

# Advance Slicing

By Friend

# Pre-workshop

- Download and install Meshmixer
  - I'm using Meshmixer 3.5 for the slides, but any version should be fine
- Download the model of the rabbit with hole from Github

If there's a word you don't understand in the slide, let me know and I'll add it here

- Topology: organization of vertices in a mesh
- Vertex: a point in a mesh model; a model is made up of many vertices

# Note

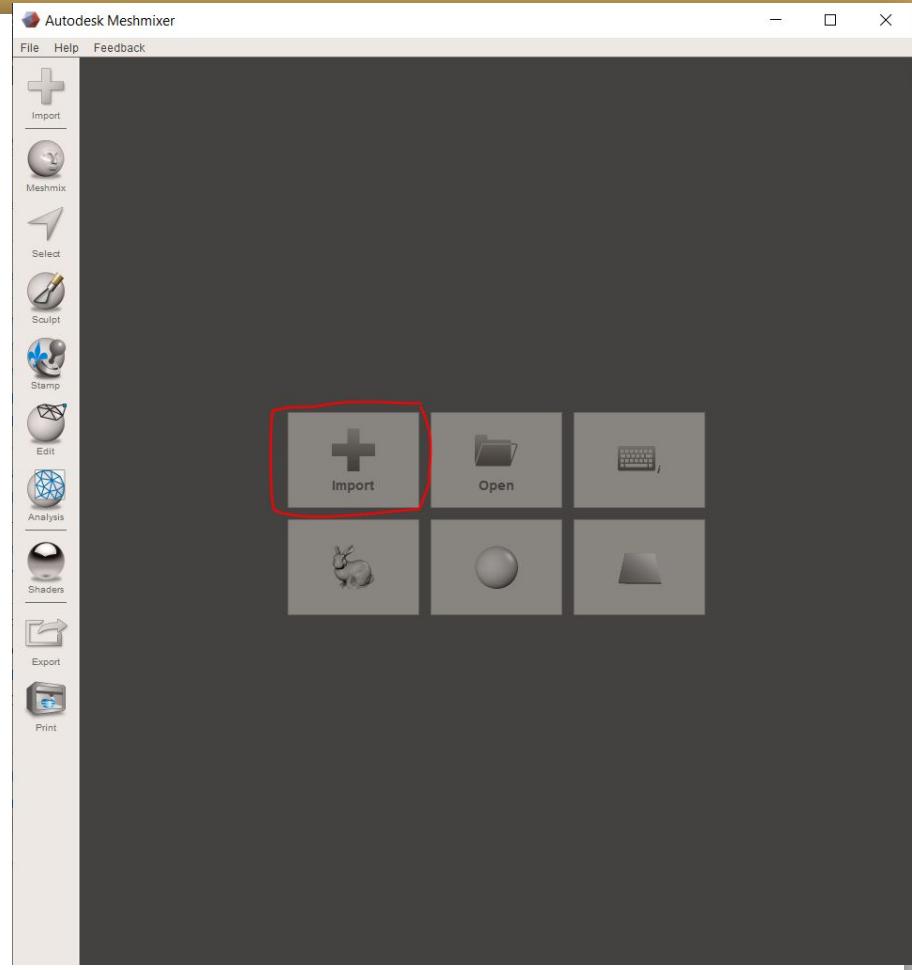
- I'll use "" for button clicks

# Agenda

- Import and export files, navigating
- Repairing holes in models
- Smoothing
- Basic Retopologizing
- Cutting models
- Tree support

# Import

- You should see this screen when you first open
- Import the rabbit

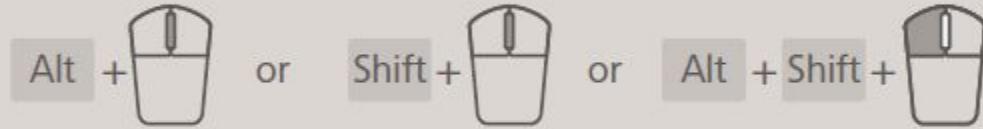


# Navigating

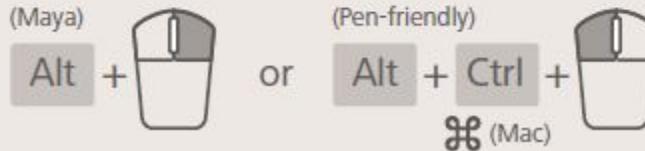
Tumble



Pan

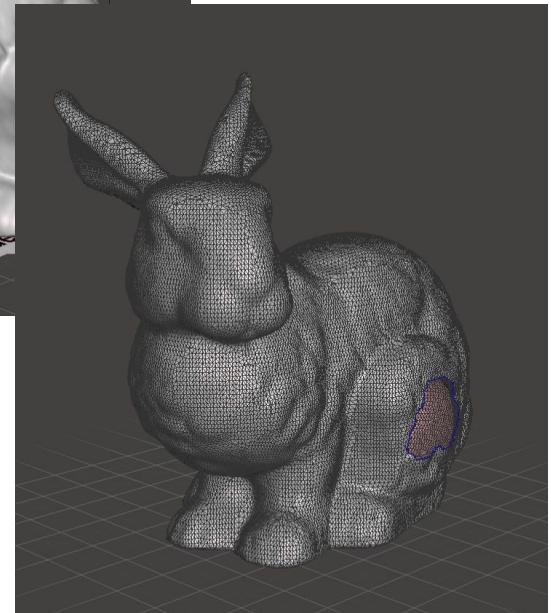
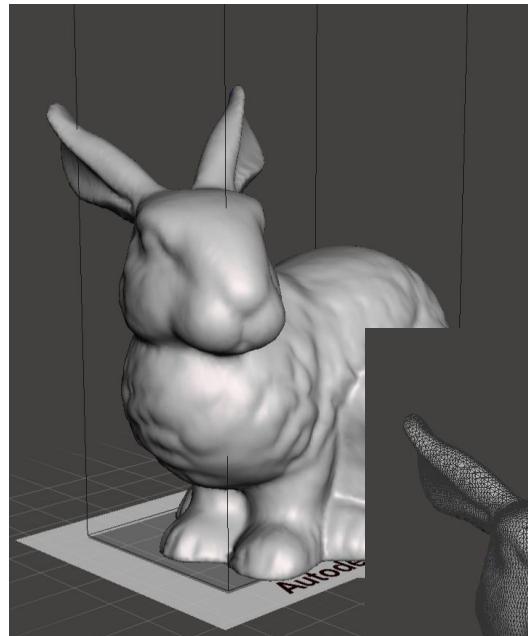


Zoom



# View

- On the toolbar on the top, there's "View" option
- For this WS, I recommend turning on wireframe, and turning off bed



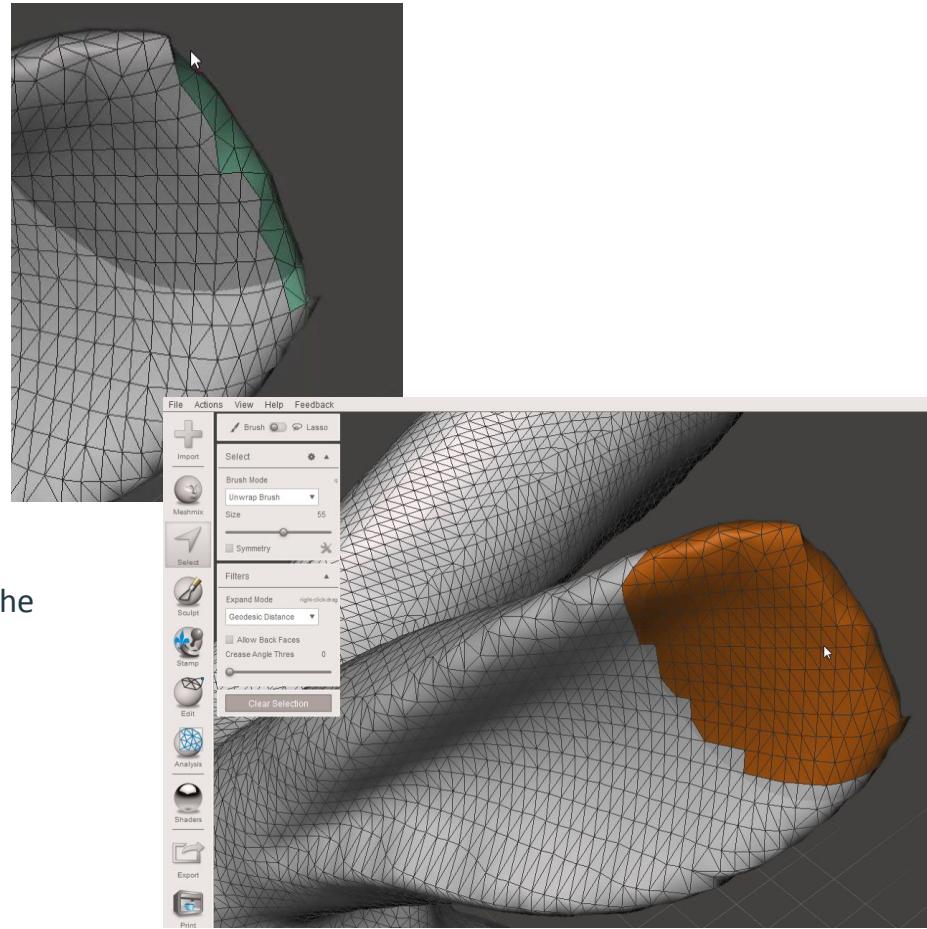
# Hole repair

- On the left toolbar, “Analysis”->”Smooth Fill”->”Auto Repair All”
- Process is fairly automated in Meshmixer
- Different fill for different mesh
  - I used Smooth Fill since the rabbit is an organic model



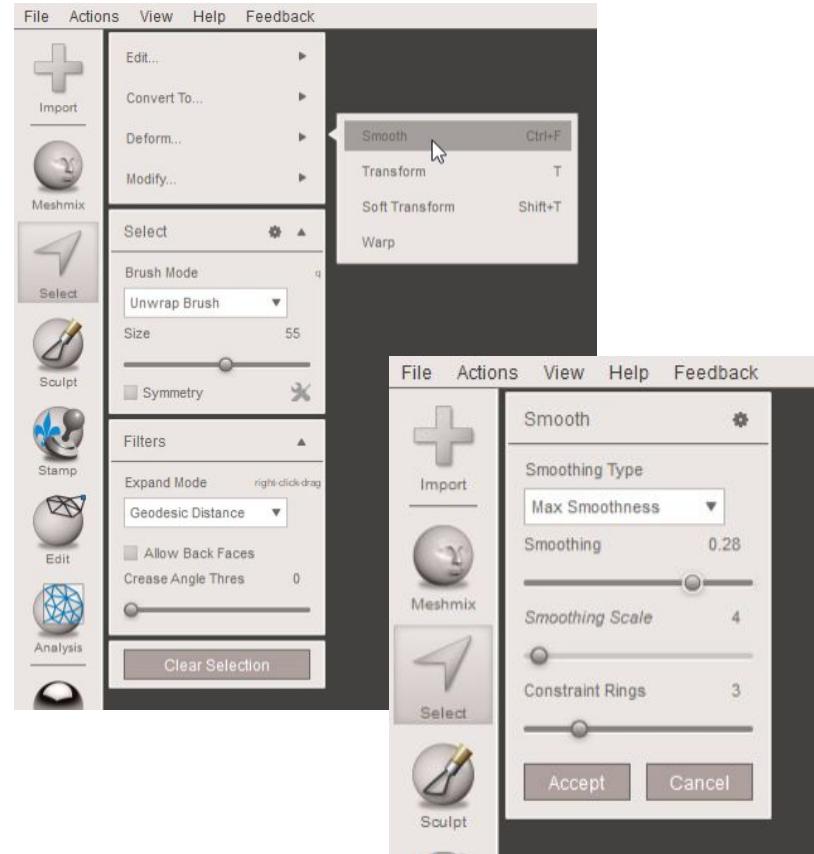
# Smoothing

- Notice that the ear that was filled looks truncated
- We can smooth it out
- On the left toolbar, click “Select” and use the round brush to select the tip of the ear



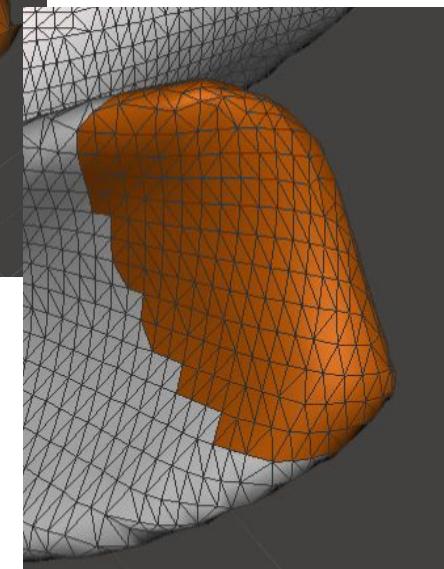
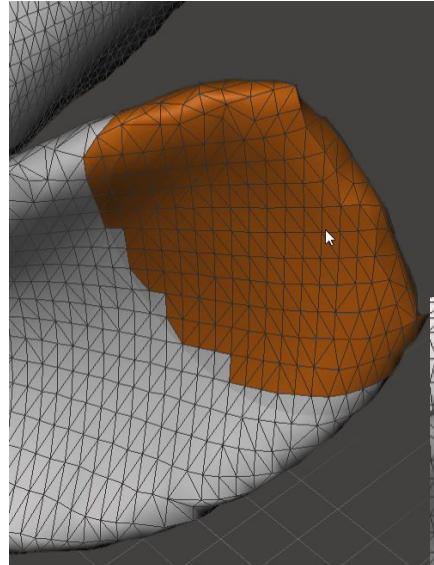
# Smoothing

- Once you're done selecting, another set of buttons should pop up
- Go to "Deform...->"Smooth"
- Play around with the settings so the ear looks nice



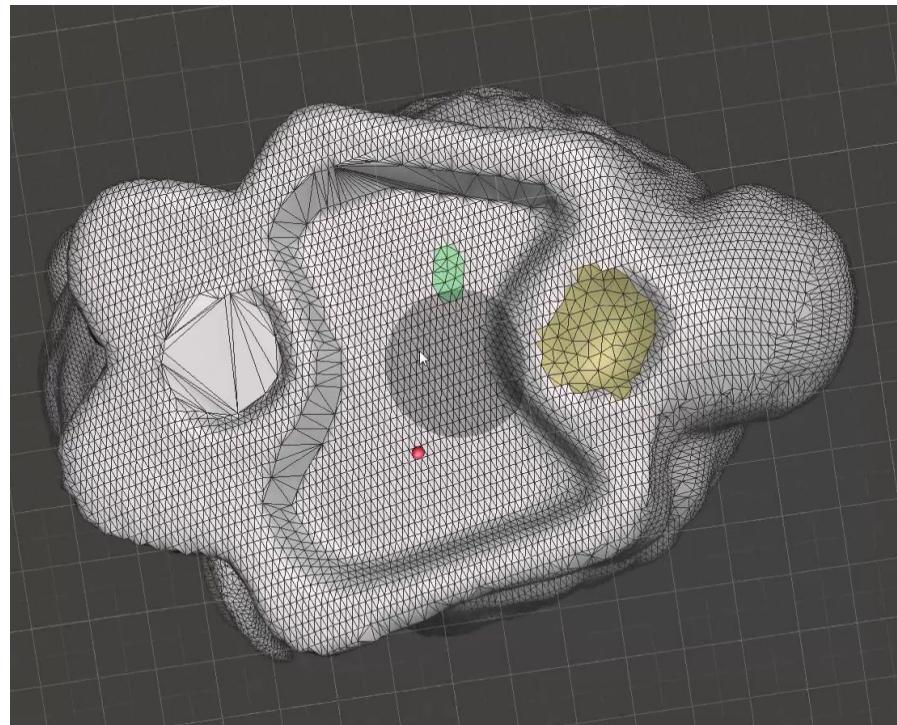
# Smoothing

- Before and after



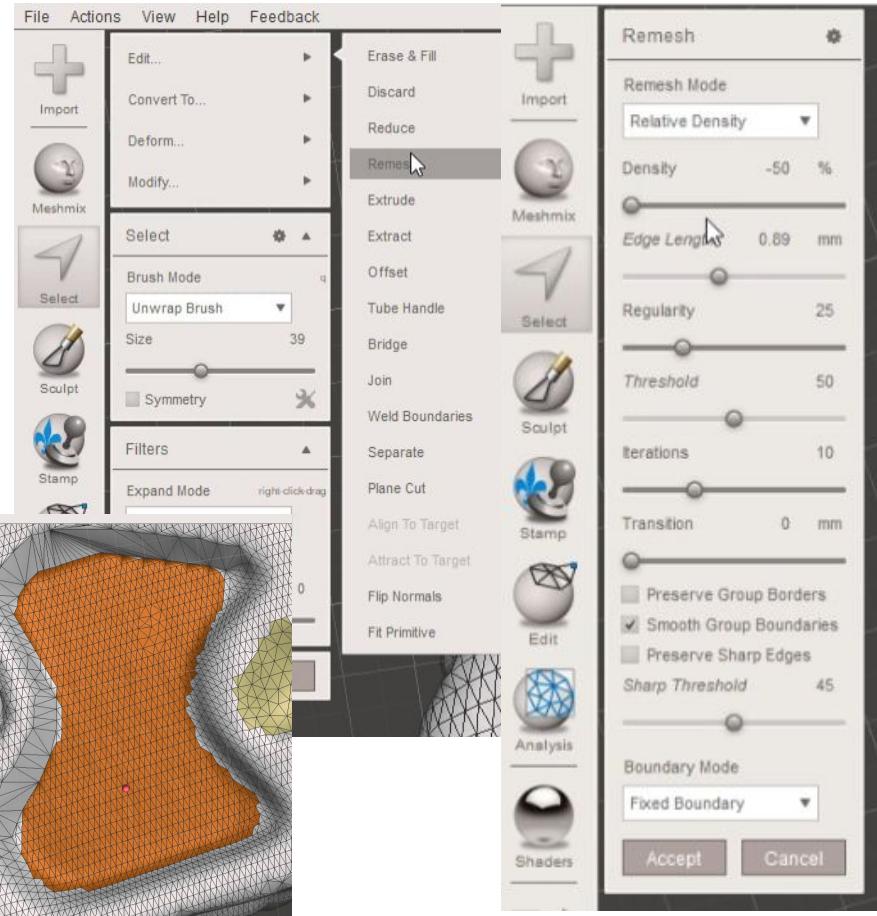
# Remesh

- Rotate camera so you see the bottom
- You can see that there's a lot of vertices for just a simple flat surface
- This makes the model larger and more complicated than it should be
- We can retopologize it (Meshmixer calls it “remesh”)



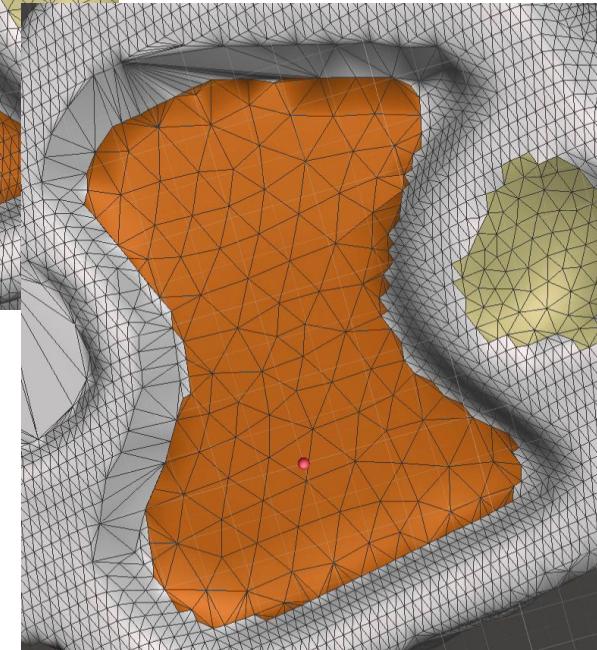
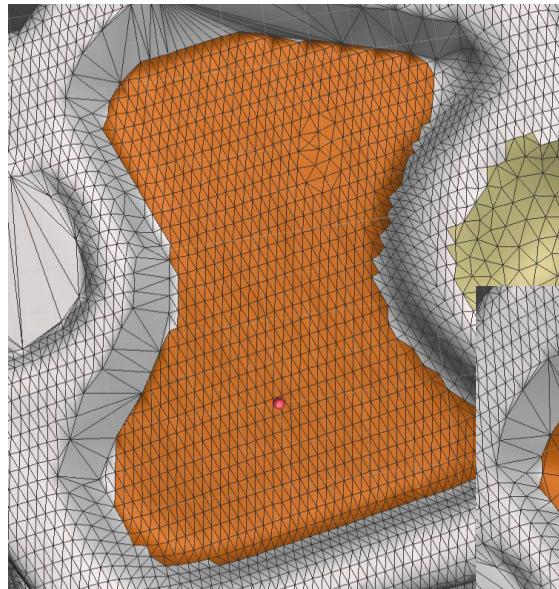
# Remesh

- Click “Select” and highlight all the vertices on the flat part
- Go to “Edit”->“Remesh”
- Play with the settings to reduce the amount of vertices to the least you can



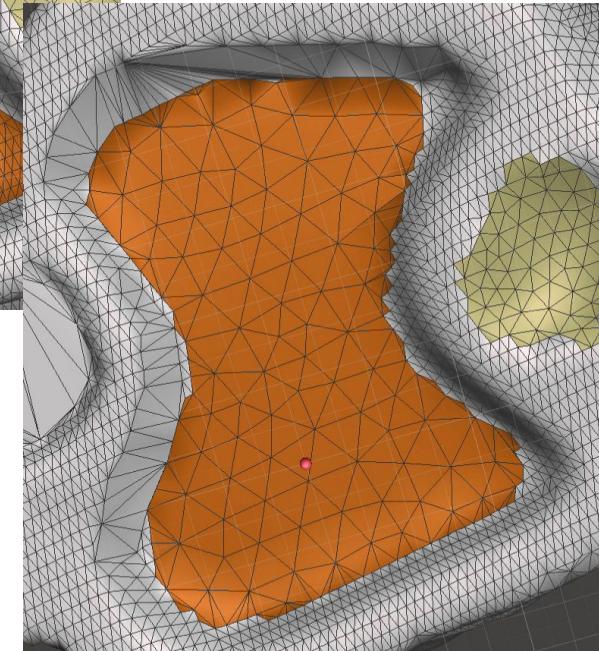
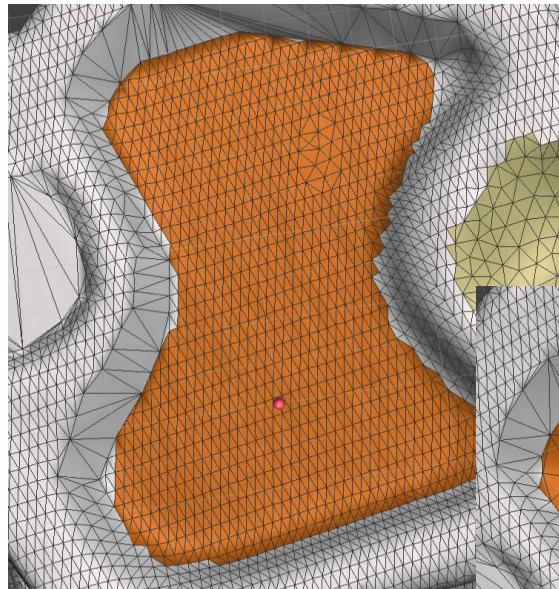
# Remesh

- Before and after



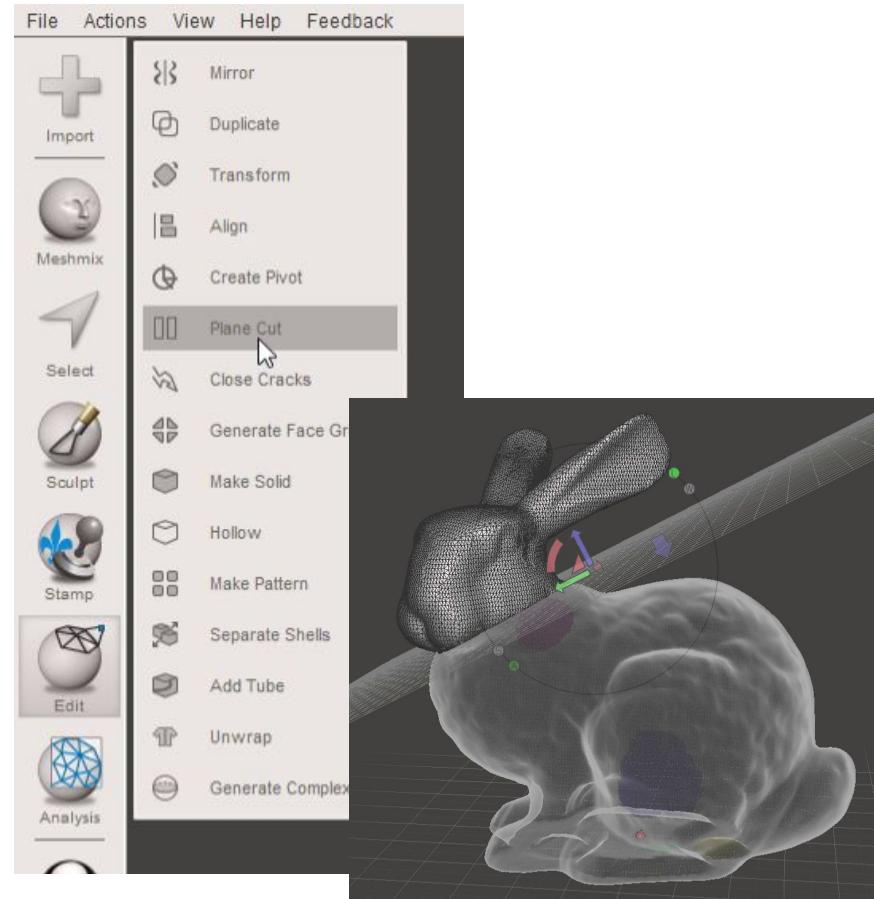
# Remesh

- Before and after



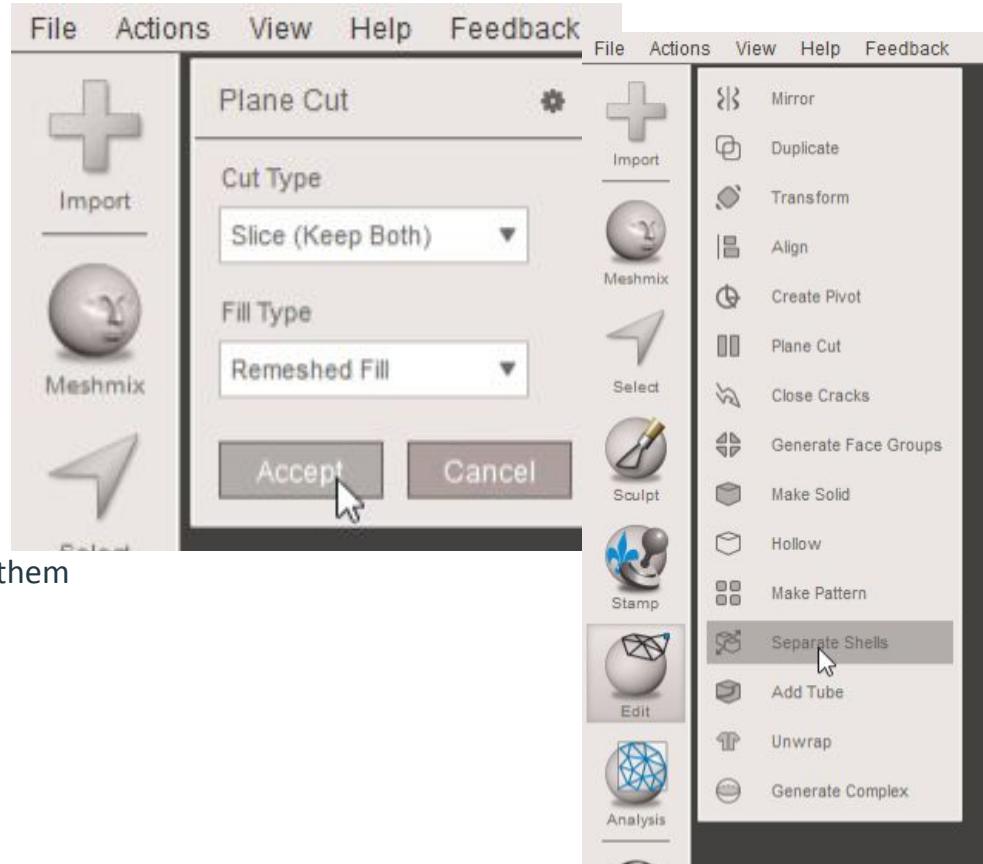
# Plane cut

- Sometimes you want to cut a model into more printable chunks
  - Too big for printer, overhang wasting supports, get rid of overhang altogether, etc.
- Use plane cut by going to “Edit”->“Plane Cut”
- Use arrows to translate the plane, and the quarter-circles to rotate the plane



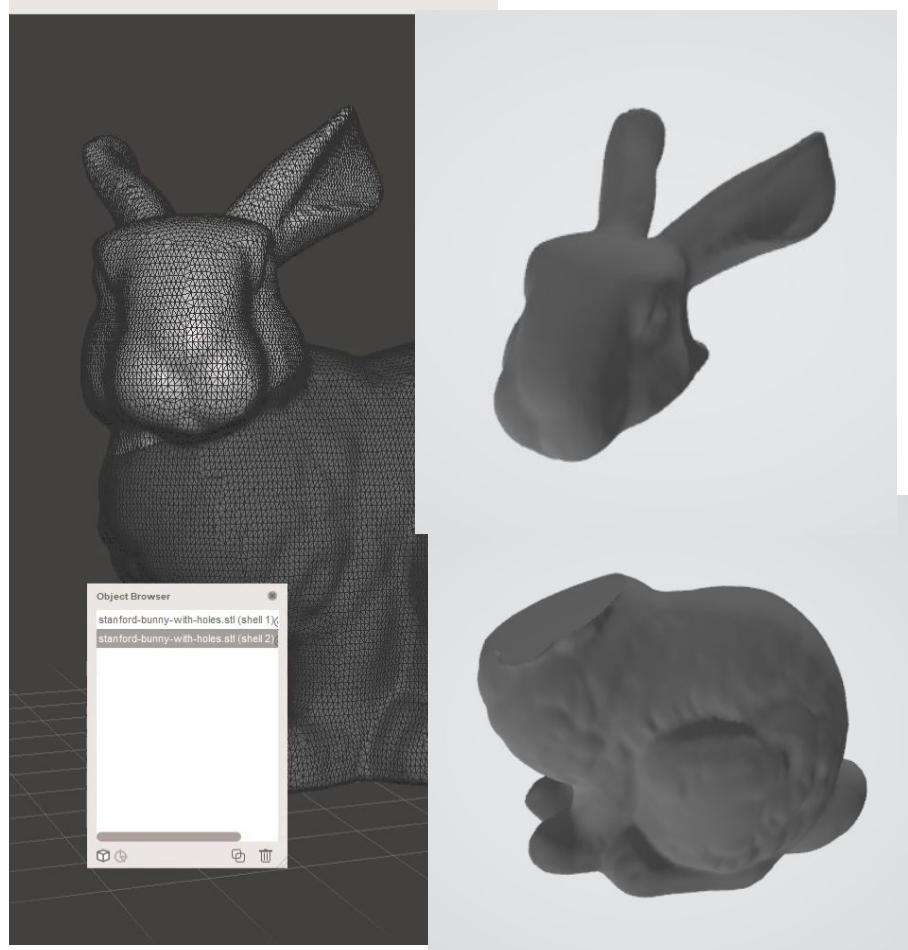
# Plane cut

- Once you're happy with plane location, change Cut Type to "Slice (Keep Both)"
- Click "Accept" to make the cut
- Go to "Edit"->"Separate Shells" to make them separate models



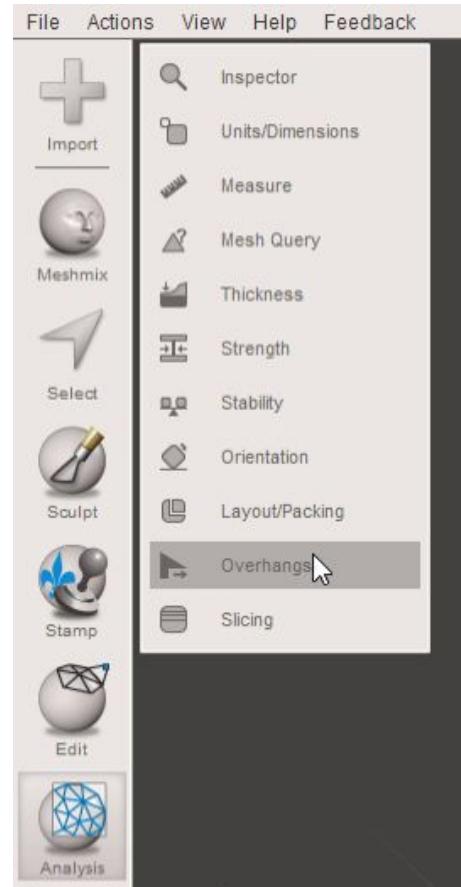
# Plane cut

- You can select the model you want and export the models individually
- Go to the top toolbar, “File”->”Export” to export the selected model



# Tree Support

- You've seen grid support in previous WS
- They take up quite a bit of plastic, and are difficult to remove, aren't they
- Tree support is generally less wasteful and easier to remove
- On the left toolbar, "Analysis"->"Overhangs"



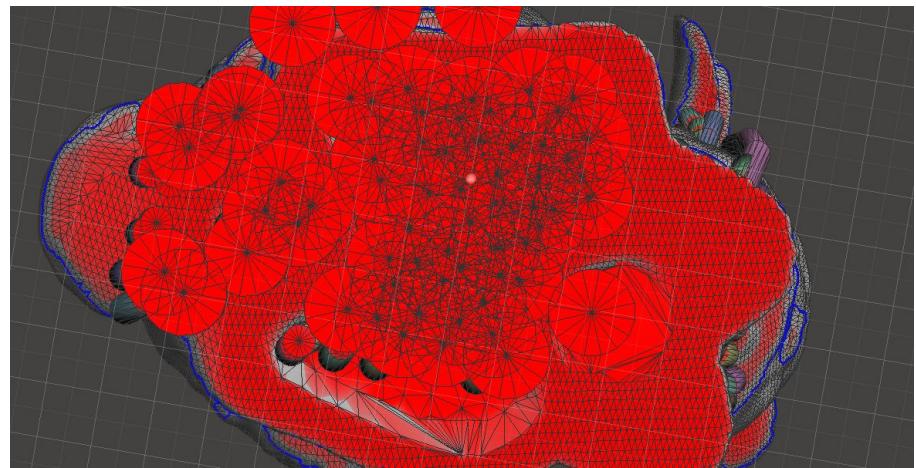
# Tree Support

- You can change Angle Thresh to 45deg
- I'll leave other settings for you to explore
- Click "Done" to generate tree support
- Try generating and ctrl-z-ing a few times to get an idea of what each setting does to the support



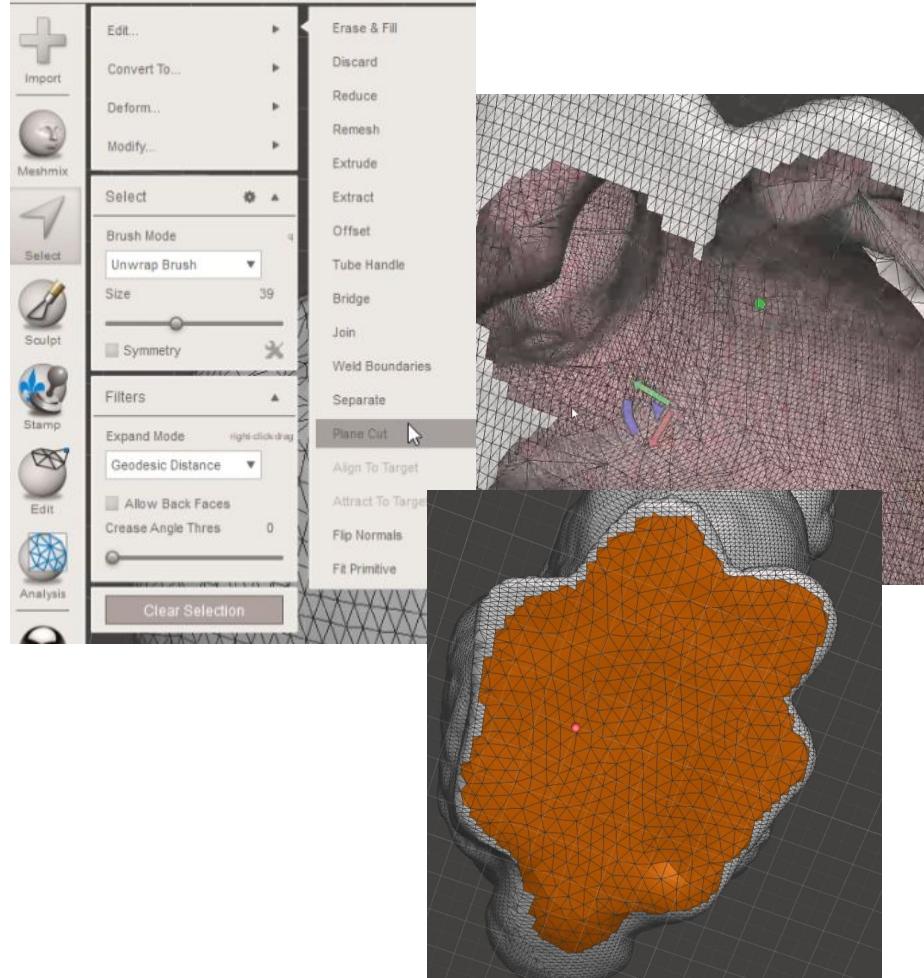
# Oh No

- Rotate to the bottom
- You'll see that there's a bunch of support generated for the groove on the bottom (the bump that we retopologized)
- Do we really need that groove? Can you get rid of it altogether?



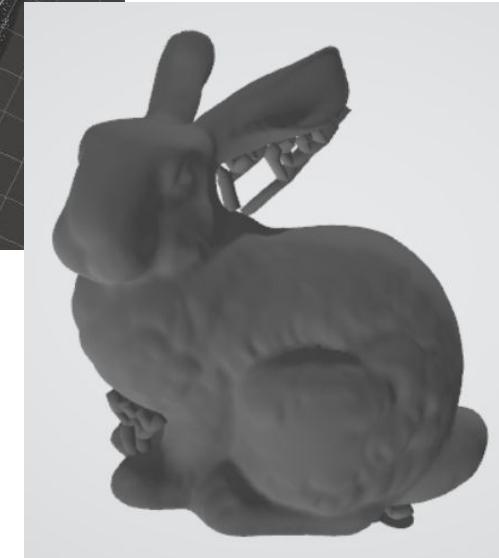
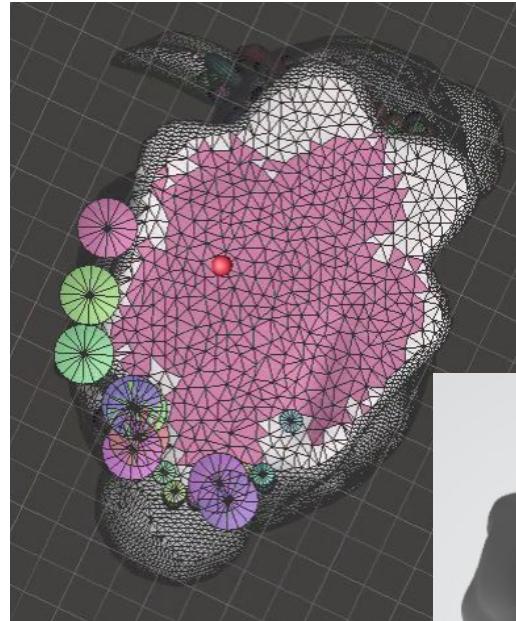
# Exercise

- As an exercise, I'll let you figure out a way using the skills we learned previously in this WS
- I did it by exploring the software a bit and breaking the problem down into steps:
  1. Select the problematic grooves
  2. Do a plane cut on them
  3. Fill the giant hole created
  4. Remesh it to make it efficient
- You don't have to do it this way



# Exercise

- Generate tree support again and rotate to bottom
- You should see that there's no wasteful supports generated now
- Export it



# Homework

- Distributed in WS

# Some further readings

- These are where I got WS material from, and there's a lot more content I didn't cover in them:
  - <http://www.diva-portal.org/smash/get/diva2:1222615/FULLTEXT02.pdf>
  - <https://blog.prusaprinters.org/cut-stl-models-3d-printing-meshmixer/>
- If you want to get ahead, Basic Mesh Modeling WS uses Blender which does everything that Meshmixer does, but much more
- Cura also does tree support, although it is less customizable; I highly recommend you look at it