



# A4829 - XIM: Parametric Massing + Optimization

**Instructor: Luc Wilson**

**Tuesdays 6-8pm, 202 Fayerweather**

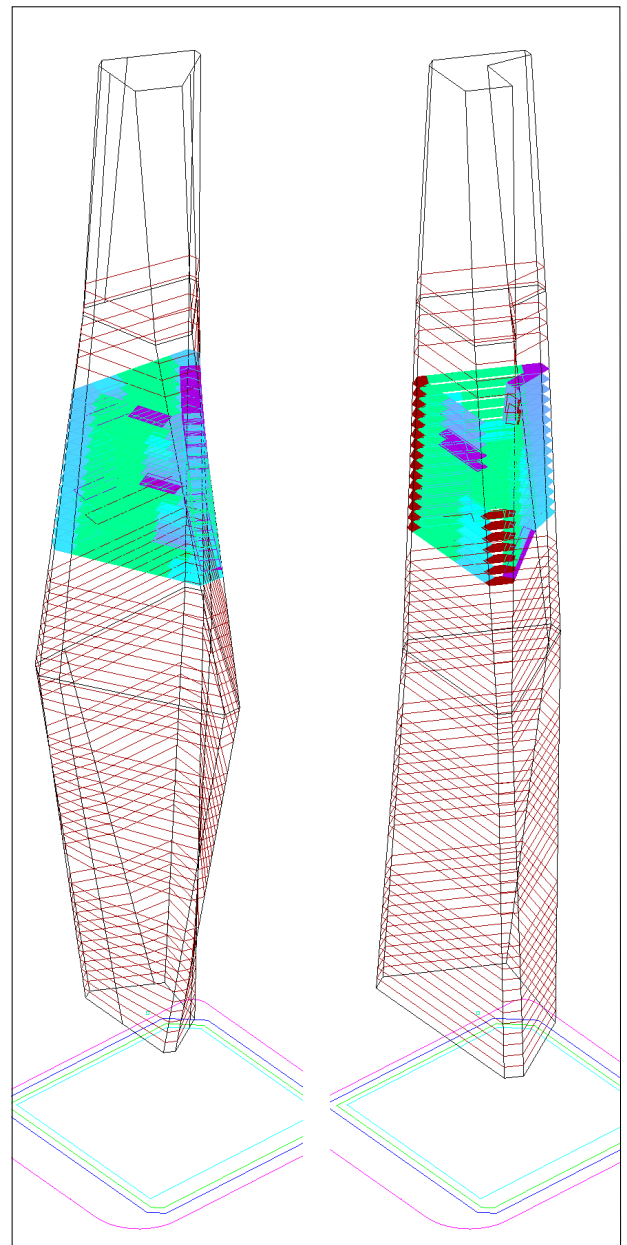
## Summary:

This course will examine the maturity of the 21st century metropolis by moving past conventional benchmarks and preconceptions of growth to develop flexible design systems founded on a holistic approach to economic, environmental, and social problems that will allow for speculation on many possible futures for the city. Using this methodology, termed X-Information Modeling or XIM, students will leverage parametric design tools to create systems that strategically integrate diverse objectives, and through Grasshopper for Rhino, visualize potential scenarios for a more informed decision making process.

Students will be given a site and a set of prompts to choose from that will guide a session long project. Based on the chosen prompt, students will reverse engineer key relationships influencing design and development, such as zoning, real estate value, social relationships (NYC Open Data, flickr, etc.), and the environment, in order to 1) find new relationships between traditionally separate or competing objectives, 2) to visualize speculative futures of the site, and 3) reposition and reorganize those relationships through a visualized evaluation process that challenges design and development preconceptions. Through this process students are asked to create new drawing types (static and animate) that can effectively communicate the intent of their parametric design systems for evaluation and critique. The end result will be a set of custom evaluation tools and speculative typologies.

Technically, students will learn Grasshopper for Rhino and an integrated workflow that includes Excel, Google Earth, Galapagos, Ecotect, and any Geotagged Data. Conceptually, students will learn how to evaluate and use data, how to visualize metrics, and, most importantly, how to define and translate simple concepts into powerful parametric relationships. Students must know Rhino. Grasshopper proficiency is not required, but a basic understand is recommended. Session A is required for Session B, however Session A can be taken without Session B. Grading for each session will be 30% attendance and weekly assignments, and 70% for the final project.

*Muchan Park and Luc Wilson developed X-Information Modeling and the content of this course.*



Parametric massing with unit evaluation visualization

# Session B - Design + Optimization

---

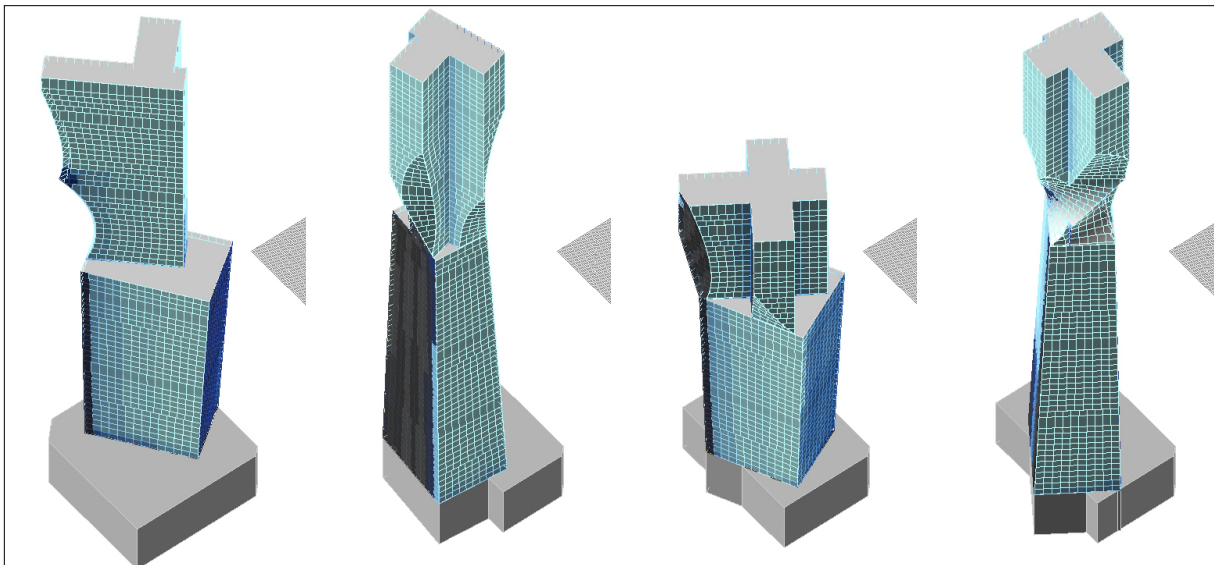
Session B will be design oriented, with students focusing on creating unique parametric massings that will be used to test the custom evaluation tools created in session A. Galapagos, a single objective optimizer in Grasshopper, will be used to speculate and experiment by testing thousands of parametric massing iterations, judged relative to the custom evaluation tool from session A. Session B will introduce the following grasshopper topics: geometric translation, scaling, solid union/difference, lofting, trimming with curves, and galapagos. Concepts covered: translating design intent into flexible relationships, spatial requirements of various programs, core requirements, zoning constraints, weighting metrics into a combined score, and scenario based optimization.

For fall 2013 the site of investigation and experimentation will be Midtown. Each student will continue their investigation from Session A by iterating massings with the goal of developing a new building or public space typology. Students working off the same provocation from session A should continue to share resources, research, and results. Within each topic, students are free to work individually or as a team.

Session B Schedule:

- Week 1: Basic Parametric Massing
- Week 2: Advanced Parametric Massing + Introduction to Optimization
- Week 3: XIM System Integration + Optimization Reviews
- Week 4: Optimization Results + Performative Detailing
- Week 5: Project Specific Advanced Techniques + Working Through Class Grasshopper Questions
- Week 6: Individual Project Critiques
- Week 7: Final - Deliverable: Custom evaluation tool + new building or public space typology.

The final deliverable for session A will be a presentation that demonstrates the applicability of each students' custom evaluation tools to investigate their chosen prompt. A more detailed outline for final deliverables will be provided.



Optimization of retail, office, and hotel skyscraper.