MATERIAL IN/FORMATION
ARCH 5110: Architecture as Catalyst, Spring 2013
University of Minnesota School of Architecture

INSTRUCTORS

Host: Adam Marcus
Cass Gilbert Design Fellow
acmarcus@umn.edu

Guest: Nathan Miller
Director of Computational Design, CASE Inc.
Editor, The Proving Ground (http://TheProvingGround.org)
n.miller@case-inc.com

PREMISE
This studio will investigate the relationship between "big data" and material practice through the construction of a series of full-scale prototypes that merge aspects of computational design, graphic design, information aesthetics, and digital fabrication. The basis for the studio will be the School of Architecture's upcoming Centennial (October 25-26, 2013). The Centennial celebration will feature a built installation inspired by the history of the School and its alumni. The School is currently in the process of collecting quantitative data from alumni that will be incorporated into this timeline. This Catalyst will serve as a testing lab for (1) innovative and creative methods of material assembly, and (2) ways in which information can be used generatively in the design of a built structure. The studio will have a specific focus on computational design tools as a way to harness large amounts of quantitative data and channel it strategically within a larger design process. Emphasis will be placed on hybrid modes of working and exploring the transformative power of large amounts of information: both digitally and analog; both quantitatively and qualitatively.

PROCESS
The workshop will include the following components:
- Students will be divided into three teams; each team will pursue its own design direction through the lens of a specific material strategy. The materials we will be working with include:
  1. Cardboard plotter tubes, using the CNC router/lathe
  2. 22 ga. stl sheet, using the plasma cutter / 1/16" plastic sheet, using the CNC router and/or laser cutter
  3. 1/2" plywood, using the CNC router
- Each team will pursue two parallel tracks:
  1. Developing structural systems of material assembly predicated on the repetition of similar components. Students will prototype scale models and 1:1 mockups to evaluate structural feasibility and overall effects at multiple scales.
  2. Developing compelling ways of using the historical data of the School of Architecture to drive large-scale formal ideas and small-scale notions of pattern, texture, ornament, and/or color.
- Some questions we will ask: How can the installation serve as both a compelling device for displaying information but also take on a spatially dynamic presence? How can qualities of time and geography be represented and embedded within the assembly? Does the structure serve as an armature/support for information to be mounted? Or does it somehow integrate embedded information within the logic of its own assembly? How can the proposed installation have multiple readings at multiple scales? Or multiple angles? How can unconventional and economical materials be utilized in unconventional and compelling ways?

TOOLS
- The studio is expected to fully utilize the School's shop and digifab facilities, including the laser cutter and the CNC router.
- Software instruction will focus on Rhino and its Grasshopper parametric modeling plugin. Prior knowledge of these packages is encouraged but not required. Those new to Grasshopper will be asked to complete a handful of introductory tutorials prior to the workshop. Students are expected to have laptops with Rhino 5 (for Windows) and

Grasshopper installed. Students are encourage to also have Revit 2013 64-bit installed (available for free from Autodesk).

- Majority of full-scale materials to be provided to students. Students may be responsible for purchasing materials/time for small-scale prototypes on the laser cutter and 3D printer.

SCHEDULE

Monday 3/11

Morning:	9:00 am	School of Architecture Catalyst kickoff in Courtyard
	10:00 am - 12:00 pm	INTRODUCTION (Rapson 35) *Introduction: Context and Introducing the Project (AM)* *Parametric Frameworks and Big Data (NM)*
	12:15pm	Nathan Miller lecture, Rapson 54
Afternoon:	2:00 pm - 3:00 pm	MODULE 1: GRASSHOPPER *LunchBox: Defining Forms, Patterns, and Structures*
	3:00 - 4:00 pm	Toolpathing Tutorial (downstairs lab)
	4:00 - 5:30 pm	Break-Out Sessions (5 per Team, Division of Labor)
	6:00pm	Daniel Friedman lecture, Rapson 100
	EVENING: *FORM-FINDING and 1:1 MATERIAL TESTING*	

Tuesday 3/12

Morning:	9:00 am - 12:00 pm	MODULE 2: GRASSHOPPER *Data Mining and Form Development (Tubes, Plywood, and Metal/Plastic Panel)*
	12:00pm	Billie Faircloth + Kiel Moe lecture, Rapson 56
Afternoon:	1:00 pm - 5:30 pm	Student Group Break-out Sessions *Design Development*
	6:00pm	Karen Lewis lecture, Rapson 100
	EVENING: *SCALE MODELS + 1:1 PROTOTYPES*	

Wednesday 3/13

Morning:	9:00 am - 12:00 pm	MODULE 3: GRASSHOPPER + REVIT (downstairs lab) *CASE Tools: Documenting Grasshopper Assemblies with Revit BIM Documentation*
	12:15pm	Barry Kudrowitz lecture, Rapson 54
Afternoon:	1:00 pm - 5:30 pm	Student Group Break-out Sessions *Documentation*
	EVENING: *DIAGRAM AND DOCUMENT DESIGN*	

Thursday 3/14

Morning: Final Production/Fabrication

Afternoon: Final Production/Fabrication

          HOMEWORK: *FINISH!*

Friday 3/15

Morning: 9:00 am - 10:00 am   Studio Review/Prep Discussion

          10:00 am - 12:00 pm   Exhibition Preparation

          2:00pm   Catalyst Exhibition/Presentations + Reception