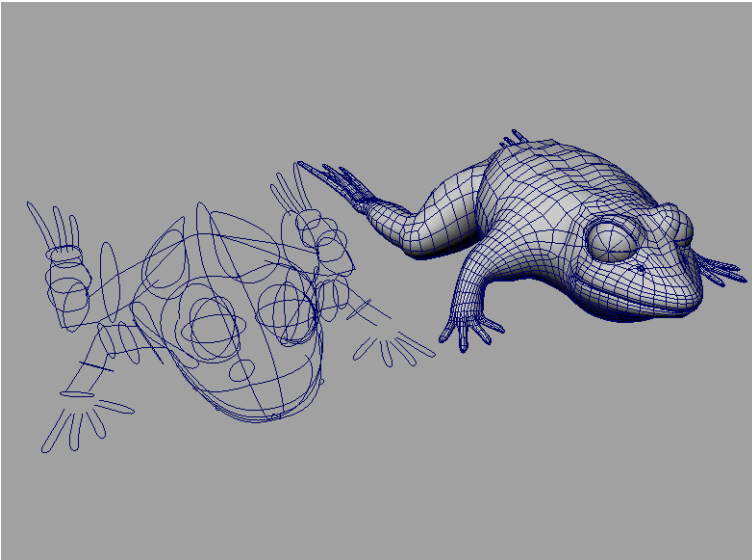


intro . what and why

This tutorial will demonstrate how to use a spline cage to help model an organic creature out of polygons and/or subdivision surfaces in MAYA. A spline cage is a representation of a 3d surface made out of splines, or curves.

Modeling with a spline cage is useful for several reasons:

1. It makes modeling quicker and easier by giving you a template to form the pollies around
2. It helps make a more accurate model by serving as an intermediate step between 2d drawing and 3d modeling
3. It forces good topology because the NURBS circles used to make the spline cage follow the flow of good poly edge loops
4. It makes revisions of the model easier because NURBS curves have far fewer points than even the lightest poly meshes
5. It looks fucking cool

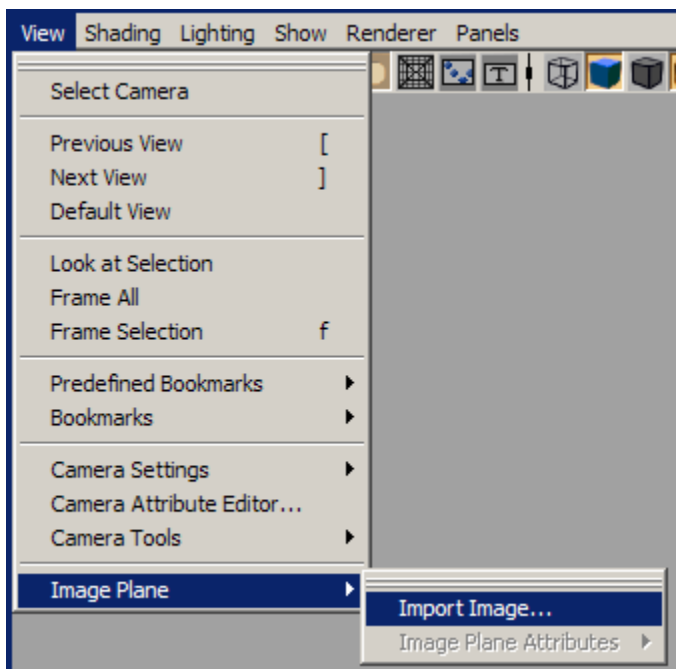


Pete the frog and his spline cage

step 1 . preplanning

Like any modeling process, making a good spline cage starts with planning. Look at reference photos, sketch stuff, and eventually make orthographic drawings of your character. Try to get them to line up as well as possible, working on graph paper or in PHOTOSHOP helps with this.

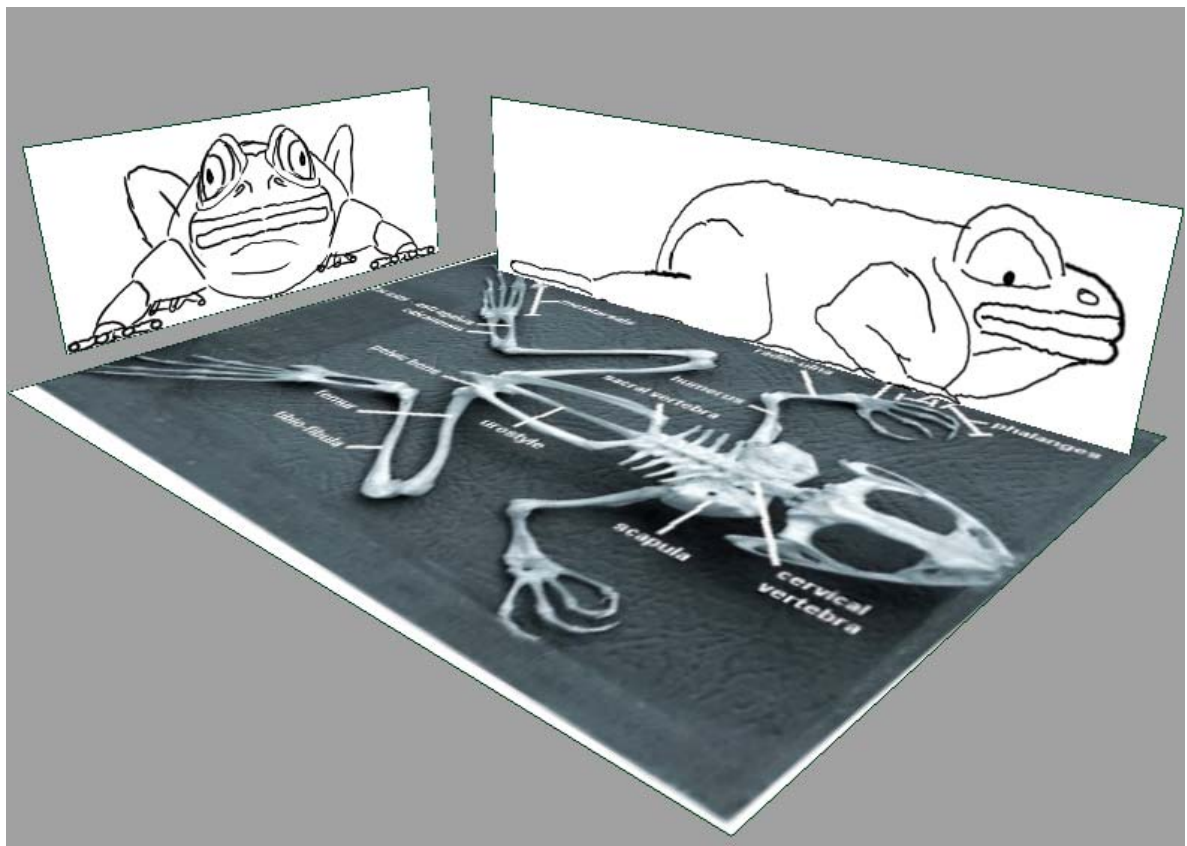
Once the orthos are drawn, bring them into MAYA by navigating to **view -> image plane -> import image**. Be sure to do this in the correct camera, so if it's a side ortho view, be in the side ortho camera. Once the various image planes are imported, position them by adjusting the image plane attributes found under the camera node.



F Stop	5.6
Focus Distance	5
Shutter Angle	144
Center Of Interest	100.1
INPUTS	
imagePlane2	
Frame Extension	1
Frame Offset	0
Alpha Gain	1
Depth	100
Size X	1.417
Size Y	0.945
Offset X	0
Offset Y	0
Center X	-31.2
Center Y	6.326
Center Z	-0.019
Width	29.118
Height	34.118

Importing an image plane

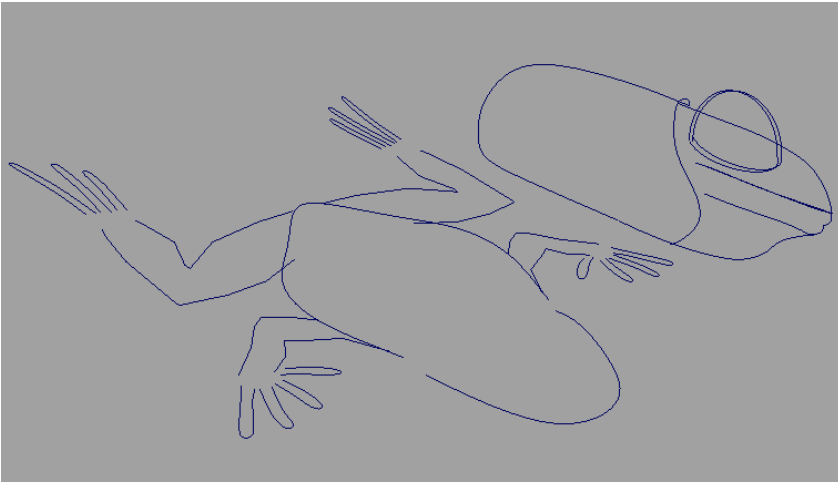
Position the image plane using image plane attributes



Positioned image planes

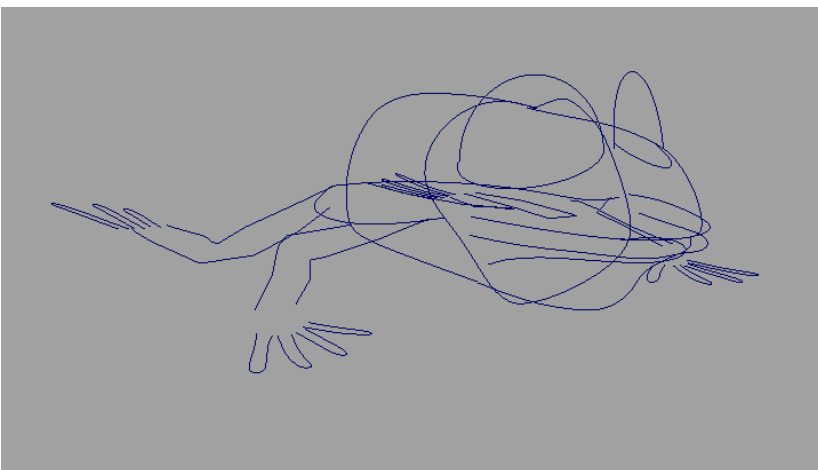
step 2 . building the rough spline cage

The next step is to trace the features of the orthographic drawings using NURBS curves. Create NURBS curves by navigating **create->cv curve tool**. Your best bet at this stage is to start with a very rough level of detail (silhouette and major features first). That way you can make adjustments to the rough shapes in 3d without having to go back and redo stuff.



2d tracing of the orthographics

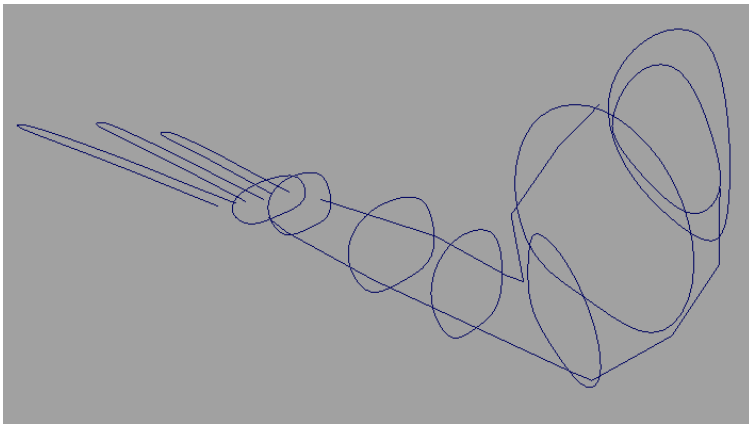
Once the elements are traced, position them in 3d by moving the CVs in place. You can very quickly start to see that the 3d model is going to look like, which is pretty sweet. At this point, you should tweak the curves to make them look good in 3d. Track around your model and make sure the silhouette reads well and the proportions look good. Feel free to get away from the way the orthos were shaped to make it look good. From this point on, the orthos will pretty much only be used for reference.



Silhouette and major features positioned in 3d space

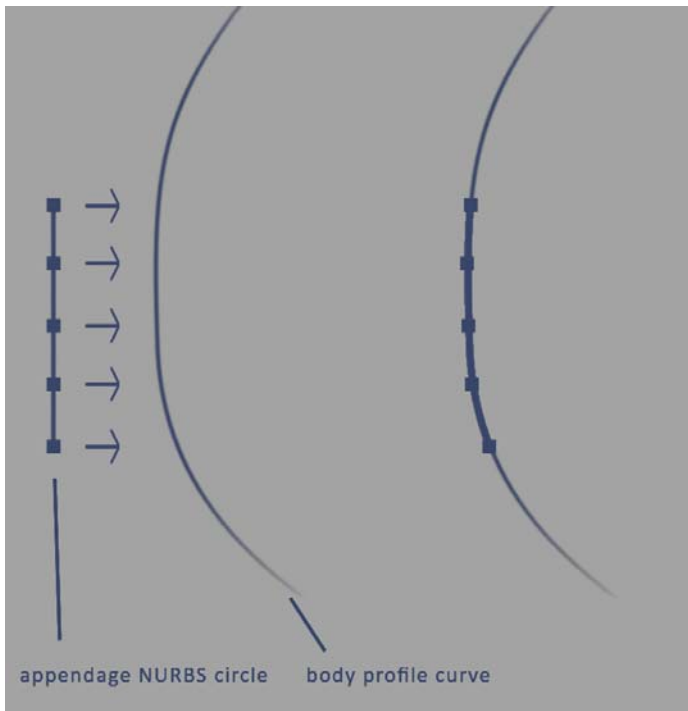
step 3 . detailing the spline cage

Now comes the part where the spline cage will really start looking like a cage. The next step is sussing out the details of the model, particularly the appendages. To create the cage for the appendages, create NURBS circles and position them along the splines already drawn for the appendages. Create surface details and features using NURBS circles and semicircles.



Detailed spline cage of a leg

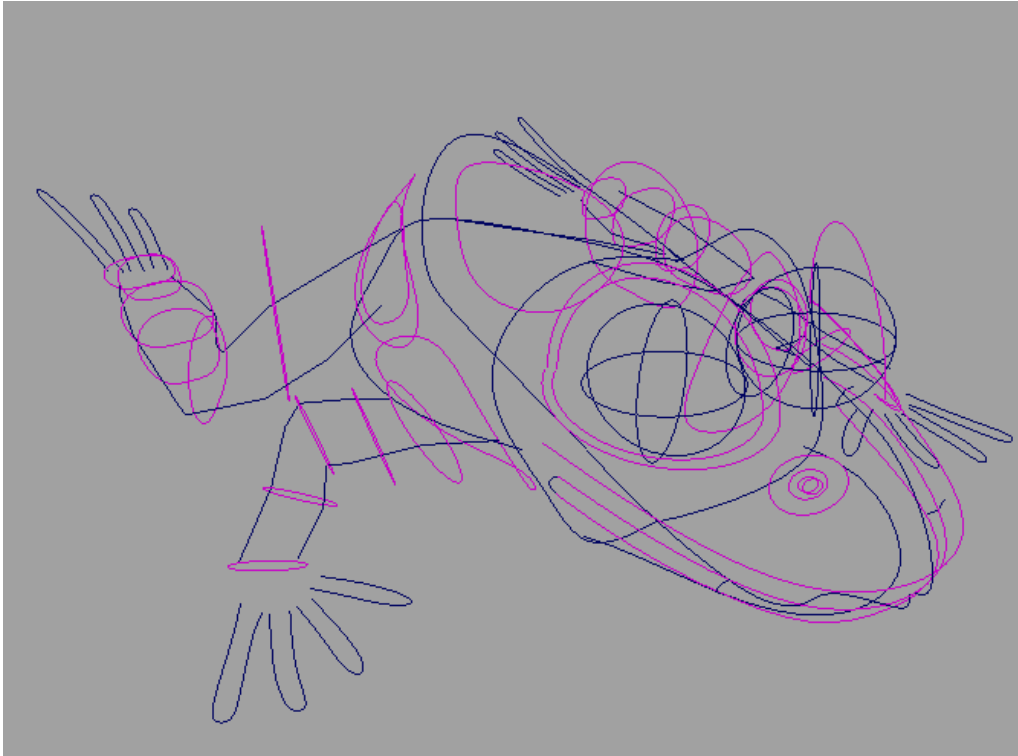
The most important part of detailing the appendages is working out the connection between the body and the appendage. This is important because the topology of the leg must continue onto the body to ensure good deformation.



Making the connection between the body and the appendage

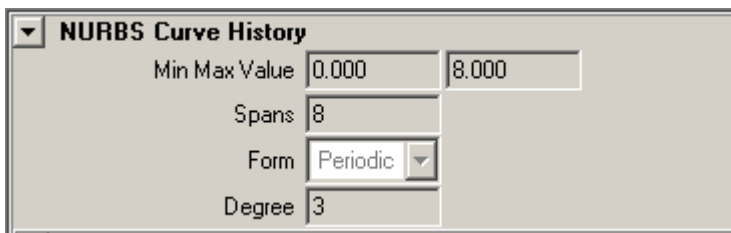
step 4. using the spline cage to create a model

The last obvious step is to create the model from the spline cage. Each part of the model will allow you to use the spline cage in different ways. The simplest way to use the spline cage is to loft the curves directly to create a surface. This is particularly useful for areas for areas with repeated circles and semi circles like the appendages and eyes.



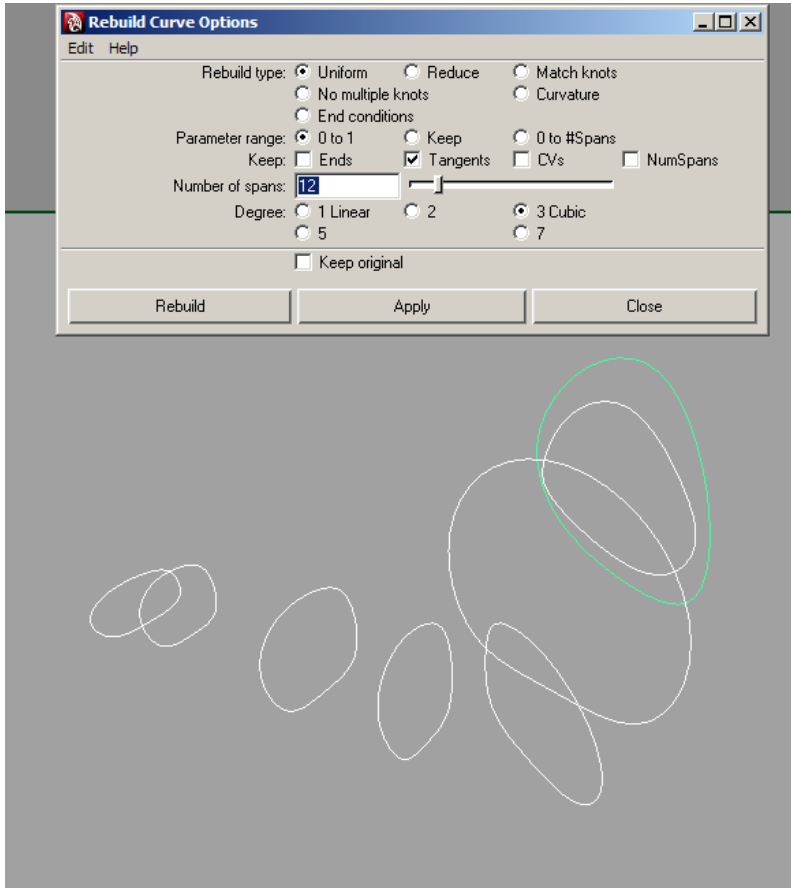
The curves in pink would be appropriate for lofting

The first step in lofting is making sure that the curves to be lofted have uniform numbers of spans and consistent parameterization. You can see the number of spans by selecting the curves and observing their attributes in the attribute editor. Under the curve shape node you can see the info on the curves.



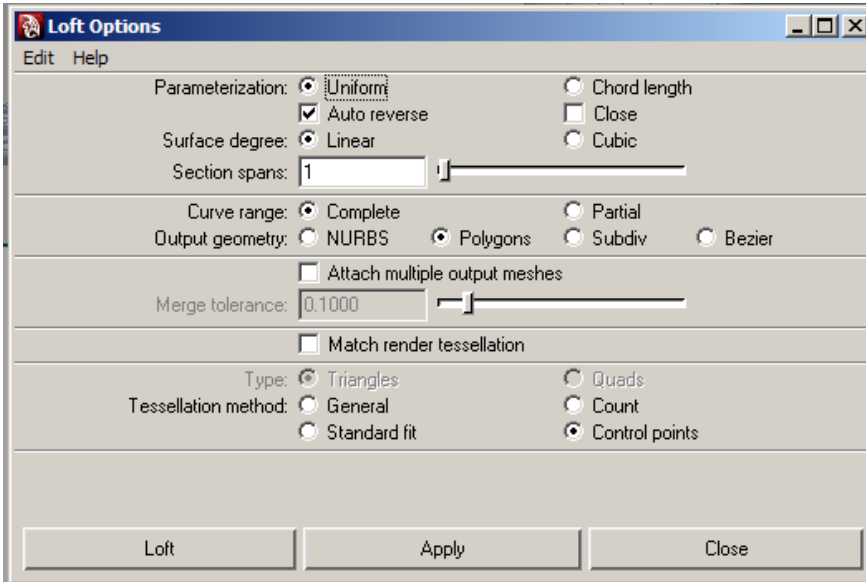
Curve attributes

To edit these attributes, you must rebuild the curve. Rebuilding curves and surfaces changes the nature of the curves while preserving the attributes you wish to keep. In this case, we want to preserve the shape of these curves, while making them uniform in spans, degree, and parameterization. To find the rebuild tool, select the curves you are trying to affect and navigate **edit curves->rebuild curve**. To maintain the general shape of the curves, check keep->tangents. To normalize the parameterization for all the curves, check parameter range -> 0 to 1. To change the number of spans, dial the spans to something reasonable. This will directly equal the number of edges running along the final polygon mesh. We want a smooth curve result, so we set degree -> 3 Cubic.

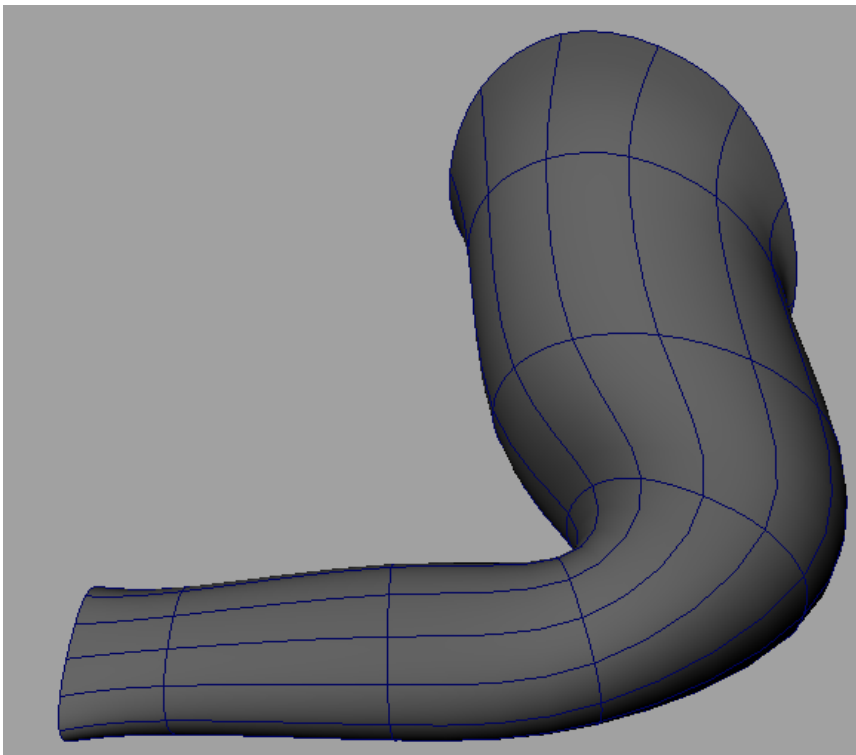


Rebuild curve tool

Once the curves are rebuilt, they can be lofted together to form a surface.



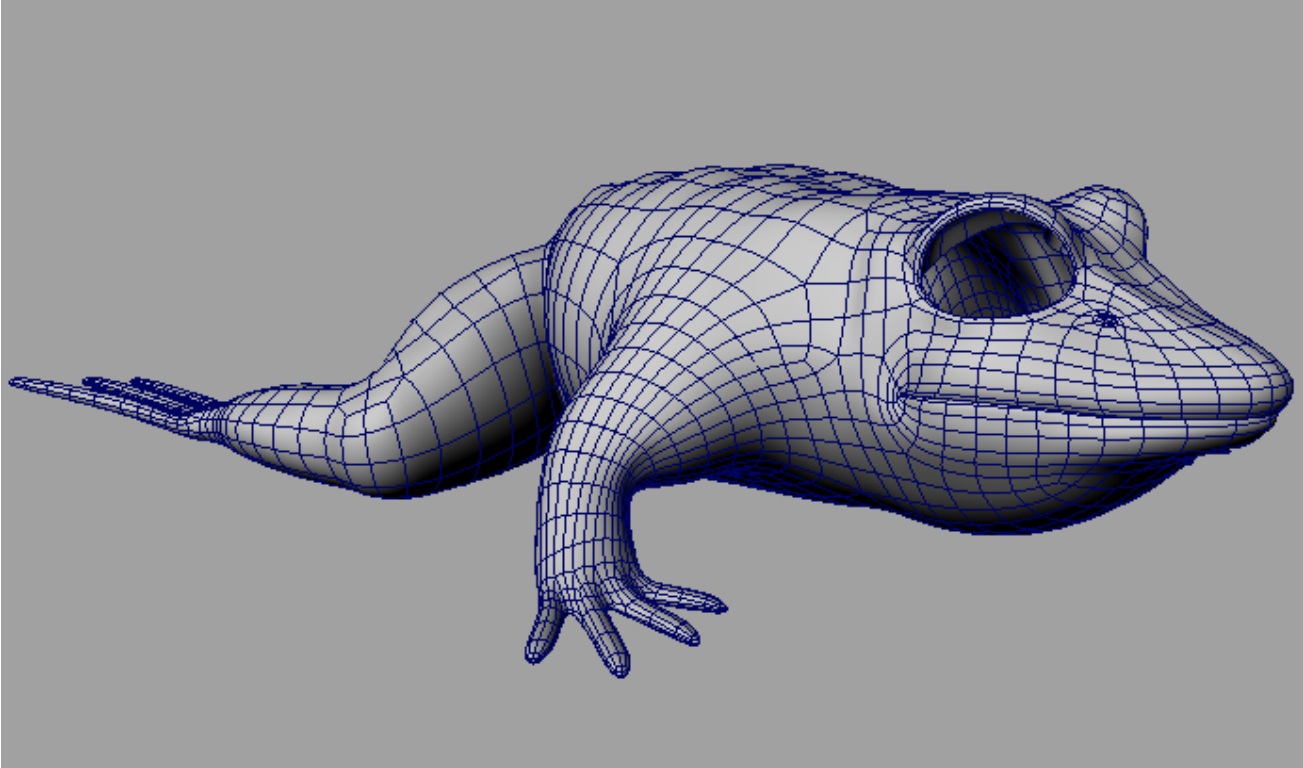
Loft options to create a polygon surface.



The lofted frog leg



For areas where lofting isn't appropriate, normal poly modeling techniques can be used. Extruding edges along the spline cage can come in handy. Snapping verts to the spline cage is also very useful. Above all, having the spline cage takes a lot of guesswork out of poly modeling. By giving you a direct, 3d reference. Good luck!



Completed frog model created using the spline cage technique.