ARCH 399: Digital Tools - PORTLAND
Grasshopper Workshop - Bio-inspired Building Envelopes
University of Oregon - School of Architecture and Allied Arts - Dept. of Architecture

Course:
Instructor: William R. Taylor, Mail@WilliamRTaylor.com / PD(X) Lab, www.PDXLab.org
Term: Winter 2012  Credits: 1
Schedule: Tues Jan 3 - Fri Jan 6: Instruction 1:30-5:30pm, Skidmore Computer Classroom, White Stag Bloc, Portland
Wed Jan 4 - Fri Jan 6: Worktime 8:30am-12:30pm, location tba
Course Fee: $375
Enrollment Limit: 20 Students

Objective: Hands on competence in and conceptual understanding of rule-based / data-driven design via parametric modeling in Grasshopper through a combination of intensive instruction, hands on exercises, and instructor assisted worktime.

Course Description: In this course we will investigate and practice the why, how, and what of Grasshopper-based parametric modeling through the evolution of a simple bio-inspired building envelope pattern. Tutorials and discussions will be organized around using Grasshopper as a platform for: managing repetition, implementing evaluation, facilitating integration, and preparing for fabrication.

Why? / Ecological Performance: Through a brief discussion of 1) computational concepts 2) instructor examples and 3) precedent case studies students will develop a firm foundation for understanding why one would choose Grasshopper as a modeling technology. Discussions will be focused on the relationship between simulation and decision making in material practices. Students will begin to access bio-inspired design concepts by exploring simple relationships between data/functions/patterns and quantitative and qualitative performance.

How? / Evolutionary Processes: Intensive and interactive Grasshopper environment and feature instruction will give students access to evolutionary “build, test, and select” design search processes. Emphasis will be placed on a simple algorithm design pattern: identifying parameters, sketching rules, implementing and iterating the rules in Grasshopper, learning to evolve the rules, and growing one’s modeling skills set. Lessons will be drawn from the instructor’s experiences as both an architectural designer and software developer critically investigating productive relationships between tool interfaces and design decision making.

What? / Envelope Patterns: Students will follow examples and then propose and model a simple building envelope structure / skin pattern. These patterns and parametric models will be thought of as preliminary steps in the process of researching, developing, and testing a bio-inspired building envelope system. Students will be encouraged to explore relationships between layering, thickness, spatial composition, and potential performance with respect to environmental factors and interactions.

Requirements: Rule sketches, Grasshopper model, and project description in a simple graphic layout.
Grading: Pass/No Pass

Software Requirements: Rhinoceros (www.rhino.com)
Grasshopper Plugin (www.grasshopper3d.com)
Todo: Create an account at www.Grasshopper3d.com
Reading: The Grasshopper Primer (www.liftarchitects.com)
Concept Resources: From Control to Design: Parametric / Algorithmic Architecture, ISBN: 8496540790
Additional Resources: To be discussed in class