
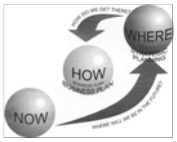

Creating a B.S. in GeoDesign at the University of Southern California


John Wilson
GeoDesign Summit
5 January 2012

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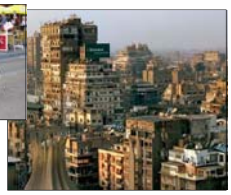
Cities





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GIS Strengths / Weaknesses

- Focus on terrestrial environments
  - Natural environments – forests, grasslands, etc.
  - Human environments & infrastructure – cities, roads, pipelines, crop and grazing lands
  - Environmental impacts – air & water pollution
- Most of the world has been ignored
  - Oceans – cover 70% of Earth's surface
  - Buildings – people spend 85% of their lives indoors & dense urban areas have much more interior space than land area


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Geodesign

Goodchild M F (2010) Towards Geodesign: Repurposing Cartography and GIS? *Cartographic Perspectives* 66: 7-21

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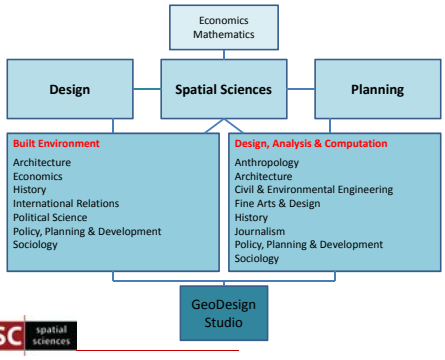

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Geodesign Core

Design	ARCH 232 Visualizing & Experiencing the Built Environment ARCH 332 Design Principles I – Part vs. Whole, Spatial Typologies, Formal Organization, Scale ARCH 432 Design Principles II – Sequence, Time, Complex Morphologies, Ecology of Place
Spatial Sciences	GEOG 301 Maps & Spatial Reasoning GEOG 382 Principles of Geographic Information Science GEOG 401 Spatial Science Practicum
Planning	PPD 227 Urban Planning & Development PPD 417 History of Planning & Development PPD 425 Designing Livable Communities
Capstone	ARCH / GEOG / PPD 422 Geodesign Studio

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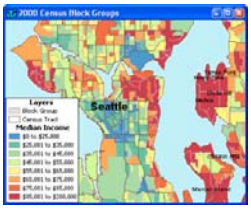
Role of Scale and Complexity

Process of building – site planning, conceptual design, programming and construction drawing



Spatial analysis – land use, census blocks, traffic patterns, air quality tables

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Scale and Complexity (2)

- Additional problems may arise because the strategies, processes, methods and ideas that work at one scale may not work at other scales
- Possible examples …
  - Best Management Practices (manage runoff and water quality)
  - Green Building Design (support life)
  - Transit Oriented Development (reduce congestion and vehicle emissions)
  - Smart Growth …

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Scale and Complexity (3)

Global		Cloud cover and CO2 levels control primary energy inputs to climate and weather patterns
Meso		Prevailing weather systems control long-term mean conditions; elevation-driven lapse rates control monthly climate; and geological substrate exerts control on soil chemistry
Topo		Surface morphology controls catchment hydrology; slope, aspect, horizon, and topographic shading control surface insolation
Micro		Vegetation canopy controls light, heat, and water for under-story plants; vegetation structure and plant physiognomy controls nutrient use
Nano		Soil microorganisms control nutrient recycling

(Slide courtesy of Michael Hutchinson)

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Enabling Science

- Environmental / economic benefits of green cover …
  - Carbon storage & sequestration
  - Air pollution removal
  - Storm water runoff reduction
  - Energy conservation
  - Wildlife habitat protection
- An example – calculating pounds of pollutants removed and economic benefits

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Geographic Knowledge Infrastructure

- Contains knowledge describing natural and human environment on Earth
- Multiple components
  - Data
  - Data models that provide structure to the data
  - Models and analytic tools that show predictions or suitability
  - Geospatial workflows
  - Metadata, which describes the aforementioned components, and is key to sharing, discovery and access
- Web environments that make this knowledge more accessible and promote spatially integrated thinking

As we move from an industrial economy to an information economy, our reliance on physical infrastructure is being supplemented by reliance on a new type of infrastructure: geographic knowledge (Dangermond, ArcNews, 2010)

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