The Case for Space
An Introduction to spatial@ucsb

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Professor of Geography
A new initiative

• building on major strengths of the campus
• a rapidly expanding area of technology
• geared to a generation that increasingly thinks spatially
• a cross-cutting theme potentially linking virtually all disciplines
Outline

• some examples
• some interesting trends
• the bigger picture
• spatial@ucsb programs
1. Google Earth image
2. 1843 map of London from David Rumsey collection
3. Pump and death locations from my own web site
CANCER MORTALITY, 1950-69, BY COUNTY
TRACHEA, BRONCHUS & LUNG
WHITE MALES

NYC Office of Emergency Management and NY Office of Cyber Security and Critical Infrastructure Coordination
Flooded areas near the New Orleans CBD
Based on Ikonos data from 02 Sept 2005
TRI sites with historical redlined areas
Mission Canyon Wildfire Hazard
Santa Barbara County
Simulations

1.8 vehicles per driveway

Driver behavior influenced by:

- lane width
- slope
- view distances
- traffic control mechanisms
- information feedback
- driver aggressiveness

770 homes

clearing times > 30 minutes
Pacific Rim Trade - LA/LB ports

2002 = 10 million TEU containers
2003 = 11.8 million TEU containers
2004 = 13 million TEU containers
2005 = 14,194,442 TEU containers

2006 = 15.33 - estimated 8% growth

Destination estimates?

50% Intermodal train (21% on-dock rail from ship)
50% Local distribution warehouses for local consumption and outbound distribution

On-dock rail
- containers move from ship to train instead of being trucked to the rail ramps

23% In Los Angeles
27% in Long Beach

Combined 1.5 million containers in 2005!

This reduces the dwell time on dock and the amount of gate and yard transactions for the marine terminal further reducing yard congestion.
L002: Port terminals
Tobler and Wineburg
Eastern tip of Uluru

The base circumference of Uluru is about 9km -- I walked solo around the rock in the early morning, stopping to photograph the long shadows and listen to the morning bird song. Uluru-Kata Tjuta National Park, Australia, 2005

Australia, Uluru, AyersRock, nationalpark...
Anyone can see this location
Does location matter?

• Can location ever truly explain?
• What is the value of a spatial perspective?
• What is "place-based" analysis?
• Old questions in social science
  – and in science generally
A spatial turn in science

• Adding space to theory
  – the New Economic Geography
    • space impeding flows of information, operation of markets
    • transport costs
  – Spatial Ecology
    • a heterogeneous resource base
    • space impeding interactions, breeding
    • metapopulations

• Reasoning from spatial data
  – cross-sectional
  – new tools to overcome methodological problems
  – impacts in all social, environmental disciplines
A growing literature

*Spatially Integrated Social Science* (Goodchild and Janelle, OUP, 2004)
planning, decision making

the natural, social world

abstracted knowledge

nomothetic science
What is spatial thinking?

Three aspects of spatial ability:

• **Spatial knowledge**
  – symmetry, orientation, scale, distance decay, etc.

• **Spatial ways of thinking and acting**
  – using diagramming or graphing, recognizing patterns or clusters in data, change over space from change over time, etc.

• **Spatial capabilities**
  – ability to use tools and technologies such as spreadsheet, graphical, statistical, and GIS software
<table>
<thead>
<tr>
<th>Tract</th>
<th>Pop</th>
<th>Location</th>
<th>Shape</th>
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<tbody>
<tr>
<td>1</td>
<td>3786</td>
<td>x,y</td>
<td></td>
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<tr>
<td>2</td>
<td>2966</td>
<td>x,y</td>
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<td>3</td>
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<tr>
<td>8</td>
<td>3979</td>
<td>x,y</td>
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What value is location as an explanatory variable?
North Korea’s missile threat

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum range</th>
<th>Payload</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Nodong</td>
<td>1,300 km (810 miles)</td>
<td>700 kg (1,550 pounds)</td>
<td>Currently deployed</td>
</tr>
<tr>
<td>Taepodong-1</td>
<td>Up to 10,000 km</td>
<td>Several hundred kg</td>
<td>Test failed 1998, not yet operational</td>
</tr>
<tr>
<td>Taepodong-2</td>
<td>10,000-15,000 km</td>
<td>Several hundred kg</td>
<td>Not yet tested</td>
</tr>
</tbody>
</table>

Source: Task Force for US Korea Policy, Centre for International Policy
Dear Waldo,

View of the Outer Banks of North Carolina from Apollo 9

This photograph was taken on March 12, 1969 at 4:10:00 a.m. EST, from an altitude of about 120 miles.

Posted at the old seafaring village of Hatteras, I know this card, with its complete and accurate address will get to you.

A pinhole shows you where we are.

Yours geographically,

[Signature]

Elizabeth City News Co., Elizabeth City, North Carolina

Professor Waldo Tobiens
34° 26' 41" N
119° 48' 26" W
Google shifts Greenwich Meridian

Hey, where'd my longitude go?

By Lester Haines Published Monday 6th February 2006 14:13 GMT. We gather the official position of the Prime Meridian at Greenwich is not to the liking of the powers that be at Google, as they have decided to shift it 100 metres or so east.

Yes indeed, according to the most reliable authority (The Greenwich Observatory press office - and if they don't know, who does?), the line marking zero degrees longitude passes right through the observatory buildings and across the forecourt where there is a lovely sculpture on top of which happy tourists can pose, one foot in the east and one in the west.
If you want to know approximately how many people each census tract has, map total population.

If you want to know where most of the people are concentrated, map population density.

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<tr>
<td>6. Spatial Heterogeneity</td>
<td>Heterogeneity as a fundamental characteristic of spatial data. First-order effects, non-stationarity, and uncontrolled variance. Implications of spatial heterogeneity for sampling and statistical inference. Place-based analysis, local indicators of spatial association, and geographically weighted regression.</td>
</tr>
<tr>
<td>8. Objects and Fields</td>
<td>Discrete objects and continuous fields as fundamental conceptualizations of space and as the basis for models of process. The dichotomy as an underpinning of methods of representation and analysis. Spatial correlation. Concepts of uncertainty in both conceptualizations.</td>
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UCSB is spatial
• Exchange ideas and resources
• Promote new tools, research, and applications
• Enhance spatial literacy
• Community of spatial thinkers

• Web portal
• Seminars and workshops
• Spatial help desk
• General course(s) on spatial thinking
Future vision

- changing how people think about the world
- equipping them with tools and data
- empowering communities to think and act locally
- rapid data collection and response
- building the planet’s nervous system
May 29

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