

4.511

Digital Mock-Up Workshop

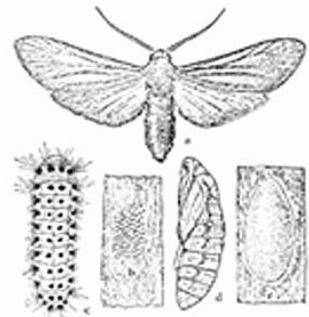
Department of Architecture

Jaebum Joo

Kalaya Kovidvisith



MASSACHUSETTS INSTITUTE OF TECHNOLOGY



Main lobby Base

Exterior main lobby
 Connected to the upper-landscape

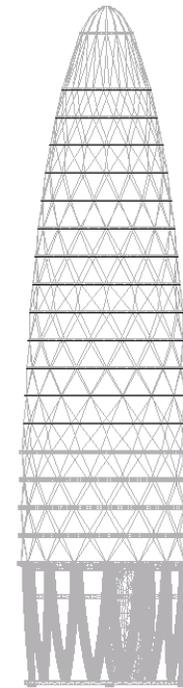
Sky level Top

Connected to the lower- landscape
 Penetrating vertical traffic
 Multi space deviation (special unit/ normal)

core



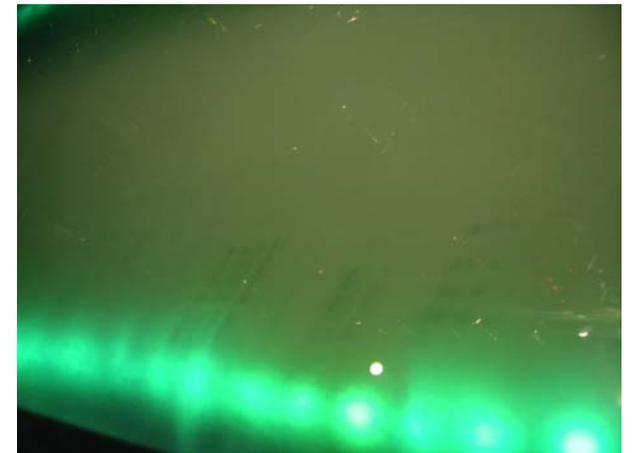
skin



tower

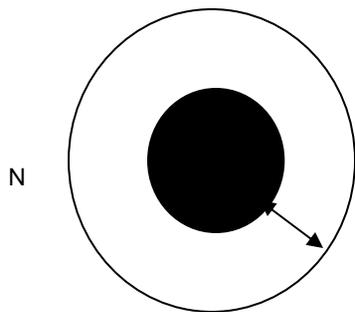


Design Interpretation

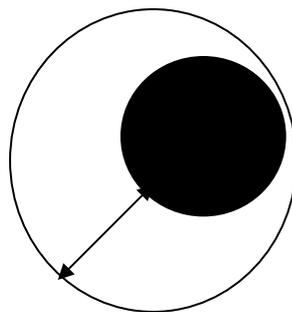


Horizontal Topology

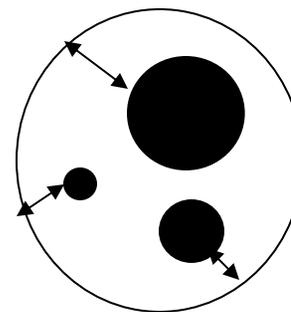
Design and Analysis



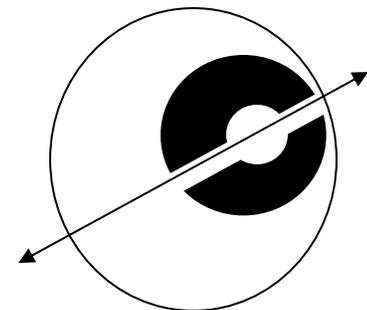
Centralized



Specialist



Independent



Aliance-reducing

Tasks

Orientation
 Identification
 Storage/ staging
 Overlap/ extent

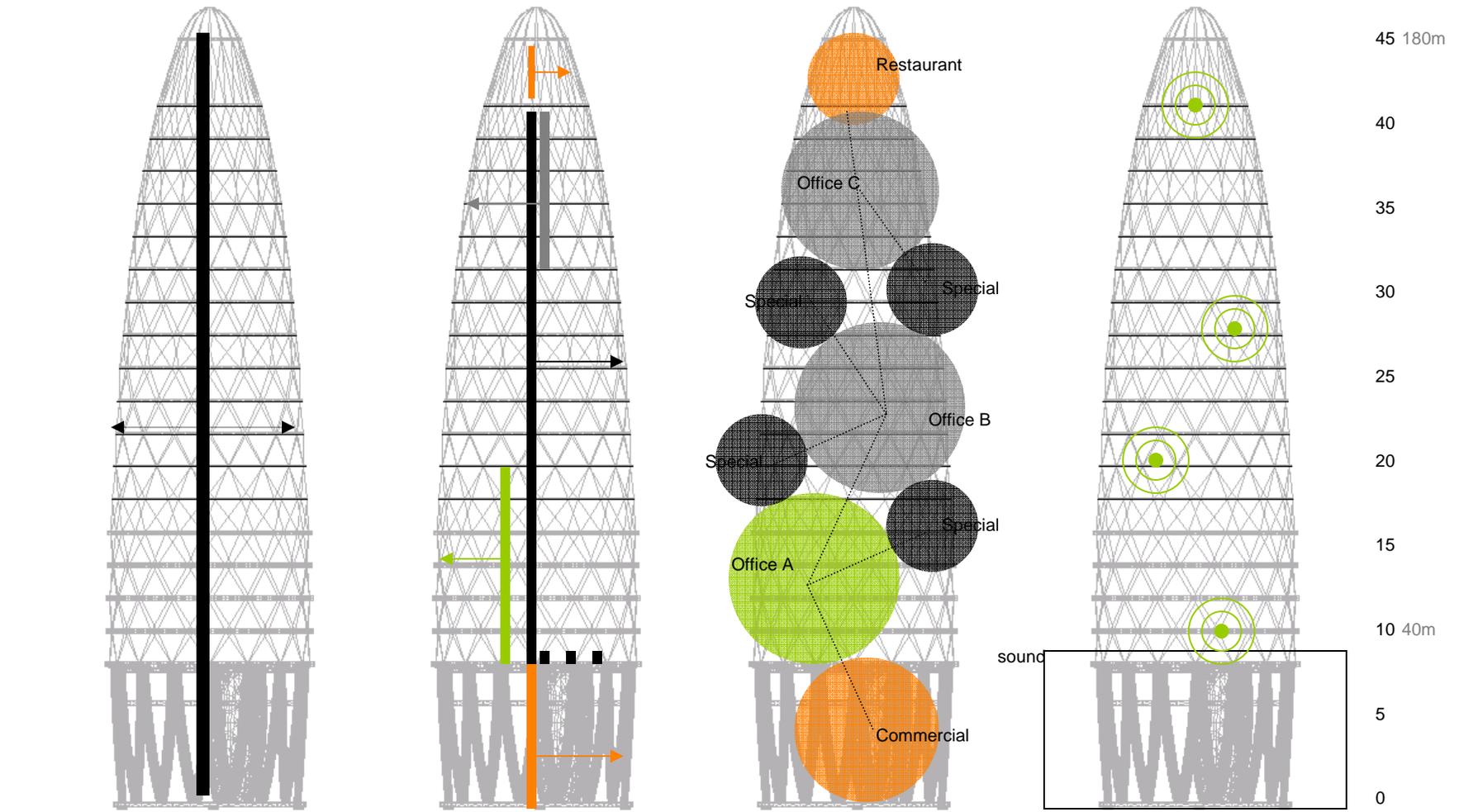
Objective

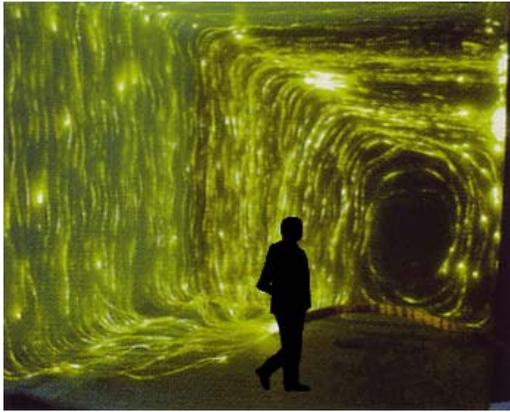
Control accessibility
 Reorganized vertical urbanization

Largest floor external Diameter
 Floor area
 Core diameter
 Max core façade distance

Vertical Topology

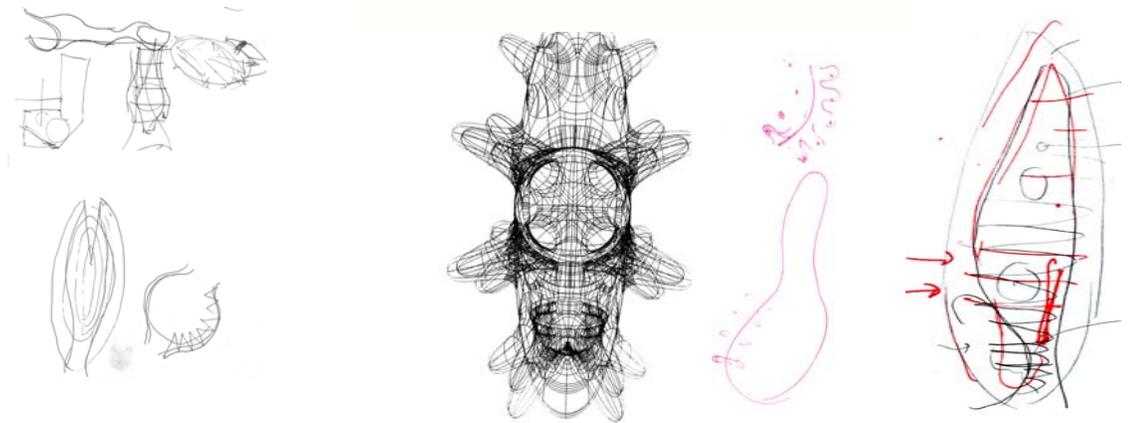
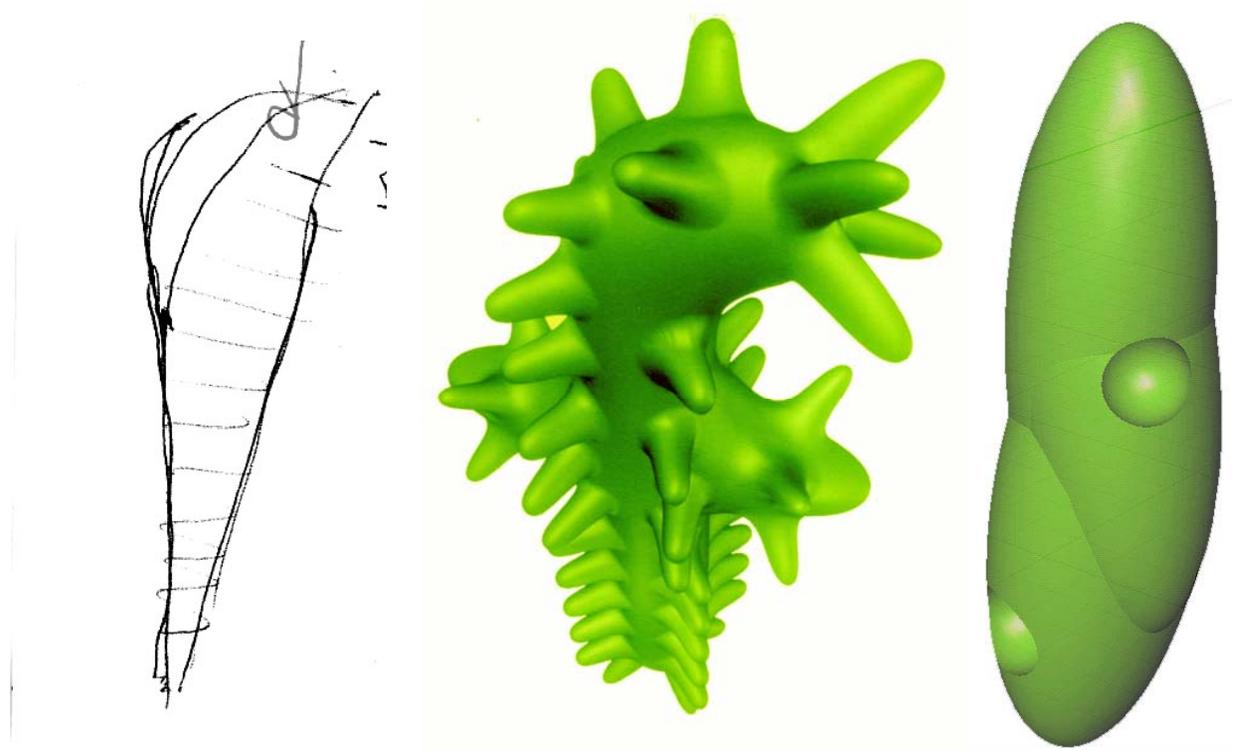
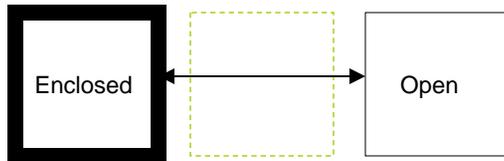
Design and Analysis





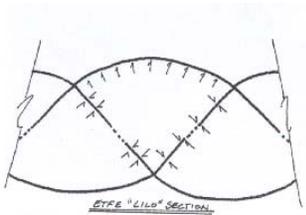
heart-core

Experience Design

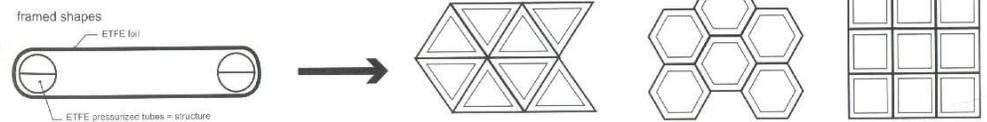
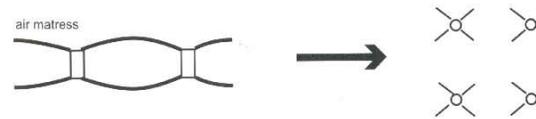
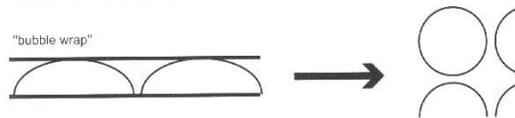
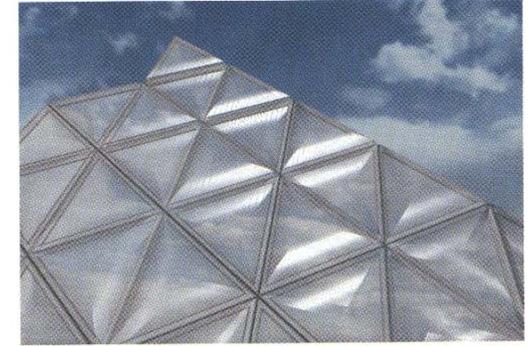
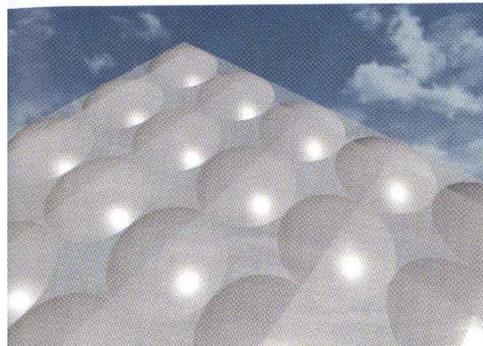
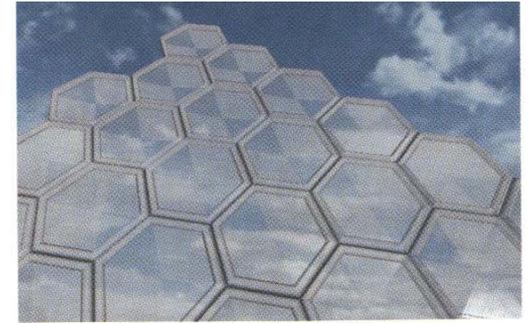
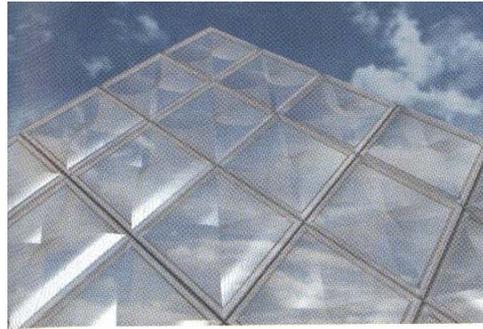
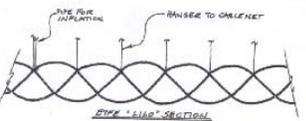


SoftSkin

Pattern and perspective

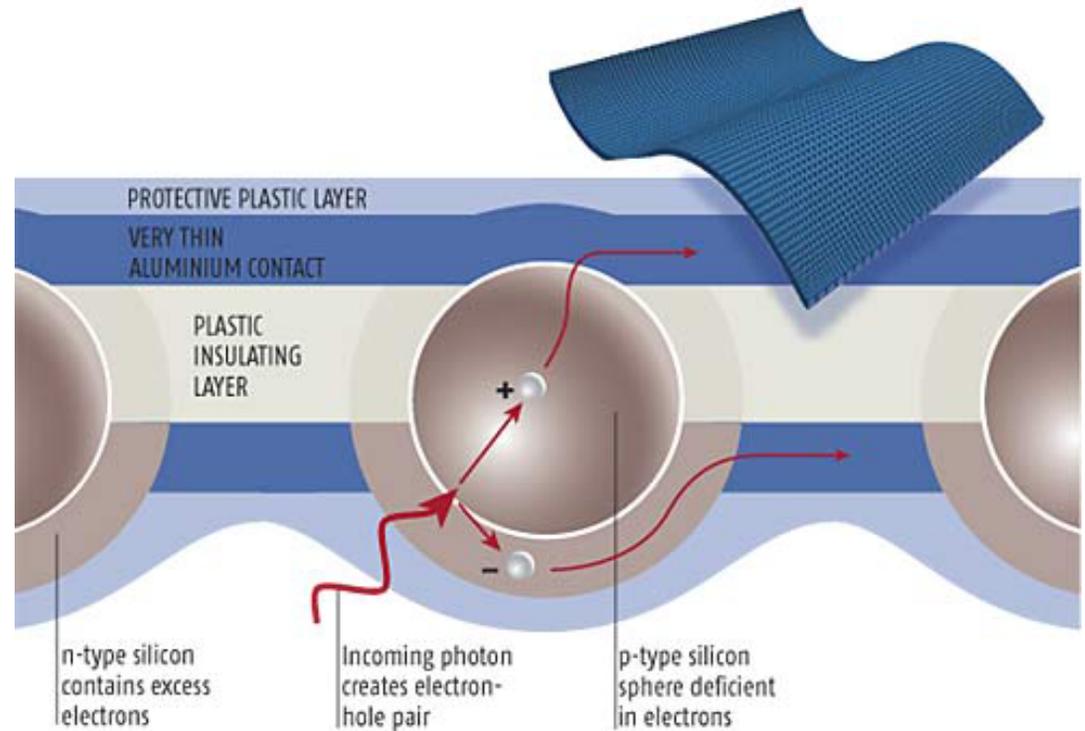


Skin Shader
Diffuse Structure
Safety
Energy Pillow

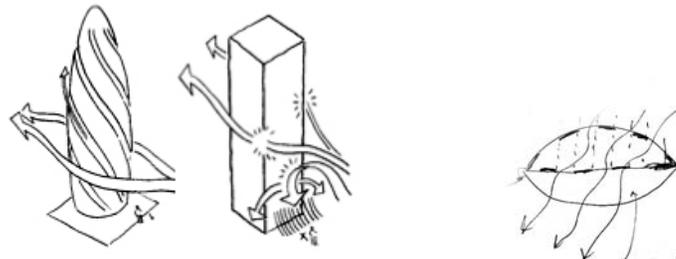


THE FLEXIBLE SOLAR CELL

Current is created by semiconducting spheres in a thin, bendy aluminium and plastic matrix



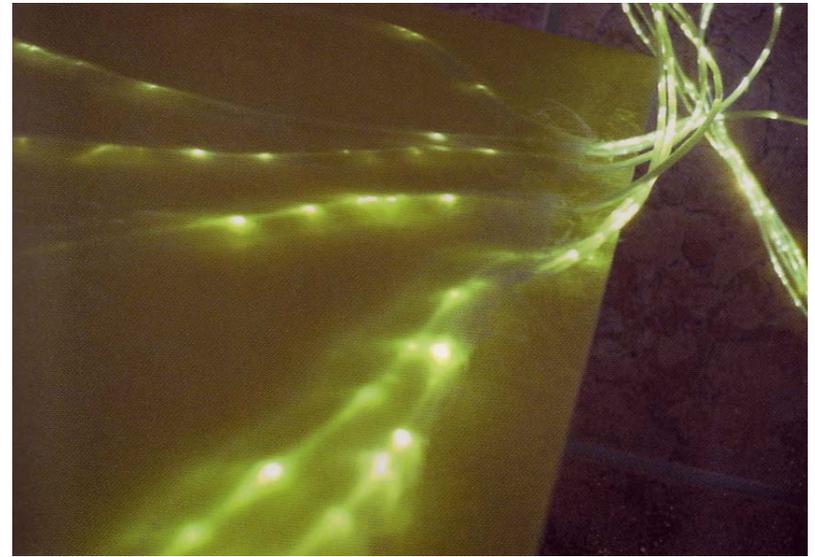
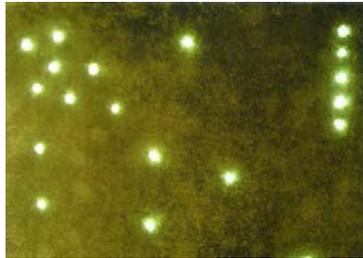
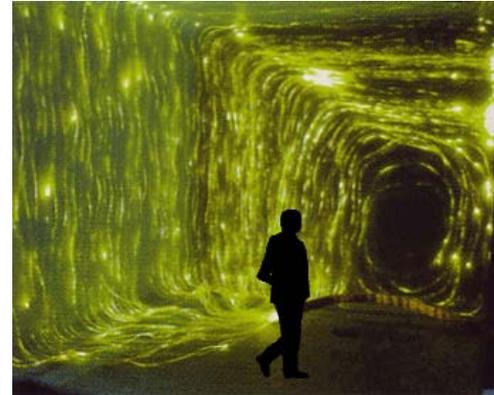
Functional façade

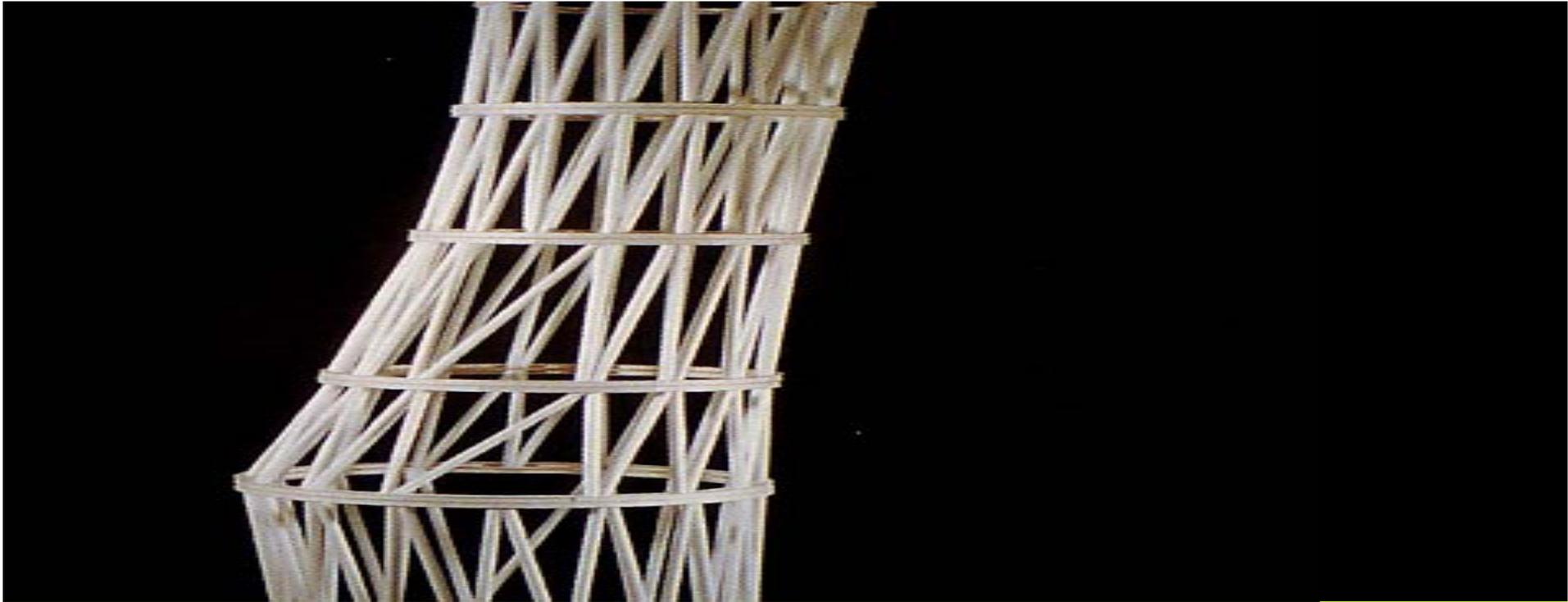


Hybrid Nanorod-Polymer Solar Cells, Wendy Huynh et al, *Science*, 29 March 2002, pp. 242-4.

Self-illuminating

The relation between light and form activating individual components of the material, in this case fiberglass. Translucent bodies expresses an especially beautiful luminosity. Using resin to protect the fiberglass damage and transmit light





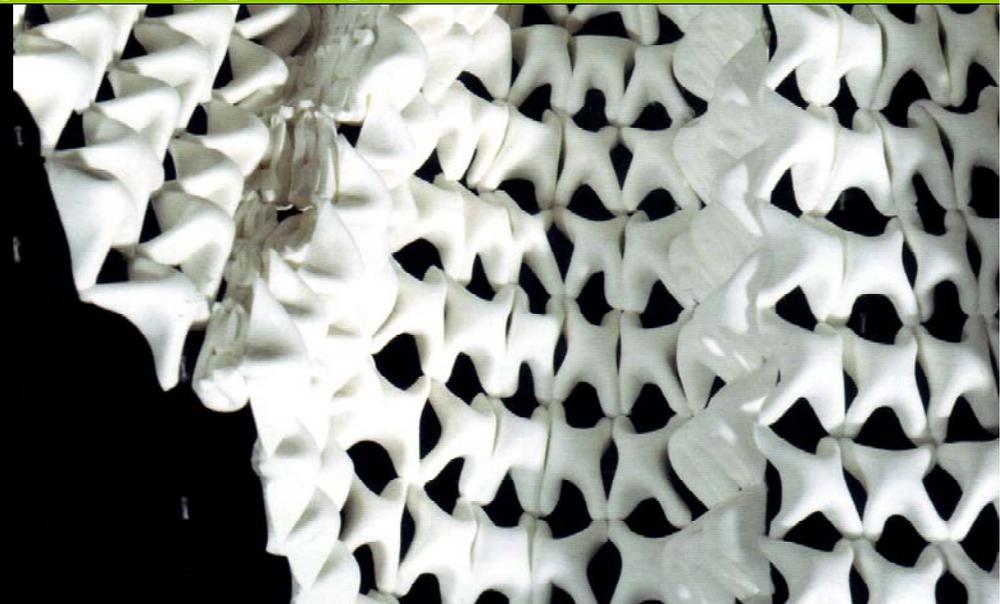
Computation and fabrication

Access and redesign

- Populate the connection to the geometrical surface
- Shape variation

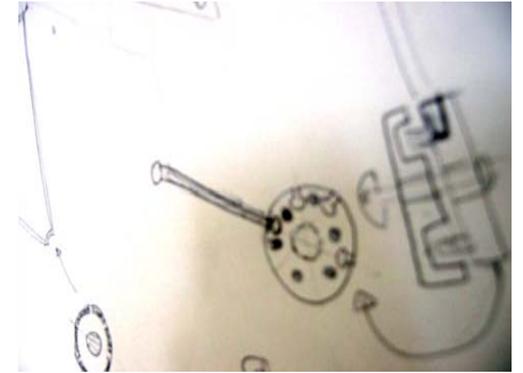
Engineering Assembly

- Joinery
- material



Connection Design

design solution on using 2D machine to fabricate connection part

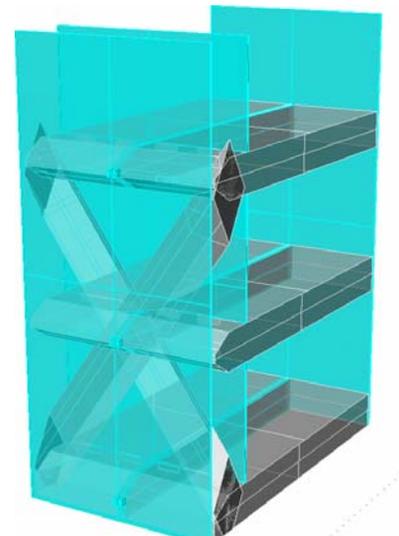
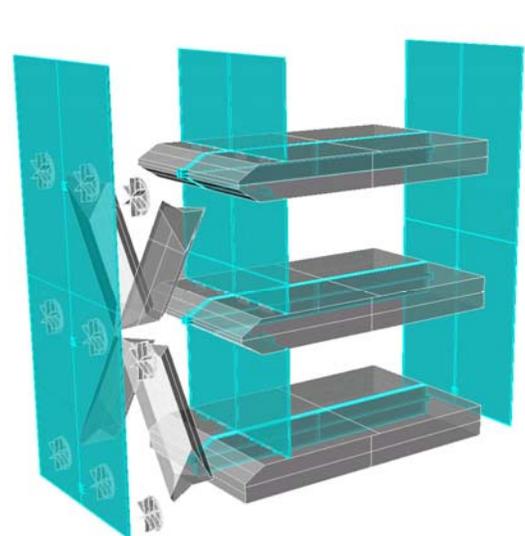
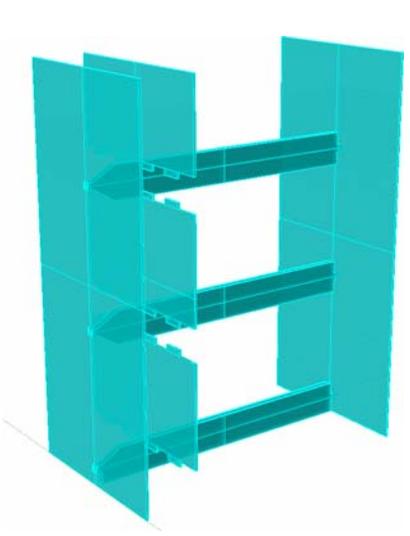
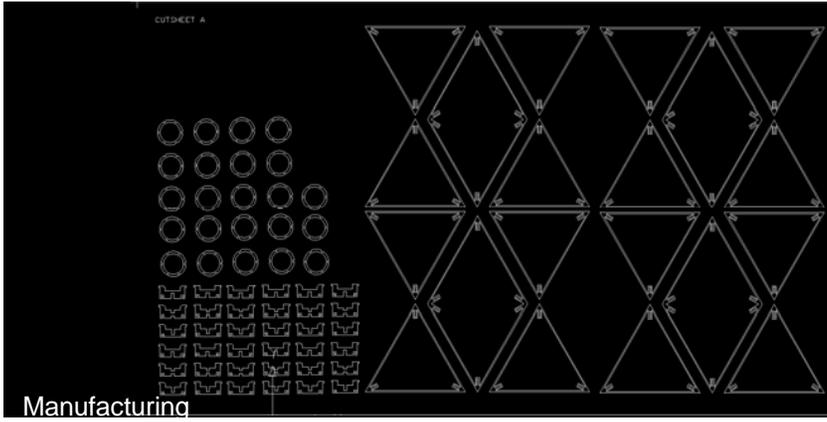


Material Flexibility

Thin circular acrylic gives flexibility in connecting flat parts

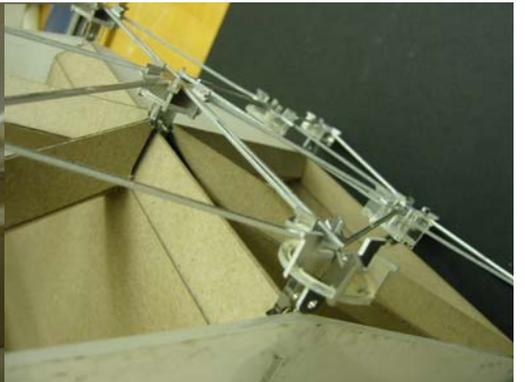
Degrees of freedom

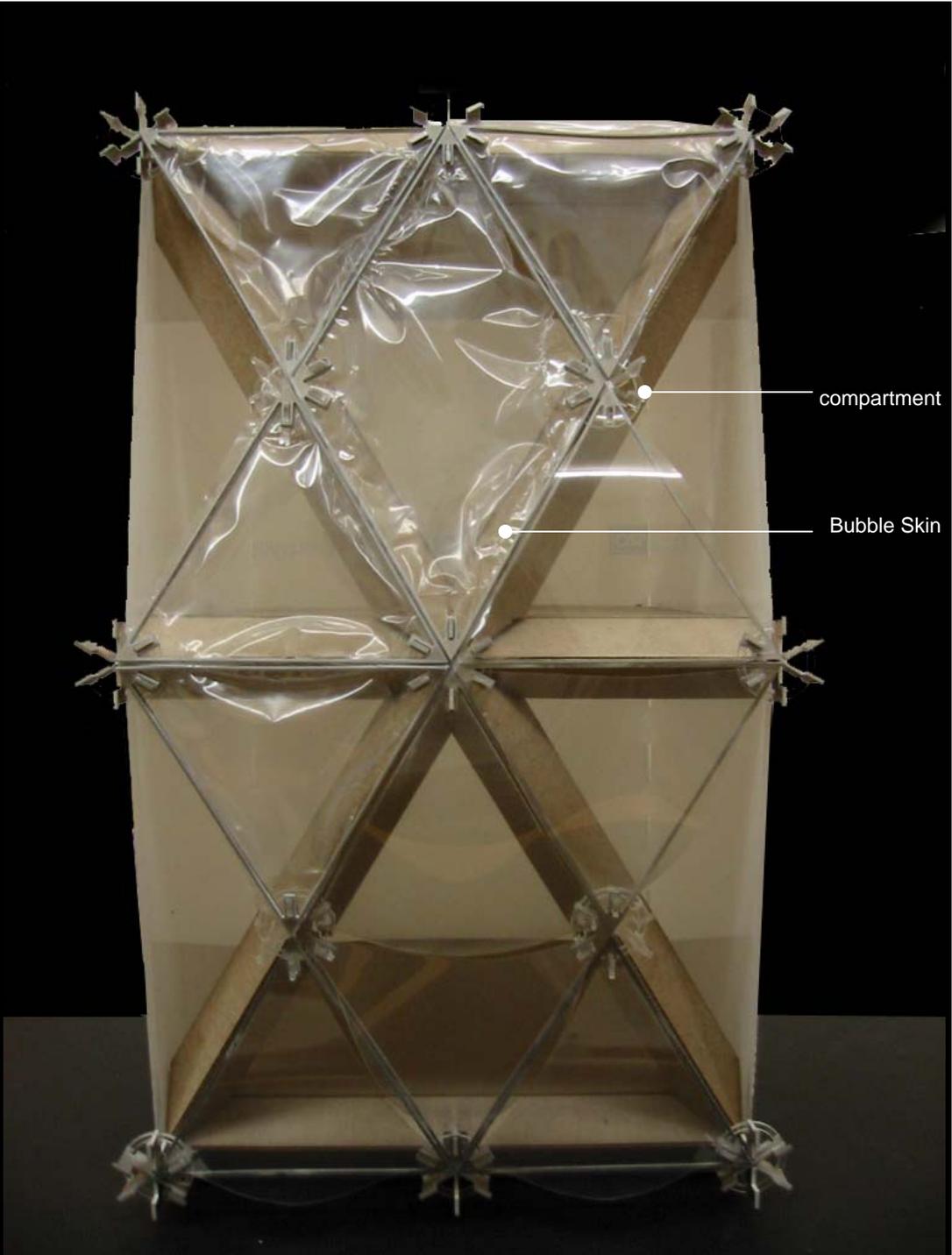
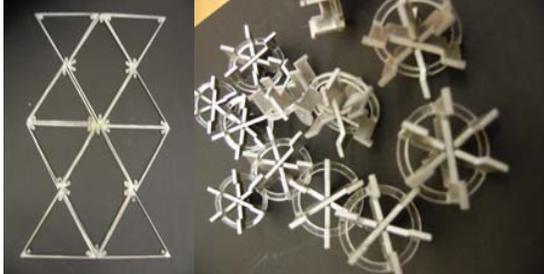
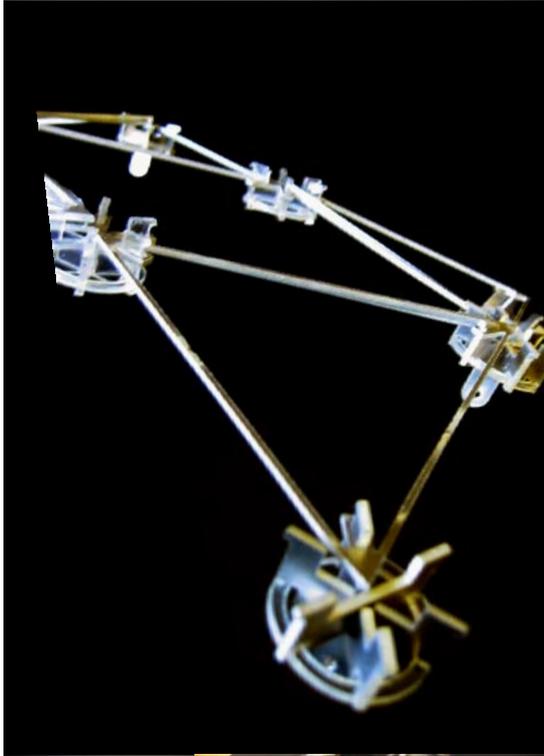
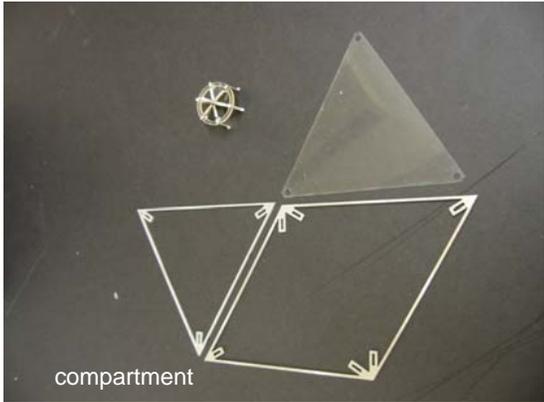
Larger gap at the center notch gives freedom of flat parts rotation



3D rendering

Assembly

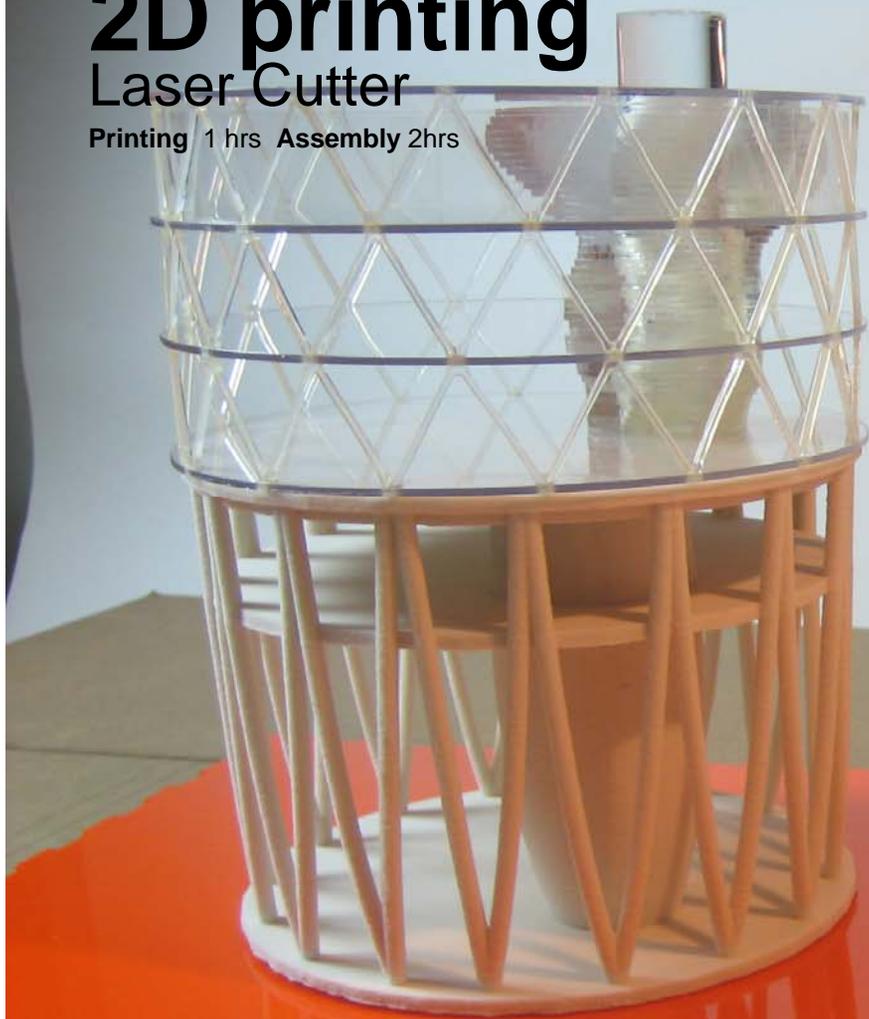




2D printing

Laser Cutter

Printing 1 hrs Assembly 2hrs



FRONT ST

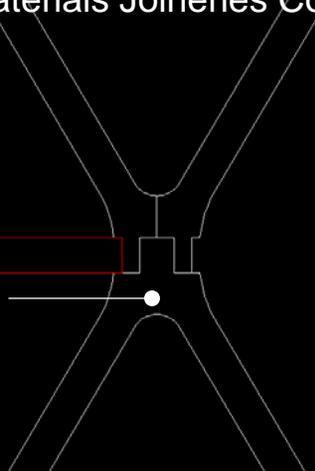
WINDSOR ST

Component Modeling

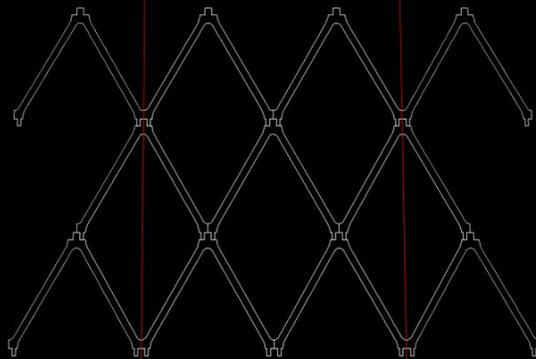
Abstract Materials Joineries Controlled Description

floor

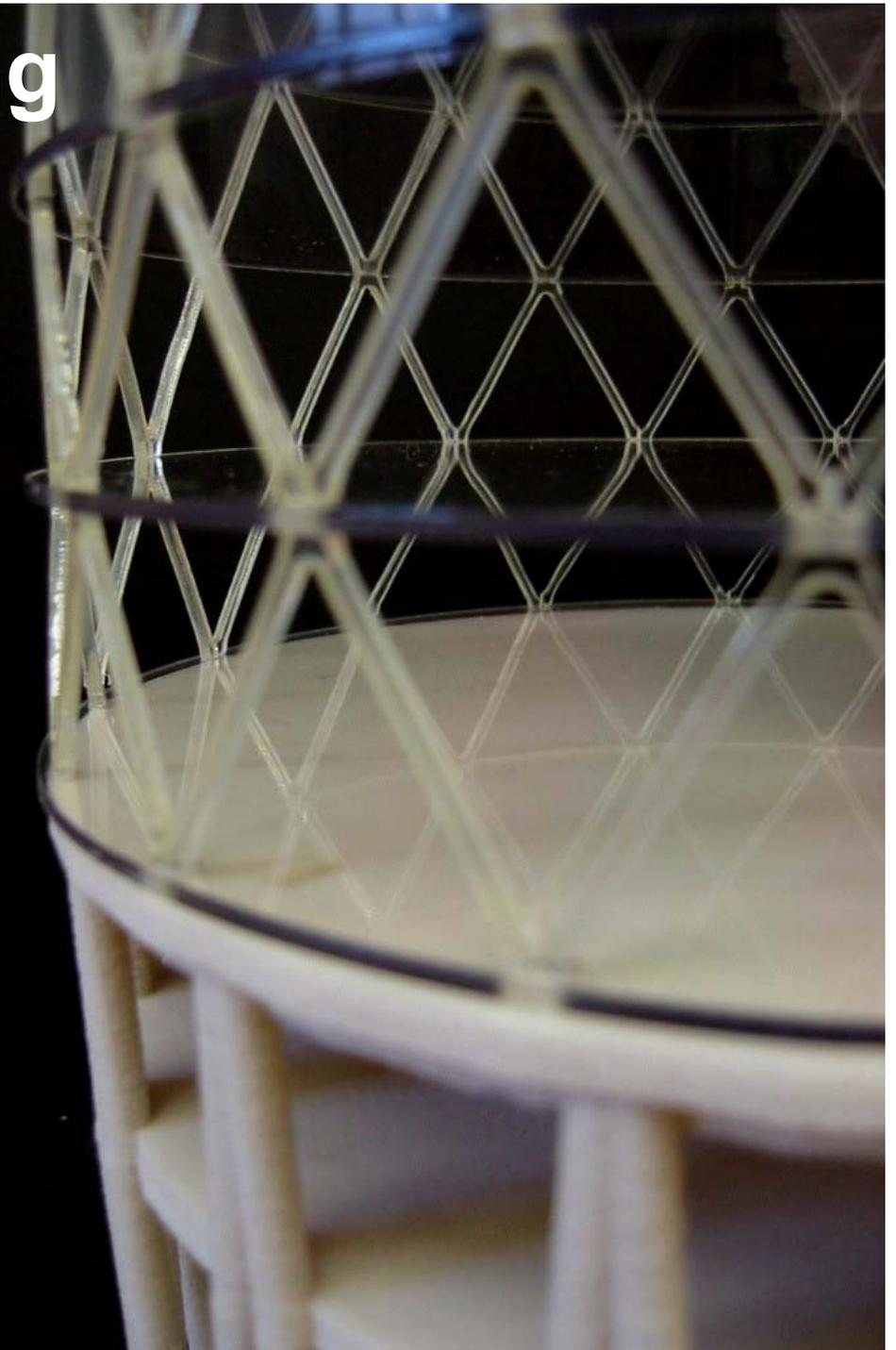
Connection part



Y
^



Pattern Alignment



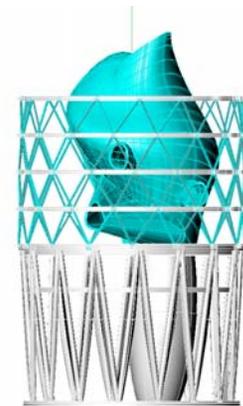
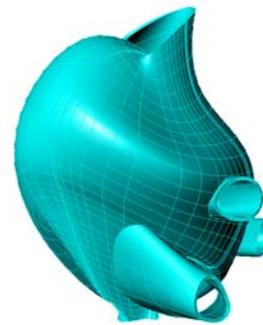
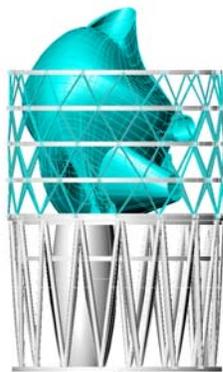
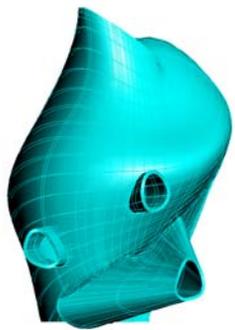
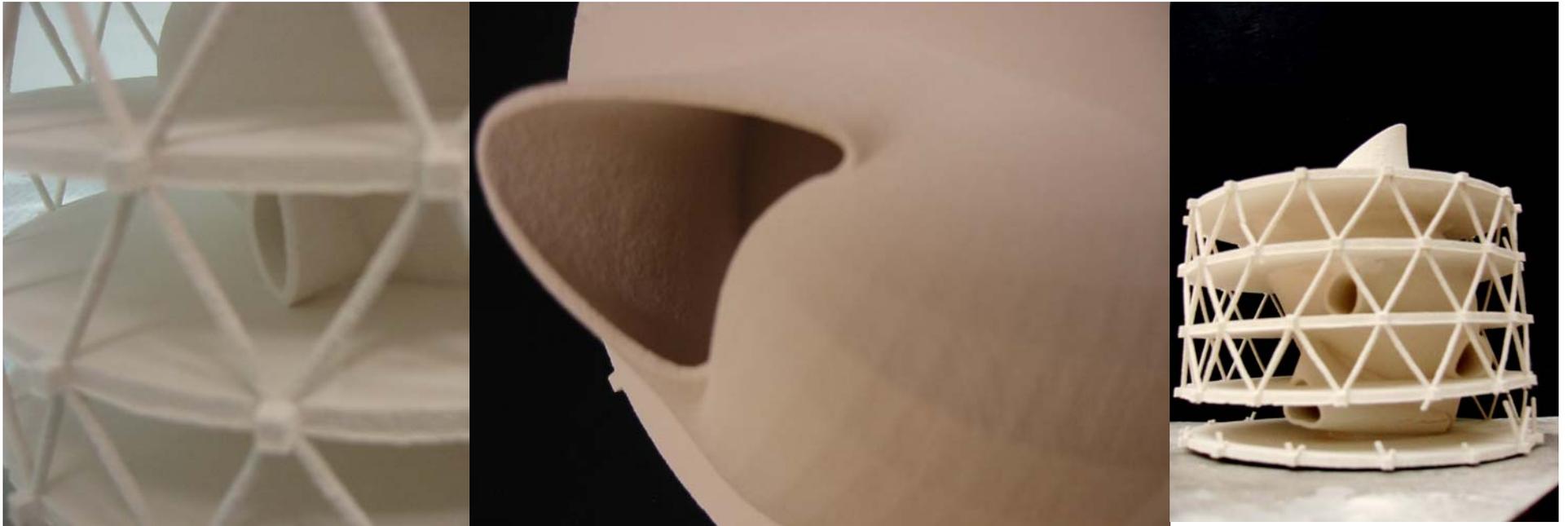
3D printing

Z-Corp

Printing 7 hrs Excavating 2hrs 30mins



3D printing



Massing Control

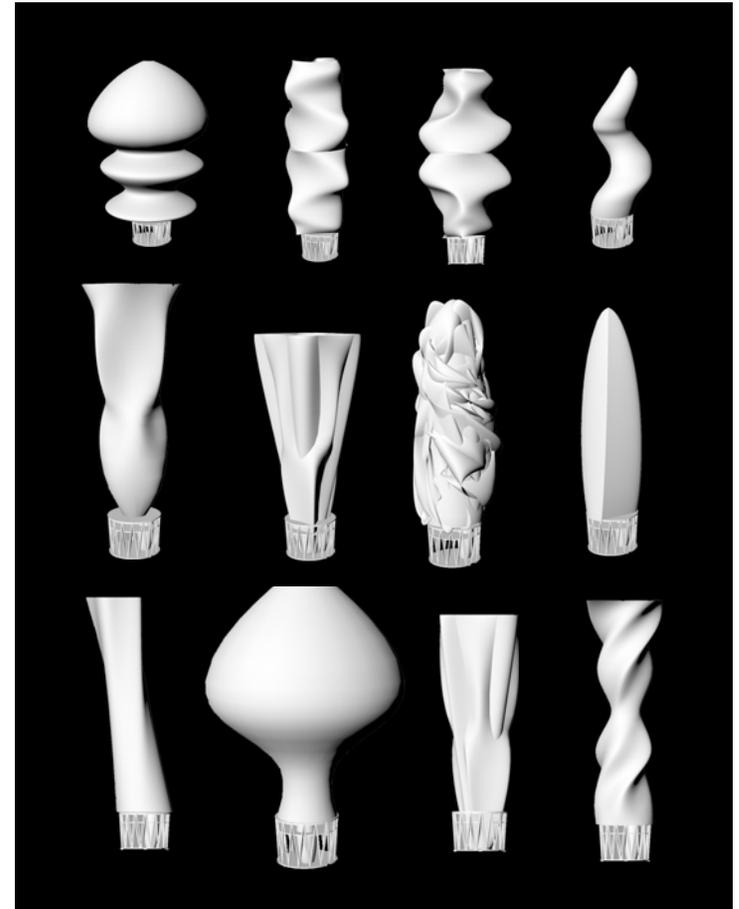
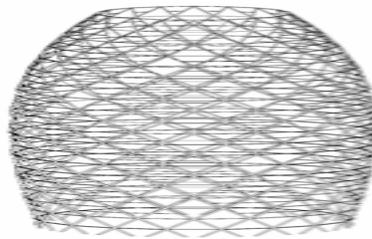
Schematic Modeling



original



Derivative tower



New tower



Size



Vertical



rotation



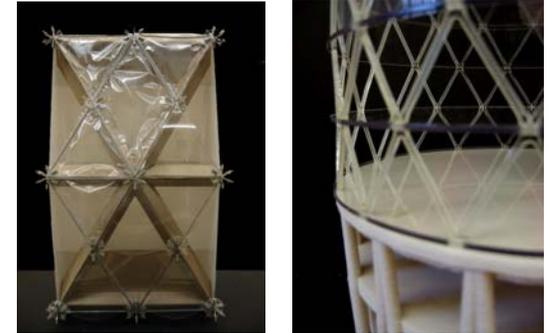
Horizontal



Evaluation and Future Development

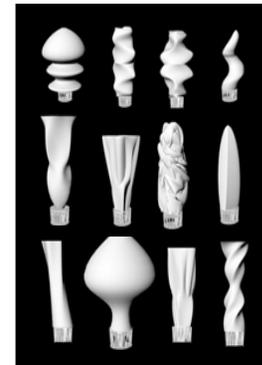
Fabrication

Scale



Parametric Modeling

Rhino / CATIA



Manufacturing

Z-corp / Waterjet

