In times of uncertainty, form needs to adapt to changing conditions. As the climate emergency accelerates, designing for site conditions such as micro-climate and resource availability becomes more critical. Designers need to control geometry so that buildings and spaces can work with natural systems, inhabitant needs, urban infrastructure, and cultural preferences. With parametric design, one idea creates a spectrum of possibilities appropriate for different situations. This course develops skills for generating and evaluating variations of a design concept.

This Media for Design Development explains how craft and computation can together support design thinking. Students will apply techniques for different stages of architectural design to either the class’s mini-design project or a design studio project. Students will use Rhinoceros’ Grasshopper platform, which opens up a spectrum of free and low-cost plug-in applications.

To complement hands-on activities, each student will research and present about the design process of an architect, interior designer or other creator. Graduate students will develop the presentation into a short paper.

Draft schedule

1 Form-finding: Experiment with cutting and folding to spawn possible building, furnishing or component forms, then translate them into geometric variations.

2 Solar simulation and optimization: With designs placed into a site location, simulate how alternate versions affect summer shading and solar radiation gain. They will experiment with genetic algorithms to identify top options.

3 Development: choose from options
a. Change over time: represent response to day-night, seasonal cycles or other data.
b. Digital fabrication: use 3D Printing or Computer-Numeric Controlled routing to examine and refine the design

c. Structural analysis: examine how loading, support conditions and form variants can change stresses and efficiency.

4 Presentation: Refine a graphic summary of main ideas.

Pre-requisites: a basic computer graphics course (i.e. ARCH222 or 610) or permission of the instructor. No prior knowledge of GH is needed. Students must to have access to Rhinoceros software running on Windows.