinking in an Introductory GIS Lab – Sharla Lair
- Roots and Routes – Lillian Larsen

- Visualizing College Freshmen Migration Patterns Using Flow Mapper – Allan Joseph Medwick
- Identifying Ethnic Communities with Spatial Analysis – Sookhee Oh
- Demographics and Detritus – Jen Petersen
- Spatial Analysis and Spatial Statistics – Ana Simão
- Population Profile in Selected Counties of Virginia – Shoba Sriharan
- Patterning and Process in the Material Record: Thinking spatially about protohistoric landscapes –Jun Sunseri
- Satellite Imagery of Menominee Indian Reservation – William Van Lopik

# IV. FOLLOW-UP SURVEYS OF 2005 – 2006 WORKSHOP PARTICIPANTS

This survey was administered by an email notification. Respondents entered their assessments on a web-based form on the SPACE website approximately 10 months after completion of the 2005 and 2006 workshops. Of the 67 participants who completed the 2005 workshops, 32 completed the survey (48%). Of the 53 who completed the 2006 workshops, 36 completed the survey (68%).

Table 11
**Summer Workshops 2005 Follow-up Survey — Results**

| Measures | UCSB | OSU | SFSU |
|---|---|---|---|
| **WORKSHOP EXPERIENCE[1]** | | | |
| Collaboration with participants | 4.70 | 4.10 | 3.73 |
| Instructor presentations | 4.60 | 3.80 | 3.64 |
| Workshop content | 4.80 | 4.00 | 3.91 |
| Workshop lab exercises | 4.50 | 3.30 | 3.18 |
| Workshop organization | 4.80 | 3.70 | 3.55 |
| Materials and handouts | 4.70 | 4.00 | 4.00 |
| Workshop facilities | 4.80 | 4.10 | 4.36 |
| Local organization | 4.90 | 4.10 | 3.64 |
| Housing facilities | 4.20 | 3.70 | 3.55 |
| Overall experience | 4.90 | 4.00 | 2.91 |
| **IMPACTS OF WORKSHOPS[2]** | | | |
| New ideas for content in undergraduate courses | 4.50 | 3.80 | 3.91 |
| New labs or exercises for undergraduate courses | 4.20 | 4.30 | 3.27 |
| New courses for student learning about spatial analysis | 3.50 | 2.90 | 3.00 |
| New modules to engage undergrads in spatial analysis | 4.40 | 3.80 | 3.36 |
| Assessment of student ability to use spatial analysis | 3.80 | 3.20 | 2.82 |
| Discussion with teaching colleagues teaching spatial analysis | 3.70 | 3.80 | 3.91 |
| Presentations to colleagues about teaching spatial analysis | 2.60 | 2.30 | 2.27 |
| Plans for presentations about SPACE at professional meetings | 2.40 | 2.30 | 2.18 |

[1/2] Average values, scaled from 1 to 5. 1= unsuccessful/no impact; 2= somewhat successful/very little impact; 3= moderately successful/some impact; 4= successful/moderate impact; 5= very successful/strong impact. See survey form in appendix.

Table 12
**Summer Workshops 2006 Follow-up Survey — Results**

| Measures | UCSB | OSU | OU |
|---|---|---|---|
| **WORKSHOP EXPERIENCE**[1] | | | |
| Collaboration with participants | 3.87 | 4.21 | 3.57 |
| Instructor presentations | 4.27 | 4.57 | 4.71 |
| Workshop content | 4.07 | 4.64 | 4.86 |
| Workshop lab exercises | 3.60 | 4.00 | 4.71 |
| Workshop organization | 4.47 | 4.36 | 4.86 |
| Materials and handouts | 4.60 | 4.64 | 4.71 |
| Workshop facilities | 4.60 | 4.71 | 5.00 |
| Local organization | 4.53 | 4.71 | 5.00 |
| Housing facilities | 4.67 | 3.50 | 4.71 |
| Overall experience | 4.00 | 3.79 | 4.57 |
| **IMPACTS OF WORKSHOPS**[2] | | | |
| New ideas for content in undergraduate courses | 4.20 | 4.21 | 4.29 |
| New labs or exercises for undergraduate courses | 3.93 | 3.86 | 4.43 |
| New courses for student learning about spatial analysis | 3.13 | 3.86 | 3.29 |
| New modules to engage undergrads in spatial analysis | 4.00 | 4.07 | 4.57 |
| Assessment of student ability to use spatial analysis | 3.33 | 3.29 | 3.43 |
| Discussion with teaching colleagues teaching spatial analysis | 4.00 | 4.14 | 4.43 |
| Presentations to colleagues about teaching spatial analysis | 3.40 | 3.29 | 3.57 |
| Plans for presentations about SPACE at professional meetings | 2.80 | 3.36 | 3.43 |

[1/2] Average values, scaled from 1 to 5. 1= unsuccessful/no impact; 2= somewhat successful/very little impact; 3= moderately successful/some impact; 4= successful/moderate impact; 5= very successful/strong impact. See survey form in Appendix

The results from the follow-up surveys show generally positive experiences at the workshops and moderate to significant impacts on the teaching and dissemination efforts (discussion with others, presentations to colleagues and at meetings) among 2005 – 2006 workshop participants. The data also flag areas for consideration by instructional teams, especially the need to enhance the transfer of skills and awareness of learning assessment strategies. We suspect that progress made in this area for the 2007 workshops will be reflected in program's final follow-up survey (to be administered in May 2008).

The follow-up survey has been a valuable tool for workshop instructors in fine-tuning the structuring and content of successive workshops. A final follow-up survey to the 2007 workshop participants will be administered in late spring, 2008, the results of which will be presented in the final report to NSF on the SPACE project.

# V.    EDUCATIONAL DEVELOPMENT AWARDS AND ACCESS PROGRAMS

The SPACE Instructional Development Awards program recognizes the tangible accomplishments of workshop participants in developing new exercises, modules, and courses. The SPACE website features examples from each of the award winners – new syllabi, examples of exercises, and student projects (see www.csiss.org/SPACE/materials/participants/). There are also descriptions of how the award recipients planned to use the awards – e.g., taking advanced courses in spatial analysis, attending a conference or workshop, sponsoring a forum or campus-wide workshop on the introduction of spatial methods in undergraduate teaching, etc.  Recipients represents represent a broad range of disciplines.

## SPACE Instructional Development Award Recipients

Awards to workshop participants in **2006 and 2007** are listed below. Fourteen awards were made to sixteen participants over this period. More information on participant accomplishments and use of awards is available at http://www.csiss.org/SPACE/materials/participants/.  This web page adds to the resource base of ideas, exercises, and syllabi for website visitors and for other workshop participants.

**Claude W. Barnes**, Political Science and Criminal Justice, North Carolina A&T State University.
**Accomplishment:** Developed and taught a new undergraduate course on GIS for Social Sciences.
**Award Info:** $1250 was awarded to present a paper on GIS instruction within an HBCU context (Historically Black Colleges and Universities) to the Thirteenth National HBCU Faculty Development Symposium in Houston, Texas (October 2006).

**Benjamin Forest**, Geography, Dartmouth College (currently at McGill University)
**Accomplishment:** Adapted existing course materials in political geography to reflect a more explicit treatment of spatial pattern by advanced students using GIS.
**Award Info:** $1250 was awarded to gather data and support information to engage students in a case study in political geography about political representation and sovereignty in Quebec and to present a paper on this to the Canadian Association of Geographers.

**Laurie Garo**, Geography & Earth Sciences, University of North Carolina-Charlotte
**Accomplishment:** Developed a new undergraduate course on GIS in Criminology for Social Sciences, offered at Johnson C. Smith University**.**
**Award Info:** $1250 was awarded to present a paper on GIS instruction within an HBCU context (Historically Black Colleges and Universities) to the Thirteenth National HBCU Faculty Development Symposium in Houston, Texas (October 2006).

**Christopher L. Holoman**, Political Science, Hilbert College
**Accomplishment:** Adapted existing course assignments to reflect opportunities for spatial thinking and created a course syllabus for introducing GIS in political science.
**Award Info:** $1000 was awarded to organize a workshop on spatial thinking for colleagues at Hilbert College and continue training in spatial analysis.

**Wenquan (Charles) Zhang**, Sociology, Brown University (currently at Texas A&M)
**Accomplishment:** Developed syllabus and taught a GIS course designed for compatibility with the needs of students in sociology.
**Award Info:** $1250 was awarded to participate Arc-IMS training and to prepare training sessions in map making, exploratory spatial data analysis (ESDA), and spatial data structures for sociology students.

**Adriana Abdenur**, International Affairs, The New School
**Accomplishment:** Modified a course on Urbanization and Inequality in South Africa, initiated discussion on developing a more explicit spatial focus in studies of international development, published an article in the New School *International Affairs Bulletin* on the need for spatial perspective in teaching and research, and established a partnership with the New School's Parsons Institute for Information Mapping to create pedagogical materials on inequality in cities of the developing world.
**Award Info:** Awarded $1,250 to acquire data for student exercises and to engage students in the development, design, and publication of didactic materials for use in courses on urbanization and segregation of South African and Brazilian cities.

**Paula Ebron and Claudia Engel**, Cultural and Social Anthropology, Stanford University
**Accomplishment:** Introduced GIS-based exercises and spatial perspectives in introductory courses on the anthropology of globalization.
**Award Info:** Awarded $750 to acquire geo-referenced demographic and economic data on non-US global cities and to employ undergraduate research assistants to create a repository of shapefiles for developing teaching resources.

**Joe D. Francis**, Sociology, Cornell University
**Accomplishment:** Developed and taught course on Analytic Mapping and Spatial Modeling.
**Award Info:** Awarded $750 to help defray cost of participating in the 2007 summer workshops on Spatial Regression at the University of Illinois, Urbana-Champaign. This will provide a foundation for developing a new course on spatial statistics.

**Iris Hui**, Political Science, University of California, Berkeley
**Accomplishment:** Developed a 2006-2007 seminar series at UCB on *Social Science in Place: GIS, Spatial Concepts and Applied Social Science*.
**Award Info:** Awarded $1,200 to organize a Panel discussion at the 2007 annual meeting of the American Political Science Association on *GIS, Spatial Statistics, and Political Science* and to participate as a panelist to explore GIS applications in political science at the 2007 annual meeting of the Association of American Geographers.

**Nancy Obermeyer**, Geography, Indiana State University, Terre Haute
**Accomplishment:** Undertook several initiatives to expand GIS teaching applications across a range of disciplines at Indiana State.
**Award Info:** Awarded $750 for organizing campus workshops for creating teaching modules and for helping researchers in the use of GIS.

**Iheanyi N. Osondu**, History, Geography, and Political Science, Fort Valley State University
**Accomplishment:** Developed a new undergraduate certificate course in GIS.
**Award Info:** Awarded $500 to organize a campus enlightenment event on the uses of GIS in undergraduate teaching and on the value of GIS in serving the local region of Fort Valley State University.

**Claudia Scholz**, Sociology, Trinity University (San Antonio)
**Accomplishment:** Work with colleagues and students on applications of GIS, mapping, and spatial thinking in teaching and research; and organizing a panel of prior participants in SPACE workshops to explore *Integrating Spatial Thinking into the Sociology Curriculum* at the 2007 annual meeting of the American Sociological Association.
**Award Info:** Awarded $810 to participate in an ESRI training session on GIS that will assist her development of content for sociology courses at Trinity University.

**Wei Tu**, Geology and Geography, Georgia Southern University
**Accomplishment:** Developed Internet GIS resources for teaching and enhancing existing courses in GIS and cartography.
**Award Info:** Awarded $810 to attend in an advanced ArcIMS training session offered by ESRI to assist in expanding the use of Internet GIS in teaching.

**Joan Walker**, Geography and Environment, Boston University
**Accomplishment:** Enhanced courses in GIS and in Economic Geography with greater hands-on GIS applications.
**Award Info:** Awarded $750 to initiate discussions on establishing a region-wide alliance of GIS instructors in the Boston area for sharing web resources on GIS case studies.

## SPACE ACCESS Program 2005 – 2007
## Academic Conference Courses for Enhancing Spatial Science

Through the ACCESS program, SPACE supports prior workshop participants in the organization of conference sessions that support SPACE objectives of national dissemination of spatial thinking in social sciences undergraduate courses and programs. This report highlights only the titles of presentations for conferences and the objectives for workshops. The website features copies of the actual presentations and examples of resources made available to attendees of the sessions. These are available as examples to assist other instructors in curriculum development and in instruction.

**American Sociological Association - 102nd Annual Meeting,** New York City, August 2007
**Claudia Scholz**, Research Programs Coordinator at Trinity University in San Antonio, organized a panel session on **Integrating Spatial Thinking into the Sociology Curriculum**.

- **Beyond the Field Trip: On Tourism as a Pedagogical Strategy**
  **Shaul Kelner and George Sanders**, Vanderbilt University

- **Spatial Sociopoly: Understanding the Role of Space in Inequality using "Monopoly" Board Game, Kishi Ducre**, Syracuse University

- **Teaching Residential Segregation in Undergraduate Classes Using Spatial Methods, Laurel Cornell**, Indiana University

- **Race and Space: Crime, Joblessness and the American Apartheid**
  **Karen Hayslett-McCall**, University of Texas at Dallas

- **Integrating GIS Across Disciplines in a Liberal Arts College**
  **Jeana Abromeit**, Alverno College

**Minorities in Agriculture, Natural Resources, and Related Sciences** (MANRRS)"22nd **Annual Career Fair and Training Conference"** Birmingham Alabama, March 2007
> **Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing Applications in Support of Community and Urban Forestry**
> **David A. Padgett**, Associate Professor of Geography and Director of the Geographic Information Sciences Laboratory at Tennessee State University, led the half-day workshop with the following content:

- The background and methodology of three urban forestry projects developed by undergraduate students as Power Point presentations;

- Live demonstrations of GIS software;

- An outdoor tree inventory exercise to demonstrate the use of GPS receivers;.

- Importing the inventory data into ArcGIS for display on a digital ortho quarter quadrangle;

- Discussion of the results and procedures of the exercise; and

- An overview of opportunities for training in GIS, acquisition of GIS software, and the development of GIS-based curriculum.

**National HBCU Faculty Development Symposium "Leading and Learning in an Age of Accountability"** Houston, Texas, October 2006

> **Workshop on Geographic Information Systems and Spatial Analysis Methods in Social Sciences Teaching and Research.** Workshop leaders included: **David A. Padgett**, Associate Professor of Geography and Director of the Geographic Information Sciences Laboratory at Tennessee State University, **Charles Barnes**, Department of Political Science at North Carolina A&T State University, and **Laurie Garo**, Department of Geography at University of North Carolina at Charlotte, and instructor at Johnson C. Smith University

> **Objectives:**

- to expose HBCU (Historically Black Colleges and Universities) faculty to innovative ways that geographic information systems (GIS), spatial analysis, and related technologies may be used to enhance social sciences teaching and research.

- to provide HBCU faculty with information on how to obtain affordable GIS and spatial analysis software, and how and where to get training.

- to demonstrate how students may directly benefit by adding GIS and spatial analysis applications to their professional skill sets.

- to encourage those in attendance to attend GIS-related workshops, such as those sponsored by the Center for Spatially Integrated Social Science (CSISS) and the **HBCU Faculty GIS Workshop.**

- to invite those in attendance to join the **HBCU GIS users online discussion group.**

**University Consortium for Geographic Information Science** (UCGIS) **Summer Assembly**. Vancouver, Washington on July 2006

> Instructors and participants in the SFSU SPACE/UCGIS 2005 workshop at San Francisco State University (SFSU) made a plenary presentation to the describing the workshop. Delegates from 70 UCGIS member institutions, students, and others attended the presentation.

> Presentations featured a description of the workshop by **Richard LeGates** (workshop PI and Professor of Urban Studies at SFSU) and XiaoHang Liu (workshop Co-PI and Assistant Professor of Geography at SFSU), a video that describes the workshop experience, presentations from three faculty workshop participants, and discussion.

- **Jeana Abromeit** (Professor of Sociology at Alverno College) described how she used workshop material to help create the college's first GIS course, establish a GIS lab, and create materials to integrate spatial thinking into Alverno's curriculum.

- **Chris Holoman** (Associate professor of Political Science at Hilbert College) described his use of workshop material and a CSISS Instructional Development

award to help create Hilbert's first two GIS courses, establish a GIS lab, expose every Hilbert student to basic spatial thinking concepts in a course that he teaches, and organize a one-day faculty development workshop on GIS and spatial thinking for Hilbert faculty.

- **Benjamin Forest** (Associate professor of Geography, at McGill University) described an exercise he developed using material from Houston, Texas to teach Dartmouth University students about the politics of gerrymandering and how he will use information from the workshop and support from a CSISS Instructional Development award to develop a new module using ArcGIS' redistricting extension to teach McGill students about redistricting in Quebec city and simulate spatial consequences of sovereignty for Quebec.

## Society for American Archaeology (SAA) 71st Annual Meeting
San Juan, Puerto Rico, April 2006

2004 and 2005 SPACE workshop participants, **Veronica Arias, Heather Richards, and Judith van der Elst** (Department of Anthropology, University of New Mexico), organized a symposium entitled *Integrating Geospatial Perspectives and Education in Archaeology*. The symposium focused on pedagogical approaches, innovative teaching methodologies, instructional development, and dissemination of teaching strategies that are suited for teaching geospatial methods and techniques. Presentations included the following:

- Spatial Thinking and Technologies in the Undergraduate Social Science Classroom
  **Stacy Rebich, Fiona Goodchild, and Don Janelle**, University of California, Santa Barbara
- Using Cultural Resource Information System Geospatial Data in Scholarly Research and Public Education
  **Karyn DeDufour,** Archeological Records Management Section, N.M. Historic Preservation Division, and **Jeremy Kulisheck,** Detail Project Archeologist, Gila National Forest
- Developing Spatial Thinking in Archaeology through GeoScience
  **Veronica Arias, Heather Richards, and Judith van der Elst**, University of New Mexico
- The Student Perspective on Geospatial Education
  **David Plaza** and **Mona Angel**, University of New Mexico
- GIS and Spatial Statistical Tools for Archaeological Work, **Joe D. Francis and Antoni Magri**, Cornell University
- GIS, Faunal Remains, and Public Archaeology in the Gulf of Maine
  **Matthew Bampton, Nathan Hamilton, and Rosemary Mosher**, University of Southern Maine
- Eco's Eye: Semiotic Approaches to Designing a New Computer Application for Visualization of Spatially Distributed Archaeological Data
  **Kevin Schwarz,** ASC Group, Inc., and **Jerry Mount,** University of Iowa
- Representing Maya Architecture: Techniques for Research and Education

**Jennifer Ahlfeldt**, University of New Mexico. **Heather Richards**, University of New Mexico, and **Laura Ackley**, University of California, Berkeley

- Mindscapes and Virtual Ecosystems
  **Maurizio Forte**, Istituto per le Tecnologie Applicate ai Beni Culturali, Rome
- Positive side-effects of the implementation of GIS on heritage management in developing countries
  **Rolf Schütt**, Architect – World Heritage Consultant, Santa Cruz, Bolivia
- Nasca archaeology in 3D: Interdisciplinary research and education in Palpa on the south coast of Peru
  **Karsten Lambers**, German Archaeological Institute, KAAK Bonn
- Learning and Teaching: Using a Public Planning Process as a Teaching Tool
  **Sarah Schlanger**, New Mexico Bureau of Land Management
- Session Discussant:
  **Stacy Rebich-Hespanha**, SPACE, University of California, Santa Barbara

## Association of Collegiate Schools of Planning Annual Conference
Kansas City, Missouri, October 2005

**Richard LeGates**, Professor of Urban Studies at San Francisco State University, and coordinator of the 2005 SPACE workshop at SFSU, organized a set of events related to curriculum development for the annual meeting of the Association of Collegiate Schools of Planning - the national organization of universities teaching urban and regional planning. The objective is to encourage greater use of spatial concepts in planning courses and to introduce resources and tools to make this possible.

- **Integrating GIS and Spatial Analysis into the Undergraduate Planning Curriculum**

- A **Roundtable** introduced teaching materials developed by the panelists and reviewed open source software appropriate for teaching spatial concepts to students of urban planning.

- **Drop-in Workshops**, equipped with laptop computers, will permit meeting attendees to review demonstrations of GIS instructional modules for ArcGIS software, and to experiment with open source software for spatial analysis (GeoDa, FlowMapper, and STARS).

Participants in this program included **Ayse Pamuk**, Associate Professor of Urban Studies at SFSU; **Brian Paar**, Workbook project manager for ESRI Virtual Campus; and **Stuart Sweeney**, Assistant Professor, Department of Geography, U.C. Santa Barbara, and Coordinator of the 2004 – 2007 UCSB SPACE summer workshops.

## National Technology and Social Science Conference, Las Vegas, NV, April 2005
2004 SPACE workshop participant, **David Padgett**, organized a workshop session on **Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Spatial Analysis Tools in Support of Service Learning Course Content**

The NTSSC membership includes history, geography, education, economics, psychology, anthropology, sociology, ethnic studies, women's studies, interdisciplinary studies, political science, and other related studies.

**Association of Social and Behavioral Scientists**, Nashville, TN, March 11, 2005

2004 SPACE workshop participants, **David Padgett** and **Nikitah Imani**, organized a Panel Session for the 70th Anniversary Annual Meeting of the **Association of Social and Behavioral Scientists** (ASBS), in Nashville, TN. ASBS membership is drawn primarily from academics representing Historically Black Colleges and Universities (HBCUs), spanning a broad range of disciplines in the social and behavioral sciences.

**Geographic Information System (GIS) and Spatial Analysis Tools to Enhance Social Science Course Content and Research**

- Geographic Information Systems (GIS) in Support of Service Learning Course Content in an Undergraduate Urban Geography Course **– David A. Padgett**, Tennessee State University

- Notes on Building a Critical Sociological Pedagogy for Spatial Analysis: Adventures in Oxymoronics **– Nikitah Okembe**, James Madison University

- Applications of GIS and Spatial Analysis Tools in the Development of Demonstration Modules for an Urban Geography Course **– David A. Padgett**, Tennessee State University

**University Consortium for Geographic Information Science**, Winter Meeting, Washington, D.C., February 2005

**The University Consortium for Geographic Information Science** (UCGIS) is a collaborating partner in the SPACE program and is responsible for offering one of the program's three annual workshops. A feature of the UCGIS workshop is that participants may be invited to give presentations and to participate in mini-workshop sessions in conjunction with the UCGIS Assemblies and Meetings. Some of the results of the 2004 SPACE workshop at San Diego State University were showcased at the UCGIS Winter Meeting.

- John R. Weeks, San Diego State University, Chair
- The Role of UCGIS as a Cooperating Agency for GIScience Education, **Arthur Getis**, San Diego State University
- Bringing Space to the Core: Developing Undergraduate Curriculum in Spatial Reasoning, **Wendy Bigler**, Arizona State University
- Introducing Space in a Non-Computational Context, **Timothy M. Bray**, University of Texas at Dallas
- Integrating GIS and Urban Geography in the Classroom (& Beyond), **David R. Rain**, George Washington University
- Adaptation and Implementation of an Undergraduate Spatial Analysis Curriculum for Social Science Majors**, Christopher C. Weiss**, Columbia University

# V. USE OF SPACE WEBSITE Oct 2006 – Sept 2007
**Guylene Gadal**, SPACE Web Developer

Traffic logs were analyzed by *WebTrends Log Analyzer* for October 1, 2006 – September 30, 2007. Visits to the site have increased steadily but slowly from an average of 44 visitors per day in year one, to 144 per day in year two, to 294 visitors per day in year four. Of visitors in the past year, 26% were repeat visitors. Visitors spent an average of 13.5 minutes on the site.

Average hits per day – 1,692          Total hits – 661,947
     Total visitors – 114,993
Number of Unique visitors – 23,463          Average visitor length – 13.46 minutes

**The Top Entry Pages (by specific url / visitor sessions):**
- Discipline Resources (24,896)
- SPACE Home Page (6,691)
- SPACE Workshops (3,370)
- GIS Cookbook (1,049)
- Learning Resources (987)
- Teaching Materials (923)
- CSISS Classics ((918)
- Participant Contributions (916)
- About SPACE (837)

**The most requested pages by visitors already on the site:**
- Discipline Resources Home (9,768)
- Home Page (7,676)
- Workshop Home (5,033)
- Choosing a GIS (2,095)
- Learning Resources Home (1,788)
- Teaching Resources Home (1,777)
- Workshop Home 2007: UCSB (1,717) / OSU (1,702)
- About the Program (1,653)
- GIS Cookbook TOC (1,636)
- Participant Contributions (1,468)
- CSISS Classics (1,397)
- Workshop Home 2006: UCSB (1,223) / OSU (1,177) / OU (1,010)
- 2007 Workshop Application (1,123)

**The most downloaded files:**
- The Meaning of Spatial Thinking, Goodchild (23,701)
- Spatial Aspects of Globalization, Appelbaum (7,628)
- Geographical Movement, Tobler (2,717)
- Lab on Choropleth mapping with GIS (1,167)
- Annual Report 2005 (1,730)

- The SPACE brochure (896) / SPACE flyer 2006 (609) /SPACE flyer 2007 (495)
- NSF Proposal (582)

Table 14
**Use / Evaluation of Web Resources at www.csiss.org/SPACE**
**by Workshop Participants for 2006 and 2007**

|  | Syllabi Collection | Assessment Links | Discipline Resources |
|---|---|---|---|
| Did not use it | 32 | 38 | 35 |
| Not useful | 0 | 0 | 0 |
| Somewhat useful | 25 | 17 | 22 |
| Very useful | 37 | 39 | 37 |
| Percent of Users rating resources "Very Useful" | 39% | 40% | 37% |

Over the past two years, the quantity of resources made available on the site has expanded with new sections on Participant Contributions, Conference Presentations, and Discipline Resources. The earlier (year two) Forum and MyPage resources were dropped from the site – they were intended for interactive use during the workshops, however the assessment after year two was that most participants were too busy with in-house hands-on activities during the workshop to manage simultaneous virtual exchanges. The same rationale explains the comparatively low use during the workshops of syllabi, assessment links, and discipline resources. Nonetheless, resources organized by discipline have proven especially popular for visitors to the site (not necessarily workshop participants). and SPACE hopes to use the final no-cost extension year to enhance this section of the website. This is a search convenience that can be made more prominent on the site to assemble all other site resources (learning, teaching, and assessment materials, links, special collections such as CSISS classics, workshop participant contributions, and etc.). This consolidation around common search terms (discipline names and study areas) will provide a basis for maintaining a valuable set of resources following the cessation of the SPACE program and for enhancing public accessibility.

On the Exit Survey, 8286% of workshop participants rated the on-line application procedures as '4' and 18 13% as '3' on a scale of 1 (totally unacceptable) to 4 (excellent). The online application and decision-processing procedures have worked exceptionally well for the workshop coordinators and principal investigator. The website has been the principal vehicle for managing SPACE program across different universities and for distributing workshop materials to participants.

**Note from the PI**. SPACE  lostSPACE lost its original Webmaster (Gamaiel Zavala) to Yahoo in October 2005 and it was not until January 2006 that we could find a replacement. The transition resulted in the loss of data logs. For this reason, this report focuses on the last complete season of activity, October 2006 – September 2007, which is most comparable to the earlier reports.  There is a gap of data for the period October 2005 to June 2006.

# From the NSF Fastlane Report

The following responses from D Janelle were copied from the NSF Fastlane Report:

**Annual Report for Period:** 10/2006 - 09/2007 **Submitted on:** 10/15/2007
**Principal Investigator:** Janelle, Donald G. **Award ID:** 0231263
**Organization:** U of Cal Santa Barbara
**Title:** Spatial Perspectives on Analysis for Curriculum Enhancement (SPACE)

**Project Participants**

**Senior Personnel**

**Name:** Janelle, Donald
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Serves as Principal Investigator and Program Director for SPACE. He plans and coordinates all project activities with the overall objectives for the NSF CCLI national dissemination program. He works with the workshop coordinators for UCSB, OSU, and UCGIS on the development of workshop programs, directs the advertising for applicants and the selection process, cooperates with the SPACE Educational Development Coordinator on the implementation of instructional development components in the workshops and in the design of instruments for evaluating workshop results. He supervises the work of the project administrator and webmaster, hires and supervises graduate student assistants at UCSB, organizes planning meetings for project leaders from the three partner institutions and workshop planning meetings for UCSB, arranges for SPACE participation in national academic conferences, visits and instructs at all SPACE workshops, represents the SPACE project at annual academic conferences in the social sciences, and prepares documentation for annual reports to NSF and to UCSB's Institute for Social, Behavioral, and Economic Research.

**Name:** Appelbaum, Richard
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
As co-PI on the project, he participated in the December 2003, 2004, and 2005 planning meetings of the project team and has assisted in advertising the workshop program. As an award-winning teacher at UCSB, he gave a featured presentation to the 2004 workshop at UCSB. He featured the SPACE program workshops in a presentation to the Annual Meeting of the American Sociological Association in mid August 2004. His primary role in SPACE commenced in year two (2004-2005) of the project in helping to implement its program of short workshops at the annual meetings of academic societies. Several such workshops have taken place over the four primary years of SPACE, all of which are describe at www.csiss.org/SPACE. As Director of UCSB's Institute for Social, Economic, and Behavioral Research, he is well positioned to engage in this outreach effort.

**Name:** Goodchild, Michael
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
As a Co-PI on the project, he assisted in the overall design for the SPACE program and was one of the primary instructors in 2004, 2005, 2006, and 2007 workshops at UCSB and at San Diego State University in 2004. He was also a guest presenter at the workshop hosted by the University of Oklahoma in 2006. For the workshops at UCSB, he participated in planning meetings, provided advice to the graduate students involved in setting up exercises, and worked closely with the PI and workshop coordinators in setting the workshop agenda.

**Name:** Kwan, Mei-Po
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
PI for the subcontract to Ohio State University. She was responsible for designing, implementing, coordinating the workshop program at Ohio State University. She took part in the SPACE planning meetings in Santa Barbara in

December 2003, 2004, and 2005. She supervised other personnel working on the project at OSU, developed lecture plans and lab exercises, and taught part of the 2004, 2005, 2006, and 2007 workshops.

**Name:** Getis, Arthur
**Worked for more than 160 Hours:** No
**Contribution to Project:**
PI for the UCGIS subcontract on the SPACE project. He participated in the planning meeting for the SPACE project in December 2003 and 2004, and served as Co-coordinator with John Weeks for the 2004 UCGIS SPACE workshop at San Diego State University. He was responsible for workshop development, was a principal workshop instructor, tutored participants, and supervised the work of Jared Aldstadt. In 2005, he worked with John Weeks to organize a special session on the SPACE program for the UCGIS Spring Assembly in Washington DC. He monitors participation of UCGIS in the SPACE project and assists in disseminating information about the program.

**Name:** Goodchild, Fiona
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Fiona Goodchild serves as the Educational Development Coordinator for the Space Project. Her primary obligations are planning, documentation and evaluation of workshop outcomes. She prepared resources for and attended the SPACE planning meetings in December 2003, 2004, and 2005. She participated in the design of survey instruments for selecting participants and for workshop entry and exit surveys for all of the program workshops in 2004 through 2007. In addition, she provided instruction about curriculum development and student assessment in 2004, 2005, 2006, and 2007 for the UCSB workshops and for the 2004 SDSU summer workshop. She also is a consultant to instructors in the OSU workshop. She worked with D. Janelle in supervising the assistance of Stacy Rebic-Hespanha and communicated with all workshop instructors on the pedagogical goals of the program. In fall 2004, 2005, and 2007, she assisted Don Janelle with pedagogical aspects of the annual SPACE report to the National Science Foundation.

**Post-doc**

**Name:** Keuper, Alex
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He completed his PhD in June 2004. He was the primary lab instructor for the UCSB workshop in 2004. He prepared the workshop-related exercises on the use of GIS, and tutored participants on their educational development projects.

**Graduate Student**

**Name:** White, Eric
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
A PhD candidate in Anthropology and a expert on the development of Internet search engines, he held a 35 % appointment in the Fall 2003 and Winter 2004 quarters. His role was to locate web resources that feature educational curriculum development and learning assessment. These are presented on the SPACE website (www.csiss.org/SPACE). He also identified course syllabi on the Web that feature spatial perspectives in a range of social science disciplines. These were examined by workshop participants as examples for critique and emulation.

**Name:** Howarth, Jeff
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
He worked on a 35% graduate appointment in the Spring 2004 quarter and a 25% appointment in the summer to prepare resources for the 2004 workshop at UCSB. He prepared a document to assist undergraduate instructors in choosing a GIS software package suitable for their needs and he gave a presentation on his work to participants in

the UCSB workshop. In 2007, Jeff was a primary instructor for GIS in the UCSB workshop. He completed his PhD in 2007.

**Name:** Farrell, Rob
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He provided tutorial assistance on GIS and spatial statistics to participants in the 2004 UCSB workshop. He worked with the workshop coordinator in setting up exercises on the use of the GeoDa software (exploratory spatial data analysis).

**Name:** Aldstadt, Jared
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He prepared lab exercises and instructed and tutored participants in the use of GIS and GeoDa software exercises at the 2004 workshop held at San Diego State University (host university for the UCGIS SPACE workshop). He completed his PhD in 2005.

**Name:** Ren, Fang
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
She helped to advertise and coordinate the 2004 workshop at Ohio State University, assisted in the development of lab exercises, and provided tutorial support in the lab sessions.

**Name:** Boschmann, Eric
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
He assisted with overall project coordination for the 2004, 2005, and 2006 workshops at Ohio State University, assisted in advertising the workshops, contributed to workshop logistics, helped in the development of lab exercises, and provided tutorial support during the lab sessions.

**Name:** Klaf, Suzanna
**Worked for more than 160 Hours:** No
**Contribution to Project:**
She helped with logistics during the 2004, 2005, and 2006 workshops at Ohio State University. She sent out fliers to more than 100 academic departments, helped to coordinate the workshops, and assisted in the development of lab exercises.

**Name:** Ding, Guoxiang
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Guoxiang (PhD candidate in Geography) assisted with logistics and served as a lab instructor for the 2006 and 2007 workshops at Ohio State University.

**Name:** Hui, Wei
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Provided assistance with logistics for the 2004 workshop at Ohio State University. This work was funded by the Department of Geography at OSU.

**Name:** Davis, Jason
**Worked for more than 160 Hours:** No
**Contribution to Project:**

Provided assistance with logistics for the 2004 and 2005 workshops at Ohio State University. This work was funded by the Department of Geography at OSU.

**Name:** Rebich-Hespanha, Stacy
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
A PhD student with an interest in educational development and learning assessment. She provided educational development support for the SPACE project in 2004 through 2007, assisting Fiona Goodchild in the refinement of survey instruments, grouping of workshop participants according to expertise and needs, providing tutorial support and instruction for workshop participants in the SDSU workshop in 2004, the SFSU workshop in 2005, and the UCSB workshops from 2004 through 2007. She maintains the workshop library for participant use and she designed UCSB workshop exercises and resources for educational development initiatives. In addition, she has been involved in processing data and interpreting results on program evaluation. She contributed to instructor orientation for the 2004 and 2005 planning meeting and worked closely with the PI and webmaster to enhance resources on the SPACE website.

**Name:** Griswold, Julia
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Julia Griswold is an MA candidate in the Department of Geography at SFSU. She prepared census lab exercise and lab materials on ArcCatalog and map projections. She assisted with exercise preparation and testing, and helped participants during workshop labs for the SFSU workshop in 2005.

**Name:** Hemphill, Jeff
**Worked for more than 160 Hours:** No
**Contribution to Project:**
A Ph.D. candidate at UCSB. He was a workshop lab instructor and project consultant for participants in the 2005 and 2006 UCSB workshops. He designed some of the lab exercises.

**Name:** Battersby, Sarah
**Worked for more than 160 Hours:** No
**Contribution to Project:**
She was a workshop lab instructor and project consultant for participants in the 2005 UCSB workshop. In 2006, Sara was the primary cartography and graphic visualization instructor for the workshop. She completed her PhD in 2006.

**Name:** Yoo, Eun-Hye
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Enki was a workshop lab instructor and project consultant for participants in the 2005 and 2006 UCSB workshops. She completed her Ph.D. in 2006.

**Name:** Grace, Kathryn
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Kathryn is a PhD candidate. She was a lab instructor for the 2005, 2006, and 2007 workshops at UCSB, responsible for instruction and assistance to workshop participants in the area of spatial statistics.

**Name:** Goldsberry, Kirk
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Kirk was the primary instructor for cartographic visualization of social science data for the 2007 UCSB workshop. He completed his PhD immediately after the workshop.

**Name:** Hawthorne, Tim
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Tim (PhD candidate in Geography) assisted with logistics and served as a lab instructor for the 2007 workshop at Ohio State University.

**Name:** Rich, Katy
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Katy worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the University's Office of the Vice President for Research.

**Name:** Kuehl, Marcie
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Marcie worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the University's Office of the Vice President for Research.

**Name:** Howard, Dustin
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Dustin worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the University's Office of the Vice President for Research.

**Name:** Collier, Matthew
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Matthew worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the OU Center for Spatial Analysis.

**Name:** Cheuk, Mang Lung
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Mang Lung worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the OU Center for Spatial Analysis.

**Name:** Bothwell, James
**Worked for more than 160 Hours:** No
**Contribution to Project:**
James worked as a student consultant to participants in the 2006 remote sensing workshop at the University of Oklahoma. Funding was provided from the OU Center for Spatial Analysis.

**Name:** Glennon, Alan
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Alan, a PhD student at UCSB, gave a guest presentation on geo-browser technologies to the December 2005 Planning Meeting and to the participants in the 2006 SPACE workshop at UCSB.

**Name:** Richards, Heather
**Worked for more than 160 Hours:** No
**Contribution to Project:**

Heather is a PhD Candidate in the Department of Anthropology at the University of New Mexico. She participated in the 2004 workshop at Ohio State University and the 2006 workshop at UCSB. She provided guidance to the SPACE planning meeting in December 2005 and helped to organize a session on undergraduate training in GIS for the 2006 meetings of the American Archaeological Society.

**Name:** Folch, David
**Worked for more than 160 Hours:** No
**Contribution to Project:**
David is a PhD candidate in the joint program between UCSB and San Diego State University. He participated as a lab instructor in the 2007 UCSB workshop, with responsibility for helping participants with applications of spatial econometric analysis.

**Undergraduate Student**
**Name:** Williams, Andrew
**Worked for more than 160 Hours:** No
**Contribution to Project:**
An undergraduate student in the SFSU Urban Studies program who assisted with the 2005 workshop preparation (Xeroxing, assembling packets and exercise binders).

**Name:** DeJesus, Anthony
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Anthony DeJesus is an undergraduate SFSU film major who prepared a short documentary video of the 2005 SFSU workshop. This will be used to illustrate the SPACE program at a 2006 Assembly of the UCGIS.

**Name:** Pennucci, Aly
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Aly Pennucci is an undergraduate student in the SFSU Urban Studies program who assisted with the 2005 workshop preparation re: liaison to participants about housing arrangements. She assisted with photocopying.

**Technician, Programmer**
**Name:** Zavala, Gamaiel
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Webmaster and database development and management for the SPACE project. In 2003-2004, he developed the project's website (www.csiss.org/SPACE) as a basis for web advertising and project dissemination of instructional and course development resources. He designed all of the automated database management systems for participant applications and processing, and for workshop entry and exit surveys, providing a range of output to enable the PI and workshop organizers for all three workshops to assess applicants and to understand the backgrounds and needs of workshop participants. In addition, he created a customized web forum for participant-instructor dialog during and after workshops and developed a 'My Page' resource for workshop participants to store and retrieve customized teaching and learning resources that they find useful in their curriculum development efforts. He also serves as liaison with the systems director of the computer labs used in the 2004 and 2005 workshops at UCSB. In 2005 he worked closely with SPACE award recipients and conference workshop presenters in documenting their undergraduate instructional activities. The interface developed for these presentations was also used for displaying the work of workshop participants -- providing examples for instructors from a broad range of social science disciplines and interdisciplinary programs. Gamaiel took a position in the private sector in October 2005.

**Name:** Nickel, Barry
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**

Barry Nickel is the Associate Director of the SFSU Institute for Geographical Information Science. He oversaw all technical aspects of the 2005 workshop, including preparation of labs, data installation, and trouble shooting. He assisted in designing workshop content and he developed and delivered lectures on attribute tables, vector GIS analysis, and GIS resources for social scientists. He attended all workshop sessions.

**Name:** Cohen, Jesse
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Jesse Cohen provides technical support for the SFSU Institute for Geographical Information Science. He assisted Barry Nickel with technical aspects of the 2005 workshop. He also helped with workshop organization: overseeing preparation of materials, preparing exercise materials, managing logistics, and liaison to workshop participants.

**Name:** Gadal, Guylene
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Guylene assumed duties as project web developer beginning in January 2006. She also managed the implementation of web-based databases associated with SPACE and coordinated with workshop participants in the organization of resources that are useful for teaching and assessment. During the UCSB workshops, she provided logistical support for computer facilities.

**Name:** James, Ann
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Ann James provided technical and logistical support for the 2006 workshop on remote sensing at the University of Oklahoma.

**Other Participant**
**Name:** Weeks, John
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Co-Coordinated (with Art Getis) the development and implementation of the 2004 workshop at San Diego State University. He handled the workshop logistics, budgeting and related issues, and was a primary instructor in the workshop, responsible for presentations and for tutoring participants. He also participated in the December 2003 and 2004 SPACE planning meetings -- representing SDSU and UCGIS. In 2005 he coordinated a special session featuring the teaching accomplishments of SPACE workshop participants at the Spring Assembly of the UCGIS in Washington DC.

**Name:** Brown, Christian
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Project administrator for the SPACE program from October 2003 to July 2006. He provided assistance to the PI on workshop advertising and application processing, processed all invoices on expenses for the UCSB workshops -- publications, printing, software, etc. He organized accommodations, reserved classroom and lab space, and provided logistical assistance to the workshop organizers and participants at the UCSB workshops. He handled the preparation of participant stipends and certificates of completion for all three SPACE workshop sites and was responsible for all correspondence with workshop participants. He reviewed all instructions to participants that appear on the SPACE website for accuracy and compliance with NSF regulations.

**Name:** Sweeney, Stuart
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
A Professor of Geography with expertise in spatial analysis. He worked with the PI and with Sara Fabrikant to organize the workshop agenda for the 2004 UCSB workshop and was the primary coordinator for the 2005, 2006,

and 2007 UCSB workshops. He supervised graduate students in the development of exercises using the GeoDa software (exploratory spatial data analysis) and presented instruction and offered tutorial support to participants throughout the workshop. He also played an important role in the December 2003, 2004, and 2005 SPACE planning meetings.

**Name:** Fabrikant, Sara
**Worked for more than 160 Hours:** No
**Contribution to Project:**
A Professor of Geography with expertise in cartographic visualization of research data. She worked with the PI and with Stuart Sweeney in co-organizing the 2004 UCSB workshop. She was a primary instructor for the 2004, 2005, and 2006 UCSB workshops. She prepared lab exercises on the integration of GIS with other data visualization tools, lectured, and provided consultation for participants on their workshop projects.

**Name:** Tobler, Waldo
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Emeritus Professor and one of the World's leading analytical and theoretical cartographers, he was one of the lead instructors in the 2004, 2005, 2006, and 2007 UCSB workshops. He developed tutorials, exercises, and data sets to accompany the customized software that he developed (FlowMapper) for free download by workshop participants and their students. He also participated in the December 2003, 2004, and 2005 planning meetings for the SPACE project and contributed to planning the agenda of UCSB workshops.

**Name:** Jankowski, Piotr
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He was an instructor at the 2004 workshop at San Diego State University, responsible for presentations and exercises on public participation GIS and for tutoring participants.

**Name:** Murray, Allan
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He was an instructor in the 2004, 2005, 2006, and 2007 workshops at Ohio State University. He developed related teaching materials and lab exercises.

**Name:** O'Kelly, Morton
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He was an instructor in the 2004, 2005, 2006, and 2007 workshops at Ohio State University. He developed related teaching materials and lab exercises.

**Name:** Tiefelsdorf, Michael
Annual Report: 0231263
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He was an instructor in the 2004 and 2005 workshops at Ohio State University. He developed related teaching materials and lab exercises. He also participated in the SPACE project planning meeting in Santa Barbara in December 2003 and was involved in designing the original workshop program for OSU.

**Name:** Xiao, Ningchuan
**Worked for more than 160 Hours:** No
**Contribution to Project:**

He was an instructor in the 2004, 2005, 2006, and 2007 workshops at Ohio State University. He developed related teaching materials and lab exercises.

**Name:** McLafferty, Sara
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Department of Geography, University of Illinois, Urbana-Champaign. She gave guest lectures in the 2004, 2005, 2006, and 2007 workshops at Ohio State University, illustrating the role of GIS and spatial analysis in health studies and in teaching.

**Name:** Shaw, Shih-Lung
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor, Department of Geography, University of Tennessee. He gave guest lectures in the 2004, 2005, and 2006 workshops at Ohio State University.

**Name:** Rey, Serge
**Worked for more than 160 Hours:** No
**Contribution to Project:**
He was an instructor in the 2004 workshop at San Diego State University, demonstrating the STARS (Space-Time Analysis of Regional Systems) open-source software and its potential uses in undergraduate social science education.

**Name:** Herr-Harthorn, Barbara
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Research Professor in Anthropology. She gave a guest presentation on spatial perspectives on risk assessment in public health for the 2004 workshop at UCSB.

**Name:** Freudenberg, William
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor of Environmental Studies and Sociology. He gave a presentation to the 2004 UCSB workshop participants.

**Name:** Lobao, Linda
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Department of Sociology, OSU. She gave guest lectures in the workshops at Ohio State University from 2004 through 2007.In 2005 she joined the panel discussion on teaching.

**Name:** Proctor, James
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor of Religious Studies and Geography at UCSB -- gave presentation to the 2004 UCSB workshop participants on spatial perspectives in the regionalization of cultural values and attitudes.

**Name:** Kuhn, Peter
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor of Economics, UCSB. He gave a guest presentation to the 2004 UCSB workshop on applications of spatial thinking in economics, with examples of how he treats this in undergraduate teaching.

**Name:** Usery, Lynn
**Worked for more than 160 Hours:** No
**Contribution to Project:**
As 2003-2004 President of the University Consortium for Geographic Information Science (UCGIS), he was responsible for selecting San Diego State University to host the UCGIS SPACE workshop in 2004 and for overseeing management of the UCGIS subcontract on the SPACE project. He also participated in the December 2003 SPACE project planning meeting in Santa Barbara.

**Name:** Plank, Kathryn
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Associate Director, Office of Faculty & TA Development, Ohio State University. She helped in designing the educational development component of the OSU workshops, facilitated the activities of participant focus groups, and taught part of the 2004, 2005, 2006, and 2007 workshops at Ohio State University. She also took part in the 2004 and 2005 SPACE planning meetings in Santa Barbara, providing workshop instructors with guidance on student learning styles.

**Name:** Johnson, Richard
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Senior Instructional Consultant with the UCSB Office for Instructional Consultation. He participated in the SPACE planning meetings in December 2003, 2004, and 2005, and he provided advisory support and resources for the project's Educational Development Coordinator.

**Name:** Nicholson, Stanley
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Director of the Office of Instructional Consultation at UCSB. He participated in the SPACE planning meeting in December 2003 and provided advisory support and resources for the project's Educational Development Coordinator.

**Name:** Cartwright, Donald
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor Cartwright is one of the most highly recognized teachers in Canada -- a recipient of the highest possible awards for the University of Western Ontario (UWO), for the Province of Ontario, and for Canada. He participated as a project advisor at the December 2003, 2004, and 2005 SPACE planning meetings, sharing ideas about the faculty mentor program that he coordinates for the Teaching Support Center at the University of Western Ontario. He continued as a primary educational development advisor to the SPACE project through 2007.

**Name:** Fournier, Eric
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor Fournier (Samford University in Alabama) participated as a project adviser at the December 2003, 2004, and 2005 SPACE planning meetings in Santa Barbara. He shared ideas based on his experience as Co-Principal Investigator in an NSF-supported program for GIS instruction for science and social science instructors at Samford (Academic Excellence through GIS project (AEGIS)). He also shared ideas from his involvement as an instructor in the NSF-supported Geography Faculty Development Alliance Workshops, led by Kenneth Foote at the University of Colorado.

**Name:** LeGates, Richard
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**

Richard LeGates served as Coordinator of the 2005 SFSU workshop and as project principal investigator on behalf of the University Consortium for Geographic Information Science for the second year of the SPACE project. He contributed to the SPACE planning meeting in Santa Barbara in December 2004, managed personnel and budget, and played the lead role in designing the SFSU workshop content. He developed and taught lectures introducing ArcGIS, on vector GIS, on computerized cartography, and on GIS resources for social scientists. He attended all workshop sessions and prepared a final report on the SFSU workshop. He also organized a SPACE session for the 2006 UCGIS Assembly, and organized a special session on pedagogy in urban planning for the Association of Collegiate Schools of Planning Annual Conference, in 2005.

**Name:** Pamuk, Ayse
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Ayse Pamuk is an Associate professor of Urban Studies at SFSU. She prepared and delivered a lecture on the use of census data in spatial analysis at the 2005 SFSU SPACE workshop, and oversaw a lab exercise on the use of census data in GIS.

**Name:** Clarke, Keith
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Keith Clarke is a Professor of Geography, U.C. Santa Barbara. He delivered the keynote address at the 2005 SFSU workshop and led discussion on use of GIS in social science teaching.

**Name:** Kirkeberg, Max
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Max Kirkeberg is a Professor of Geography at SFSU. He led a walking tour of San Francisco's South of market district for the participants of the 2005 SFSU workshop, several with teaching interests in urban studies.

**Name:** Padgett, David
**Worked for more than 160 Hours:** No
**Contribution to Project:**
A Professor of Urban Studies at Tennessee State University who attended the 2004 SPACE workshop at UCSB. He presented a participant's perspective on the SPACE program at the 2004 SPACE Planning Meeting, assisted with applicant recruitment from HBCUs, and organized four SPACE sessions at academic conferences in the period 2005-2007. He also contributed extensively to instructional resources for the SPACE website.

**Name:** Jocoy, Christine
**Worked for more than 160 Hours:** No
**Contribution to Project:**
A Professor of Geography at California State University, Long Beach who attended the 2004 workshop at San Diego State University. She presented a participant's perspective on the SPACE program at the 2004 SPACE Planning Meeting.

**Name:** van der Elst, Judith
**Worked for more than 160 Hours:** No
**Contribution to Project:**
A PhD Candidate at in Archaeology at the University of New Mexico who attended the 2004 workshop at Ohio State University. She presented a participant's perspective on the SPACE program at the 2004 SPACE Planning Meeting, assisted with applicant recruitment in her discipline, organized a SPACE-sponsored Forum on teaching GIS in the social sciences at the University of New Mexico, and contributed to instructional resources on the SPACE website. She also helped organize a SPACE session for the meeting of the Society for American Archaeology in 2006.

**Name:** Liu, XiaoHang
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
XiaoHang Liu is an Assistant Professor of Geography at SFSU who served as the 2005 SFSU workshop project co-principal investigator. She contributed to the SPACE planning meeting in Santa Barbara in December 2004 and played lead role in designing the SFSU workshop content. For the workshop, she developed and delivered lectures on GIS and GIS data, raster GIS, and GIS data acquisition. She developed a geocoding lab exercise and oversaw labs on raster GIS and geocoding. She attended all workshop sessions.

**Name:** Ahlqvist, Ola
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Ola was the primary cartography instructor for the 2006 and 2007 workshops at Ohio State University.

**Name:** Munroe, Darla
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Darla was an instructor in the 2006 workshop at Ohio State University, responsible for instruction on spatial statistics, using GeoDa software.

**Name:** Liu, Desheng
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Desheng was an instructor in the 2007 workshop at Ohio State University, responsible for instruction on spatial statistics, using GeoDa software.

**Name:** Brown, Philip
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor Brown (History at OSU) was a guest presenter on the role of maps and spatial thinking in history for the 2006 and 2007 workshops at Ohio State University.

**Name:** Lee, Jiyeong
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor Lee was a guest presenter on GIS applications for the 2006 and 2007 workshops at Ohio State University. He is a professor at the University of North Carolina, Charlotte.

**Name:** Brown, Melisa
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Melisa provided administrative support for the 2006 workshop at the University of Oklahoma, including logistical support for all of the participants.

**Name:** Rashed, Tarek
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Dr. Rashed was the principal organizer for the workshop on remote sensing on behalf of the UCGIS, hosted at the University of Oklahoma in 2006. He participated in the SPACE planning meeting in December 2005. He arranged for instructors, solicited additional support from within the university, and taught during the workshop.

**Name:** Pedersen, Jon
**Worked for more than 160 Hours:** No

**Contribution to Project:**
Dr. Pedersen is the Dean of Education at the University of Oklahoma. He was an instructor in the workshop in 2006, working with participants on questions regarding curriculum development, pedagogy, and learning assessment. He also took part in the December 2005 SPACE planning meeting.

**Name:** Mesev, Victor
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Dr. Mesev is a professor of geography at Florida State University. He was one of the primary remote sensing instructors for the 2006 workshop at the University of Oklahoma and also participated in the December 2005 planning meeting.

**Name:** Powell, Rebecca
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Dr. Powell completed her PhD at UCSB just prior to the 2006 workshop at the University of Oklahoma. She was one of the primary instructors in applications of, and teaching with, remote sensing.

**Name:** Yuan, May
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor Yuan was one of the primary instructors in the 2006 workshop on remote sensing applications in the undergraduate classroom, hosted by the University of Oklahoma. The Center for Spatial Analysis at OU provided a cost share for hiring Professor Yuan as a workshop instructor.

**Name:** Lam, Nina
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Nina Lam, Professor of Geography at Louisiana State University, participated in the December 2004 SPACE Planning Meeting in her advisory role as President of the UCGIS.

**Name:** Wilson, John
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Professor of Geography at the University of Southern California, participated in the December 2005 SPACE Planning Meeting in his advisory role as President of the UCGIS.

**Name:** Holoman, Christopher
**Worked for more than 160 Hours:** No
**Contribution to Project:**
Christopher is a political scientist from the Liberal Studies Department of Hilbert College. He participated in the 2005 workshop at San Francisco State University, gave a guest presentation about his SPACE workshop experience to the UCGIS 2006 Summer Assembly, and provided guidance to the SPACE planning meeting in December 2005.

**Name:** Popa, Clara
**Worked for more than 160 Hours:** Yes
**Contribution to Project:**
Clara is on the faculty in the Department of Communication Studies of Rowan University. She participated in the 2005 workshop at Ohio State University and provided guidance to the SPACE planning meeting in December 2005.

**Name:** Ross, Glenwood
**Worked for more than 160 Hours:** No
**Contribution to Project:**

Glen is a Professor of Economics at Morehouse College. He participated in the 2005 UCSB workshop and in the December 2005 Planning Meeting as an Advisor.

**Research Experience for Undergraduates**
No entry

**Organizational Partners**
**Ohio State University**
Under the direction of Professor Mei-Po Kwan, Ohio State University's Geography Department is a partner in the SPACE program under a subcontract from UCSB. OSU's primary role was in offering a one-week workshops on 'GIS and Spatial Modeling for Use in Undergraduate Education' in each of the four years of the program (2004 through 2007).

The Department has provided additional funding for graduate students working during the workshops and for social events for workshop participants. In addition, it has provided lab and classroom space and has contributed staff support time for organizing workshop events.

OSU Geography has contributed a teaching laboratory with 50 PCs running all the GIS and statistical software needed for the workshop. The department also reserved two additional teaching laboratories with about 10 seats of computers and three classrooms (including one classroom with a capacity of 75, and two seminar rooms). The department also helped participants with needs on Xeroxing and faxing. The department contributed $1000 for each year to help with costs like providing social activities and hiring students to help with logistics. The department also paid for the tuition and fees for the two graduate student assistants.

Professor Kwan has assisted in the design of workshop survey instruments (application, entry, and exit); she and Professor Tiefelsdorf participated in a two-day planning meeting for the SPACE program in December 2003; and she contributed to the 2004 and 2005 planning meeting, as well.

**San Diego State University**
In 2004, San Diego State University's Department of Geography was selected to host a SPACE workshop on behalf of the UCGIS under a subcontract to UCSB. This occurred on 2-6 August. The Department's support included funding for social events for workshop participants and the use of in-kind and facility resources. Facilities included a 'smart' classroom, a seminar room, and a laboratory that enabled each participant to work independently at a properly loaded computer with software for all workshop activities.

The SDSU Department of Geography boasts outstanding GIS laboratories and considerable experience in conducting workshops and short-courses. The workshop took place on the third floor of Storm Hall. The main classroom is equipped with the latest presentation technology. The facility used for this workshop is the Richard Wright Laboratory for Spatial Analysis, a state of the art facility with two-dozen workstations. All machines were loaded with the new software, GEODA, a creation of Luc Anselin (University of Illinois) as part of the NSF funding to the Center for Spatially Integrated Social Science (CSISS). In addition, participants were in a position to use STARS, a new time-space analytic package by Serge Rey (SDSU), and FlowMapper, a spatial interaction package created by Waldo Tobler of UCSB with support from CSISS. Participants could use the laboratory at all times during the week. In addition, display material was available in the Center for Earth Systems Analysis and Research (CESAR), an advanced spatial analytic laboratory of the Department of Geography and in a large seminar room. Professor Douglas Stow (SDSU) took the participants on a tour of the specialized facilities in CESAR. Coffee and cookies were available each day in the seminar room and on the veranda of Storm Hall.

**University Consortium for Geographic Information Science**
The University Consortium for Geographic Information Science (UCGIS) is a partner in the SPACE program under subcontract to UCSB. The UCGIA President (Lynn Usery in 2004; Nina Lam in 2005; John Wilson in 2006; Sean Ahearn in 2007) is responsible for the selection of a member institution to offer a week-long workshop on 'Spatial Analysis and GIS for Undergraduate Course Enhancement in the Social Sciences.'

For 2004, this workshop was offered by San Diego State University (2-6 August 2004), with Arthur Getis and John Weeks as workshop coordinators. For 2005, Richard LeGates of San Francisco State University organized and offered the workshop. For 2006, the University of Oklahoma, under the leadership of Tarek Rashid offered a workshop on using Remote Sensing in undergraduate social science education. In 2007, UCGIS contributed a portion of its SPACE subcontract to support the workshops at Ohio State University and at the University of California, Santa Barbara. This made it possible to have a workshop program in a no-cost extension year for SPACE.

UCGIS also assisted in advertising the SPACE program through its website (www.ucgis.org), and through member institutions, and provided the assistance of Professors Lynn Usery, Arthur Getis, and the UCGIS presidents at the December 2003, 2004, and 2005 planning meetings for the SPACE program. It also sponsored a SPACE session at its 2005 Spring Assembly in Washington DC and at its 2006 Summer Assembly in Vancouver WA. In June 2007, SPACE PI (Don Janelle) gave a presentation on spatial thinking in the social sciences, based on outcomes of the SPACE program, to the UCGIS Summer Assembly at Yellowstone National Park.

**San Francisco State University**
SFSU's Geography Department and Institute for Geographic Information Science provided infrastructure support. The workshop was taught in the Geography Department's GIS classroom (HSS 290): a state-of-the-art facility with the appropriate software licenses, individual working areas, powerful computers for each participant, an overhead projection system, and comfortable discussion space. On-campus housing was made available by SFSU in apartments and dormitories. The lending library of ESRI Press books was housed in the Geography Department map library immediately adjacent to the teaching laboratory. The workshop reception was held in the Blakeslee Room ù a university facility often used for this purpose.

The University assisted the project financially by not charging overhead on the subcontract and by front ending expenditures on project development and implementation for reimbursement from the SPACE subcontract to UCGIS later. Professor LeGates and his colleagues worked collaboratively with the SPACE staff at UCSB to create appropriate web infrastructure for offering the SFSU workshop. A special contribution was the preparation of a video presentation about the SFSU workshop that appears on the SPACE website.

**University of Oklahoma Norman Campus**
The University of Oklahoma, under the leadership of Dr. Tarek Rashed, hosted a workshop on 'Remote Sensing and GIS Technologies for Undergraduate Curricula in the Social Sciences', July 23-28, 2006, in Norman, OK. The OU Office of the Vice President for Research provided a 22% cost share to support salary for three student consultants and the airfare of Mike Goodchild (a workshop keynote speaker). The Center for Spatial Analysis at OU provided a cost share for a workshop instructor (May Yuan) and three full time students. In addition, the Sasaki Institute and College of Atmospheric and Geographic Sciences at OU contributed $1,000 and $500 respectively toward social activities for workshop participants.

**Other Collaborators or Contacts**
The Department of Geography, University of California, Santa Barbara, provided a lecture room, a computer lab with 24 fully equipped computers, and technical assistance for the two-week-long workshop at UCSB in 2004 and for the six-day-long workshops in 2005, 2006, and 2007.

Luc Anselin (Spatial Analysis Laboratory, Department of Geography, University of Illinois, Urbana-Champaign) provided copies of the GeoDa software for exploratory spatial data analysis for all space workshop participants -- on disk for the UCSB workshop and as a free download from https://geoda.uiuc.edu for participants in the other workshops. The GeoDa software was featured as a tool for direct application in undergraduate social science courses in the UCSB 2004/2005/2006/2007 workshops, in the OSU 2005/2006/2007 workshops, and in the 2004 SDSU workshop.

Intergraph Inc. provided one-year trial licenses of their GeoMedia Professional GIS software for all SPACE workshop participants in 2004, along with information on the Intergraph program for educational support. In 2006, Intergraph provided a one-year license of GeoMedia for each participant in the workshop at the University of Oklahoma.

The ESRI Press provided a complimentary library of more than thirty publications on GIS applications in the social sciences for each of the SPACE workshops in 2004, 2005, and 2006 (approximate retail value $4,000). ESRI also donated 1-year licenses of ArcGIS 9.0/9.1/9.2 to all participants in the 2005 workshops at UCSB and SFSU, 2006-2007 workshops at UCSB and OSU, and 2006 workshop at the University of Oklahoma.

Clark Labs (Clark University) provided evaluation copies of its Kilimanjaro Idrisi GIS software for workshop participants in each of the 2004 SPACE workshops.

ITT Visual Information Solutions donated a full version lab license of ENVI to use during the workshop and an evaluation single-user version for each of the participants in the 2006 workshop at the University of Oklahoma.

Oxford University Press granted its deepest discounted price, and Donald Janelle and Mike Goodchild waived their royalties on the book 'Spatially Integrated Social Science' to permit a SPACE purchase of the book for each participant in the 2005-2006 workshops at SFSU, OU, OSU, and UCSB.

Arc2Earth provided all participants and instructors in the 2006 workshops (OU, OSU, UCSB) with a 30-day trial use of their software for integrating information on Google Earth.

**Activities and Findings**
**Training and Development:**
The SPACE project employs graduate students at each of the host institutions to assist with Training and Development. The SPACE project employs graduate students at each of the host institutions to assist with the organization and delivery of instructional materials. The graduate students have gained appreciation for how to design materials with clear instructions; how to assist in the instruction of labs and tutorials, and how to work with university professors from a variety of disciplines and different types of educational institutions. In working with workshop participants over the course of one or two weeks, they have acquired contacts within the academic teaching and research communities. Eleven graduate students and one Post Doc assisted in the development and administration of the SPACE project during its first year. In year two, 8 graduate students and three undergraduate students worked in the project, creating lab exercises, teaching in the labs, handling general workshop logistics. In years three and four, additional graduate students have taken part as consultants to workshop participants and as instructors, and others have participated in the organization of web resources for the SPACE web site. Specific examples include:

- A PhD candidate in Anthropology (Eric White), with expertise in the design of customized search engines, helped in the search and organization of educational development resources. These include links to course syllabi that demonstrate instructional strategies for using spatial analysis in a range of social science disciplines. He also gained familiarity tools for the assessment of learning, discovering resources that are currently featured on the website.

- An Environmental Science and Geography student (Stacy Rebich-Hespanha), with a strong interest in education, played a significant role in the project, helping to design survey instruments used in evaluating applicants for selection as workshop participants and in the development of entry and exit surveys to evaluate the program and to assess progress made by participants. She also assisted with instruction and in one-on-one discussions with participants about their pedagogical goals and projects during the workshops at SDSU (2004), SFSU (2005), and UCSB (2004 through 2007).

- A PhD student in geography (Jeff Howarth) helped to develop a tool for assessing various GIS software that workshop participants might consider for use in their undergraduate teaching. He gave a presentation on this to the UCSB workshop (2005) and, based on feedback from participants, the GIS selection guide is now a resource

available on the SPACE website. In 2007, Jeff was a primary instructor for GIS in the UCSB workshop, just prior to entering a faculty position at Middlebury College.

- Other graduate students at UCSB have shared similar success. Sarah Battersby was a primary instructor on the visualization of social science data in the 2006 workshop and directed lab exercises for the 2005 workshop. She is now a professor at the University of South Carolina. Enki Yoo, responsible for spatial statistics labs in the 2005 and 2006 workshops, is now in a tenure-track position at the University of Texas and Dallas. And, Kirk Goldsberry (primary workshop instructor for data visualization in 2007) has just started a tenure-track position at Michigan State University. All of these students credit the SPACE workshop experience as an important factor in their ability to relate to students and to communicate with a broad audience of scholars. Kathryn Grace completed three years as a workshop lab consultant and greatly values her involvement with representatives of a broad range of disciplines. She is expected to complete her PhD in the coming year.

- At San Diego State University in 2004, a PhD candidate (Jared Aldstadt) designed the exercises and taught the lab component of the workshop for the use of GeoDA -- an exploratory spatial data software package for spatial econometrics. This software, an outcome of the CSISS program, was provided to all workshop participants for use in both teaching and research. Jared is now a professor at the University at Buffalo (SUNY).

- At Ohio State University, Eric Boschmann and Fang Ren played lead roles in workshop management in 2004 workshop and contributed to instruction of workshop lab exercises. In doing so, they and several other graduate students acquired an appreciation of the benefits and challenges of cross-discipline communication, awareness of different teaching issues, and exposure to different disciplinary perspectives on applications of spatial analytic methods. In 2005, these duties were assumed by Jason Van Horn and Suzanna Klaf. In 2006, Eric Boschmann handled workshop management For 2007, Tim Hawthorne and Guoxiang Ding managed workshop logistics and assisted in instruction.

- At SFSU, an undergraduate film major was hired to produce a short documentary film on the workshop and its participants. This was featured by Richard LeGates in presentations to the SPACE planning meeting in December 2005 and to a special session on the SPACE program at the 2006 summer Assembly of UCGIS.

- Workshop coordinators and primary workshop instructors also benefited û for the very same reasons noted for graduate students.

**Outreach Activities:**
Although project activities are oriented largely to serving university undergraduate social science instructors in the United States, the dissemination of project resources has invited unexpected outreach opportunities to share the science of spatial analysis. For example, the SPACE website has opened communications with a broad public of diverse interests. Inquiries arrive regularly from high school teachers, university instructors from outside the social sciences, and students from across the country and from abroad. A few workshop instructors have been invited by participants to meet with environmental agencies and community interest groups and to give guest presentations at academic institutions and conferences.

SPACE directed its advertising fliers and email announcements to designated minority institutions. The program also provided supplemental funding for minority participants -- two Hispanic American and three African American workshop participants received support under this initiative in 2004. In 2005, the number of African American participants and instructors from HBCU and Hispanic Serving Institutions expanded significantly -- to 17 of 67 total participants (25%). For the 2006 workshops, 18 of 53 participants were designated minorities (33%). In 2007, the program attracted two participants from Tribal Colleges, in addition to another 6 minority participants, 8 of 44 (18%). Overall, in the four years of workshops, 22% of workshop participants were from designated minorities. The project supported one participant from the developing region of Assam in India in 2004 û an international outreach that also enriched the workshop experience for other participants. Other foreign participants have come from Portugal, Canada, The Netherlands, and England.

SPACE workshops are intended to have results beyond local campuses through the local outreach efforts of the workshop participants and their institutions. More than a dozen of the 2004 participants made conference presentations that drew on their experiences in SPACE workshops; some of them organized forums on their own campuses to expose other faculty to the potentials of spatial analytic methods in teaching and research. Some -- through the SPACE ACCESS program (Academic Conference Courses to Enhance Spatial Science) described elsewhere in this report -- have organized conference sessions and workshops on education development issues with financial support from the SPACE program.

SPACE hopes to continue its ACCESS program to fund 2007 workshop participants in their initiatives at organizing conference events in their disciplines. This is contingent on a small supplement from NSF, which will be requested once this report is approved.

**Journal Publications**

Richard LeGates, "Introducing Social Science Educators to GIS and Spatial Thinking", *GIS Educator*, p. 9, vol. Winter, (2007). Published.

Stacy Rebich Hespanha, Fiona Goodchild, and Donald G. Janelle, "Spatial Thinking and Technologies in the Undergraduate Social Science Curriculum", *Journal of Geography in Higher Education* (2007). Submitted.

Donald G. Janelle, Stacy Rebich Hespanha, Fiona Goodchild, and Michael F. Goodchild, "CSISS Workshops and National Dissemination of Geographic Analysis in the Social Sciences", *Journal of Geography in Higher Education*, (2007). Submitted.

**Books or Other One-time Publications**

Donald G. Janelle, "Spatial Social Science", (2004). booklet, 16 pages, Published. Center for Spatially Integrated Social Science, University of California, Santa Barbara

Donald G. Janelle, "Expanding the social sciences with mapping and GIS", (2007). Book, Published. Editor(s): Diana Stuart Sinton and Jennifer J. Lund, Collection: *Understanding Place. GIS and Mapping across the Curriculum,* Redlands, CA: ESRI Press.

Donald G. Janelle and Michael F. Goodchild, "Spatially Integrated Social Science", (2006). Book, Published. Editor(s): Barney Warf, *Encyclopedia of Human Geography*, (Thousand Oaks, CA: SAGE Publications) pp. 455-457.

**Web/Internet Site**
**URL(s):**
www.csiss.org/SPACE
**Description:**
The SPACE website is a principal means of advertising the workshop program, it is the primary means for submitting applications to participate in workshops, and it is used to administer the program. Workshop instructors use a secure database on the site to evaluate applicants and to make decisions on admission. The site conveys information about workshop agenda and logistics and it is a repository of resources for workshop participants (example syllabi, learning materials, assessment instruments, etc.). In 2005, the website was enhanced to search for discipline-based instructional resources and to display resources and details on initiatives created by workshop participants to share with others over the Web. Back-end databases provide the means for administering web-based entry and exit surveys. See "Findings" section for detailed information on the actual use of the SPACE website.

**Other Specific Products**
**Product Type:**
**SPACE program flier**
**Product Description:**

A two-sided bi-fold brochure describing the SPACE program and resources for use in introducing spatial analysis to undergraduate social science students was produced in 2005.

**Sharing Information:**
1500 copies of the brochure were distributed at workshops and through academic conferences attended by SPACE personnel and former participants in SPACE workshops in 2005 and 2006.

**Contributions**
**Contributions within Discipline:**
The host discipline for this project is arguably Geography. However, the project's origin in the NSF-supported Center for Spatially Integrated Social Science enhances the importance of original instructional contributions from scholars in a range of disciplines. Accordingly, aside from Geography, SPACE workshop instructors have academic origins in other social science disciplines (e.g., John Weeks, coordinator for the workshop at SDSU, is a Demographer; Stuart Sweeney, coordinator for the workshop at UCSB, holds degrees in Urban and Regional Planning; Richard LeGates, coordinator of the SFSU workshop is an urban planner; and Fiona Goodchild, the Educational Development Coordinator for SPACE, has degrees in History, Education, and Psychology). Most of the featured guest lecturers came from outside of the discipline of geography - anthropology, economics, education, environmental studies, health studies, history, and sociology. Workshop participants from this broad range of social science disciplines are expected to use the workshop experience to engage actively in exposing their students to the importance of spatial thinking in tackling a wide variety of social science problems. Spatially integrated social science (SISS) derives its principles and practices from the integration of spatial analytical methods with the theories and thematic problems of the social sciences (see Goodchild and Janelle, 2004 -- Spatially Integrated Social Science, Oxford University Press). SISS is based on the premise that a wide variety of social processes and problems are more clearly understood through the mapping of phenomena and the analysis of spatial patterns. The locational properties of information are often obscured in tabular formats that are traditional to most social sciences. Maps permit the visualization of this information to reveal patterns and trends not easily seen in a table. Spatial association, regional differentiation, diffusion, spatial interaction, and pattern detection are key concepts of spatial thinking. Through applications of analytical cartography, spatial statistics, spatial econometrics, and geographic information systems (GIS), these concepts facilitate the integration of theory with empirical analysis and aid both the interpretation of research findings and the presentation of research results. The integration perspective of SISS focuses on location as a natural basis for ordering and combining diverse information sources and for seeing the resolution of social science problems as fundamentally multi-discipline in character. For example, GIS and other spatial tools can facilitate an integration of perspectives from several disciplines (e.g., anthropology, economics, geography, political science, and sociology) to help understand social processes such as economic globalization or gentrification. Confining investigations of such issues to the realm of one discipline fails to capture the complexity of processes and interactions across geographic scales. Some examples follow:

- maps of environmental quality and human health can be overlaid to examine correlations that may suggest clues for further research.
- the territorial division of cities, based on ethnicity, demographic processes and social class, can be analyzed spatially as a key driver of social changes and as a basis for assessing social needs.
- public health researchers are concerned with contagion effects in the spread of diseases.
- changes in public opinion may reflect social diffusion processes that underlie spatial patterns of political movements, shifts in value systems, and changing norms of human behavior.
- cartographic visualization of these processes through animated maps represents one method to depict temporal patterns in the geographic spread of such phenomena.
- the analysis and modeling of spatial flows is an important focus for resolving problems in transportation studies, in explaining trade patterns in relationship to regional development issues, and in understanding demographic changes that alter the demand for social services.
- physical arrangement and clustering of phenomena are keys to pattern detection - for identifying the patterns of crime occurrences in cities and in being able to discern whether such patterns arise by chance or through some underlying associations of social and economic conditions that occur within regions and their surrounding areas.

Imparting these ideas and skills to undergraduates will yield significant benefits to their further education and to the knowledge that they will bring to their post-university careers.

A special section of the SPACE website was developed in 2005 to feature contributions from 2004 workshop participants. This resource has expanded with contributions from participants in the 2005 and 2006 workshops, and currently features examples of instructional innovations (new course syllabi, student exercises, assessment practices, etc.) from instructors in archaeology, communication studies, criminology, cultural anthropology, demography, economics, environmental studies, history, human geography, political science, sociology, and urban studies. Additional contributions will be solicited from 2007 workshop participants. These resources provide examples that other instructors can review and build upon for their own courses. They are very helpful for workshop participants looking for guidance on what they might do to foster spatial analytic skills in their instructional programs.

**Contributions to Other Disciplines:**
SPACE sponsors a special program to foster spatial perspectives broadly across a range of disciplines. Its Academic Conference Courses to Enhance Spatial Science (ACCESS) program has funded the following initiatives in 2005 through 2007:

(1) The 2007 annual meeting of the American Political Science Association featured a session on 'GIS, Spatial Statistics, and Political Science,' organized by Iris Hui, a Political Science PhD candidate from the University of California, Berkeley, who participated in the 2006 SPACE workshop at Ohio State University

(2) The 2007 annual meeting of the American Sociological Association in New York City featured a panel session on 'Integrating Spatial Thinking into the Sociology Curriculum.' The panel was organized by Claudia Scholz (Research Programs Coordinator at Trinity University in San Antonio) and consisted of prior SPACE workshop participants.

(3) The 2007 Annual Career Fair and Training Conference for Minorities in Agriculture, Natural Resources, and Related Sciences (MANRRS), in Birmingham Alabama featured a half-day workshop on 'Geographic Information Systems (GIS), Global Positioning Systems (GPS), and Remote Sensing Applications in Support of Community and Urban Forestry.' This was presented by David A. Padgett, Director of the Geographic Information Sciences Laboratory at Tennessee State University and a prior SPACE workshop participant.

(4) The National HBCU Faculty Development Symposium 'Leading and Learning in an Age of Accountability,' in Houston, Texas, included a 'Workshop on Geographic Information Systems and Spatial Analysis Methods in Social Sciences Teaching and Research.' The organizers and presenters were all prior SPACE workshop participants -- Charles Barnes, Department of Political Science at North Carolina A&T State University; Laurie Garo, Department of Geography at University of North Carolina at Charlotte, and instructor in Criminal Justice at Johnson C. Smith University; and David A. Padgett.

(5) Instructors and participants in the SPACE workshop at San Francisco State University in 2005 made a plenary presentation to the University Consortium for Geographic Information Science (UCGIS) Summer Assembly in Vancouver, Washington in July 2006 describing the workshop. Delegates from 70 UCGIS member institutions, students, and others attended the presentation. This was organized by Richard LeGates, Professor of Urban Studies and coordinator of the SFSU workshop.

(6) A Symposium on 'Integrating Geospatial Perspectives and Education in Archaeology' took place at the annual meeting of the Society for American Archaeology in San Juan, Puerto Rico, April 2006. This was organized by prior participants in the OSU 2004 SPACE workshop -- Veronica Arias, Heather Richards, and Judith van der Elst (all from the University of New Mexico).

(7) A workshop on 'Integrating GIS and Spatial Analysis into the Undergraduate Planning Curriculum,' was organized by Richard LeGates (SFSU SPACE workshop leader in 2005) and Stuart Sweeney (UCSB SPACE

workshop coordinator in 2004 through 2007) for the annual meeting of the Association of Collegiate Schools of Planning, in Charleston, South Carolina, October 2005.

(8) A Demonstration Workshop on 'GIS, GPS, and Spatial Analysis Tools in Support of Service Learning,' was presented at the April 2005 meeting of the National Technology and Social Science Conference, in Lass Vegas, NV. David Padgett, a participant in the 2004 UCSB SPACE workshop was the organizer and instructor.

(9) A Panel Session on 'GIS and Spatial Analysis Tools to Enhance Social Science Course Content and Research' was presented to the annual meeting of the Association of Social and Behavioral Scientist in Nashville TN, in March 2005. David Padgett and Nikitah Imani (participant in the 2004 OSU SPACE workshop) organized this session to help enhance knowledge about the SPACE program across the historically black colleges and universities.

Over the past four years, several SPACE workshop participants (approximately 25 percent) were from disciplines that apply social science perspectives in their study areas -- criminology, public policy and management, environmental policy studies, health studies, tourism and recreational resource management, and urban and regional planning. Our investigations indicate that these are areas that are making significant strides in applying spatial methodologies in research. However, instructional uses of GIS and spatial statistics are only recently making their way into curricula. The SPACE program offers focused exposure to both the methods of analysis and the instructional issues that must be understood to introduce these powerful tools within the university curricula of these more applied areas of the social sciences.

Specific presentations by SPACE personnel to interdisciplinary audiences have included the following:

- Richard Applebaum (SPACE co-PI) gave a presentation on the SPACE workshop program to the August 2004 annual meeting of the American Sociological Association, in San Francisco.
- Don Janelle discussed strategies for implementing GIS in the social science curricula at the November 2004 annual meeting of the multi-disciplinary Social Science History Association, in Chicago.
- In September 2005, Janelle gave a presentation to more than 100 participants in the annual Crime Mapping Research Conference, hosted by the U.S. Department of Justice's National Institute of Justice, in Savannah.
- Don Janelle reviewed 'GIScience, Learning, and Knowledge Transfer in the United States,' for a Symposium on Spatial Literacy in Teaching and Communicating GIScience,' hosted by the Royal Geographical Society, in London, in February 2006.
- Don Janelle organized a panel session on 'Interdisciplinary Spatial Analysis Programs for Undergraduate and Graduate Education' for the annual meeting of the Association of American Geographers, in Chicago in March 2006.
- Stacy Rebich-Hespanha (presenter), Fiona Goodchild, and Don Janelle discussed 'Spatial Thinking and Technologies in the Undergraduate Social Science Classroom,' at a meeting of the Society for American Archaeology in San Juan, PR, in April 2006.

**Contributions to Human Resource Development:**
The dissemination of spatial technologies among undergraduates has the potential to enhance the conceptualizing of problems by students in several social science disciplines, providing them with new tools to explore and process information for use in studying societal and environmental issues. Since many of the participants in the SPACE workshops are from applied disciplines (such as urban planning, criminology, and health studies), it is anticipated that the spatial conceptualization and analysis of problems will become more widely distributed skills in the workforce. Many of the participants indicated their intention to engage undergraduate students in group project-based studies that would require teamwork and the experience with spatial analytic tools that is increasingly important for many jobs (in business, policing, investment, assessment, etc). The concepts and skills imparted by SPACE workshop participants to their undergraduate students will intensify the diffusion into an even greater variety of work and study environments in the years to come.

The participant contribution section of the SPACE website provides examples of what students trained to think spatially in such disciplines as economics, human geography, and sociology are capable of after completing new courses offered by prior SPACE workshop participants.

**Contributions to Resources for Research and Education:**
Since SPACE is focused on the national dissemination of existing spatial technologies within undergraduate social science education, it has also engaged in consolidating resources at www.csiss.org/SPACE to make it easier for busy educators to access information resources that they might find difficult to uncover on their own. For example, in establishing a collection of discipline-based syllabi from educators who teach spatial analysis, instructors who are contemplating the adopting of spatial components in their courses have a place to turn to for ideas. SPACE has also worked with commercial vendors to help facilitate access to GIS software by instructors and institutions that have not yet moved in this direction.

SPACE provided each of the 67 workshop participants in 2005 and 53 participants in 2006 with a copy of the edited book *Spatially Integrated Social Science*. The editors (Goodchild and Janelle) waived all royalties and the publisher (Oxford University Press) provided its deepest level of discount to reduce the price of the book. Featuring 21 chapters of research examples from a dozen disciplines and interdisciplinary areas, it provides workshop participants with a timely resource and reference on applications of spatial analysis for classroom discussion. Funding did not permit this contribution for participants in the 2007 workshops (workshops offered as a no-cost extension).

On the research front, the data collected via application forms and entry / exit / follow-up surveys provide a rich set of resources for analysis on the pedagogic value of different approaches in structuring workshop programs and on their relative value in achieving national dissemination. Up to this point, the data have been used only for administering and evaluating the SPACE program. However, the PI (Don Janelle), the Education Development Coordinator (Fiona Goodchild), and a graduate student (Stacy Rebich-Hespanha) have commenced with a formal analysis of these data. Two manuscripts have been submitted (2007) for possible publication in education journals.

**Contributions Beyond Science and Engineering:**
Citizen groups increasingly use spatial technologies, such as GIS, GPS, and remote sensing. The emergence of a movement referred to as Public Participation GIS (PPGIS) demonstrates the perceived power associated with being spatially informed in how one characterizes and resolves societal issues. By seeking the dissemination of spatial analytic methods among undergraduate students in a wide range of disciplines, the SPACE project helps indirectly to foster a more deeply informed use of these technologies. Spatial understanding is fraught with problems regarding scale, with alternative methods for the aggregation of data, and with difficulties in interpretation of spatial analytic results. Exposure to these concerns at the undergraduate level and from the perspective of the underlying theories of different disciplines will in the long run enhance significantly the spatial literacy of citizen groups and policy makers.

Don Janelle's presentation on the SPACE program to the Crime Mapping Research Conference in September 2005 reached practitioners of law enforcement from across the United States in addition to academic criminologists who teach undergraduate students going into the fields of law enforcement. Instructors in health studies have also participated in SPACE workshops, and there is growing application of spatial methodologies in health fields to evaluate the effectiveness of health dissemination practices. Similarly, interdisciplinary interest in environmental justice is increasingly reliant on spatial analysis to interpret data and to display evidence for public participation events. Several SPACE workshop participants feature issues in environmental justice for their courses -- this is especially the case for participants from urban studies, human geography, and sociology.

# NSF Division of Undergraduate Education (supplement to report)

**NOTE**: The NSF Division of Undergraduate Education seeks a supplemental report on pedagogic goals. Responses were automatically transferred from the Activities and Findings section of the general NSF report. In some cases (below), I changed these responses to reflect more clearly the specific headings of the supplemental form (dj).

**Project 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 in undergraduate education
- Promote discipline integration
- National dissemination

**Disciplines Affected by Project:**
In workshops over the past four years, participants were from:
-anthropology
-archaeology
-art and design
-business management
-communication studies
-community studies
-criminology
-demography
-economics
-education
-epidemiology
-geography (physical and human)
-health studies
-history
-humanities
-landscape architecture
-law
-library science
-public policy and management
-psychology
-regional science
-sociology
-technology studies
-tourism and recreation management
-urban and regional planning
-urban studies

**Subjects Affected by Project:**
Participants have been interested in teaching spatial concepts in relationship to a broad base of subjects. Examples include:
- criminal justice
- environmental justice
- globalization
- health policy

- immigration policy
- poverty and inequality
- regional development
- social and ethnic segregation
- urban gentrification
- etc.

**Titles of Courses Affected by Project:**
For the workshop entry surveys, participants were asked to list the courses that they taught over the past two years and to identify the courses that they are considering for inclusion of spatial analytic approaches. Given the diversity of the disciplines and subjects noted in the last two sections, the subjects are correspondingly varied. Specific examples are documented on the SPACE website under participant contributions -- showing detailed syllabi and course exercises designed by SPACE workshop participants in 2004 - 2007. Example course titles and exercises reported by participants include:

-Geospatial Analysis in Archaeology (University of New Mexico)
-Resource Economics and Policy Applications of GIS (University of Maine)
-Environmental Conservation / exercises using GIS (University of Southern Illionis
-Urban and Regional Analysis / exercises using GIS (Gustavus Adolphus College)
-Communication and Social Change / exercises in mapping (Rutgers University)
-Introductory Spatial Analysis Using GeoDa in Economics / exercises (Hobart and Smith Colleges)
-Spatial Analysis of Environmental and Social Systems (Harvard University)
-Urban Geography / class demonstrations of GIS and GeoDa use (Tennessee State University)
-GIS Applications in Law Enforcement (Methodist College)
-History and Philosophy of Geography / spatial analysis exercise based on land use modeling (Indiana University at Indianapolis)
-GIS for the Social Sciences (North Carolina A&T State University)
-GIS in Criminology for Social Sciences (Johnson C. Smith University)
-GIS in Political Science (Hilbert College)
-Analytic Mapping and Spatial Modeling (Sociology at Cornell University)

**Summary Description of Pedagogical Approaches**:
In the first year of SPACE, we presented several sessions during the summer workshops that encouraged participants to focus on their objectives for student learning. We also varied the pedagogy of the summer workshops to illustrate the value of different types of instruction -- small group discussion, individual laboratory assignments, and lectures to achieve a variety of goals. It was clear that a few participants had experience in designing curricula that matched the content ideas with the assessment of student performance. However, many of the participants had not adopted this approach before, and several of them expressed interest in pursuing this aspect more extensively. This topic was on the agenda for the SPACE Planning Meetings in December, 2004 and December 2005, resulting in a more concentrated emphasis on student learning objectives in the undergraduate curriculum in the 2005-2007 summer workshops. Examples of related workshop resources are included in the 'Activities' section of this report.

**Project Products, Publications, Materials:**
The following resources have been prepared and distributed to SPACE workshop participants:
(1) an informative brochure (16 pages), titled "Spatial Social Science," produced in 2003 from NSF funding to CSISS.
(2) the book "Spatially Integrated Social Science" (edited by Goodchild and Janelle, published by Oxford University Press, 2004), developed with funding from the CSISS project. This book provides examples of exemplary research practice in spatial analysis of relevance to several disciplines.
(3) a descriptive brochure on the SPACE program was produced in 2005 for promoting workshop participation and web resource use
(4) a CD of "Tobler's FlowMapper" (for mapping flows from interaction matrices) was produced and distributed to all SPACE participants at UCSB and made available for free download on the web. It contains data sets and and

tutorial that instructors can use in developing student exercises. FlowMapper is formally introduced to participants in the UCSB workshop.

(5) a CD copy of the GeoDa software, training manual, and example data sets was presented to each workshop participant at UCSB and OSU in 2004/2005/2006/2007 and at SDSU in 2004. This software, produced with NSF funding from the CSISS project, is one of the primary tools for introduction to workshop participants.

(6) a video of discussions with workshop leaders and participants was made under the direction of Richard LeGates for the San Francisco State University workshop in summer 2005.  This is available for public viewing on the SPACE website.

**Additional Sources of Funding**:

The SPACE project has made use of resources created from NSF funding of the Center for Spatially Integrated Social Science (BCS 9978058)-- including GeoDa and FlowMapper (software created for exploratory spatial data analysis and for mapping data from interaction matrices). These packages are provided to the participants of the SPACE workshops and are featured in the workshops.  In addition, learning resources (CSISS Classics and the GIS Cookbook) are cross listed on the SPACE website and are widely used by SPACE workshop participants for self-learning and for sharing with their students.

Supplemental funding for workshops by host institutions has been the norm at UC Santa Barbara, Ohio State University, and also at the UCGIS-hosted workshops at San Diego State University, San Francisco State University, and the University of Oklahoma (documented elsewhere in the report).

Report submitted to the National Science Foundation
Donald G. Janelle
15 October 2007

# Appendix of Survey Forms used for SPACE Workshops

## Applicants and Participants 2006-2007

# Summer Workshops 2007 Application Form

To apply to for the workshops complete and submit the form below.
*Application deadline is April 23, 2007.*

## The Workshops

Please **rank** the following workshops in your order of preference to attend (1 being most preferred; 2 least preferred; 0 not interested):

**Ohio State University** (June 18-June 23, 2007):

**UC Santa Barbara** (July 15-20, 2007):

**Not sure?** See Which workshop should I apply for?

## Laptop Access

Participation in the UC Santa Barbara and in the Ohio State University workshops requires that you bring a laptop computer for use during the workshop. **Recommended Laptop Requirements:** Windows XP/2000, 512 MB RAM, 1.0 GHz Processor, Internet Browser, CD-ROM, USB, and a Wireless card. Minimum free disk space is 1 GB (1,000 MB). See requirements for all ESRI software.

## Personal Information

First Name:

Last Name:

Affiliation:

Address:

City:

State:

Postal Code:

Country:

Citizenship:

US citizen

US Permanent Resident

Other (describe below):

Email:

Phone:

Gender:  Female  Male

Ethnicity:*

African American

Hispanic American

Native American

Other (describe below):

* *SPACE* encourages applications to achieve a broad representation of all citizen groups,

including underrepresented minorities and
applicants from designated minority-serving
institutions. This field is optional.

# Academic Background

**Note:** *SPACE* workshops are limited to individuals with instructional appointments at colleges and universities and to Ph.D. students who are strongly committed to careers that will involve instructing undergraduate students.

Discipline /
Teaching interest:

Highest Academic Degree
Attained:

   ☐ MA

   ☐ MSc

   ☐ PhD

   ☐ Other (describe below):

Academic Rank:

   ☐ Graduate Student

   ☐ Post Doctoral Fellow

   ☐ Lecturer

   ☐ Assistant Professor

   ☐ Associate Professor

   ☐ Professor

   ☐ Other (describe below):

Academic Appointment:

   ☐ Limited-term appointment

☐ Untenured academic appointment

☐ Tenured academic appointment

☐ Other (describe below):

# Teaching Experience

How many years have you been teaching at the college/university level?

Please list the titles and academic levels of courses you have taught in the past 2 years.

Do you currently teach spatial approaches in your undergraduate courses? If so, please describe.

Have you participated in instructional development and professional development programs offered through your institution, discipline organizations, or other agencies? Please describe.

Please describe your experience with course evaluation and student assessment.

Please list any previous CSISS, SPACE, or ICPSR spatial analytic workshops that you completed.

# Concept Familiarity

Rate your proficiency in the following areas where:

- 1 = No familiarity

- 2 = Familiar with concepts

- 3 = Experience with applications

- 4 = Know enough to teach

- 5 = Expert

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Spatial thinking: | ☐ | ☐ | ☐ | ☐ | ☐ |

Cartography/map making:　　　　　　　　　◌　◌　◌　◌　◌

Data and computer file management:　　　　◌　◌　◌　◌　◌

Internet search and information retrieval:　◌　◌　◌　◌　◌

Graphic visualization of data:　　　　　　　◌　◌　◌　◌　◌

Qualitative methods in social science:　　　◌　◌　◌　◌　◌

Quantitative methods in social science:　　◌　◌　◌　◌　◌

Undergraduate curriculum development:　　◌　◌　◌　◌　◌

Geographic Information Systems (GIS):　　　◌　◌　◌　◌　◌

Spatial statistics:　　　　　　　　　　　　◌　◌　◌　◌　◌

Geocoding:　　　　　　　　　　　　　　　◌　◌　◌　◌　◌

Global Positioning Systems:　　　　　　　　◌　◌　◌　◌　◌

Remote sensing:　　　　　　　　　　　　　◌　◌　◌　◌　◌

Other (describe below):　　　　　　　　　　◌　◌　◌　◌　◌

# Software Experience

Please list any software that you currently use for research:

Please list any software that you have students use in your classes:

Do you and your students have access to spatial analytic software at your institution? Please describe:

## *SPACE* Workshop Referral

How did you learn about the SPACE Workshop Program?

☐ The SPACE/CSISS Website

☐ SPACE Workshop flyer

☐ Colleague

☐ Newsletter (please specify below)

☐ List Serve (please specify below)

☐ Other (please specify below)

## Personal Workshop Goals

How do you hope/plan to use the workshop experience to enhance your undergraduate courses, programs, and student learning experiences?:

Other Comments:

## Scholarship Support

There are no fees required for participation in the CSISS SPACE Workshops.

However, participants are encouraged to seek funding from their own institutions to cover transportation, lodging, meals, books, and access to a laptop (required for UCSB and OSU workshops, see above).

Stipends are available for all qualifying applicants, with a priority given to candidates that best fit the profile for meeting the objectives of SPACE.

**Please indicate the level of stipend support that you are applying for:**

[ ⏷ ]

All workshop participants are expected to attend the full six days of workshop instruction.

Decisions on acceptance of applications will be made by May 1, 2007 and invited applicants will be expected to confirm attendance by May 8, 2007. Confirmation of acceptance will require the completion of a entry survey that will allow the organizers to tailor the workshop content to the needs of the audience.

**I have read the above statement. If I am selected for the workshop, I agree to cover the expenses noted and to participate for the full duration of the workshop. By submitting this application, I confirm my agreement with the above statement.**

Reset Form     Submit Form

# Summer Workshops 2007 Entry Survey

**This survey will assist instructors in tailoring SPACE workshops for the needs of participants. Results from the analysis of surveys will be be used for annual reports at aggregate levels that protect your identity and confidentiality. The survey is being administered on behalf of SPACE, an NSF-supported program for national dissemination of spatial analysis in undergraduate education in the social sciences.**

**Please have a productive and enjoyable workshop.**

**Donald G. Janelle**
**Principal Investigator, SPACE**
**University of California, Santa Barbara**

## The Workshops

**Please select the workshop you are attending:**

**Workshop:** ☐ GIS and Spatial Modeling for the Undergraduate Social Science Curriculum (OSU)

☐ Spatial Analysis in the Social Science Curriculum: Enhancing Undergraduate Learning (UCSB)

# Personal Information

**First Name:**

**Last Name:**

**Email:**

**Discipline / Teaching interest:**

**Highest Academic Degree Attained:**

# Barriers to Spatial Approaches

**To what degree are the following issues obstacles for you in teaching spatial approaches to undergraduates in the social sciences? If you see additional barriers to the use of spatial methods in undergraduate social science education, please add them in the available spaces.**

**Rate on a scale of 1-4 where:**

- **1 = not an obstacle at all**

- **4 = very significant obstacle**

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Limited knowledge of appropriate pedagogical strategies:** | ☐ | ☐ | ☐ | ☐ |
| **Lack of experience with GIS and spatial analysis tools:** | ☐ | ☐ | ☐ | ☐ |
| **Inaccessibility of necessary data:** | ☐ | ☐ | ☐ | ☐ |
| **Inadequate access to necessary software/facilities:** | ☐ | ☐ | ☐ | ☐ |

**Lack of technical support for spatial analysis tools at my institution:**   ☐  ☐  ☐  ☐

**Lack of student readiness to grasp the concepts behind spatial analysis:**   ☐  ☐  ☐  ☐

**Other (describe below):**   ☐  ☐  ☐  ☐

**Other (describe below):**   ☐  ☐  ☐  ☐

# Workshop Expectations

**How important is it for you to acquire or gain experience with each of these things through the SPACE workshop?**

**Rate on a scale of 1-4 where:**

- **1 = not important at all**

- **4 = very important**

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|

**Practical Work**

**Practical hands-on experience with spatial statistical software:**   ☐  ☐  ☐  ☐

**Practical hands-on experience with data visualization software:**   ☐  ☐  ☐  ☐

**Practical hands-on experience with a variety of GIS software packages:**   ☐  ☐  ☐  ☐

**Data sets that can be used for course/classroom activities:**   ☐  ☐  ☐  ☐

**Discussion with Other Participants**

**Discussion of how to assess how learning through spatial analysis enhances student understanding of the target**   ☐  ☐  ☐  ☐

**material and ideas:**

**Opportunities to discuss yours or others experiences using spatial analytical methods for teaching; problems you may have encountered and pedagogical strategies to address them:** ☐ ☐ ☐ ☐

**General ideas that I can use after the workshop is over to develop my own curricula or classroom/lab activities:** ☐ ☐ ☐ ☐

**Ideas for student projects:** ☐ ☐ ☐ ☐

### Learning from Lectures by Experts

**More knowledge about specific spatial analysis tools:** ☐ ☐ ☐ ☐

**Theoretical framework for appropriate data visualization:** ☐ ☐ ☐ ☐

**Answers to specific problems that I have encountered when using spatial analysis methods:** ☐ ☐ ☐ ☐

**Pedagogical strategies for helping students learn successfully:** ☐ ☐ ☐ ☐

**Other (describe below):** ☐ ☐ ☐ ☐

**Other (describe below):** ☐ ☐ ☐ ☐

# Current Teaching Practices

**What are some concepts that you currently illustrate for your students through the use of data? What datasets do you use, and how do you analyze them?**

**Do you have a specific topic or dataset you would like to develop instructional activities around during this workshop? If so, provide information about scale, region, topic, type of data.**

**How are your courses currently evaluated?**

**Please write a brief paragraph describing your teaching philosophy and how you expect to enhance your undergraduate teaching through attending this workshop.**

## Consent for use of Survey Data in Research

**Subject to the removal of any information that would permit my identification and to the aggregation of data to protect the confidentiality of my specific responses,**

**I grant permission to the principal investigator and SPACE-project personnel designated by him to use information that I provide in this survey for research purposes.**

**I do not want the information that I provide in this survey to be used for research purposes by SPACE-project personnel.**

Reset Form | Submit Form

# Summer Workshops 2007 Exit Survey

## The Workshops

**Please select the workshop you attended:**

**Workshop:** GIS and Spatial Modeling for the Undergraduate Social Science Curriculum (OSU)

Spatial Analysis in the Social Science Curriculum: Enhancing Undergraduate Learning (UCSB)

## Personal Information

First Name (optional): 

Last Name (optional): 

# Barriers to Spatial Approaches

**To what degree did the workshops help in overcoming obstacles for you in teaching spatial approaches to undergraduates in the social sciences? If the workshop helped you in overcoming additional barriers, please add them in the available spaces.**

**Rate on a scale of 1-4 where:**

- **1 = did not help at all**

- **4 = helped significantly**

|  | 1 | 2 | 3 | 4 | N/A |
|---|---|---|---|---|---|
| **Provided knowledge of appropriate pedagogical strategies:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Provided experience with GIS and spatial analysis tools:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Enhanced awareness on how to access data for use in exercises:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Improved awareness of software resources appropriate for use in undergraduate education:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Removed technical barriers to the likelihood of using spatial analytical approaches in my undergraduate teaching:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Other (describe below):** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Other (describe below):** | ☐ | ☐ | ☐ | ☐ | ☐ |

# Workshop Expectations

**To what extent did the workshop experience meet your expectations in the areas listed?**

**Rate on a scale of 1-4 where:**

- **1 = of no value**

- **4 = exceeded my expectations**

|  | 1 | 2 | 3 | 4 | N/A |
|---|---|---|---|---|---|
| **Practical Work** | | | | | |
| **Hands-on experience with spatial statistical software:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Hands-on experience with data visualization software:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Hands-on experience with GIS software:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Suggested or provided data sets that can be used for course/classroom activities:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Discussion with Instructors and Other Participants** | | | | | |
| **Acquired a better understanding of how learning through spatial analysis enhances student understanding of the target material and ideas:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Gained ideas about assessment methods that allow observation of how spatial analysis has enhanced student understanding:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Learned from others' experiences with using spatial analytical methods for teaching:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Learned pedagogical strategies that will be helpful when teaching material or techniques that students** | ☐ | ☐ | ☐ | ☐ | ☐ |

**find especially difficult:**

| | | | | | |
|---|---|---|---|---|---|
| **Received ideas that I can use after the workshop to develop my own curricula or classroom/lab activities:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Gained ideas for student projects:** | ☐ | ☐ | ☐ | ☐ | ☐ |

**Workshop Lectures**

| | | | | | |
|---|---|---|---|---|---|
| **Expanded my knowledge about specific spatial analysis tools:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Provided a theoretical framework for appropriate data visualization:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Provided answers to specific problems that I have encountered when using spatial analysis methods:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Suggested worthwhile pedagogical strategies for helping students learn successfully:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Other (describe below):** | ☐ | ☐ | ☐ | ☐ | ☐ |

# Teaching Practices

**Please describe how you plan to use what you have learned in this workshop to enhance the exposure of spatial methods to students in your undergraduate courses and programs (e.g., describe exercises that you will introduce, modifications to course syllabi, new course proposals, or changes in an academic program, etc).**

**As a result of this workshop, describe how you will alter your approach to the evaluation of courses and to the assessment of student learning.**

# Workshop Management and Facilities

**Rate the following items on a scale of 1-4 where:**

- **1 = totally unacceptable**

- **4 = excellent**

|  | 1 | 2 | 3 | 4 | N/A |
|---|---|---|---|---|---|
| **Lecture Room and Laboratory Facilities:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Workshop Organization:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Level of Instruction:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Quality of Exercises:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Overall Quality of Guest Presenters:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Social Events:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Housing Arrangements:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **On-line Application Procedures:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Information Provided for Planning for Workshop Participation:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Adequacy of Participant Funding:** | ☐ | ☐ | ☐ | ☐ | ☐ |

# Website Resources

**Did you make use of the website resources and how helpful did you find them?**

**Web links to Course Syllabi of social science courses:** ⌄

**Web links to Instructional Assessment resources:**

**Web links to Instructional Discipline resources:**

**CSISS Classics:**

**GIS Cookbook:**

**Choosing a GIS/Virtual Globes Review:**

**Contribution from Past Workshop Participants:**

**Please suggest ways in which these resources could be improved.**

## Additional Comments

**Enter any additional comments, suggestions, or concerns here.**

# Summer Workshops 2006 Follow-up Survey

**May 2007**

**Dear CSISS workshop participant,**

**CSISS is seeking to evaluate the success of SPACE summer workshop offerings in 2006. We wish to document the impressions of participants about how significant the workshops have been in their teaching and related activities. Please take a few minutes to reflect and provide the information requested below. Results from the analysis of surveys will be at aggregate levels that protect your identity and confidentiality.**

**Yours sincerely,**

**Donald G. Janelle, SPACE PI and Program Director**

# The Workshops

**Please select the workshop you attended in summer 2006:**

**Workshop:** ☐ GIS and Spatial Modeling for the Undergraduate Education (OSU)

☐ Spatial Analysis for the Undergraduate Social Science Curriculum (UCSB)

☐ Remote Sensing and GIS Technologies for Undergraduate Curricula in the Social Sciences (OU)

# Workshop Experience

**How successful was each element of the workshop in achieving the workshop's goals? For each element listed below, please choose the best response on the given scale:**

- **1 = Unsuccessful**
- **2 = Somewhat Successful**
- **3 = Moderately Successful**
- **4 = Successful**
- **5 = Very Successful**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Collaboration with Participants:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Instructor presentations:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Workshop content:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Workshop laboratory exercises:** | ☐ | ☐ | ☐ | ☐ | ☐ |

**Workshop organization:**   ☐  ☐  ☐  ☐  ☐

**Workshop materials and handouts:**   ☐  ☐  ☐  ☐  ☐

**Workshop facilities:**   ☐  ☐  ☐  ☐  ☐

**Local organization:**   ☐  ☐  ☐  ☐  ☐

**Housing facilities:**   ☐  ☐  ☐  ☐  ☐

**Overall experience:**   ☐  ☐  ☐  ☐  ☐

# Impacts of the Workshop

**What impact has the workshop had on your own work? For each element listed below, please choose the best response on the given scale:**

- **1 = No Impact**
- **1 = Very Little Impact**
- **3 = Some Impact**
- **4 = Moderate Impact**
- **5 = Strong Impact**

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Other (describe below):** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **New ideas for content of undergraduate courses:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **New labs or exercises for undergraduate courses:** | ☐ | ☐ | ☐ | ☐ | ☐ |
| **New courses that include student learning about spatial analysis:** | ☐ | ☐ | ☐ | ☐ | ☐ |

**Plans for new modules that will engage undergrads in spatial analysis theory and/or techniques:**
☐ ☐ ☐ ☐ ☐

**Assessment of student ability to use spatial analysis:**
☐ ☐ ☐ ☐ ☐

**Discussion with teaching colleagues about new resources for teaching spatial analysis:**
☐ ☐ ☐ ☐ ☐

**Formal presentations to teaching colleagues about new resources for teaching spatial analysis:**
☐ ☐ ☐ ☐ ☐

**Plans to make presentations about SPACE at professional meetings:**
☐ ☐ ☐ ☐ ☐

**Have already made presentations about SPACE at professional meetings:**
☐ ☐ ☐ ☐ ☐

# Further Comments

**Please provide suggestions for changes or additions to the workshop content that would help improve the overall experience. Any other information or insights that you believe might help workshop organizers, including any suggestions of subject matter that could provide the focus of a future workshop is also encouraged:**

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