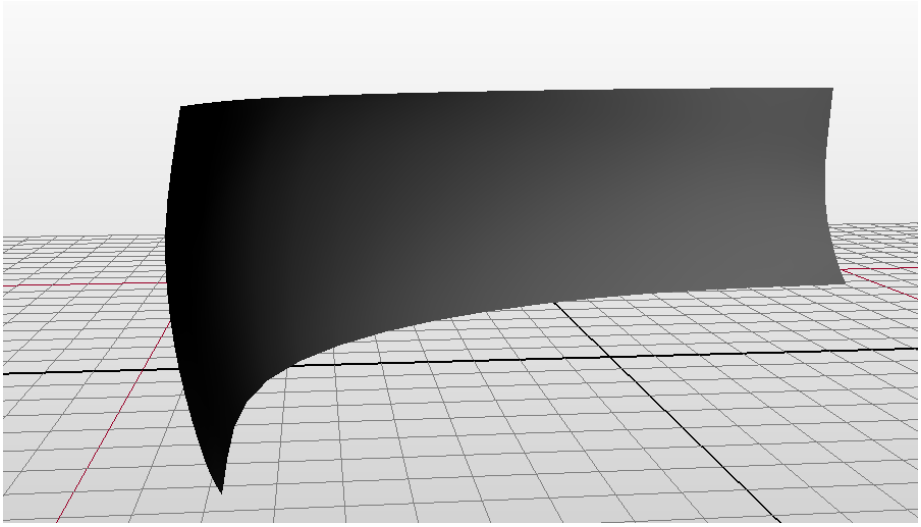
A Curved NURBS Wall
Wireframe Structure



(Acknowledging the beautiful and powerful curved-wall sculptures of Richard Serra.)

Set up your Dimensions

- In *Maya*
- In *Illustrator*

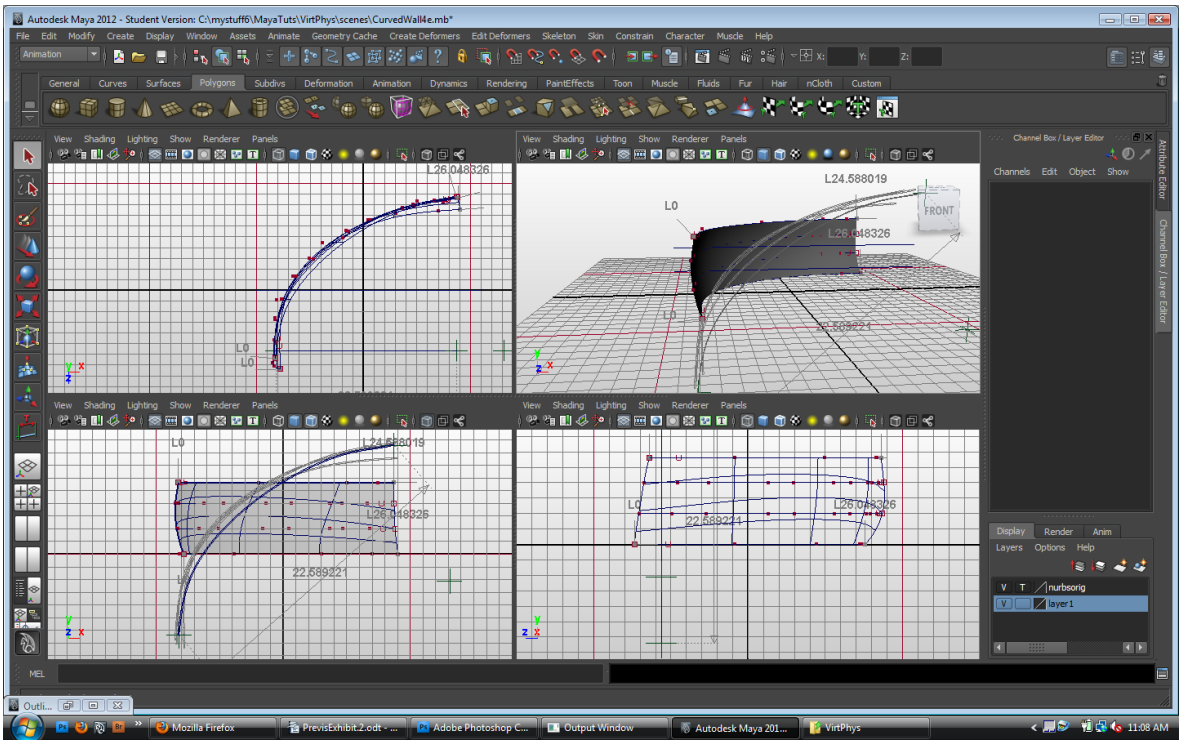
Create a Curved Wall

- ...in Maya

- >Create >EP Curve Tool []
  - Curve Degree = 3 Cubic
  - In Top Window,
    - draw curve for top of wall
      - Translate it up
    - Draw curve for bottom of wall
      - Leave it on the ground plane
  - Select both curves
    - >Display >NURBS >CVs
  - In other window
    - Draw vertical end curve
      - Use “v” key to snap to end point of each horizontal curve
  - Adjust position of cvs as desired
  - Select all four curves
    - >Surfaces >Surfaces >Birail >Birail 2 Tool
      - It creates a NURBS surface
  - Adjust shape of surface
    - by moving Cvs of contour curves
    - Since History is active,
      - surface is updated

Create Lines to be projected

- >Create >EP Curve Tool []
  - Curve Degree = 1 Linear
- >Display >Grid []
  - set up grid spacing
- In Top Window,
  - draw one straight line
    - that passes through
    - and is longer than
      - your wall model
  - Use “x” to snap to the grid
  - Using the Top Window
    - gives you a curve at Y=0
- Translate that curve up in Y to a good height
  - E.g, to 2.5”
- Duplicate that Curve:
  - Select the Curve
  - >Edit >Duplicate
  - Now Translate this second curve up the same amount
    - E.g., to 5”
- Repeat for as many horizontal curves as you will need



Create projection curves on surface

- Select all the straight-line curves you just created to be projected
- Shift-select the NURBS surface

- Click in *Front* window to select that window

- >Edit NURBS >Project Curve on Surface []
  - Active View (that is, the Front window)
  - curves are created on the surface
- With these newly projected curves still active
  - >Edit Curves >Duplicate Surface Curves

Duplicate top and bottom curves

- Select surface
- Component selection mode
  - Isoparm
  - Select top isoparm
  - Shift select bottom isoparm
- With both still selected
  - >Edit Curves >Duplicate Surface Curves

Create geometry to be output

- Create a short straight line
- Move it (snap it) to end of one duplicated curve
- Select straight line; shift select curve
- >Surface >Extrude []
  - Tube, At Path, Closest End Point, Profile Normal, Polygons, Quads, Count = ~50
- Repeat for each curve

Output Curve Geometry

- Make sure the FBX plugin is loaded
  - >Window >Settings/Preferences >Plug-in Manager
    - fbxmaya.mll
      - Click on Loaded and on Auto Load

- Group all poly curves
- Rot 90 to make the Front window show them from the top
- With group of poly curves selected
  - >File >Export Selection []
    - FBX_export

Confirm Dimensions

- In Maya
  - Measure each curve
    - Easier to measure the original curves
    - rather than the poly curve they created

  - >Create >Measure Tools >Arc Length Tool
    - “v” to snap to end point of one curve
      - Don't wiggle or move; should read “L0”
    - Click again near far end of curve
      - “v” to snap to point, drag to far end point.
    - Arc length distance of curve is indicated as “L<number>”
      - This is the exact length of your curved piece of wire

  - >Create >Measure Tools >Distance Tool

- snap click on one end, then the other of a curve
- This is the straight-line distance from end to end

Convert FBX to DXF

- FBX Converter is a stand-alone program
  - Can be downloaded for free from Autodesk website

- Run FBX Converter
  - In Source Files window
    - click Add
      - Browse to select the .fbx file you just created
        - (By default it will be in your /scenes folder)
  - In the Destination Files window
    - Change Destination format to DXF
      - (This is a format that Illustrator can read)
    - Click Convert (bottom right)
    - Result should now read “Converted”

- Check in your folder to make sure the .dxf file exists

Read DXF into Illustrator

- Open *Illustrator*
- >Edit >Preferences >Units....
  - Set Units to same units you used in Maya
    - E.g., “inches”

- >File >Open
  - Select your .dxf file
    - Keep Original Size
    - Units should be same as in Maya
- >File >Document Setup >Edit Artboard
  - Drag corners to make artboard include all of drawings

- Each poly curve is a separate layer
  - and can be printed separately
  - or color-coded and printed all together
    - To color-code, select a curve,
      - change Stroke color
- Helpful to also use Text tool
  - to identify each curve
  - to write in length of curves
  - to identify filename
  - etc.

- Confirm dimensions of your Illustrator drawing
  - Mouse over eyedropper tool, hold down
    - Select ruler = “Measure Tool”
    - Click on one end of a curve; click on the other
    - In the Info window, D = Distance = straight-line length

- Should be same as it was in Maya

Print Drawings as Guides, Form Wires

- From Illustrator
  - >File >Export or >File >Save
    - a vector files
      - E.g., .eps or .pdf
    - Or, a bitmapped image file
      - E.g.,, jpeg
- Read into Photoshop
  - Print on large-format printer

- Use printed images of wires
  - as visual guide
  - to bend aluminum sculpture wire
    - into correct shape and size

- Glue (Krazy Glue?) aluminum wires together