



**ARCH1291 - Visual Studies II**  
**FALL 2014**  
**Assignment 2: Digitizing Folded Models**

**ASSIGNMENT INTRODUCTION**

This assignment will examine the translation of a developable geometric design from a 3-dimensional folded, or origami, paper form into a digitized Rhino 3D model (created through point selection and the building up of surfaces) in which the fundamental design concept will be explored and strengthened through this process of the imposition of geometric rules by the student, i.e. recognizing symmetry.

Rhino skills:

- Mirror
- Rotate Copy
- Layer Organization
- History

New Rhino skills introduced

- Setup and use of digitizer
- Align
- Set Point
- Curve Through Point
- Surface from Corner Points
- Control Points
- Edit Point
- Interpolate curve

**ASSIGNMENT RESOURCES**

Rhino Primer

- <http://openlab.citytech.cuny.edu/12101291coordination/rhino-prim>

Video Tutorial for Assignment 2

- <http://openlab.citytech.cuny.edu/12101291coordination/assignment-4-digitizing-folded-models/>

Folding Design Options & Diagrams

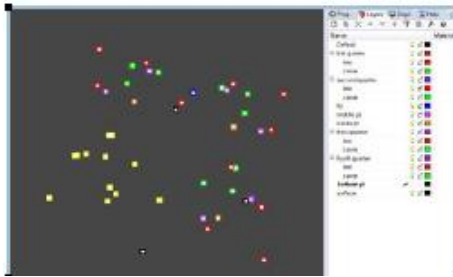
- <http://openlab.citytech.cuny.edu/12101291coordination/folding-diagrams/>

**INSTRUCTIONS**

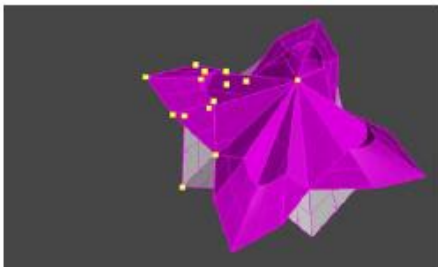
1. Take your folded form, secure it to the digitizing table in Lab V813 using clips or drafting tape – one rule about scanning and digitizing is that the object must remain still while you're collecting data.
2. Log in to one of the digitizing stations (one is set up for right-hand use and other for left-hand use). Launch Rhino 5 64bit and issue the "Digitizer" command. Select "Microscribe Digitizer" when prompted to "Select

Digitizer.” The light on the digitizer base should turn green – if the light is not green then contact a CLT for assistance as something may not be connected properly.

3. Depending on the size and location of your model on the digitizing table you may need to recalibrate the digitizer by selecting an origin point, an X axis vector, and a Y axis vector, the latter of which Rhino will automatically correct to be 90 degrees off the X axis to create a proper coordinate system.
4. Begin to digitize your form by collecting points at all fold corners of your form. Some origami may have induced curvature, in which case you may want to collect curve data along that crease. Practice good layer management by placing points on different layers – the following are a few examples of how you may want to organize your data:
  - a. Place all points along a curved crease on their own layer
  - b. Place all corner points that form a planar surface boundary on their own layer
  - c. Place all corner points that form a sequence of linearly aligned folded edges on their own layer
  - d. Points may fall into multiple categories, in which case you may want to use nested layers or special color-coding in addition to layer management. Whatever you do, be systematic about it so that you don't end up with a pile of indecipherable points



5. Even if a form has inherent bilateral symmetries, it's good practice to digitize the entire object. That way, you can locate the single unit that digitized most accurately and mirror, rotate, or polar array the data to ensure that your digital recreation is as precise as it can be. You will most likely need to draft a geometrical diagram or construction lines on a separate layer beneath the scanned data and use them as alignment objects for the digitized data.
6. Once the digitized data has been aligned properly, begin making surfaces. For the most part you will be making planar surfaces from planar curve boundaries or planar point boundaries but you may find cases where you will be approximating curved surfaces using surface from edge curve, sweep, or loft tools. In the upcoming surfaces assignment we will go into further detail on Rhino surface tools, but you will need to get familiar with a few now in order to complete the assignment.



7. Save your Rhino file to your course Dropbox using the proper naming convention. Your final Rhino file for the assignment should include the following information organized into proper layers:
  - a. Original digitized point and curve geometry (messy!)
  - b. Aligned point and curve geometry with construction curves or alignment diagram (clean!)

c. Surface model generated from aligned geometry

## GRADING

To receive a grade, your Rhino file must be submitted to your Dropbox folder by the beginning of the next class. Assignment 2 will be graded as follows:

1. Are your files named properly? 10%
2. Does your Rhino file contain the original digitized data? 10%
3. Does your Rhino file contain the aligned digitized data with construction geometry? 10%
4. Does your Rhino file contain a surface model generated by the digitized data? 15%
5. Is the Rhino model a reasonably accurate translation of the original physical object? 30%
6. Are the only naked edges on the outermost boundary of your joined polysurface? 10%
7. Are your surface normals pointing upward (or outward) from the model? 15%
8. Did you digitize a second model? 25% EC