In times of uncertainty, form needs to fluidly adapt to changing conditions. As the climate emergency accelerates, designing for specific 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.

Students will study how architects and designers apply biomimicry with computational design to use knowledge embedded in natural forms, processes and systems. Students will examine how natural structures, skins and shells address environmental forces (gravity, water, sun), and how the evolution, growth and movement of organisms can be inspiration for architectural applications.

Rhino Grasshopper (GH) software opens the door to many free and low-cost analysis programs for evidence-based design decision-making. Students can learn about genetic optimization, weather, sunlight and structural simulation using Galapagos, Ladybug and Karamba. The course will include recorded video and interactive demonstrations, discussions of readings and homework. with opportunities for individual help. Students may address the Biomimicry Design Challenge on climate change or create a physical installation.

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 either need Rhino running on a Windows computer or will rely on the UO High-Performance Virtual Lab.

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