

SystemCity

If the greatest challenge to architecture since the turn of the century was posed by mechanization, then current preoccupations undoubtedly concern technological approaches to information. The impact of empirical approaches on architecture's spatial concerns and compositional methods are part of a broad inquiry into how twenty-first-century sciences, such as geography, have influenced design and the profession. This paper addresses "systems thinking" as a way of teaching design and practicing architecture. It presents student work that was conceived of and critiqued as a system. How can systems aid in the reformulation of our ideas of urban infrastructure, programmatic/social relationships, public space, and site constructs? The inquiry is predicated on the ostensible need to further investigate the design of cities as systems that are resilient, responsive, and regenerative; capable of absorbing multiple, varied and often conflicting and unpredictable forces to sustain changes in process over time.

HISTORY

An urban system has been defined as any network of interdependent urban places in which any significant change in one city/urban place will have consequences for other cities/urban places in the system. Or in the words of Brian Berry: "Cities and sets of cities are systems susceptible of the same kinds of analysis as other systems and characterized by the same generalizations, constructs, and models."¹ General-systems theorists in urban geography, such as Berry and his followers adopted and adapted systems theory approaches emerging in the natural sciences. These approaches that were advanced by contemporaneous computing technologies and new sources of data were used to comprehend cause and effect in the growth and development of cities. The search was for predictability and order in urban growth. In general, geographers' notions of urban growth have been based on economics, on proximity and the movement of goods and services. Pre-industrial city expansion was related to profit, e.g., Thünen, *Der isolierte Staat* (1826). Modernist models examined the optimization of land use as the driver of urban development and sought to visualize the structure of relationships and their spatial interaction, e.g., *Das System der Zentralen Orte*, 1933, by Walter Christaller who developed his theory while studying the development of

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towns in southern Germany (Figure 2). Architects on the other hand have focused on the design of core vs periphery, or urban-suburban-exurban structure, e.g., the Garden City concept, 1902, of Ebenezer Howard (Figure 1).

THEORY

The conception of the architecture and the city not as static objects but rather as supple systems is perhaps an as-yet unexplored lineage for contemporary architectural theory. Work of the early to mid-twentieth century in the field of cybernetics, such as that of scientists Gordon Pask and Norbert Wiener, was used in the design process by architects such as Cedric Price. Archigram and the Metabolists designed cities as interconnected complexes of functionally related components based on the interaction of the parts that constituted an emergent whole. MVRDV views their works such as Pig City and Regionmaker as “exploration[s] of the social and economic forces that shape space.”

Today, that architectural design has shifted from the exploration of form and composition to a kind of proto-digital conception of form as the regulator (mediator) of relations and processes. Whether social, economic, or structural, this is demonstrated by projects such as Silodam Housing (MVRDV, 2002) and CCTV (OMA, 2012). The understanding of cities as systems--as entities comprised of interacting interdependent parts can be studied on a variety of levels, structural, functional and dynamic, as well as partitioned into variety of subsystems. Research on the Pearl River Delta in *Project on the City: Great Leap Forward* (OMA, 2002) is based on the premises of urban geography to incorporate a range of urban data for instance related to transportation studies and studies of economic bases.

CRITIQUE

“Freedom to move, a scarce and unequally distributed commodity, quickly becomes the main stratifying factor of our times... A particular cause for worry is the progressive breakdown in communication between the increasingly global and extraterritorial elites and the ever more ‘localized’ rest.”²

Figure 1: Ebenezer Howard, Garden City concept 1902.

Figure 2: Walter Christaller, *System der Zentralen Orte*, 1933.

The urban geographer’s mid-century search for a unified “general systems theory” of urbanization, one that attempted to understand why cities and groups of cities developed as they did, was critiqued by social theorist David Harvey in the nineteen-seventies. Pointing to the economic, social, and political inequalities and injustices perpetrated by the geographies and policies that geographers were committed to structuring, Harvey called for a more critical stance on capitalism and the corporate state (Harvey, 1973, 1974). Yet a world of complete randomness was not accepted—if geographers largely abandoned top down approaches, new concerns with regional traditions that addressed unique, more local conditions and historical contexts produced new theories

How might architecture negotiate the dynamics of capital and speculate upon the constructive future of an urbanism with social mission yet driven by consumption? Can a systems thinking methodology be used to organize architecture as a series of different relational systems, their feedback loops and interactions? These questions were addressed in a studio project which engaged recent debates on state-run gambling casinos, coastal reclamation, and the rituals of tourism.

DESIGN

Students were asked to find ways to harness the processes of casino gambling in response to the challenges of fragile environments that, like gaming, evolve via the intersecting complexities of contingency, risk, and instability. A systems-thinking view of architecture as an integrator of complex systems that embraced elements of diversity and indeterminacy was used to construct the social and environmental life of the site. Students considered how built form would change over time and participate in larger natural, cultural, and infrastructural processes projected into the future. They drew upon the analytical and expressive tools of map-making to design and reveal conditions existing on the site reflecting consideration of the larger context—natural processes, circulation, tracked and projected pathways, and cycles of nature. Time was incorporated through the expression of flows and diagrams of force as well as physical circulation of objects and people.

The collective strength of the studio lay in engaging students, professionals, and professors in pivoting formations as teams and as individuals. Efforts coordinated with the Gulf Coast Community Design Studio and peers in the critically related disciplines of landscape and planning offered opportunities for shared discourse and collaboration, and provided the interdisciplinary convergence so critical to contemporary design practice.

We viewed the gambling casino as a microscopic magnification of capital based on the proceeds of chance and luck. Projects were conceived as a means to kick-start urban and environmental loops that would feed into and upon gambling—that excessive, “non-productive expenditure” identified along with jewels, belief sacrifice, and art as a manifestation of the “accursed share,” the inescapable excess in life that is destined for waste and considered a luxury (Bataille 1967). According to Bataille, like monetary waste, nature follows a similar principle of loss in the recurring “natural” catastrophes that destroy and lead to rebuilding. In projects which proposed frameworks within which casinos could fund coastal reclamation, gambling would ironically become part of a donation [belief sacrifice]. The studio would thus pinpoint the contradictions of excess and economy, effect and efficiency, structure and cosmetics, virtue and vice—i.e., sacred and profane—inherent in the global trajectory of unprecedented urban flows breaching the shores of the Gulf Coast.

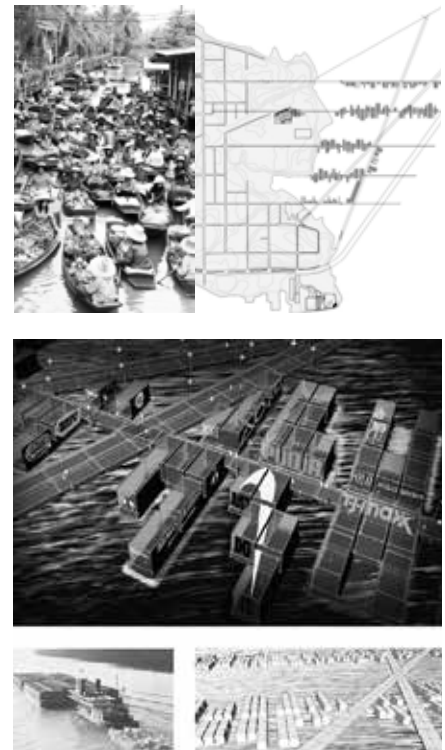
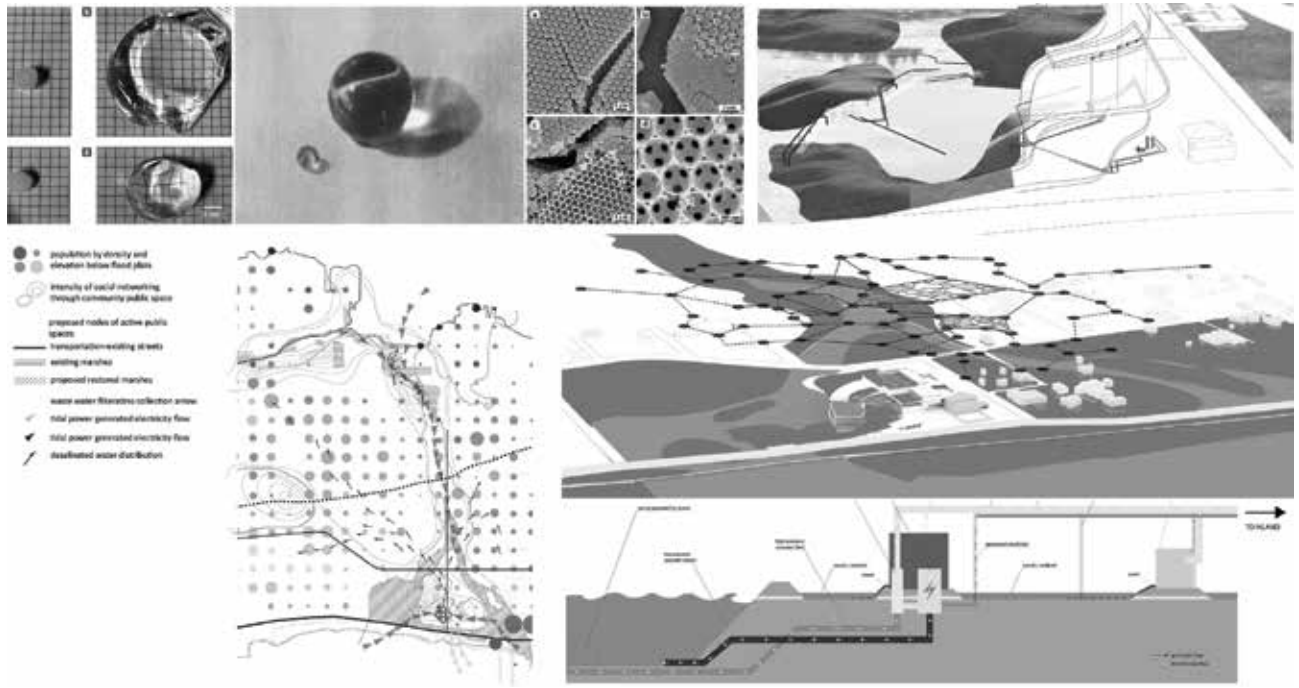
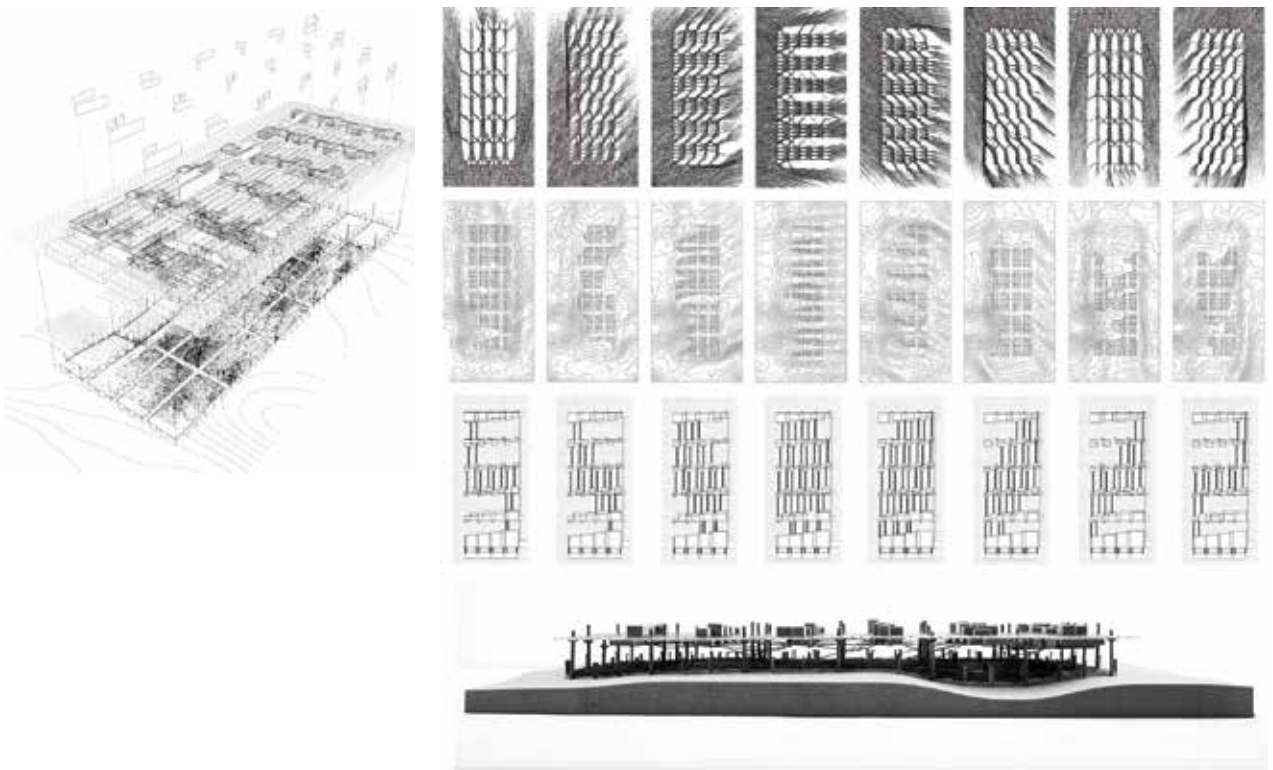


Figure 3: *Barge-topia*, Adam Rhoades, Mississippi State University.



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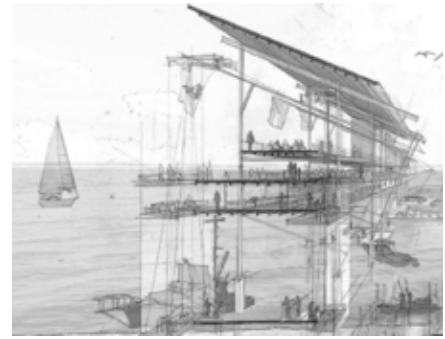
Figure 4: *Sponge City*, Xueping Li, Georgia Institute of Technology.

Figure 5: *Contingent City*, Megan McDonough, Shota Vashakmadze, Georgia Institute of Technology.

Like other spaces of circulation, consumption, and communication such as the superstore, airport, and hotel, the gambling casino is a kind of “non-place” which suspends time and as such is “beyond history” (Augé, 1995). The non-place is associated with a kind of partial awareness, or incoherence, caused by the excess of space (“spatial overabundance”), hinting at the psychological condition of the solitary individual in the city discussed in the Arcades project. Walter Benjamin identifies in both the modern worker and the gambler—two of his paradigmatic figures of modern urban life—a reflexive relationship to the machine. The “futility, the emptiness, the inability to complete something... connects the gambler to the machine laborer: Gambling in fact contains the modern workers gestures...the jolt in the movement of the machine is the so-called coup in a game of chance” (Buck-Morss, 198). Thus were students were asked to consider bottom-up processes and user-maching interaction in the design of non-places for human activity and experience.

SYSTEMS THINKING

The studio proposed that the design of an urban ecosystem linking nature and technology within a systems-based approach could occur at both the scale of the landscape and the scale of materials. As the register of chance, diversity, and contingency, systems thinking could be projected into the future through design innovation for the environment. Since we cannot accurately predict or control the events and conditions resulting from processes like climate change or global flows of various sorts, we must create functioning networks or systems, and locate the role of the architect in the calibration of those valves which direct certain flows and processes. Strategies derived from the adaptation of existing processes, structures, and organizations can be transposed onto a taxonomy of media and material systems that are generic, mass-produced, anonymous, or vernacular, then ideally injected into contemporary modes of design production, fabrication, and use that could be tested within new contexts. This required a conceptual shift in design from a hierarchical part to whole approach to one that ideally integrates performative criteria through different organizing systems and phenomenon existing in multiple scales and layers.



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Figure 6: *Oyster Bar*, Richard Clay Cottingham, Mississippi State University.

ENDNOTES

1. Brian J.L. Berry, “Cities as Systems within Systems of Cities,” *Papers of the Regional Science Association* 13, 1964, 147-163.
2. Zygmunt Bauman, *Globalization, The Human Consequences*, 1998.
3. Susan Buck-Morss, “The Flaneur, the Sandwichman and the Whore: The Politics of Loitering,” *New German Critique* 39, 1986, 99-140.