Modeling with T-Splines, Grasshopper, and Rhino

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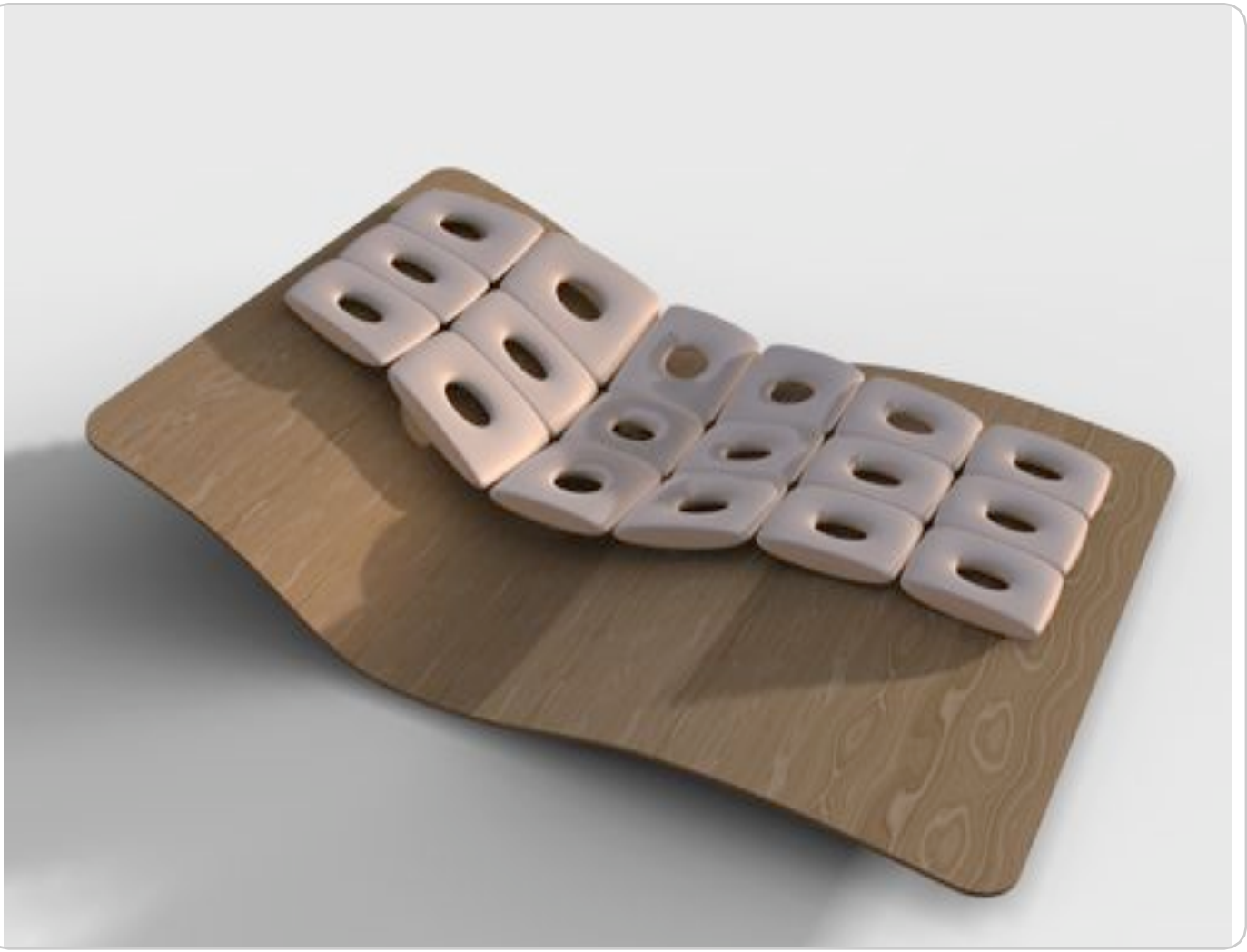
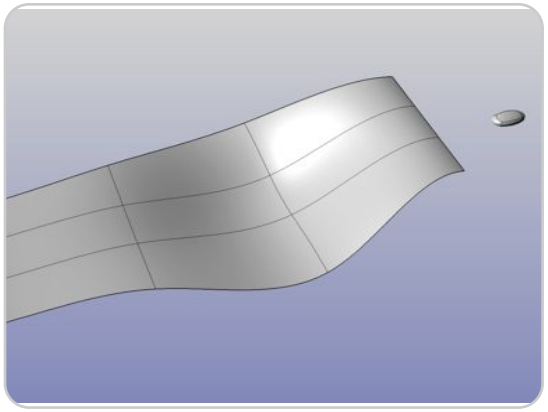
In this simple tutorial we will model these modular chaise lounge cushions using T-Splines, Grasshopper, and Rhino.

The purpose of the tutorial is to show that these programs can all be used together in the design process.

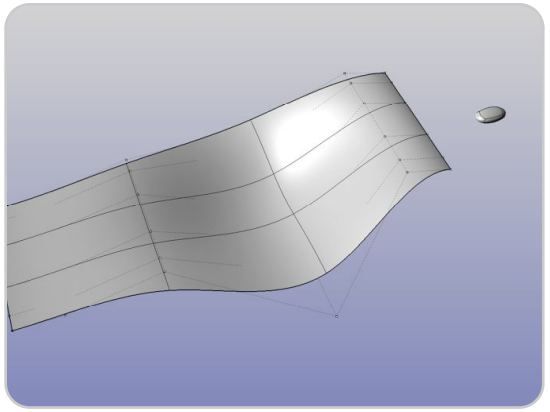
T-Splines is used to create an organic look for the cushions.

Grasshopper is used for its parametric and generative capabilities to array the modules and update them in real-time as we make changes.

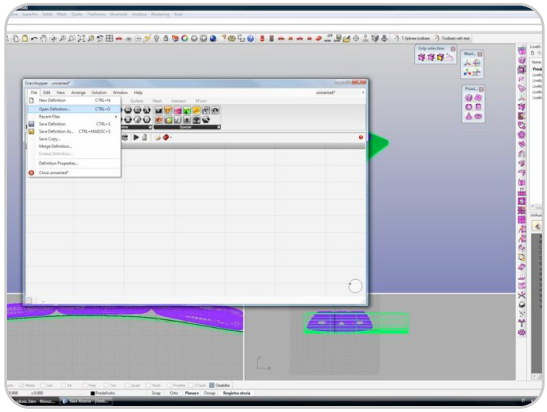




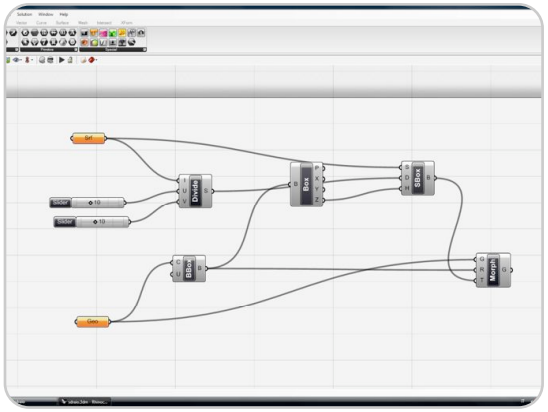
First, create a surface from Rhino with six control points in both the U and V directions. Then, create a T-spline box (tsBox) with one face in the x, y, and z directions.



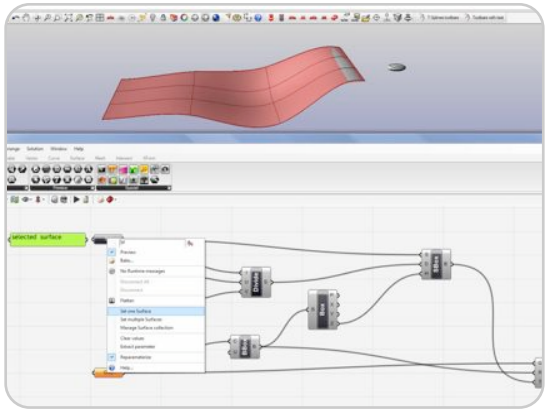
Next, edit the control points of the surface so it takes the shape of a chaise lounge chair.



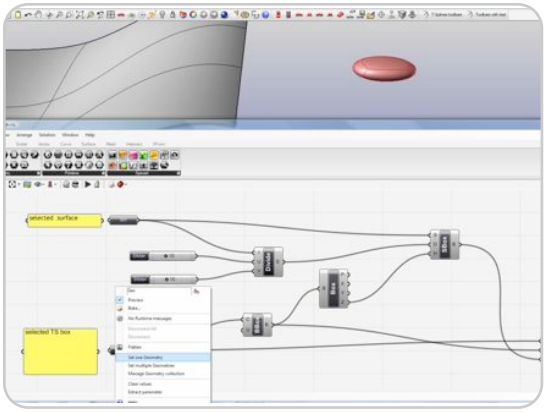
Type “Grasshopper” in the Rhino command line to load the Grasshopper program.
For information on installing and using Grasshopper, visit www.grasshopper3d.com.



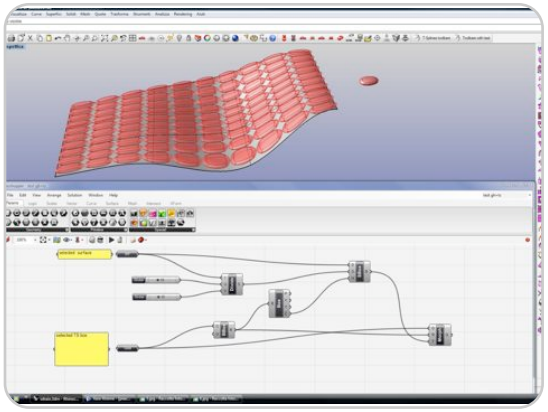
I have previously created a file, gh+ts.ghs, which appears below. The links between parameters and components are telling us that we have a surface on which is perched a repeated series of geometry made with T-splines.



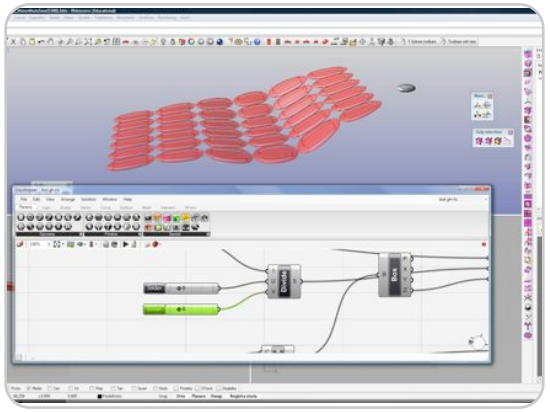
Click the right mouse button on the **Srf** icon to open the menu window, left click on Set One surface, select the surface in Rhino, and it will turn red.



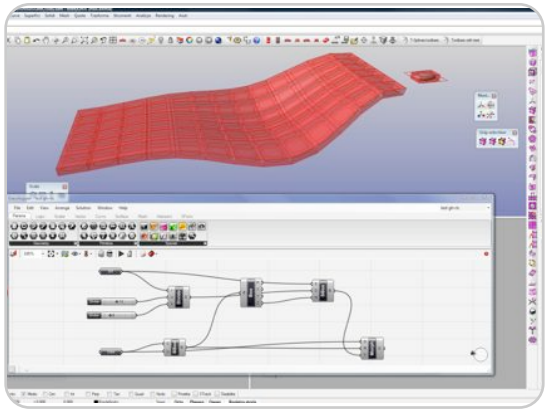
Click with the right mouse button on the **Geo** window to pop up a menu, click Set One geometry and select the T-Splines box, which also turns red.



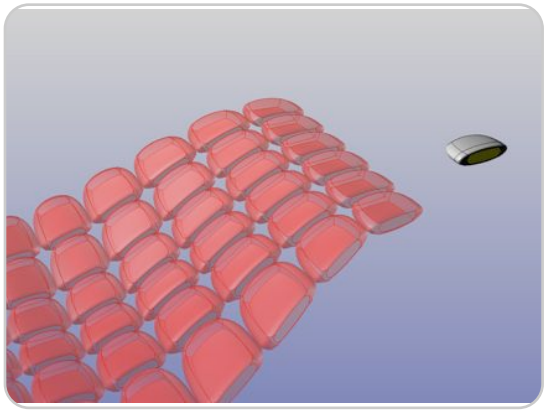
Immediately you will get a modular repetition (based on the value in the slider) of the T-Splines box across the surface.



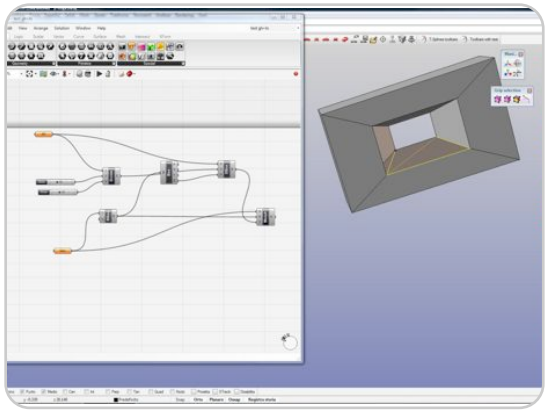
You can decide the number of modules in the U and V directions via the sliders.



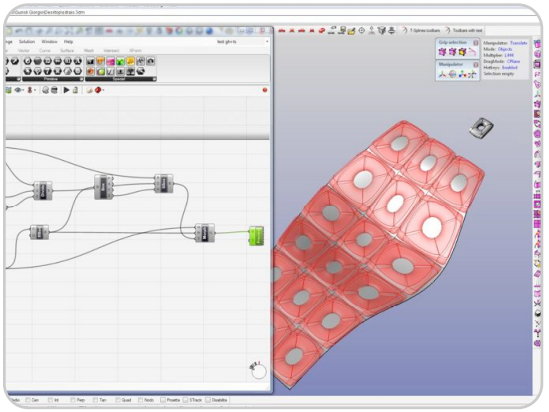
By running the srf_divide_box command, you can preview where these boxes will be placed in the geometry; to hide the boxes, just disable the preview (right click on the component and check preview).



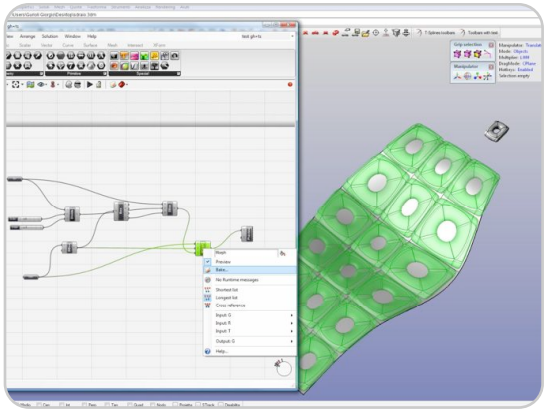
When we extrude a face from the T-spline box, the extrusion is updated across the array in real time.



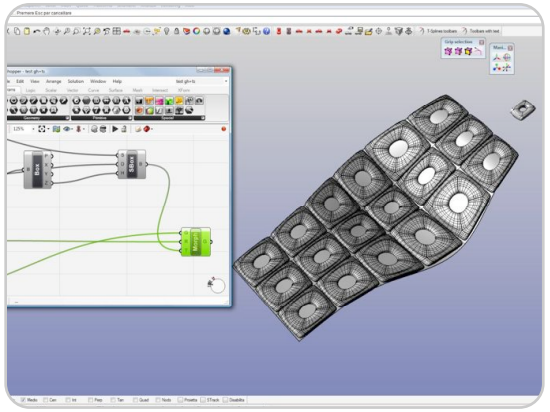
Similarly, we can create a hole in the T-spline.

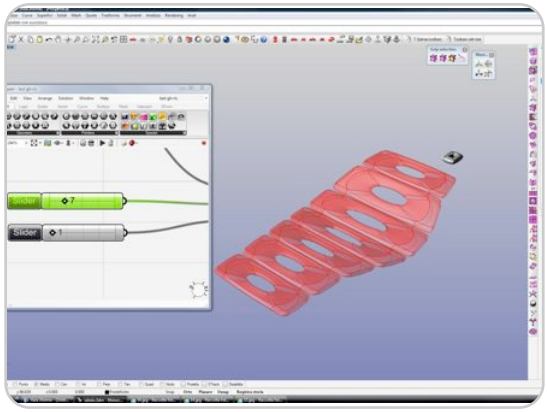


The result is immediately updated in the rest of the scene.

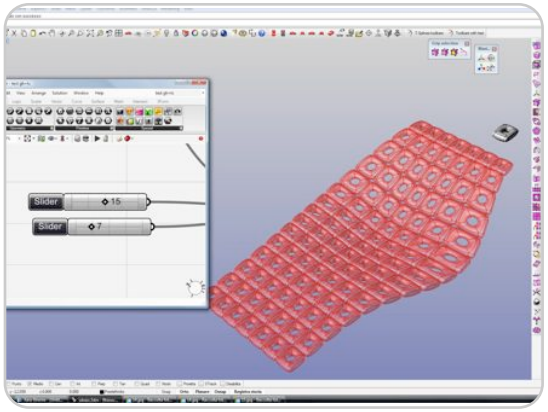


Right click on **Morph**, then select **Bake** to turn the T-spline into NURBS polysurfaces.

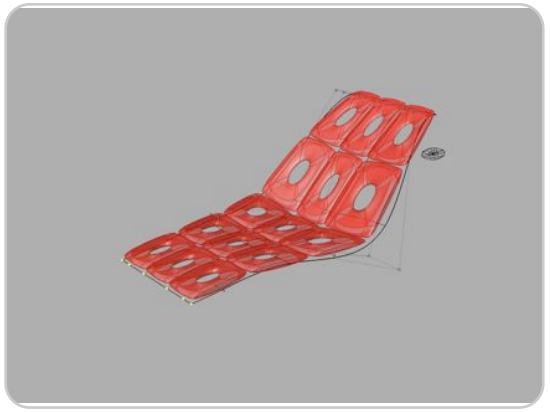




Returning to Grasshopper, here's some examples of how changing the values of the sliders will give us other solutions.



Alternate design.



Also, we can modify the surface by editing control points of the NURBS, and the T-spline surfaces will adapt to the changes (due to component Morph).