

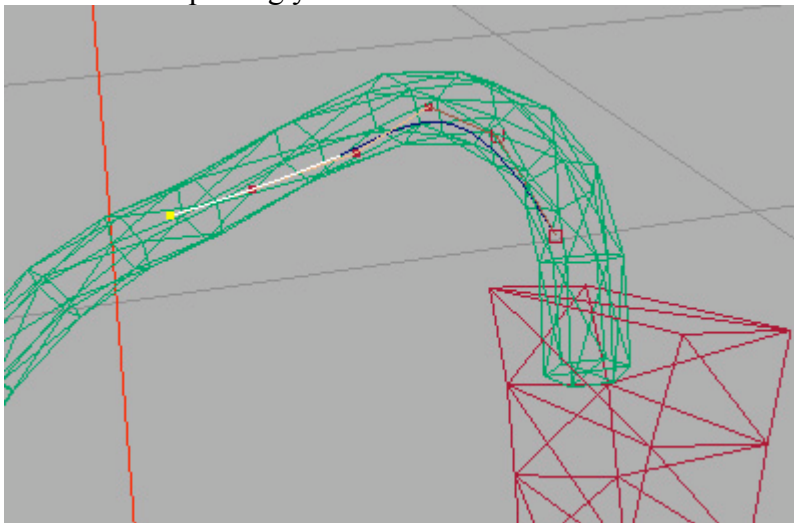
# Wire Rigging Cartoon Ribbon Models in Maya:

by Geordie Martinez ([www.negative13.com](http://www.negative13.com))

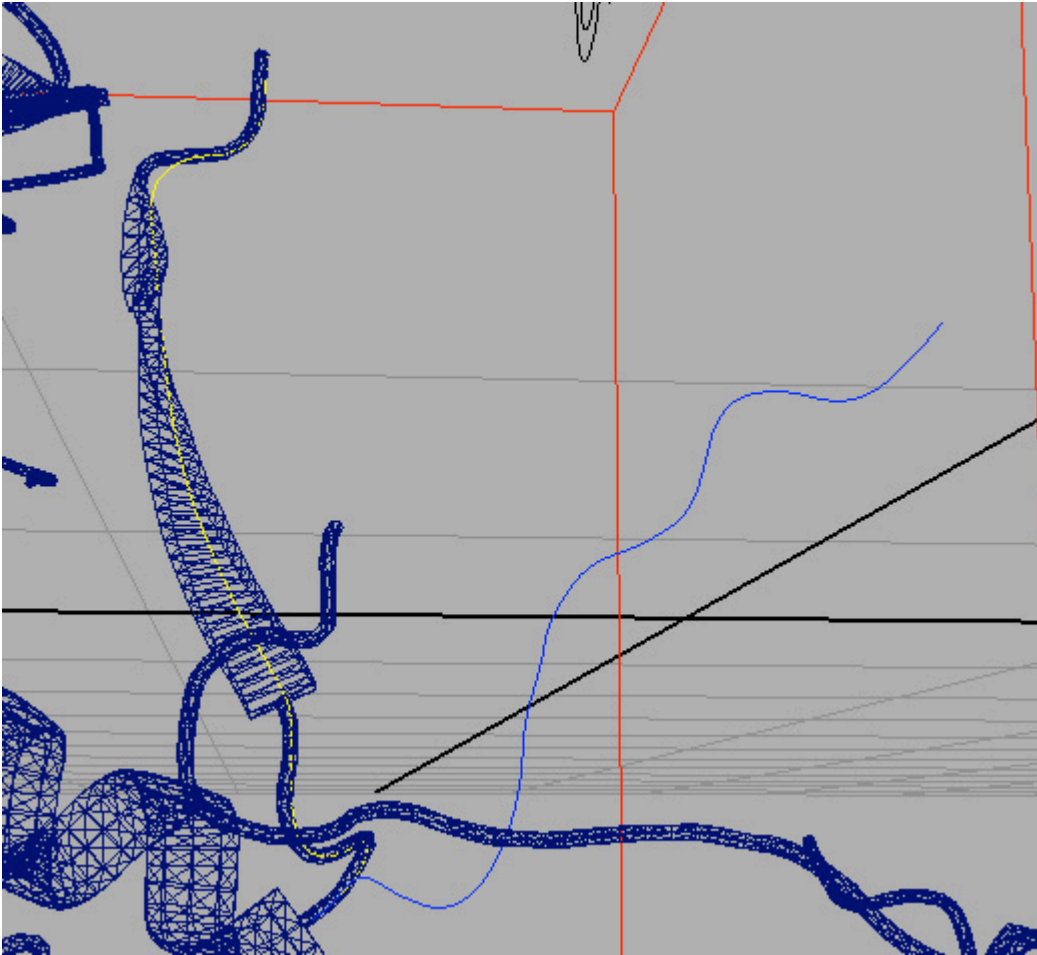
The following process was used to create a custom rig to study the conformational morphs of the HIV gp120 receptor as it binds CD4. A cartoon model can first be generated in Pymol, VMD or Chimera, exported as VRML and then converted to OBJ for import into Maya.

1. **Clean the model.** Use the Polygon “extract faces” tool to separate all of the main parts into individual parts: Beta Arrows, strands, and Helices.
2. **Merge the vertices** of each new part and delete history. Also rename the parts now if required.
3. **Draw curves on the surfaces.** Make each surface “live” by clicking the icon that looks like a magnet while the object is selected. Only one object can be made live at a time. Place a CV at just about every ring in the strand tube to achieve a balanced deformation.

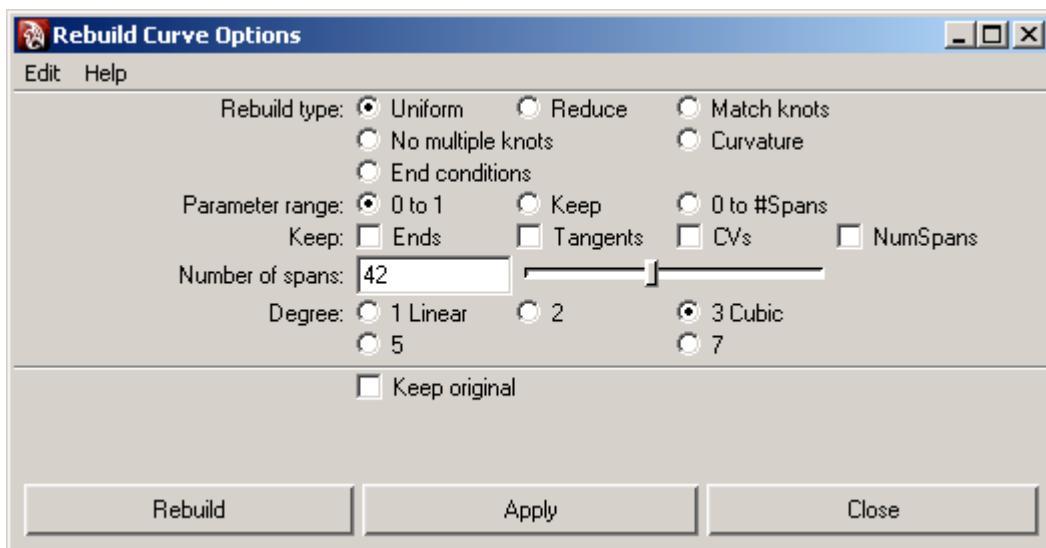
This will end up being your initial confirmation state curve.



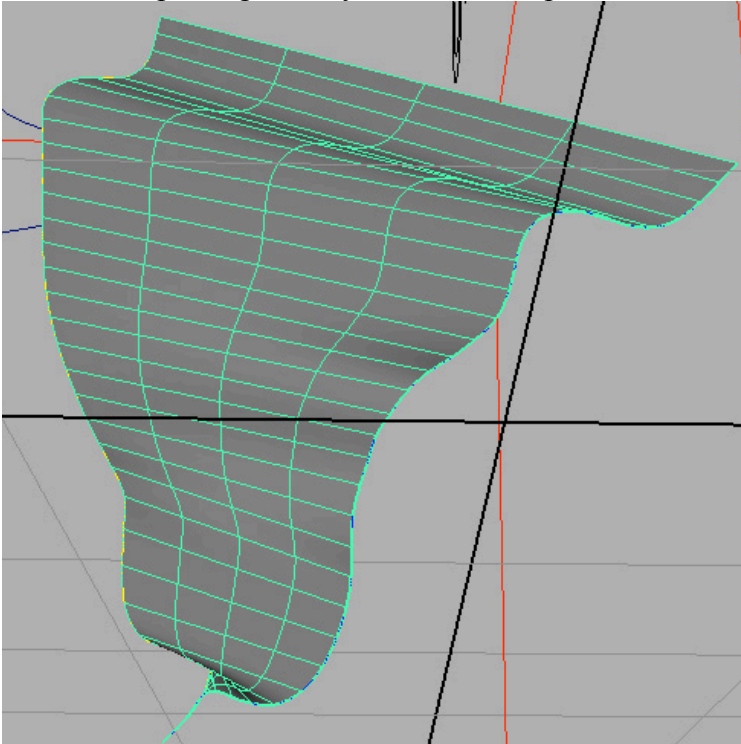
4. **Import the final confirmation state geometry. And make it live and perform the same task as above.** However you don't have to break it up or clean this geometry, it will be deleted.
5. You should have a beginning (yellow) curve for the initial confirmation state and a final (blue) curve for the final confirmation state. With *almost* the same number of CVs in them:



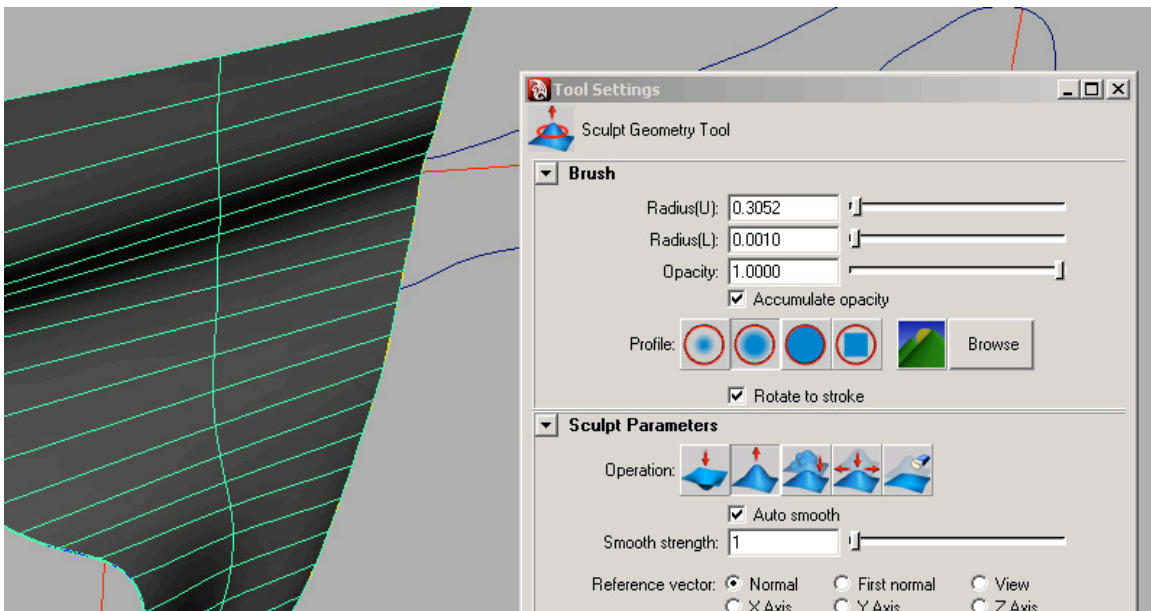
6. **Rebuild the curves** to have the same number of spans, and parameter range 0 to 1. One of your curves may have 34 and the other 42. It doesn't matter. pick the higher number and go with it using the Edit Curves > Rebuild Curve command.



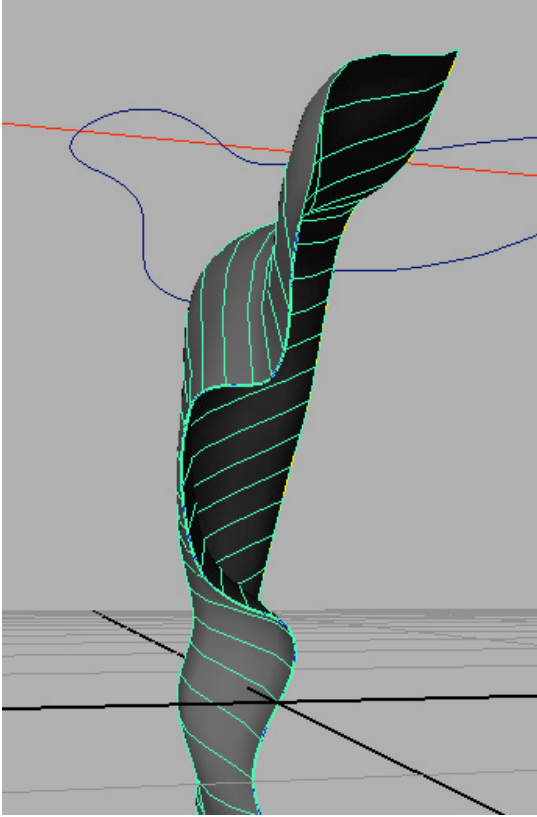
7. Now Loft these two curves to create a NURBs surface. You can have a few spans in the loft, but it's best to have just one right now. Adjust the spans value BEFORE you start to sculpt the geometry in the next step:



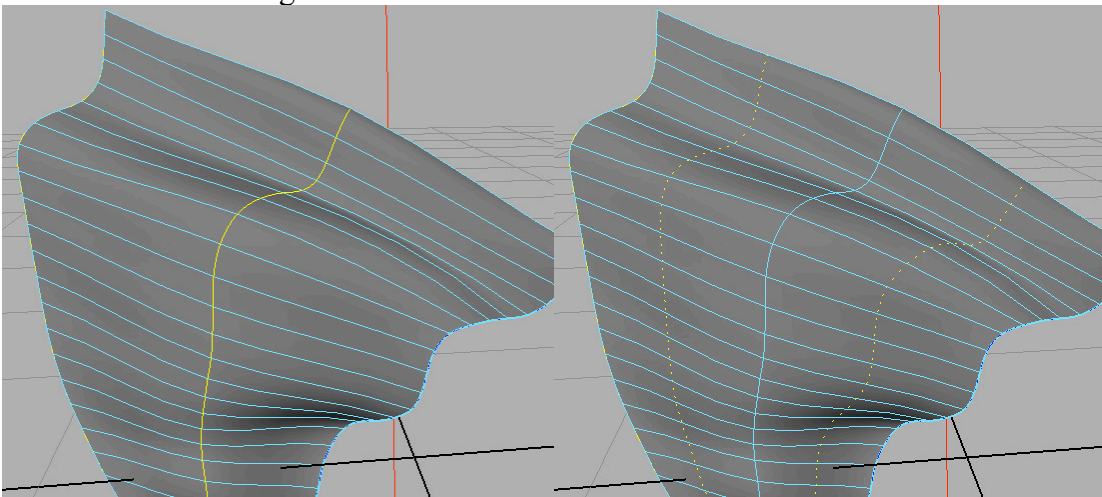
8. We're going to create "in-between" curves from this surface **so sculpt the geometry to create a "sweep" look. This way the curves we generate from this don't look so linear** when they're used as blendshapes. Use the Sculpt Geometry tool for this. Having a wacom tablet makes this part really fun and easy.



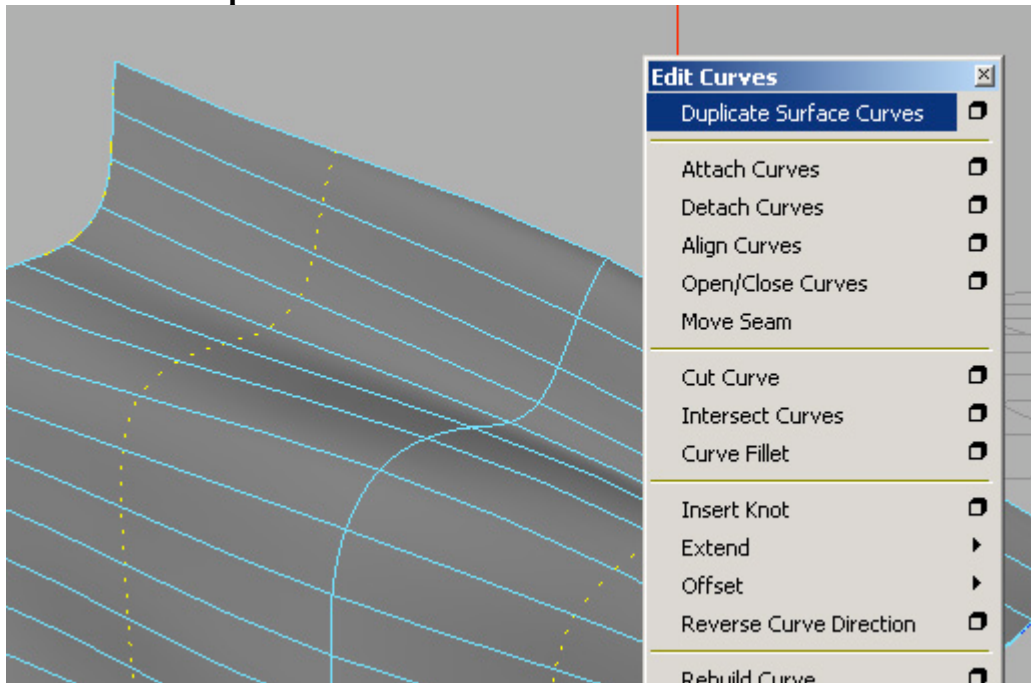
Make sure your geometry has a nice organic look to it:



9. Right-click on the surface and **select Isoparams**. Select the middle isoparam and drag it to the left and the right to create dotted lines:



10. Select the **Duplicate Surface Curves** tool to create curves from these dotted lines.

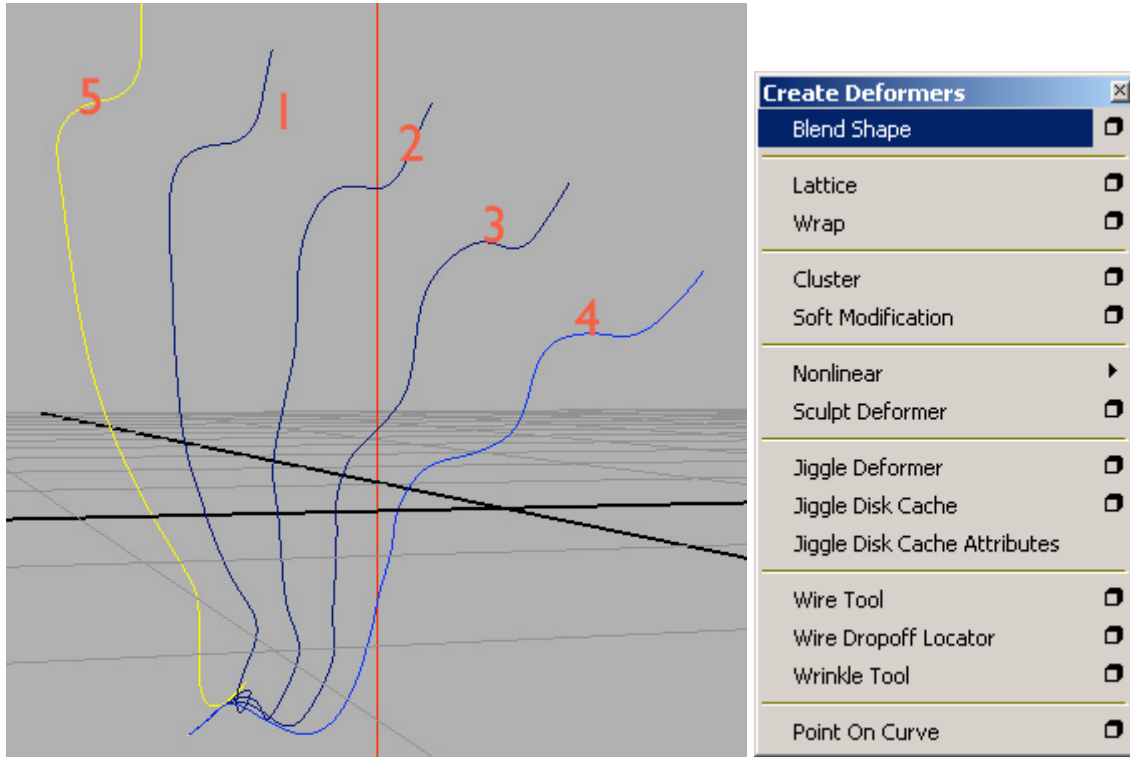


11. repeat this as many times as you would like to have in-between curves. I have found that 3 in-between and one final curve do the trick.



12. Delete or hide the lofted surface and select the curves in the following order. First is the 25% blendshape, then the 50% blendshape then 75% blendshape, final blendshape, and then lastly the curve which was based on your master geometry.

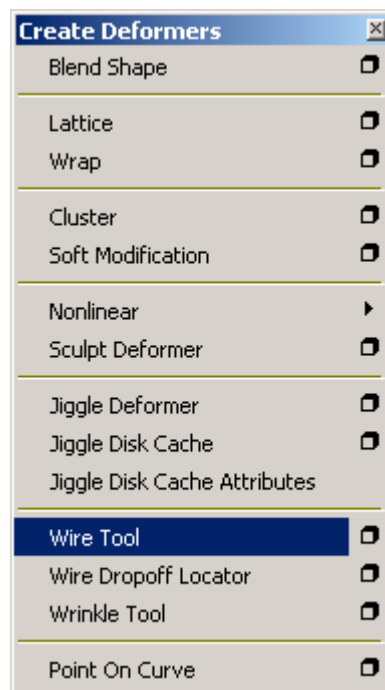
**Create a blendshape on the initial confirmation state curve**

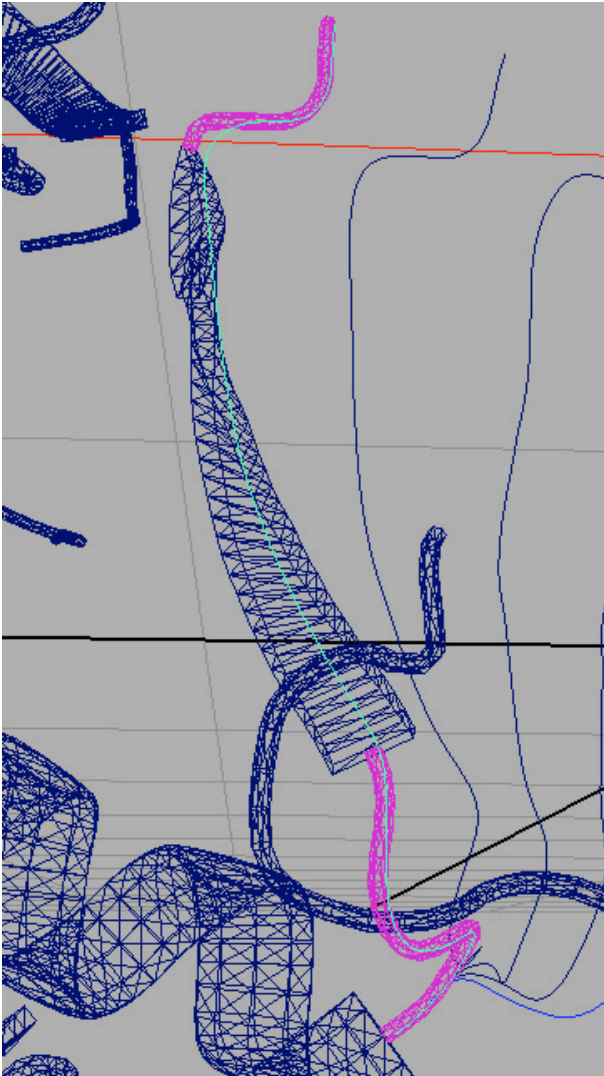


13. Use the yellow curve, your initial positioning curve and the geometry for the wire that deforms the strands.

**Open the Wire Tool.**

Select the strand. Press enter.  
 Select the yellow curve. Press enter.





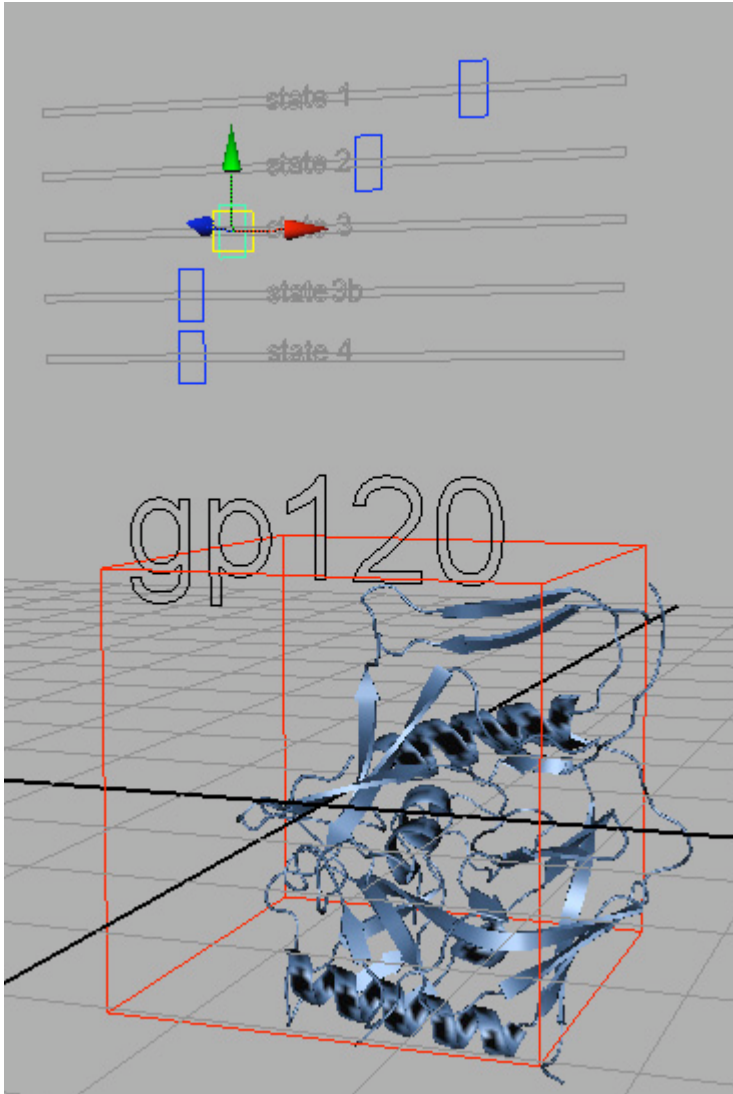
The strand geometry will now follow the curve as it animates. It will also retain its volume nicely. And the in-between curves can be tweaked to make sure they always meet up with the beta strands and helices as the animation occurs.

**Wire deformers don't work well with the helices and the beta arrows,** for these parts of the geometry to be rigged, utilizing traditional rigging techniques works best to make sure they retain their shapes and volumes.

I have used Joints, lattices, blendshapes, etc. to achieve great results, **but** even simply using Set Driven Key to translate and rotate the geometry works very well.

Once you are done with the wires and other rigging. It's time to synchronize them under one slider and hide the direct access controls. You want to prevent animators from accessing the wire values directly, so creating controls, sliders that use Set Driven Key to drive the blendshapes is the best way to prevent animators from messing up the rig.

It also allows the animator quick access to achieving the confirmation state they are looking for.



All additional rigging techniques can be found in rigging manuals and books available on the internet and most bookstores.

**RIGGING RECOMMENDED TRAINING:**

1. CGToolkit “Art of Rigging” series for insight on MEL, deformers and general rigging skills.
2. Fahrenheit Digital ([www.fahrenheitdigital.com](http://www.fahrenheitdigital.com)) DVDs are excellent sources for learning how to use the wire tool to deform geometry.
3. Alias/Autodesk DVDs Hyper-Real series also cover many great rigging challenges that make come around.