



CANCER SURVEILLANCE


The Case for an Enduring Spatial Science Base

John P. Wilson





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Outline

- o Spatial roots
 - Geography
 - Landscape architecture
 - Computer science
- o The current opportunity
- o Guiding principles
 - Spatial as an enabling discipline
 - Core concepts (and distractions)
 - Role of collaboration
 - Changing character of spatial data
 - Role of geodesign | actionable science
- o Final thoughts







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OUTLINE | 2





The Spatial Turn

- o Rapid spread of spatial thinking & GIS throughout sciences
 - Snow's 19th century work on cholera
 - Scholten et al's new book
 - ACM GIS conference series
- o Swept through social sciences and humanities as well
 - All human action literally *takes place* somewhere
 - Spatial dimension of social interaction key for understanding all of the classic questions about the human condition




Map showing clusters of cholera cases in London epidemic of 1854






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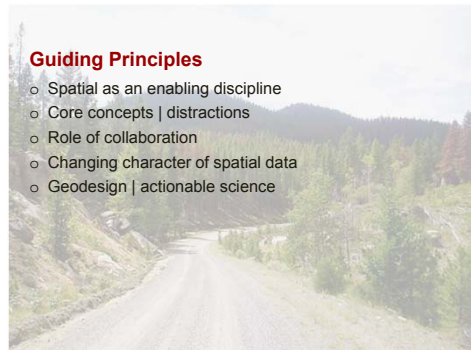



THE OPPORTUNITY | 3




Guiding Principles

- o Spatial as an enabling discipline
- o Core concepts | distractions
- o Role of collaboration
- o Changing character of spatial data
- o Geodesign | actionable science






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GUIDING PRINCIPLES | 4




Spatial as an enabling discipline

- o Cf. with statistics
- o Need small number of fundamental spatial scientists, larger numbers of translational scientists
- o Know ourselves and our role in knowledge discovery process
 - GIS&T Body of Knowledge
- o Learn how to connect and collaborate with others






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SPATIAL | 5



Core concepts | Duckham 2014

Spatial Structure

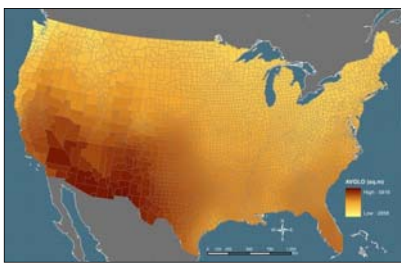
Dynamism


Uncertainty

Cognition


Design

Scale





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CORE CONCEPTS | 6

Dynamism

Catalina Island Fox, Photo: Courtesy of Tim Coonan

Mission Blue Butterfly, Photo: Courtesy of Travis Longcore

Poronui Lodge: Home Ranges for Stags

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Uncertainty

Local R^2

- 10 - 30
- 31 - 38
- 39 - 44
- 45 - 51
- 52 - 82

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CORE CONCEPTS | 8
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Distractions

esri HEXAGON

USGS MDA

Bentley DIGITAL GLOBE

GeoEye Hitz Ubisense

OGC
Making location count.
www.openspatial.org

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DISTRACTIONS | 9
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Role of collaboration

- Work with scientists in other domains
- Tackle "big" questions in new and important ways
 - Use of taxi, cell phone, and social media data to explore form and function of cities, metropolitan regions, etc.
- Key criteria for success
 - Collaboration needs to involve more than spatial scientists
 - Some of the parts must be greater than parts themselves

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Urban form | function

Placemaking, neighborhoods, active living

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COLLABORATION | 11
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Changing character of spatial data

- Finer granularity in terms of both space and time
 - Exposure modeling
- 3D
- Crowdsourcing | Volunteered Geographic Information
- Social media
- Sensing systems
- Role of government

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The exposome

The diagram shows a human figure with various exposure points labeled: Radiation, Air & Water Pollution, Diet, Drugs, Stress, Infections, and Behavior & Lifestyle. A central orange circle contains the text: "Environmental Information Processing: Personalized, Population, and Public Health." A red arrow points to the text "Personalized Chemical Exposures".

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3D | LIDAR surface modeling

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SPATIAL DATA | 14
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Crowdsourcing | VGI

OpenStreetMap
COUNT WITH US THIS HOLIDAY SEASON
eBird
Report and track your birds online any place, any time!

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SPATIAL DATA | 15
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Crowdsourcing | social media

colloquium
Discovering Landmarks and Movement Patterns from Flickr Postings
Piotr Jankowski
HEALTHCARE SOCIAL MEDIA
WHAT PATIENTS ARE DOING
HEALTH-RELATED CHATERS
28%
ECONOMIC OPTIMISM
3
15
28
43%
20%
facebook

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GeoSensor networks

GeoSensor Networks
What far-off technology will be commonplace in a decade?

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SPATIAL DATA | 17
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American Community Survey

Poverty in Rural America, 2008

American Community Survey
Percent in Poverty (White areas are other counties.)
National Average: 13.2%
Lowest: Los Angeles County, CA: 3.1%
Highest: Ziebach County, SD: 24.4%
Legend:
14.4% to 20%
20% to 20%
20% to 14.2%
14.2% to 12.2%
12.2% to 10%
10% to 3.1%

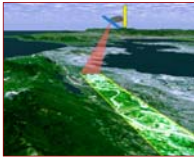

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GeoDesign


- o Focuses on spatial thinking
 - New field built on spatial sciences base
- o Leverages geospatial technologies
 - Sketching
 - Computation
- o Focuses on the future
- o Focuses on design as a force for good and precursor to action
- o Focuses on collaboration
 - Multidisciplinary
 - Stakeholders and general public
 - Special role for Web



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GEODESIGN | 19





GeoDesign | Placemaking

Spatial thinking
Geospatial technologies
Focus on the future
Design as a force for good
Collaboration




Capacity building
Ecosystem services
Human well-being
Sustainable development
Spatial leadership



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GEODESIGN | 20





Close | Questions?

Project for Public Spaces

Placemaking plans

City-wide strategic plans

Capacity building and cultural change





Public Laboratory for Open Technology & Science



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FINAL THOUGHTS | 21

