Urban Ecological Design

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Time: 9:05am-11:50am; Venue: Clough Commons (TBA)

Abstract:

Direct design of cities is often regarded as impossible owing to the fluidity, complexity, and uncertainty entailed in urban systems. And yet, we do design our cities, however imperfectly. Cities are created objects, intended landscapes, that are manageable, experienced and susceptible to analysis (Lynch, 1984). Urban design as a discipline has been focusing on “design” in its professional practices. It is analytically distinct from “science” related research that tends to ask positive questions such as how cities function, or what properties emerge from interactive processes of urban systems. The course introduces how urban design integrates urban ecology and emerging urban systems science. Cities can be regarded as an urban metabolism or complex systems, in which the metabolic processes, or flows and fluxes of energy, matter, water, organisms, transportation and human movement as well as social and economic activities, determine the physical forms and spatial configurations of cities (Baccini and Brunner, 2012). Once we connect properties of urban form and their ecological processes, we would better know how a city should be designed to contain flows in sustainable and resilient ways. New technologies have also changed the way we understand cities. Technologies enable urban designers and planners to digitally think of the non-digital aspects of cities by using computer simulation and modeling (Batty, 1997). Empowered by new tools and technologies, cities are now far more designable than ever before. Urban design is becoming data-driven. An ability to handle massive data captured in cities or arising from people, devices, buildings and infrastructures, is critical to address problems occurring in places, streets, neighborhoods and cities. The course is structured by four topics. Students will learn principles of cities as ecologically sustainable systems, and how design as a transformative approach makes our cities greener, resilient, energy efficient and more adaptable to unpredictable future changes.

**Topic 1: Urban design and urban form**
1. 1/10 Urban design: a normative theory
2. 1/17 Urban form: representation, perceptual quality and design

**Topic 2: Urban systems design**
3. 1/24 Urban systems design for smart cities (with Dr. Yoshiki Yamagata)
4. 1/31 Seminar on urban systems design and smart cities
5. 2/7 Urban high-density environment and organized complexity

**Topic 3: Urban ecology, landscape urbanism and ecological urbanism**
6. 2/14 Ecological urbanism and urban sustainability
7. 2/21 Seminar on landscape ecology and urban ecology
8. 2/28 Urban nature and landscape urbanism

**Topic 4: Urban energy and urban metabolism**
9. 3/6 Urban energy systems design
10. 3/13 Urban building energy modeling (Soowon Chang)
11. 3/20 Spring break
12. 3/27 Seminar on urban metabolism: urban energy, water, air and mobility
13. 4/3 Design for urban metabolism

**Projects presentation**
14. 4/10 Students’ project presentation I
15. 4/17 Students’ project presentation II