MIT Department of Architecture
4.181 / Network Urban Design for Resilience: New tools and approaches
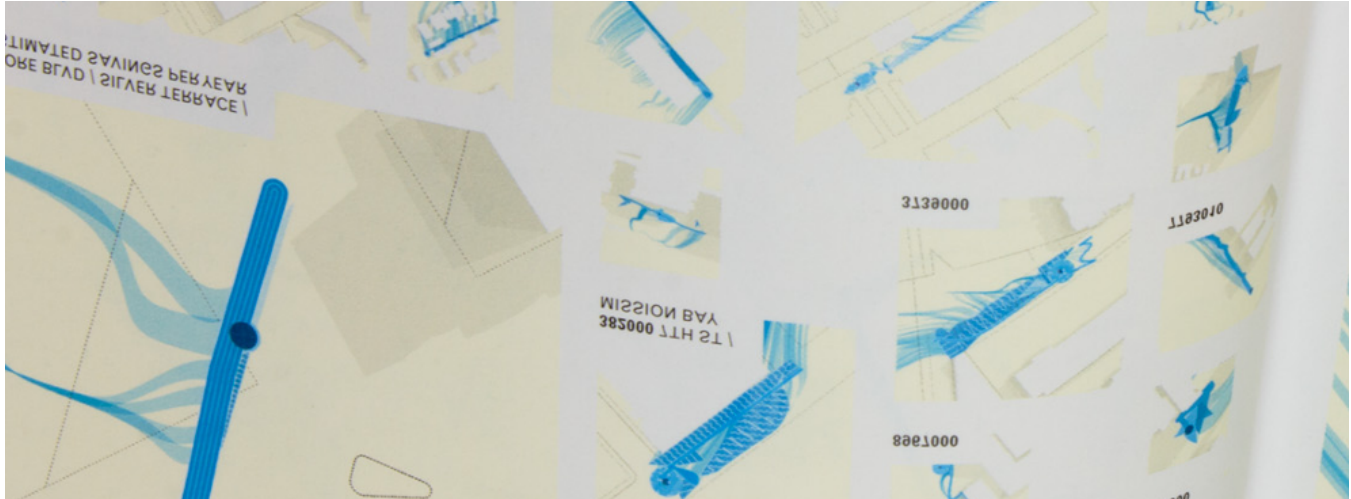Sandoval Olascoaga / de Monchaux

Spring 2022 / W 9:00 AM-12:00 PM / 5-233 / In-Person

Introduction

Merely to think about cities and get somewhere, one of the main things to know is what kind of problem cities pose, for all problems cannot be thought about in the same way.
  - *Jane Jacobs, The Death and Life of Great American Cities[1]*

While we have begun to understand the interconnected properties of our cities, we still lack the tools and methodologies to engage cities as designers along the grain of these insights. This has consequences not just for the inclusion of physical factors at different scales, but also to the lack of influence of those most affected by climate change on design for resilience in their communities

In this workshop we will explore digital tools and methodologies to conceive distributed, environmentally validated design proposals, connecting principles behind urban networks with systematic design and evaluation of a large number of distributed design interventions. We will introduce Local Software, a set of tools and workflows to imagine, evaluate, and implement networked urban designs by connecting GIS and parametric CAD software.

The course will provide a critical introduction to computational tools and approaches for urban design. Students will familiarize themselves with design workflows that integrate geospatial information, parametric modeling, and geospatial modeling to develop networked urban proposals. We will also discuss the conceptual, social, and political framework for such networked action in urban environments.

In the workshop, we will be engaging with [Green City Force,](#) an AmeriCorps program that engages young adults from New York City Housing Authority (NYCHA) communities in environmental service. The workshop will begin to prototype a set of distributed interventions – 'eco-hubs'— across NYCHA properties. NYCHA sites represent a distributed landscape throughout New York City whose population approaches that of Atlanta, and

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[1] Jane Jacobs, "The Kind of Problem a City Is.," in The Death and Life of Great American Cities (New York, NY: Penguin Random House, 1961).

which are in areas of the city most vulnerable to the effect of climate change. Participating students will have the potential to apply to join this ongoing collaboration after the conclusion of the workshop as well.

Workshop Objectives

- The course will provide a critical introduction to computational tools and approaches for urban design.
- Students will familiarize themselves with design workflows that integrate geospatial information, parametric modeling, and geospatial modeling to develop networked urban proposals.
- Students will acquire basic skills to acquire, manipulate, and perform basic analysis with geospatial information.
- We will introduce workflows to integrate spatial information in parametric design software.
- Students will design algorithms to develop site specific proposals, which can be used in a set of sites.
- We will introduce strategies to evaluate the environmental impact and performance of their proposals.

Structure

Starting with the class meeting of February 2, the course will adopt the following week-by-week structure to address a range of software and graphic techniques and tools.

Requirements

You are required to be present at all class meetings, unless by prior arrangement. You may be absent from one class each semester without prior notice (not a review or workshop), but each subsequent unexcused absence will result in the loss of a letter grade. Similarly, you are expected to have completed homework and preparation for each class, unless excused by prior arrangement. You also get one free pass in this regard, but afterwards a penalty correspondent to that for an absence applies.

In this workshop we won't be teaching software tutorials in-class. Instead, prior to every class you are required to review and complete the technical module of each session. In every week's session we will be discuss challenges, troubleshoot workflows, and ideas. You are expected to participate in the discussion.

Finally, you are expected to contribute robustly to the success of the class as a shared enterprise; without this commitment from everyone involved, we might as well not show up. Participation and weekly assignments will count for 65% of your grade, and the presentation of your final project 35%.

Course Materials

Including this document, course materials will be available and distributed via the MIT Canvas site (https://canvas.mit.edu/courses/14233/), for which you should shortly receive an invitation. Large files, including site information, will be distributed via Dropbox filesharing service, with links/instructions provided on Piazza.

Software

All the software we will use is provided to you free of charge - QGIS, Adobe Creative Suite, Rhino and Grasshopper.

Schedule

DATE	#	AGENDA
2-Feb-22	0	Introductory Lecture
	1	Mapping Information
9-Feb-22	1.1	Introductory Lecture – History of GIS
		Technical Lecture – 1.1 Introduction to Mapping
		Discussion of Readings, 1:
		Mandatory:
		de Monchaux, Nicholas. *"The Map and the Territory."* In Local Code - 3,659 Proposals About Data, Design & the Nature of Cities, 154–77. Princeton, NJ: Princeton Architectural Press, 2016.
		Optional:
		Sandoval Olascoaga, Carlos. *"Really, Now, Who or What is ESRI?":* Draft
16-Feb-22	1.2	Introductory Lecture - Fake Estates and Reality Properties
		Technical Lecture – 1.2 Site Selection and Site Presentation
		Guest Lecture - Green City Force: Tonya Gayle, Executive Director
		Discussion of Readings, 2:
		Mandatory:
		de Monchaux, Nicholas. "Life Attracts Life." In Local Code - 3,659 Proposals About Data, Design & the Nature of Cities, 123–41. Princeton, NJ: Princeton Architectural Press, 2016.
		Optional:
		de Monchaux, Nicholas. *"Fake Estates and Reality Properties."* In Local Code - 3,659 Proposals About Data, Design & the Nature of Cities, 62–86. Princeton, NJ: Princeton Architectural Press, 2016.
		Homework 1 Presentation: Mapping
	2	SITE OPPORTUNITIES AND POTENTIALS
23-Feb-22	2.1	Technical Lecture – 2.1 From GIS to Parametric Modeling
		Discussion of Readings 3
		Mandatory:
		Sandoval Olascoaga, Carlos, and de Monchaux, Nicholas. *"Local Software: Integrated Design and Geo-Computing Workflows for Urban Design":* Draft

		Homework 2 Presentation: Multi-Site Analysis
2-Mar-22	2.2	Technical Lecture – 2.2 Designing with Information
		Homework 3 Presentation: Site Design
	3	DESIGN EVALUATION
9-Mar-22	3.1	Technical Lecture – 3.1 The Site as a Network
		Homework 4 Presentation: Multi-Site Design
16-Mar-22	3.2	Technical Lecture – 3.2 Evaluating Design Impact
		Concluding Discussion
30-Mar-22	4	Final Presentation