

Assignment 2: FAMILIES OF FORM

Hand-in: Wednesday, Oct. 7, 1pm

Folding allows flat materials to quickly shift between different 3D forms. This morphing capacity can be used to shield or expose surfaces to sun, wind or water. By arranging materials that reflect or transmit light, heat and humidity, we can create foldable components that adapt to environmental conditions. Changeable lightweight components can be used with static elements that store heat energy or stormwater.

Experiment with form, light and shadow, moving towards designing a facade module that varies between open and closed that will be part of a minimal living pod. First, experiment with light and shadow effects by manipulating surfaces and material properties. Use one folding motif to design a screen that modulates the sun for the south-facing wall of a living pod. Daylight should animate the surface, changing the interior from dawn to dusk and over the seasons, for varying moods.

The goal is to develop a fruitful design process with physical folding that maximizes sensory engagement, with parametric design that expands design possibilities and digital analysis that informs design decisions.

1



FOLD

Learn basic patterns, try own variations

- create & combine 3D motifs
- cut apertures for light

2



LIGHT

Photograph light and shadow experiments with folded pieces.

- substitute pieces and background form
- adjust color, shininess or transparency

Select 3 top images

3



COMBINE & VARY

Lasercut vector patterns

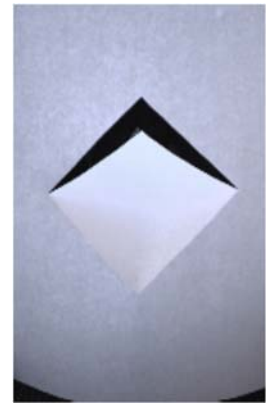
- increase intensity, edit down to essence
 - work with a partner to photograph results
 - Panel area should be 100 and 150 square inches. Any shape is fine
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A. FOLDING MOTIFS & CLUSTERS

1. Play with bending, curving, and cutting paper to create 3D motifs that admit light. Move them under a light source to see what pockets, lines, spaces create the most evocative visual images. Snap photos as you work, carefully framing them to maximize light and shadow play.

2. Insert colored surfaces to increase the emotional impact. Record images.

3. Join together multiples units to create both spatial clusters and flat panels, photograph.



Bring all folding work (including less successful trials) to class along with 8.5" x 11" horizontal printouts of your three favorite images (including at least one color image).

B. PARAMETRIC VARIATION FACADES

Develop light-modifying facade panels at 1"=1'-0" by using Rhino Grasshopper and tessellation patterns to lasercut dynamic variants of your favorite folded module. See if you can generate unexpected results.

1. Start by generating 2D patterns. Draw your folding motif in Rhino. Use GH to place it onto different grids, and use slider bars to change the number and size of the grid. Bake the successful variants onto different Rhino layers.

2. Using the same GH file, try substituting different Rhino motifs. Adjust the sliders until you have something that looks good

3. Look at generating other relationships between the motifs.

Bring 3 top images 8.5" x 11" and folding work to class.

REFERENCES



<http://blogs.uoregon.edu/shapinglight>

Guzowski, Mary. (1999). *Daylighting for Sustainable Design*. McGraw-Hill.

Hauer, Erwin (2004). *Continua: Architectural Screen Walls*. Princeton Architectural Press.

Integrated Design Lab, Seattle. Daylighting Modeling

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Jackson, Paul, *Folding Techniques for Designers: From Sheet to Form*, Laurence King Publishing, 2012

March, Lionel & Philip Steadman (1974). *Geometry of Environment*, Cambridge, MA: MIT Press.

Millet, M. S. (1996). *Light Revealing Architecture*. Hoboken, N.J: John Wiley & Sons.