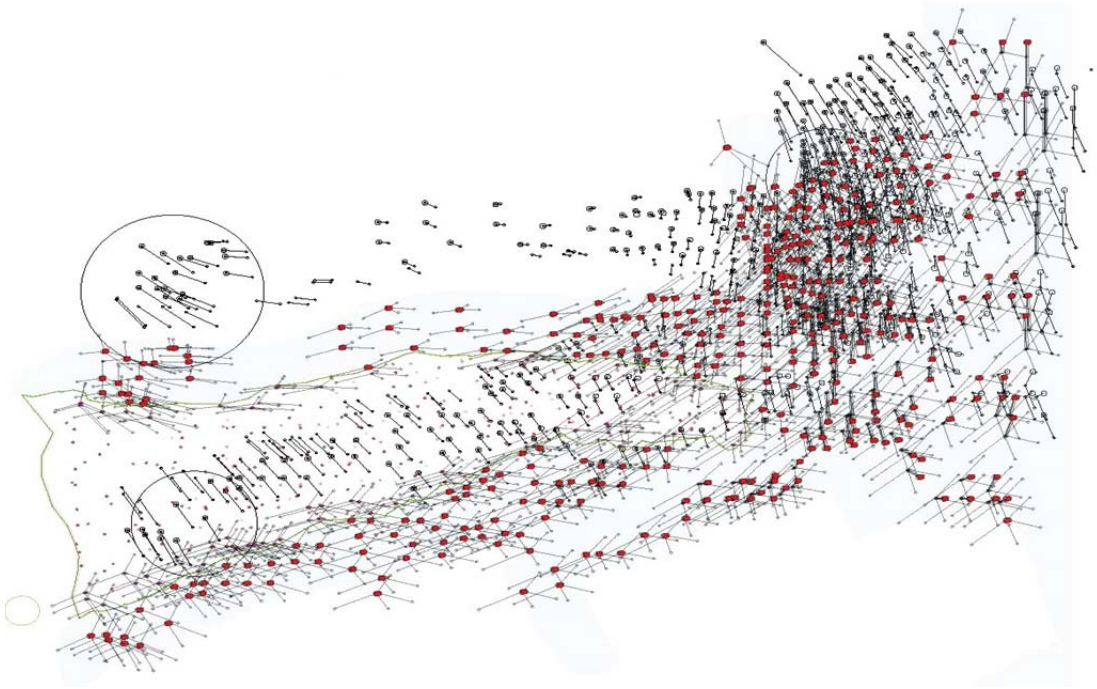
University of Pennsylvania
School of Design
Department of Landscape Architecture
Fall 2015; LARP 740, Topics in Digital Media: Simulated Natures
Instructors: Keith VanDerSys (vandersys@peg-ola.com/ kvand@design.upenn.edu),
Joshua Freese (jjfreese@design.upenn.edu)

SIMULATED NATURES



Leading us away from the system of fixed things, and toward the system of spatiotemporal patterns, the newly revealed visible world brings us to the threshold of a new vision.

--Gyorgy Kepes

"Place" is today treated as an instantiation of process rather than an ontological given.

--Denis Cosgrove

Synopsis

This seminar will explore the value and potential of computer-aided analysis, design, and manufacturing's (CAD/CAM) role in landscape architecture. Computation has greatly expanded the means by which designers can engage the temporal and relational qualities inherent to the *dynamic medium of landscape*. Students will engage in combining the computational capacities of geospatial analysis (GIS), computational flow dynamics (Aquaveo, Ecotect), and parametric software (Grasshopper) to investigate new modes of defining, articulating, and reorganizing a small vacant site on the banks of the Delaware River. Demonstrations of essential tools and techniques will be presented and discussed throughout the semester, along with relevant project examples, readings, and guest lecturers.

Students will explore the creation of living shorelines as new types of "environmental art forms." These interventions, as both ecological resource and spectacle, can activate the publicly inaccessible pier sites along the southern portion of the Delaware River Master Plan. As such, we will be working closely with the Delaware River Waterfront Corporation (DRWC).

Eligibility

Limited to LARP, ARCH, Fine Art students who have successfully completed LARP 544 Media IV or equivalent. Instructor permission is necessary for registration. Laptops encouraged. Course availability is limited.

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Background

For centuries, humans have created tools to uncover and understand the complexities that underlie our environment's immediately visible characteristics. The extension of humans' sensory threshold through telescopes, microscopes, stop-motion cameras, cyclotrons, infrared and ultraviolet satellites, etc., continue to open horizons of insight and understanding about our world. Today, the pervasiveness of remotely imaged information—captured in fine resolution via satellites and archived at a dizzying rate—has led to an increased ability to visualize the complex physical processes that give rise to identifiable patterns in landscapes.

Landscape has been slow to explore and adopt new computational tools and techniques, however. While data and information are widely accepted in analysis, it is still resisted when it comes to landscape formation. This is largely because the field still remains attached to romantic ideas of nature, phenomenologically conceived (through empirical evidence). When digital media is used, it remains largely in the two-dimensional realm and simply replicates manual drawing techniques, such maps, diagrams, or montages. Digital media, however, has rarely been used to understand the factors and forces that remain outside humans' perceptible limits. The 'invisible' information of microscopic and macrocosmic forces are equally important in defining the salient conditions of a place and thereby how and what we 'see'. As such, the description of a terrain need not be limited to perceptible characteristics, as topographic objects and surfaces, but rather complex ***topological*** properties—those described as relationships among a variety processes flowing through a landscape.

In this seminar we will employ emerging media platforms to investigate new models of time and change, and the subsequent consequences on types of formation. Time and change are only implied in previous models. These include *simultaneity* (the superimposition of multiple images that convey a shifting landscape over time); *successional* (sequential drawings to illustrate changes in landscape composition over time); or *episodic* (notational drawings). Advanced digital tools now enable us to investigate an untapped model of change: ***recursion***. Recursion pertains to both the techniques enabled by computation (where sequences of operations are used to relate process and form through feedback) as well as to the resultant forms (i.e.: patterns). Force, quantity, and direction (such as in water or wind flow), numerically enabled, can be used to generate organizations that are intrinsically relational; that is, entities defined by virtue of their association or proximity to other elements. Consequently, the affiliation between form and process is inherent in recursive models; changes made to any one entity have a reciprocal effect on neighboring entities. As a generative design tool, this type of modeling enables the possibility of new relational and organizational structures, which close the divide between analysis and formation.

To achieve our aims, we will explore "simulated natures" where ecological and social formations are conceptualized through 'invisible' information (both data and flows)—rather than relying only on 'visible' substance—providing an alternative to the overreliance on a phenomenological approach that gives priority to an experiential understanding of place. The seminar prioritizes feedbacks between analysis and intention—pattern finding and pattern forming—by utilizing advanced digital media, including parametric software and fabrication.

Structure

The class will meet during one action-packed session every Thursday from 9am-12pm in Lab 321. Class attendance (and punctuality) is mandatory, as much of the content involves in-class exposition. Sessions will include demonstration of relevant techniques, topical presentations, reading discussions, and hands-on working sessions. The course is an exploratory think-tank not a recitation. The class will also readily exploit the Fabrication Lab for expert demonstrations and tutorials from the lab staff. Material purchases and machine scheduling are the responsibility of the student. Students should thoroughly consult the Fabrication Lab's hours of operation, file and machine protocols, and material restrictions (http://www.design.upenn.edu/fabrication/) during the preliminary planning stages of each project.

Exercises

The course will begin with a series of short skill-based exercises to introduce tools, techniques, and concepts. Exercises offer an opportunity to attempt different approaches and methods while refreshing and expanding your digital media skills. These first short assignments are due on a bi-weekly basis. Rigorous documentation of the development is required. Technical demos, topical presentations, and readings will supplement exercise topics.

Design-Research

The latter portion of the semester will be dedicated to a longer collaborative exploratory project focused on the generative potential of dynamic media. Students will work together to develop the direction and focus of the design-research project. The hope of collaborative exploration is to promote maximum breadth and depth of study while limiting workloads. Given the multi-scaled focus of the design-research, each team will have the freedom to structure the collaboration as they see fit.

Throughout the course of the semester, students will develop a series of flow simulation models (analog and digital) and fabrication prototypes to test possible layout configurations, flow and deposition rates, and planting characteristics. It is expected that you will work through digital simulation models and physical prototypes, rather than images, as the primary basis for the evaluation of the development.

Format

All work will be documented and cataloged. Layout templates are provided for the short exercises. All primary operations performed through the development of the longer design-research project are required to be documented. The work will be presented as a poster, animation, and prototypes at the final exhibit.

Software/Hardware

Rhino 5, Paneling Tools, Grasshopper, Ecotect, Rhino Terrain, Aquaveo SMS, Lasercutter (Lasercamm), CNC Router (Mastercamm).

Grading

Class attendance is mandatory, as much of the content involves hands-on demonstrations. More than three absences will result in a failing grade. Late submittals will be penalized 1/3 of a letter grade per day.

The bi-weekly assignments comprising the first part of the semester will account for 30% of the course grade. The latter design-research project will account for 60% of the course grade. Finally, class participation will account for 10%. A copy of all semester work on a CD/DVD will be required for final grade assignment.

A+ (4.0) = Excellent; exceptional work quality + no missed or late assignments
A (4.0) = Very Good; above average work quality + no missed or late assignments
A- (3.7) = Good; above average work quality + a missed or late assignment
B+ (3.3) = Satisfactory; average work quality + a missed or late assignment
B (3.0) = Marginal; average work quality + missed or late assignment(s)

B- (2.7) = Unsatisfactory; below average work quality + missed or late assignment(s)
C+ (2.3) = Very poor; poor quality + missed or late assignments
C (2.0) = Unacceptable; poor quality + missed or late assignments
C- (1.7) = Unacceptable; poor work quality + missed or late assignments
F (0.0) = Unacceptable; poor work quality + missed or late assignments

Cheating is a serious academic offense and grounds for course failure and/ or school expulsion. Cheating is the use or attempted use of another's material as your own. This includes any idea, image, drawing, or text that is taken from another source, such as an article or online. Any use of ideas or materials must be properly credited by citing the author(s) and source(s). Refer to the *Code of Academic Integrity* for details:
http://www.upenn.edu/academicintegrity/ai_codeofacademicintegrity.html