ADVANCED CONSTRUCTION:
PARAMETRIC DESIGN & DIGITAL FABRICATION

THE COURSE PROVIDES KNOWLEDGE AND EXPERTISE TO DEVELOP COMPLEX ARCHITECTURAL STRUCTURES FROM CONCEPTUAL DESIGN TO FABRICATION, USING ADVANCED TECHNOLOGIES FOR MODELLING AND SIMULATION

Course Goals:

Design:
• Understand the behaviour of any given structural system
• Identify the main force paths and the nature of the force (compression, tension, shear, bending)
• Understand material choice, use and distribution within the structural system.
• Appreciate how the form and geometry in a structure should be the result of the forces acting upon the material.
• Finally, demonstrate critical and technical analysis in the conception of structural systems

Construction:
• Demonstrate abilities to apply critical and technical analysis to historical modes of construction
• Be able to connect this analysis to design philosophies and material strategies, and relate them to manufacturing processes and construction.
• Approach design and production as reciprocal methods of project development rather than as successive stages of a project.
Identify how computational tools can facilitate the liaison between the design and construction phases, and be able to employ them.

Leadership:
• Ability to present and communicate research findings individually and as part of a group.
• Acquire skills to contribute to interdisciplinary professional teams.

Course Structure:

Design & Material Lectures:
These lectures study a number of case studies representing different structural typologies focusing on the logics between structure, form and material in all types of constructions. One of these typologies is later on followed by a lecture and a series of tutorials dedicated to build up a physical model of a representative example using Rhinoceros & Grasshopper.

Tools and Fabrication Tutorials:
These tutorials provide the students with the skills necessary to model the structural system studied in the case studies. Prior to these lectures, additional tutorials will be provided: during the first (Vbscript) and second (Grasshopper) weeks of the course. Following these tutorials students will explore laser cutting and/or CNC-milling as forms of design output, pursuing an opportunity to work directly with advanced design technologies reproducing one of the digital models previously prepared in the series of tutorials described above. As part of an assignment students will fabricate a scaled model using laser cutting/CNC milling. This will help students to familiarise themselves with the tools available in the prototyping lab.

Final Project:
This final phase of the course consists on the development of a structural system from design to fabrication and construction of a real scale prototype in groups.

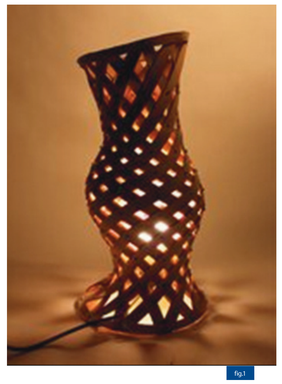
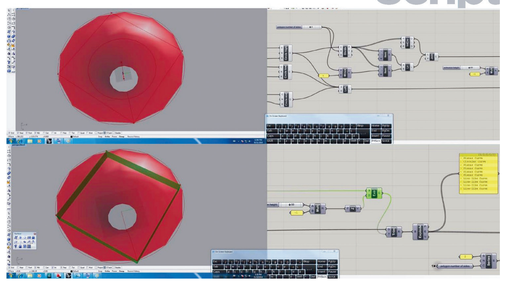


fig.1

script



assembly

final model

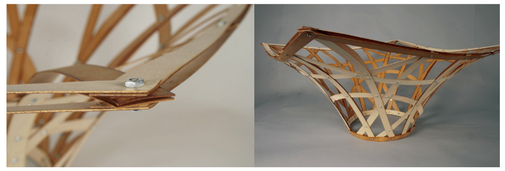


fig.2

M1

2010
ADVANCED CONSTRUCTION
MARIA MINGALLON

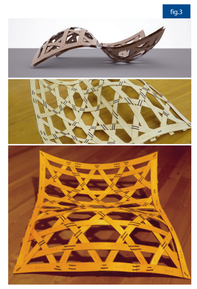


fig.3

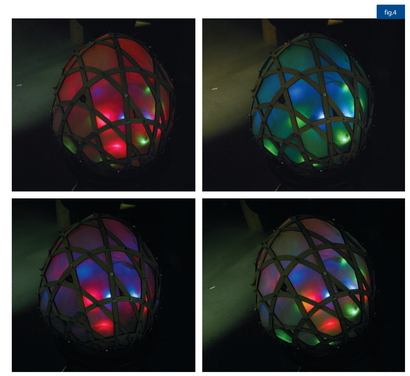
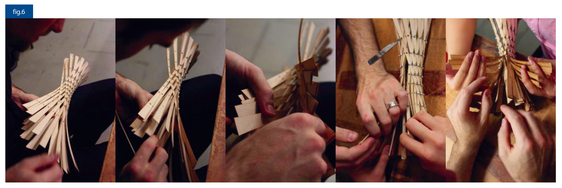
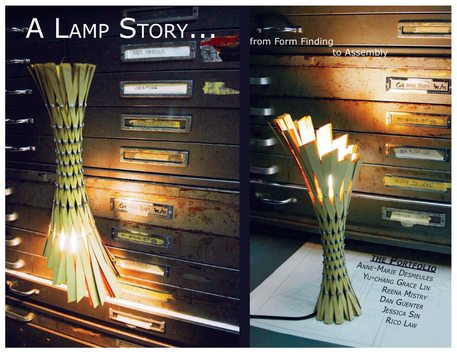


fig.4

fig.5





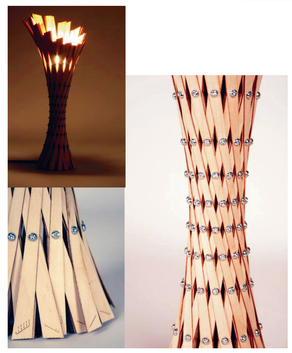
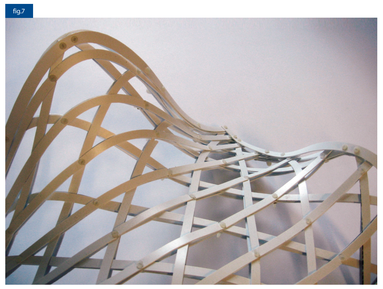
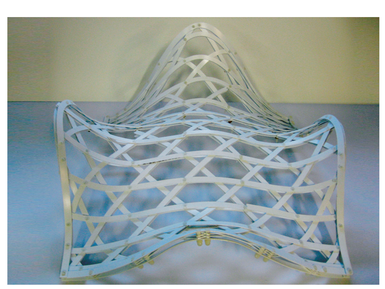
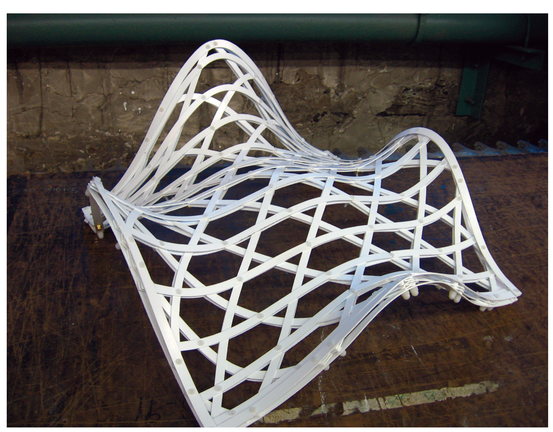


fig.6







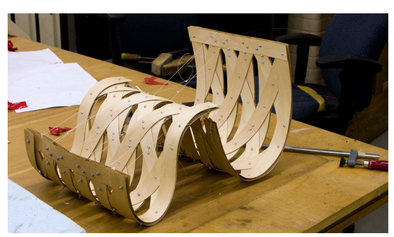


fig.7

fig.1,7 Maryse Barrette, Chi Yun (Queenie) Chau, Baharan Khosravi, Olivier Pellerin, Giulia San Gregorio, Khanh Linh Truon; final project and intermediate assingment.
fig.2 Kfir Gluzberg, Gabrielle Marcoux, Andrew Foote, Nicolay Boyadjiev, Nadia Petkovi, Tyler Rozicki final project.
fig.3 Frederik Dolmans, Sarah Ebner, Melanie Rothpan; final project.
fig.4 Jeanne Cayer-Desrosiers, Junia-Elli Jorgji, Emily Dovbniak, David Dworkind, Don Toromanoff, Ali Nouri-Nekoei; final project.
fig.5 Barra de Vicenzo, Dima, Fariha, Lortie, Messina, Sun; final project.
fig.6 Anne-Marie Desmeules,Yu-Chang Grace Lin, Reena Mistry, Dan Guenter, Jessia Sin, Rico Law; final project.