SIMULATION AS THE ORIGIN

CourseNo: ARCHA4525_001_2015_1
Meeting Time: R 06:00P-08:00P **Meeting Location:** AVERY HALL 504

Instructor Information:
Jose Isaias Sanchez

xosebierd.com

Simulation as the Origin of Tangible Form

Following the "Topological Study of Form", this course further explores design around the human interface by focusing on design optimization and simulation workflows for small scale manufacturing. As we move from large scale manufacturing to small scale manufacturing as part of the design process, it becomes very relevant to have a good understanding of the different methods for manufacturing small structures.

Material Behavior: We'll look at how physical material behavior can help us simulate and visualize design prototypes prior to manufacturing. This workflow is extremely useful since we can re-iterate many different materials and configurations before building a prototype.

Advanced Design Visualization: Continuing with an HDR Rendering setup, we'll learn how to composite a rendering onto a photograph all inside Maya's environment for the entire process. This workflow will allow us to contextualize a design in the context in which it will be used.

Design Rationalization: We'll learn Finite Element Analysis (FEA) as design rationalization tool prior to manufacturing. We'll also look at airflow simulations for design cases that can benefit from airflow optimization.

Manufacturing: We'll explore the modeling advantages and disadvantages of Injection Molding and 3D printing. Injection Molding is the most used manufacturing method for plastics. Despite the rapid manufacturing turnaround, this technique is time-intensive and costly. Thus, it is best suited for mass-manufacturing, and less so for small scale manufacturing. But, with 3D printing, once a design has been developed and optimized, it can be fabricated in several hours. Subsequent design changes can be implemented and optimized in a few minutes. For the price of an Injection Molding machine, multiple printers can be purchased and run at the same time. Therefore, 3D printing is better suited for the fast-paced design requirements of today.

Intellectual Property: Students taking this course will get a primer of how intellectual property works. We'll look at how the patenting process works and what general considerations we should take when developing and testing a design while at the same time taking measures to protect our intellectual ownership of the design. We'll also look at the different venues to commercialize a design.

Final Project: For the final project process, students will first submit a description of a design that performs at least two functions, without using a noun to describe what the design is. Students are encouraged to think of the final project as an "invention" that can be either patented as an invention or patented as a design. The final deliverable will be a working prototype of the design.