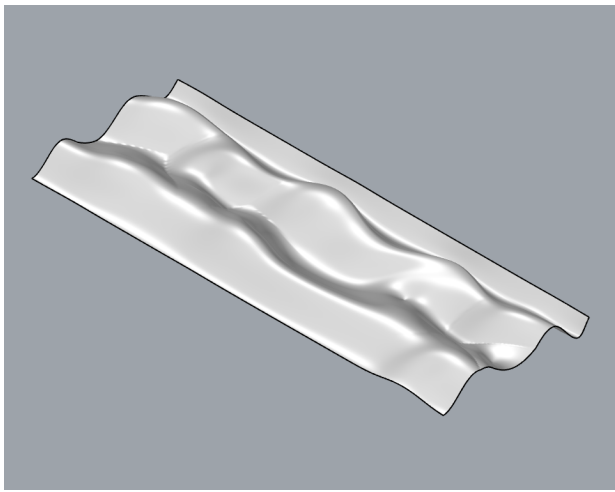


Subtractive Manufacturing Studies

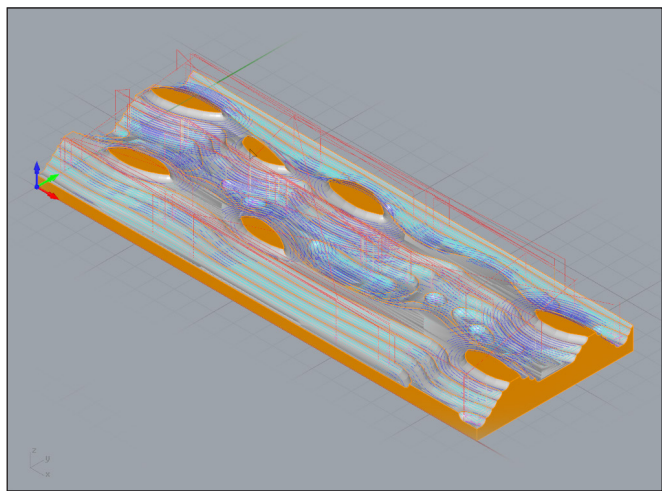
Subtractive Manufacturing Studies focuses on the uses of the computer numerical control (CNC) machine to explore different patterning and textures that can be generated by the CNC machine. The primary focus started out with pre existing knowledge of the CNC machine, both programming and the effects that the machine leaves behind on the material.

The CNC machine works by creating a series toolpaths that will carve out the desired shape needed.

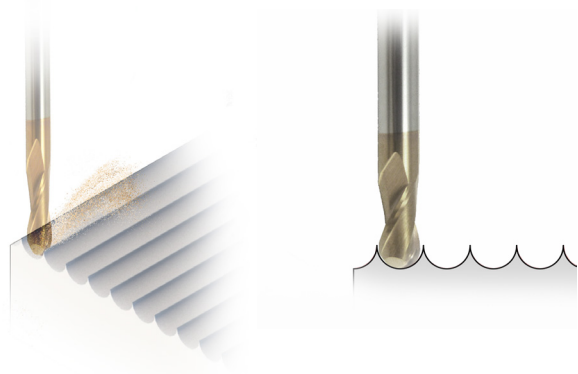
Desired Geometry



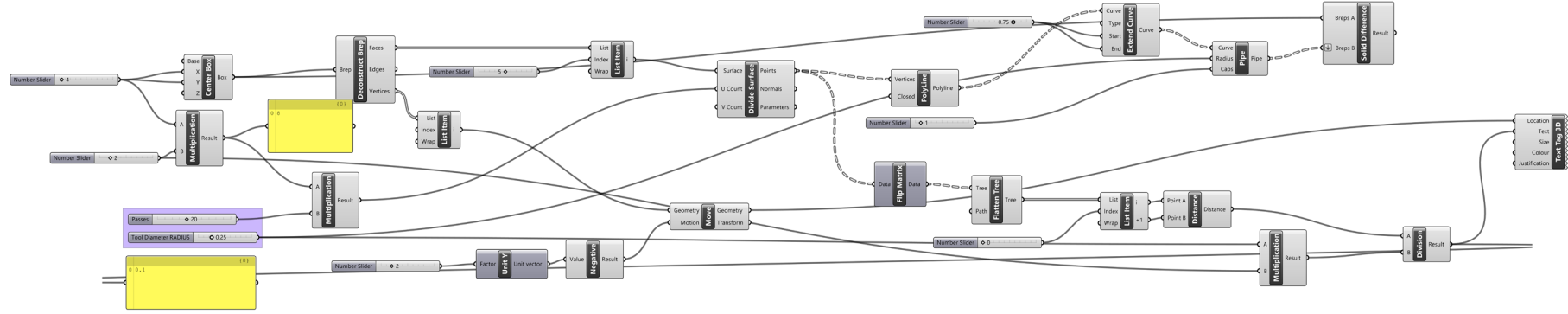
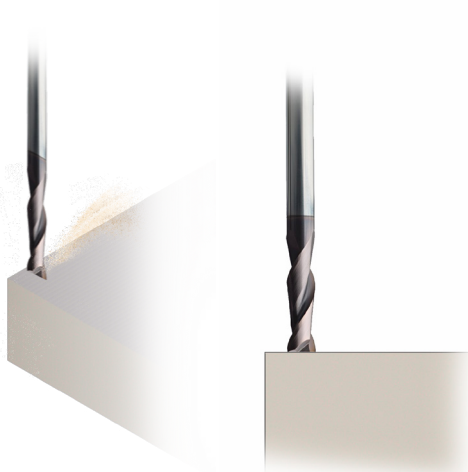
1. Horizontal Roughing Pass- The horizontal roughing pass is used to clear out large amounts of material to get to the bottom of the desired geoemtry.



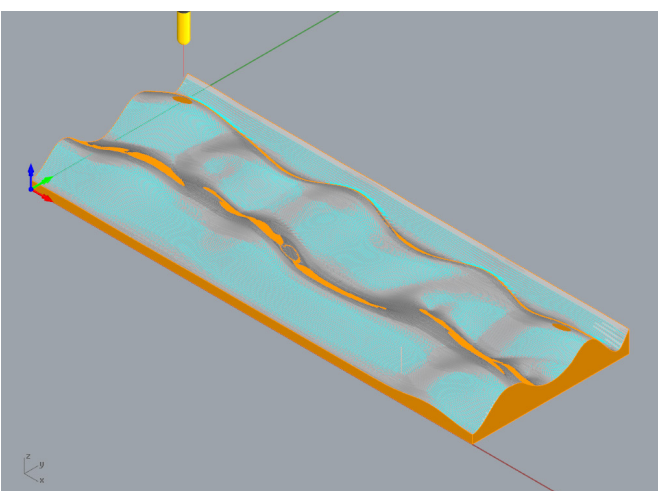
Ballnose Milling Bit



Flat End Milling Bit

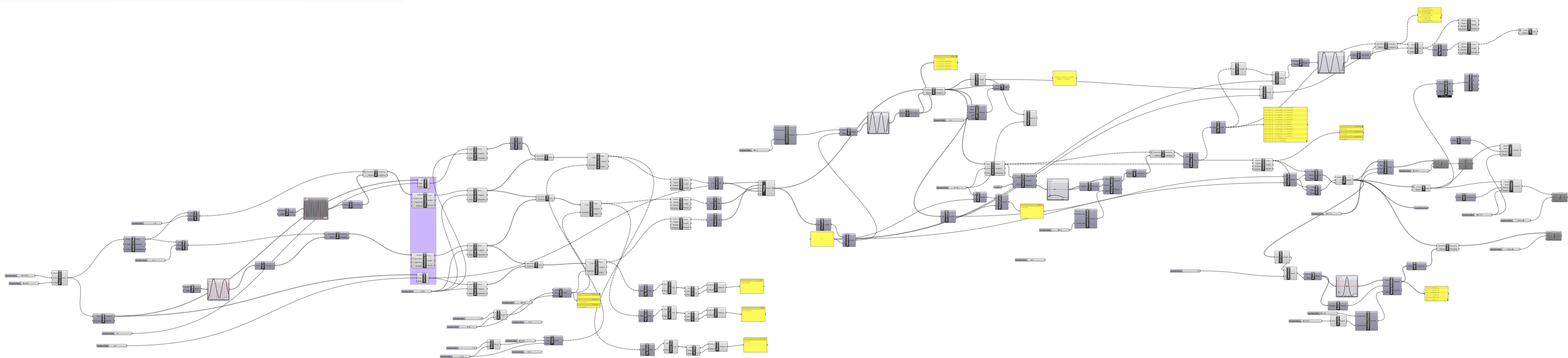
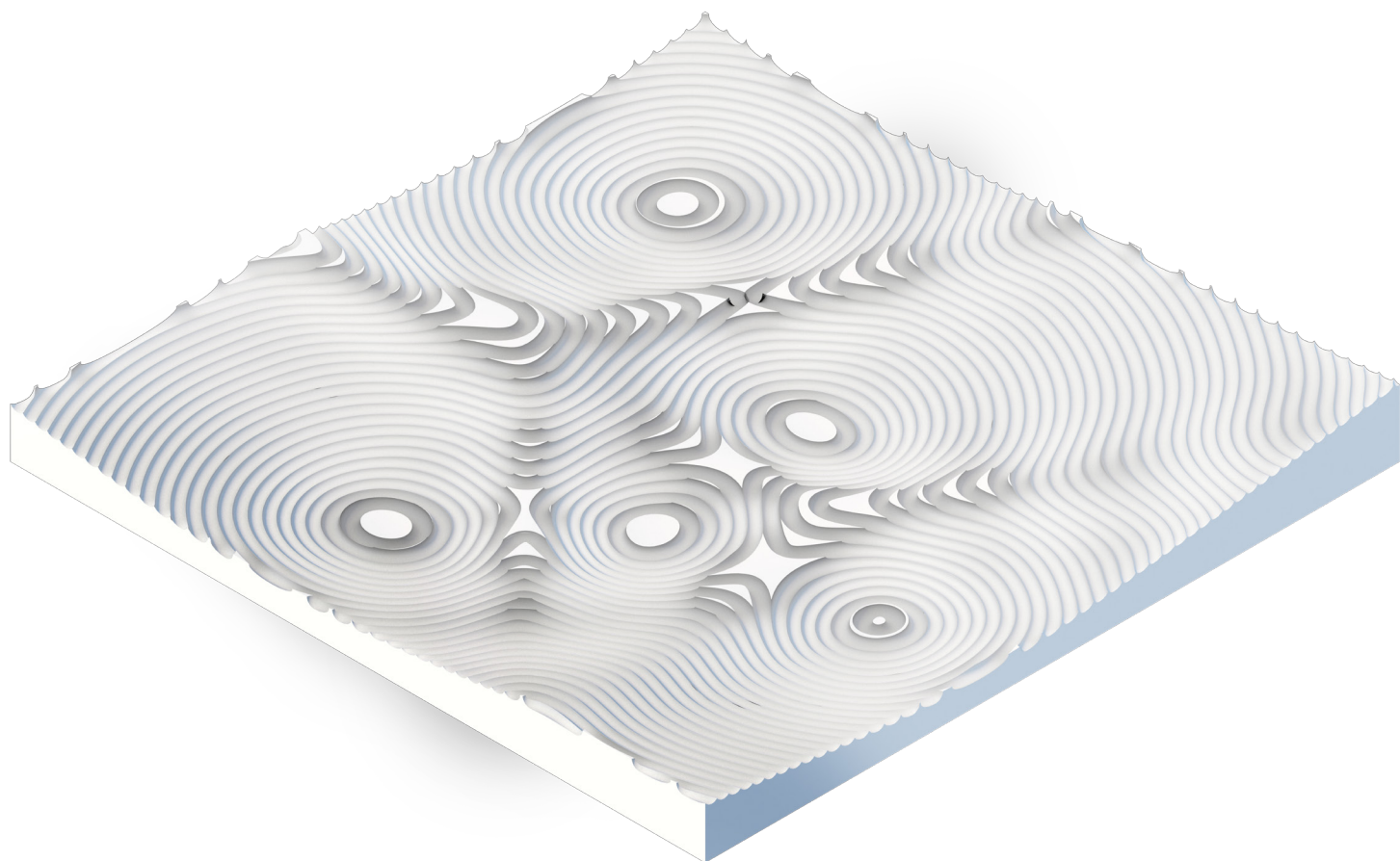
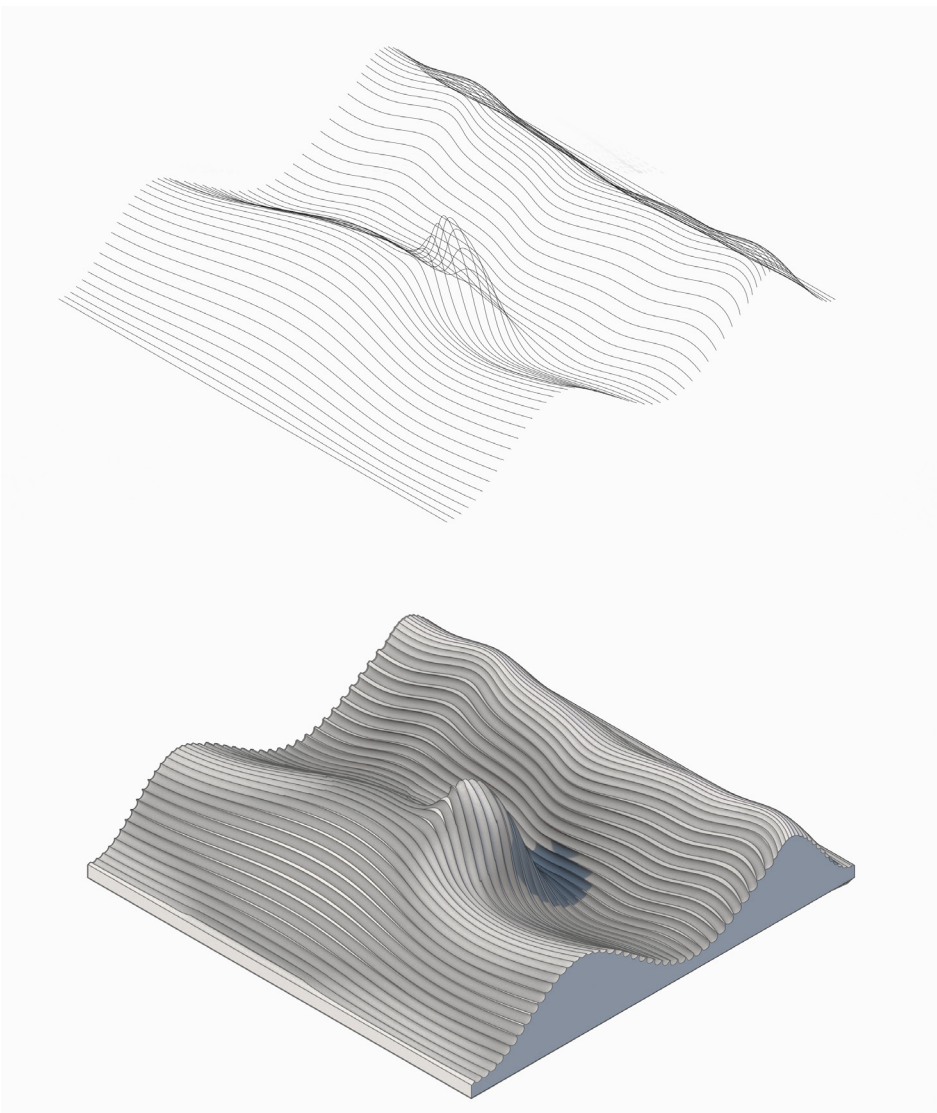


2. Parallel Finish Pass- The parallel finish pass is the toolpath that starts to define the desired geoemtry. Higher quality parallel finishes have more passes but take more time.



Custom Toolpath Generation

CNC routers use a series of curves that are generated to create the desired shape, which is called the toolpath. The toolpath is what the tool follows. Majority of the time, the tool follows this toolpath on center with the tool. With the ability to create my own curves that the tool can follow, this results in a field of optimization and customization on the toolpath.



Grasshopper Script that generated custom toolpath using tween curves to give the surface further definition.