REAL-WORLD SOLUTIONS WITH GEODESIGN

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Geodesign Summit
25 January, 2018
Outline

- My vision for spatial
- B.S. in Geodesign
- Building a geodesign community
- Julian Herren
  - SunSmart Program
  - Innovative shade structures
- Benjamin Friedman
  - Studio One Eleven
  - Mall urbanization suitability study
- Problems and opportunities
- Future plans
- Questions

Leadership

Health

Computation

Maps

Geodesign

Ecosystem Services

Geospatial Intelligence

Global Studies

Students

Human Security

Sustainability

Data Science

Outcomes

USC Dornsife
Dana and David Dornsife
College of Letters, Arts and Sciences

GEODESIGN SOLUTIONS | 2
Spatial Sciences Institute
My vision

- The spatial sciences include all of the different ways in which location may be used to organize, represent, store, analyze, model and visualize information.

- The spatial sciences can be thought of as an enabling discipline, much like statistics.

Wicked problems

Academic disciplines (use cases)

- Agriculture
- Archaeology
- Architecture
- Civil Engineering

- Economics
- Epidemiology
- Geography
- Geology

- Oceanography
- Political Science
- Soil Science
- Zoology

Location | Power of Place | Science of Where | Spatial Thinking | Spatial Turn

Poverty
Obesity
Cancer
Climate Change
Food Security
Water Security
Terrorism
Cyber Security
Aging
Dementia
Social Justice
B.S. in Geodesign

USC School of Architecture

USC Price
Sol Price School of Public Policy

USC Dornsife
Dana and David Dornsife
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Geodesign curriculum

Principles of Geodesign

Planning

- Built Environment
  - Architecture
  - History
  - Political Science
  - Policy, Planning & Development
  - Sociology

Spatial

- Design, Analysis & Computation
  - Anthropology
  - Architecture
  - Fine Arts & Design
  - History
  - Policy, Planning & Development
  - Sociology

Design

Geodesign Practicum

Economics | Mathematics | Sociology

12

36

28

4
## Geodesign core

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<td><strong>Foundation</strong></td>
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| **Planning** | PPD 227 – Urban Planning and Development  
RED 417 – History of Planning and Development  
RED 425 – Designing Livable Communities |
| **Spatial** | SSCI 301 – Maps and Spatial Reasoning  
SSCI 382 – Principles of Geographic Information Science  
SSCI 383 – GIS Modeling and Customization |
| **Design** | ARCH 203 – Visualizing and Experiencing the Built Environment  
ARCH 303 – Principles of Spatial Design I  
ARCH 303 – Principles of Spatial Design II |
| **Capstone** | SSCI 412 – Geodesign Practicum |
Student response

Growth in Undergraduate Spatial Sciences Enrollments

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Geodesign “value” proposition

- Focus on solutions
- Multidisciplinary character
- Multi-scale approach
- Cross-cutting (by sector)

Sea Level Rise & Population Impact

- 6.6’ (7.8 million)
- 3.9’ (4.7 million)
- 1.6’ (1.8 million)
- 0.7’ (1.3 million)

Global Problems
Local Impacts

Spatial Mismatch Problem
Building a geodesign community

- Study abroad opportunities
- Brown bags
- Networking opportunities
- Research opportunities
- Internship opportunities

SSCI 350: International Geodesign
Constructing a regional plan proposal for the Amstelland region, Amsterdam, the Netherlands, June 2015
SunSmart @ USC – Julian Herren

- Collaborative partnership between Spatial Sciences Institute, Keck School of Medicine, and Los Angeles Unified School District
- SunSmart & geodesign
  - Measured UV on school playgrounds
  - Mapped UV exposures
  - Proposed design alternatives
  - Presented and voted on design ideas in elementary school classes
Background and aspirations

- Geodesign Senior
  - Will graduate in December, 2018
- Interned for Stantec in Santa Barbara, CA this past summer
  - Only employee with GIS knowledge
- Future plans
  - Work for Stantec as GIS Analyst in Santa Barbara, CA
  - Work in real estate development in Ventura, CA
  - Complete M.S. degree
Shade structures

- Tiered system
- Rotunda canopy
- Rotating canopy
- Louvered flaps
- Network configuration
- Componentry
Work tasks and tools

- **Tools**
  - ArcGIS Pro
  - ArcMap
  - GeoPlanner
  - Rhino
  - SketchUp
- **Spatial interpolation of UV radiation**
- **3D shade analysis**
- **Shade structure design**
Outcomes

- Unique research opportunity to apply the geodesign framework
- Greater understanding of how to approach a design project
- Opportunity to utilize various skills learned throughout my time at USC
- General goal of improving the livability and academic environment for young children
Acknowledgements

USC Undergraduate Research Associates Program, National Institutes of Health, National Cancer Institute, Department of Health and Human Services, and the Center for Disease Control
Benny Friedman – Geodesign internship

- Interned at Studio One Eleven, a Long Beach, CA architecture, urbanism and landscape design practice as part of their urban design team

- Summer Projects
  - Climate action plans
  - Urban mall retrofits

- Current Projects
  - Activity studies
  - Data processing tasks

Studio One Eleven

Creating more livable, sustainable & engaging cities
Background and interests

- Geodesign major (junior)
- Human Security & Geospatial Intelligence minor
- Primarily work on projects for social good
  - **Carbon offset credits**
  - Social Network for Teens who have lost a parent
- **Really excited about:**
  - Bringing more data and analytics into urban planning
  - Bringing more science into geodesign
Mall urbanization suitability study

- Analyzed 50 malls for urbanization readiness
- Created metrics to assess good urbanization characteristics
  - Ratio of high-paying jobs to numbers of residents
  - Total population within a 10 minute drive
  - Medium household income within a 10 minute drive
- Used Business Analyst to source the data
Mall urbanization suitability study (cont.)

- Completed a multi-criteria analysis with the Definite decision support software tools
- The outcomes included:
  - A ranked list of what malls would be most successful reimaged as a mixed use downtown
  - My approach produced a very similar result to that of the design team but in a much shorter time
  - The client ended up hiring Studio One Eleven to retrofit some of the malls in the ranked list

The Bloc – TOD in Los Angeles

One of the ranked mall sites
Looking forward …

- My journey so far …
  - Urban design classes
  - Planning & real estate classes
  - Spatial science classes
  - The ideas and tools introduced in these classes was leveraged to support my work with Studio One Eleven

- Next steps …
  - Digging into the importance of data driven iteration and evaluation for urban design
  - Learning more about geospatial modeling and customization
Problems and opportunities | Los Angeles
Problems and opportunities | Beijing
Dreams – Turning problems into opportunities!

What would the City of Los Angeles look like if fitness was the top priority?

Bike park at Amsterdam Central Station
What’s next?

Community workshops
- Develop collaborative partnerships between the city, university, & community
- Train and engage students in problem-based learning & urban revitalization efforts
- Create alternative design scenarios
- Demonstrate value of geodesign methods & tools

B.S. in Global Geodesign
- Three partners
  - Free Univ. of Amsterdam
  - Peking University
  - Univ. of Southern California
- Common curriculum
- Virtual and face-to-face collaborations
- Students spend one semester at each of the other two institutions

Taylor Yard G2 Geodesign Workshop
Design team discussing proposed intervention for Taylor Yard site: Coby Cohen (GEOD grad), Brian Sims (Esri), Joanna Wang (Esri intern; GEOD major), Benny Friedman (GEOD major), Danny Kradjian (USC Grad & Real Estate Developer), and Fangwu Wei (ASU Postdoc)