ARCH 4/584
DESIGN ECOLOGY: systems thinking in residential architecture
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Michael and Ramin have worked together at Ankrom Moisan Architects for over 16 years. Michael is AMA’s Design Director, and Ramin is a Senior Project Designer. This studio will leverage their experience in the field to ensure that students are introduced to many of the parameters and issues that shape real-world design decisions.

Architecture emerges from the interplay between a complex set of requirements; client needs, program, site informants, building systems, economics, and climate considerations. Historically, architects have explored and leveraged new technologies to successfully meet these needs. However, in many ways the design and construction industry has changed little over the last 100 years in stark contrast to other industries (e.g. agricultural, automotive, textile etc...). Our industry continues to struggle with streamlining processes and systems to improve the quality and efficiency of large-scale housing projects.

Now we face significant societal and environmental issues that require new ways of thinking about architecture. How can architects and designers, amidst multiple crises (ie. global housing, climate, public health) create housing equitably, efficiently, and responsibly?

**Design Ecology**

: An architectural design framework concerned with finding and understanding inherent synergies between project parameters and building systems. Emergent qualities are revealed through the discovery of site phenomenon, the application of design parameters, and systems analysis which establish and reveal the project’s design language. The process results in a design solution or ‘language’ rather than a forced narrative.
Before embracing any system, its qualities and capabilities need to be fully understood. Preconceived notions of how it should be used can be detrimental to exploring its possibilities. You cannot leverage potential without understanding how it works (e.g. design modules, fabrication processes, efficient modification/customization opportunities, installation process, costs etc...). Today, and into the future buildings and construction systems need to be designed for adaptability, responding to various site and user group informants (e.g. supportive housing, intergenerational housing, CCRCs, cultures, housing for migrants, climate migrants, etc.). These projects need to provide housing for the masses while providing a higher quality of life for diverse groups of people that will be living there. Can we leverage systems thinking to streamline the architectural process for residential architecture? Can architecture embrace component and modular design solutions to optimize resources through standardization?

**STUDIO DESCRIPTION:**

This studio will explore the application of systems thinking to the architectural process. Students will work through a realistic concept design phase for a midrise/highrise residential housing project utilizing various DfMA (Design for Manufacture and Assembly) systems of their choice. A major goal of the studio will be for students to gain an understanding of how real architectural systems interact with and affect project parameters and outcomes.

*DFMA is the combination of two methodologies; Design for Manufacture, which means the design for ease of manufacture of the parts that will form a product, and Design for Assembly, which means the design of the product for ease of assembly.*

Week 1 - Research zoning/site analysis/code study
Week 2 - Research various building/structural/panelized/facade systems and other potential design components
Week 3 - Establish design informants including local/cultural phenomenon that determine constraints of the site and selected systems.
Week 4 and beyond - Diagram/model the systems incrementally, build upon each idea sequentially. (virtually or physically)

**EXAMPLE SYSTEMS TO BE EXPLORED:**

mass timber, volumetric modular, panelized/component flatpack, precast concrete, red iron steel, curtain wall/window, wall/punched openings, concrete and concrete formwork including various offsite construction/prefabricated systems and methods.

As part of the initial research phase the studio will also explore current material limitations and emerging materials.

**GUEST SPEAKERS:**

Will Grimm - Planner and urban systems designer
Michael Mathews - Architect and owner’s representative involved in a number of modular projects in LA
Ethan Martin - Mass Timber expert at DCI engineers
Hylton Mockler - Prefab logic, volumetric modular consultant
Darren Canepa - Knife River Precast
Casey McDonald - Enclosure Specialist at RDH Building Science