

LA-PLAN:

A VIRTUAL CO-LABORATORY FOR POLICY ANALYSIS OF THE GREATER LOS ANGELES BASIN

Researchers at the Center for Spatial Studies (spatial@ucsb) are participating in a multi-year research project, LA-Plan, that seeks to develop a virtual (online) co-laboratory, aimed at revolutionizing spatial policy analysis for the Greater Los Angeles Region by making it possible for metropolitan planning organizations (MPOs) and urban, public policy, and environmental experts to collaborate productively using a best-practice microeconomic simulation model. Our study area includes six counties in the Greater LA Region: Ventura, Los Angeles, Orange, San Bernardino, Riverside, and Imperial. The simulation model is called RELU-TRAN (Regional Economy Land Use and TRANsportation), which is a spatial equilibrium model of regional economy focusing on land use, transportation, and environmental quality.

The LA-Plan is funded by the University of California Multi-campus Research Programs and Initiatives (MRPI). It is a collaborative effort among geographers at UCSB; economists, demographers, and environmental engineers from UC Riverside; and planning and public-policy experts from UC Berkeley. The core of the project is to provide the co-laboratory's data architecture, mapping capabilities, and a human-computer interface for diverse users to interact and collaborate on policy analysis online, relying on the emerging CyberGIS infrastructure. Specifically, we have created the basic zones on which the model's algorithms will operate (Figure 1) by automatically aggregating from 4,109 Traffic Analysis Zones based on spatial optimization techniques. The purpose for this standardization is to enable the analysis of economic activities at a reasonable geographic scale as well as to make RELU-TRAN computationally feasible.

Another effort at UCSB has been to assess the spatial data quality and to reduce spatial uncertainty for precise economic simulation. To share the socio-economic data, services, and simulation results to a broader audience, we are utilizing state-of-the-art CyberGIS infrastructure to develop a user-friendly graphic user interface (GUI) for dynamic searching, visualizing, and seamlessly integrating heterogeneous resources. For example, Figure 2 shows the online mapping of population and employment data on a model-zone basis. These data are encoded based on Open Geospatial Consortium (OGC) interoper-

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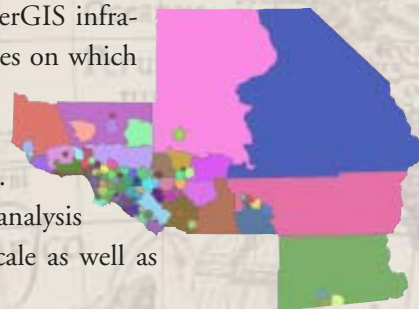


Figure 1. Model zone definition for RELU-TRAN LA



Figure 2. CyberGIS-enabled prototype: Querying the socio-economic properties (population and employment) of model zones

RECENT EVENTS 2010

- 12/13-14 Specialist Meeting, Spatio-Temporal Constraints on Social Networks
- 3/1-2 TeachSpatial Workshop, Developing Benchmarks for Spatial Literacy

UPCOMING EVENTS 2010-2011

- 6/2 spatial@ucsb.local11—Marine GIS; CIRGIS Meeting; Geography Poster Display
- 7/11-15 NIH Advanced Spatial Analysis Workshop: "Multilevel Modeling Workshop," instructed by **Kelvyn Jones** and **S. V. Subramanian**

THINK SPATIAL BROWN BAG SERIES 2010-2011

12:00-1:00 p.m.
Ellison Hall, Room 5824

- 1/18 **Michael Goodchild & Donald Janelle** (UCSB), "Introducing the New UCSB Undergraduate Minor in Spatial Studies"
- 2/1 **Jon Jablonski** (MIL, UCSB), "A Geographic Approach to Information Seeking Behavior"
- 2/15 **Marko Peljhan** (UCSB), "Unmanned Poles—Human Landscapes"
- 2/24 **Ruth Mostern** (UC Merced), "Teaching Silk Road History with Google Earth"
- 3/8 **Mark Kram** (Groundswell Technologies, Inc.), "Sensor and GIS Integration for Automated Web-Based Environmental Monitoring"
- 4/19 **Steve Conner & Dennis Whelan** (UCSB), "Campus Long Range Development Planning with a 3D GIS Model"
- 3 May **Volker Welter** (UCSB), "Umwelt: Seeing the World from the Inside Out"

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ability standards and shared as a Web map service using OGC's WMS standard. In addition, the strength of 3-D visualization is enhanced by integration with Google Earth. Figure 3 shows an example of overlaying commercial-center data in vector format with fine-resolution image data in raster format within Google Earth.

This project is undergoing its fundamental research and prototype testing phase. Once launched in the environment of the co-laboratory, the RELU-TRAN model will be capable of examining a variety of policies in the areas of environmental quality, energy use, land use, housing, and transportation, and the interaction of these areas in the regional economy. The modeling of these policies, with feedback between the academic experts on the one hand and practitioners on the other, will result in better and more practically relevant thinking about policy, and the better education of all undergraduate and graduate students who are interested in GIScience, economy, and public policy.



Figure 3. CyberGIS-enabled prototype: Visualizing local commercial centers with Google Earth

Wenwen Li

SEEK—

SCALE FOR EVERYDAY ENVIRONMENTAL KNOWLEDGE



Do people vary in their everyday spatial abilities?

If you have ever had a disagreement about how to find a destination, arrange furniture, or retrace your route to a parked car, you would probably answer this question with a firm “yes.” And while most of us can testify to similar anecdotal incidents, scientifically validated tests that help explain variations in everyday spatial behavior are sparse and relatively unsuccessful. Many psychometric tests exist that evaluate spatial abilities, but these tests may be limited in scope since they commonly evaluate spatial abilities with small, flat pictures that depict boxes, arrows, matrices of dots, and the like. This appears to be only a narrow fraction of what we actually use our spatial activities for.

The purpose of a current research project in the Department of Geography at UCSB is to develop and evaluate a self-assessed Scale for Everyday Environmental Knowledge (SEEK) that can be used to help describe and predict human spatial behavior in real-world environments. The work was originally instigated by the late

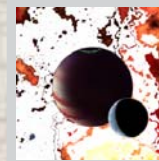
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THE END OF AN ERA—

Summer 2011 marks the end of workshop offerings in the NIH-supported Advanced Spatial Analysis program. Workshops will include **Multilevel Modeling** (July 10–15), instructed by **Kelvyn Jones** and **S. V. Subramanian** at UCSB, and **Spatial Regression Modeling** (June 19–24), instructed by **Paul Voss** and **Katherine Curtis** at Pennsylvania State University. This very successful program has been offering a variety of instructional workshops to population science and public health professionals since 2008.

Applications for the 2011 workshops close 31 March 2011. Apply at <http://www.spatial.ucsb.edu/affiliates/gispopsci.php>.

THE BEGINNING OF A NEW ERA— A NEW ACADEMIC MINOR IN SPATIAL STUDIES



Students at UCSB now have the unique opportunity to complement their academic majors with a **Minor in Spatial Studies** that features scientific

and humanistic perspectives about space, place, spatial reasoning, and spatial analysis, utilizing courses from across 26 departments and programs.

This new minor draws upon areas of acknowledged research innovations and academic strengths long associated with UCSB. These include UCSB's role in the development of geographic information systems (GIS) through the National Center for Geographic Information and Analysis (NCGIA); applications of spatial and spatio-temporal thinking across disciplines, as exemplified by the AlloSphere—an original virtual immersive environment for information visualization; the use of brain imaging in neuroscience; the integrative use of quantitative methods, spatial statistics, and simulations of space-time interactions to understand ecological and behavioral processes across a wide range of disciplines; pioneering developments in the uses of satellite imagery and remote sensing; and innovative applications of spatial principles and practices in the creative arts.

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Reginald Golledge who, as a pioneer of behavioral geography, had a profound interest in spatial decision making and behavior. Since Dr. Golledge's passing, **Andrea Nuernberger** and **Dan Montello** have continued this innovative work. **Nuernberger**, a former student of Golledge's and a Center for Spatial Studies (spatial@ucsb) alumna, has been particularly motivated to carry on this work since she anticipates employing such a scale for evaluating changes of environmental abilities in individuals who are at high risk for developing Alzheimer's disease.

Montello, a psychologist by training and now a professor in the Department of Geography at UCSB, brings to the project a deep understanding of spatial and geographic perception, cognition, and behavior. His expertise in spatial cognition and its related mechanisms contributes to the development of a scale that assesses a person's everyday environmental spatial abilities.

The SEEK scale, which consists of statements with which a person agrees or disagrees (Likert scales), is designed to give a baseline indication of personal confidence during person to environment interactions. During the different phases of scale development, the scale will be validated in research settings to explore the way the self-report assessment scales generally correlate positively with measures of spatial knowledge acquired from direct experience and performance in particular task environments.

Once developed and evaluated, the scales could be applied whenever it is beneficial to add the self assessment of spatial abilities to the set of variables that explain certain types of spatial behavior. Examples include research, business (e.g., when interviewing applicants for taxi driver, parcel delivery, or postal delivery positions), and health sciences (e.g., monitoring the progression of Alzheimer's). The types of spatial behaviors in the scale include everyday spatial tasks such as wayfinding, learning new environments, giving and following directions, orienting, and developing cognitive maps of local environments.

It is hoped that this research will address the pressing need for assessment methods of spatial knowledge characteristics and human spatial behavior and activity in large-scale or geographic spaces. As such, it contributes significantly to spatial@ucsb's mission of broadening spatial perspectives in the social and behavioral sciences.

Andrea Nuernberger

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The development of the proposal for the minor was carried out by the Center for Spatial Studies under the direction of Dr. **Donald Janelle**. The process included consultation with department chairs and curriculum committees to identify courses that featured aspects of spatial reasoning.

Students who opt to complete the minor choose from one of three focus areas: Spatial Thinking, Space and Place, or Spatial Science. **Spatial Thinking** relates to and selects courses from psychology and behavioral geography, with options to choose courses from eight other departments.

Space and Place exposes students to regional geography and to courses in art and the history of architecture, drawing from courses in nine departments, primarily in the humanities. **Spatial Science** is concerned with the spatial reasoning and spatial analysis that accompanies the scientific search for patterns and processes in diverse knowledge domains as illustrated in courses from more than twenty departments and programs.

The minor is open to students from all disciplines. For students in dozens of programs, this provides an opportunity to build a niche of expertise structured around general concepts for understanding the role of place in society, mastering methodologies for representing information and data in a spatial context (including geographical context), and engaging spatial principles for solving problems and creating new works of art or interpretive insights.

In essence, under the umbrella of spatial studies, this minor provides new opportunities for innovative programs. This imposes a responsibility on the student to think deeply and carefully about customizing his/her minor to the greatest academic and career advantage. While administered through the Department of Geography, advising for the minor is done through the Center for Spatial Studies; Janelle is happy to work with students in designing a meaningful set of courses to complement their major(s), career interests, and intellectual curiosity.

Further information about the Minor in Spatial Studies can be obtained at <http://www.spatial.ucsb.edu/programs/academic-minor.php>.