

# Follow Along: Orienting Bodies onto a Surface

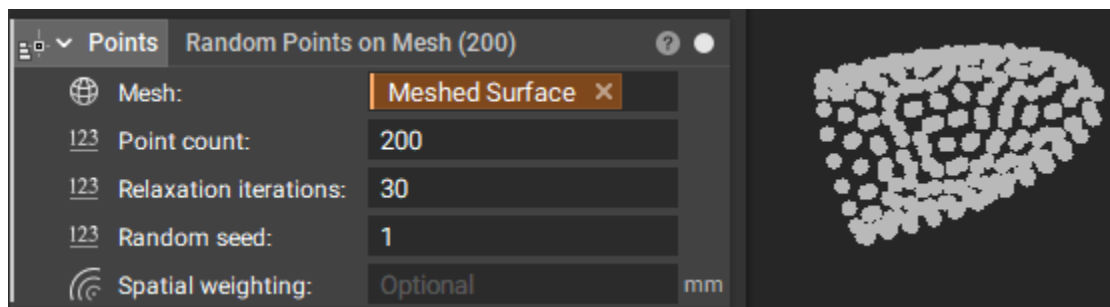
In this lesson, we will walk through how to create textures on a surface using the **Orient Object** block. We will work with meshes in this lesson, so to learn more about the meshing blocks used, please visit our [Guide to Meshing](#) Course.

Please download the nTop file below to follow along with the tutorial.

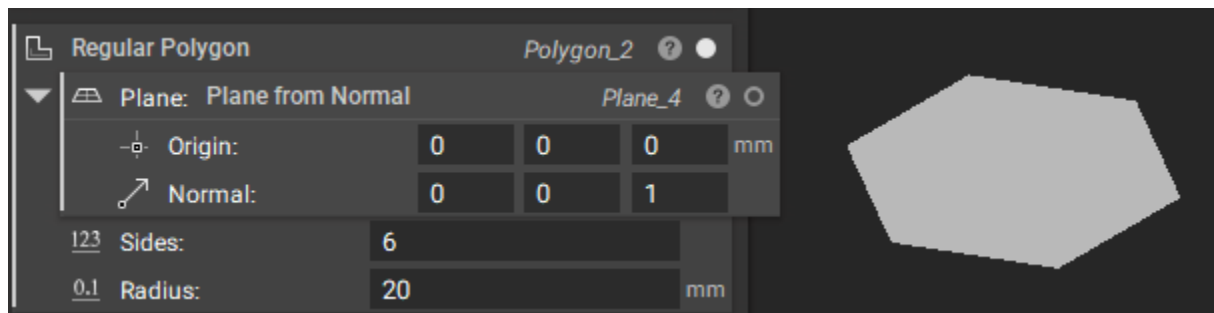
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The starter file has our completed geometry section.

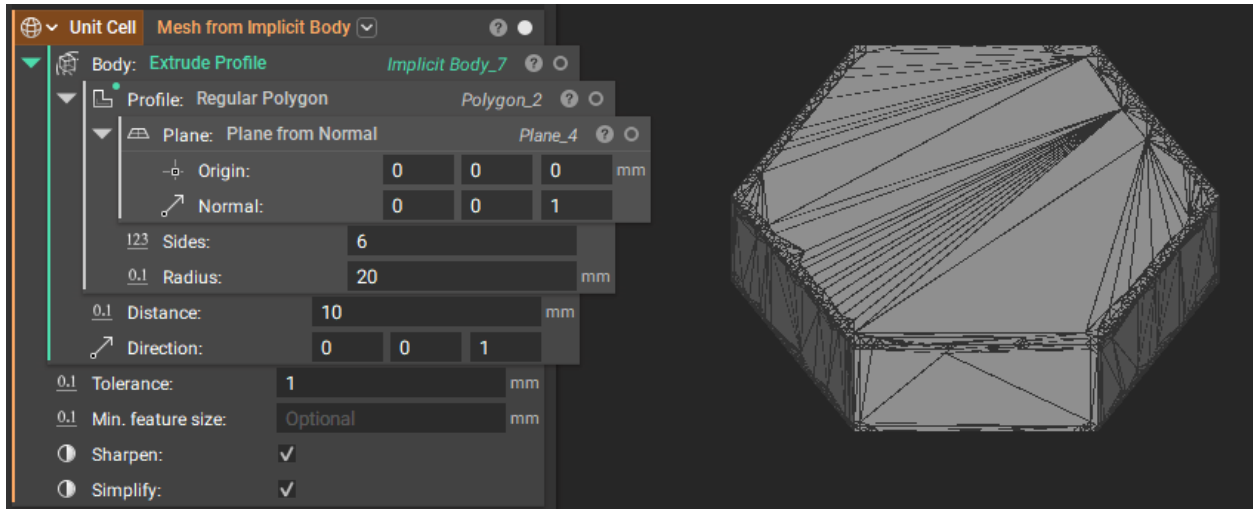
**Step 1:** First, add a **Random Points on Mesh** block to the Orient Object section. Change the Point Count to 200. Make this block into a variable labeled "Points". These will be the locations for where we add the textures.



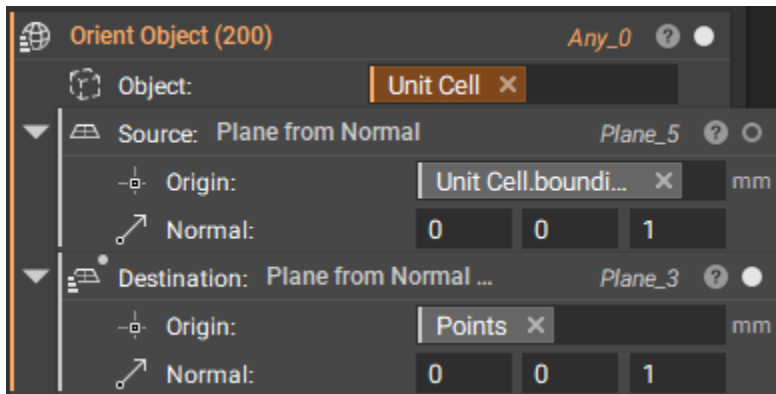
**Step 2:** Next, we will create the Unit Cell or the texture we want to apply to the surface. For this example, we are using a hexagonal prism created in nTopology. Add a **Regular Polygon** block to the notebook and place a **Plane from Normal** block into the plane option. Input 6 for the Sides and a Radius of 20mm.

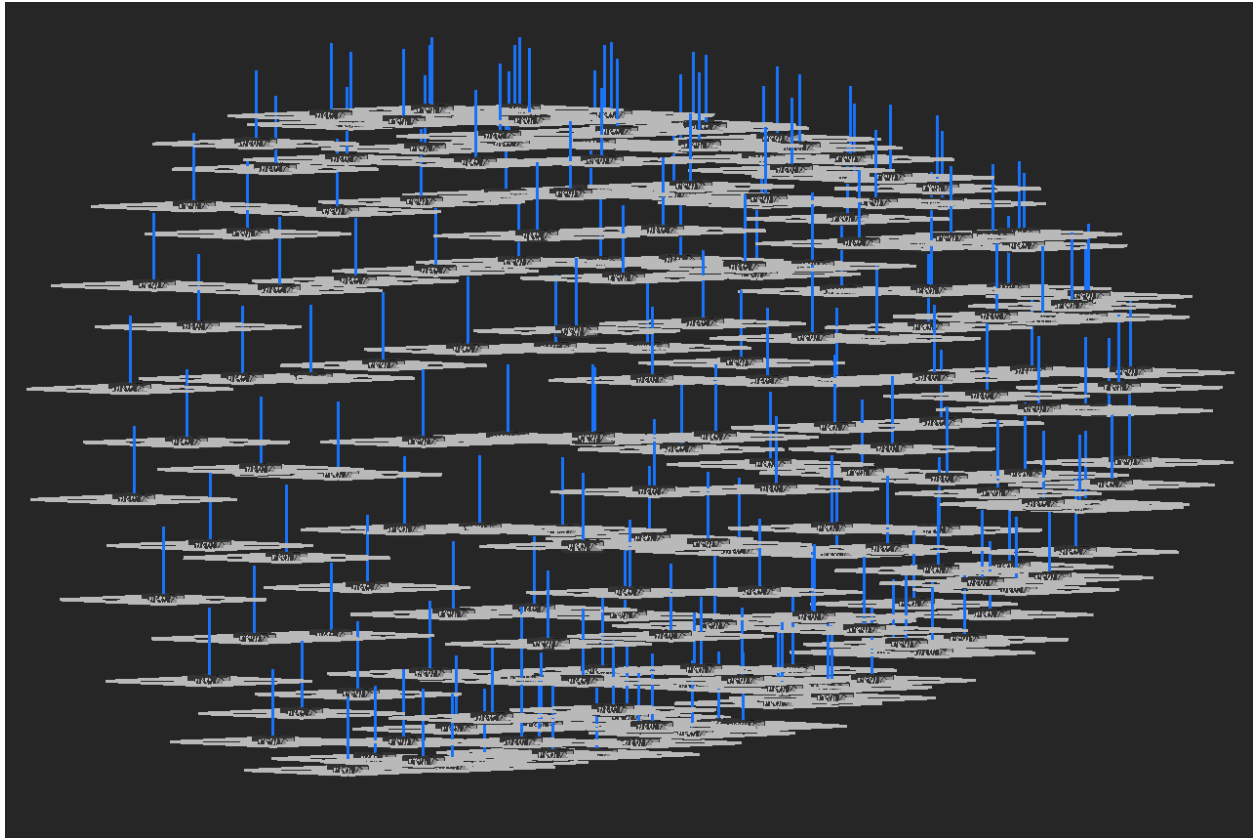


**Step 3:** Place the **Regular Polygon** block into the Profile input in an **Extrude Profile** block. For Distance, use 10mm and the Direction of <0,0,1>. Now, we have our unit cell as an implicit. Add a **Mesh from Implicit Body** block into your notebook with the **Extrude Profile** block as the input. Add 1mm for the tolerance and choose to sharpen and simplify the mesh. Make this block a variable and label this "Unit Cell".

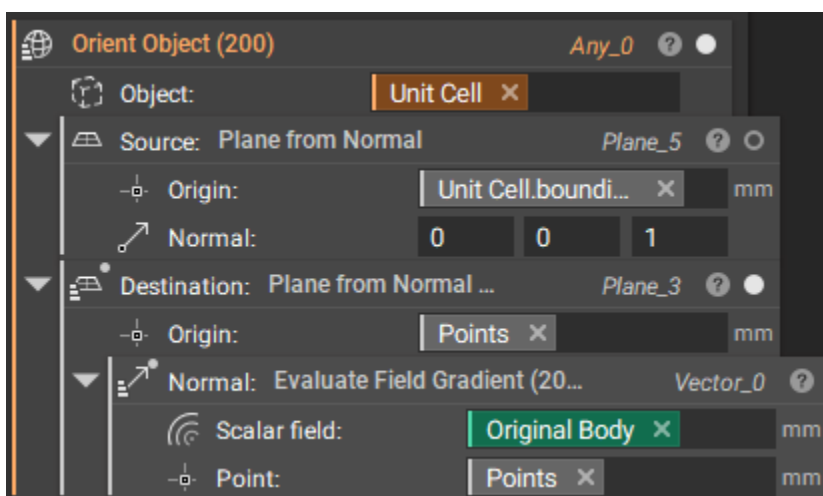


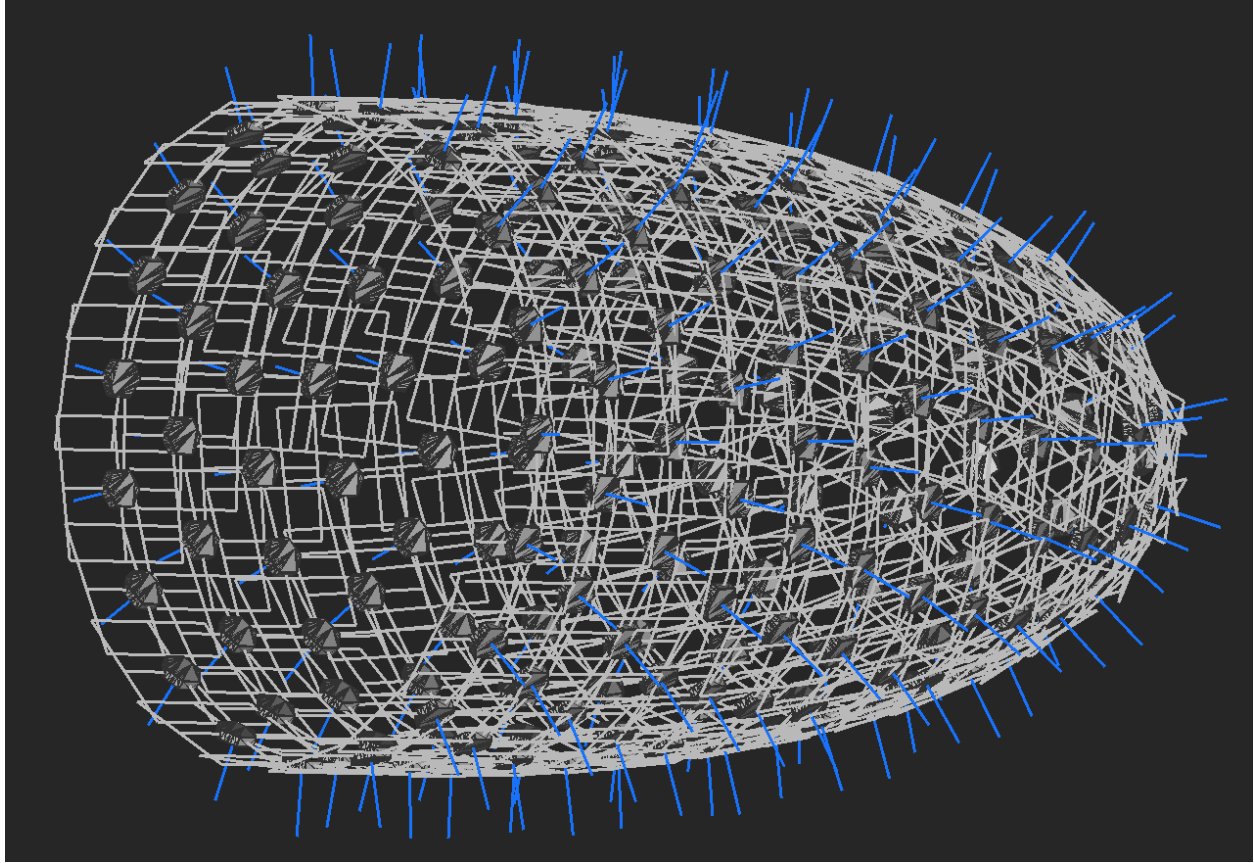
**Step 4:** Next, we will place the unit cell on all the point locations to create the texture using the Orient Object block. For the Object input, use the “Unit Cell” variable. For the Source Plane, add a **Plane from Normal** block and change the origin to be the centroid of the “Unit Cell” (It should say Unit Cell.bounding box.centroid). For the Destination Plane input, add another **Plane from Normal** block. For the Origin, input the “Points” variable. This will automatically place all of the unit cells on each of those planes if you view the Orient Object.



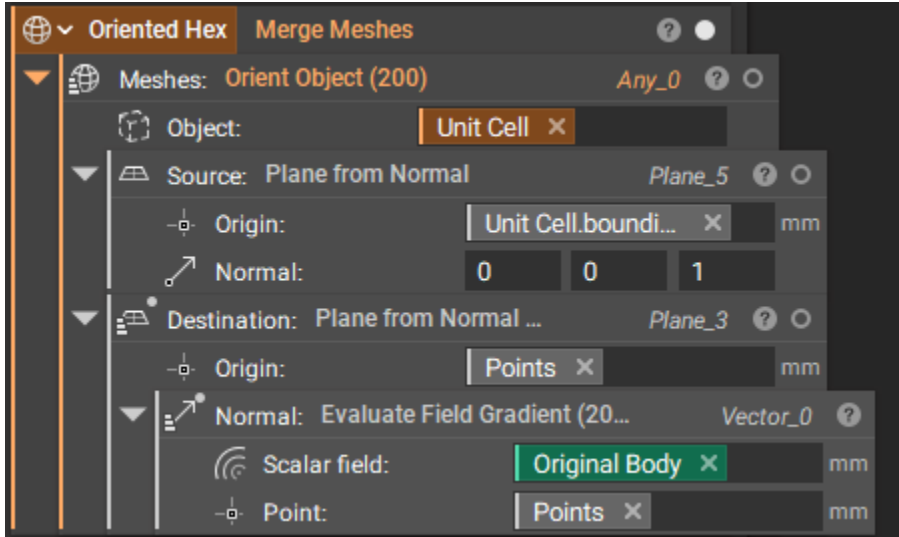


**Step 5:** To place the unit cells normal to the surface, add an **Evaluate Field Gradient** block. For the Scalar Field, place in the “Original Body” for the Scalar field and the “Points” for the point. This creates a list of vectors that are normal to the surface of the original body at that set of points.





**Step 6:** Add a **Merge Meshes** block to your notebook to convert this list of 200 meshes to 1 mesh. This will help us quickly union the unit cell to the body. If we had instead 200 implicit bodies, this would take longer to union together than to merge the meshes in this step. Make this a variable labeled "Oriented Hex".



**Step 7:** Add an **Implicit Body from Mesh** block to convert the “Oriented Hex” into an implicit. Union this to the “Original Body” using a **Boolean Union** block to create the final body.

