Geodesign in undergraduate education: An optimal platform for undergraduate inquiry and action

From ArcGIS to CityEngine in just 3 weeks

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Undergraduate liberal arts institution // one-course-at-a-time format // class size: 25
Urban campus – Colorado Springs at transition: High Plains to Rocky Mountains

Introduction to Geodesign at Colorado College

It all began with the ArcNews Fall 2013 contribution Geodesign Education takes Flight, by Kalliein Foster, that contains the statement, The emerging field of geodesign can be characterized as the collaboration of science and design that takes into account the interconnectedness between humans and nature, bringing together knowledge—in the form of both data and human expertise—and design creativity for the purpose of revealing and evaluating alternative futures for a place. I’m employed at Colorado College, in the Geology Department, and this statement resonates with current initiatives at CC and in my own Department. Situated in the city of Colorado Springs, Colorado College actively identifies and engages with the challenges and impacts of urban development at the High Plains-Rocky Mountains interface during this period of population growth, resource shortages, environmental disasters, and climate change. Colorado College’s Block Plan is conducive to immersion in the geospatial methods and rapid progress on development and realization of geodesign projects that enhance the College’s Sense of Place.
Introduction to Geo-design

Geology professor (yes, I actually do study rocks! Closely. Geologic data and imagery are spatially located, hence GIS is a crucial tool.

Professor of Art, Carl Reed internationally known sculptor educator with long experience – teaching 3D design
why introduce geodesign?
why bring geological science in to geodesign?
why geology and geodesign?

EARTH moved, per capita, in tons per year:

http://serc.carleton.edu/details/images/17055.html
why introduce geodesign?
Why work to bring geological science into geodesign?

Colorado’s devastating Black Forest fire...

By Jason Hanna, CNN

The 16,000-acre Black Forest Fire killed two people and destroyed more than 500 structures, and it prompted thousands of people to flee.

“This is the worst fire in Colorado history in terms of damage,” Rose told CNN.

Investigators are still trying to figure out what caused the fire. Investigators scouring a 24-square-foot area where the fire is thought to have begun on June 11 have *all but ruled out natural causes,* Maketa said.

“I can’t really go any further on that, but I can say we are pretty confident it was not, for instance, a lightning strike,” Maketa said.
Sedimentation rates and alluvial processes during extreme precipitation events in semiarid environments at the urban-mountain interface

Events at the urban-wildland interface, Colorado Springs, September 2013.

Dirk Rasmussen and C. Siddoway, Colorado College
20 May 2014, GSA Rocky Mountain/Cordilleran Meeting
Geodesign NOW:
These catastrophic events and rapid impacts on regional infrastructure provide impetus to

“Turn disagreement into agreement.”
- C Steinitz
Timeline

- **January 2014**: Learned of Geodesign: ArcNews
- **May 2014**: 1 participant at Geodesign Summit
- **October 2014**: CC Sustainability Workshop
- **January 2015**: College course: Introduction to Geodesign
- **May 2015**: Meetings with community stakeholders
- **October 2015**: Course: Digital Mapping for Society
- **Jan. 2016**: 15 participants at Geodesign Summit

**Week 1**: Introduced ArcGIS
**Week 2**: Collector for GIS and campus study
**Week 3**: CityEngine and campus study
**Week 4**: Geodesign Team presentations
Week 1: ArcGIS
Week 2: Collector

Smartphone-based field data collection:

- ArcGIS online via academic ORG account

Western border of campus – drainage ditch, interstate highway, coal-carrying rail line …

Where is the flood plain?
GIS data

Interdisciplinary student team:
Art and Design
Environmental science
Ecology
Geology / Hydrology

Restoration of riparian zone:
Ecosystem services, recreation, public education,
natural beauty, human health

To be reintroduced following long period of management
focused solely on flood control *

*floods can be formidable, but do not occur annually!
CityEngine model for Restoration of Riparian zone:
2. Sustainability & Resolution of incompatible Uses

DPAC Design:

Renewable Energy

Sight lines to Pikes Peak and Colorado Front Range, that represent the REGIONAL extent of our Place of Learning
DPAC Design – Site Comparison via CityEngine Models

Existing condition

Alternative design

Pedestrian traffic, utilities, and function analysis

Realize the design
Experience the design
Share it
CityEngine: Redefining Center

- Convey liberal arts values into the campus landscape
- Sense of ownership and community for students
- Restore historic structures and materials

BAM-B Design Team
Ben Parson, Arianna Solomon
Masa Iwasaki, Ben Joseph

Open views to Pikes Peak – reminder of our Place, relation of College to natural landscape and Western ecosystem
Campus landscape in harmony with ideals of liberal learning and the life of the mind
Climate-appropriate vegetation
Open space --extra-curricular student space – for recreation, performances, and design
4. Sky Canyon: student pedestrian corridor – across US highway, campus utility nodes, parking lot, intersection, and other hazards

Conclusion of course: Geodesign ‘competition’

Presentations to Jurors and Stakeholders
Education / training opportunity

Studio centered upon College campus

• Education: GIS + tools for community engagement
• Students serve in multiple, legitimate roles: analysts, designers, constituents
• Extent and scope: each study at a suitable scale
• Provide meaningful input to new campus Master Plan architects and impact-ful 3D models to City

Immersive learning: in academic setting, January term, summer sessions
Placemaking: Tony Atkin and Laurie Olin
These landscape architects and the OLIN firm, > at work on Colorado College Master Plan

Pikes Peak Community Foundation
Non-profit, dedicated to enhancement of quality of life for all residents

Fountain Creek Watershed
Water Sentinels

Thank you for opps for dialog and action!
Thank you to CC Sustainability program, the Geodesign Summit organizers and evangelists, for inspiration throughout the year, and for Student scholarships to attend the Summit!