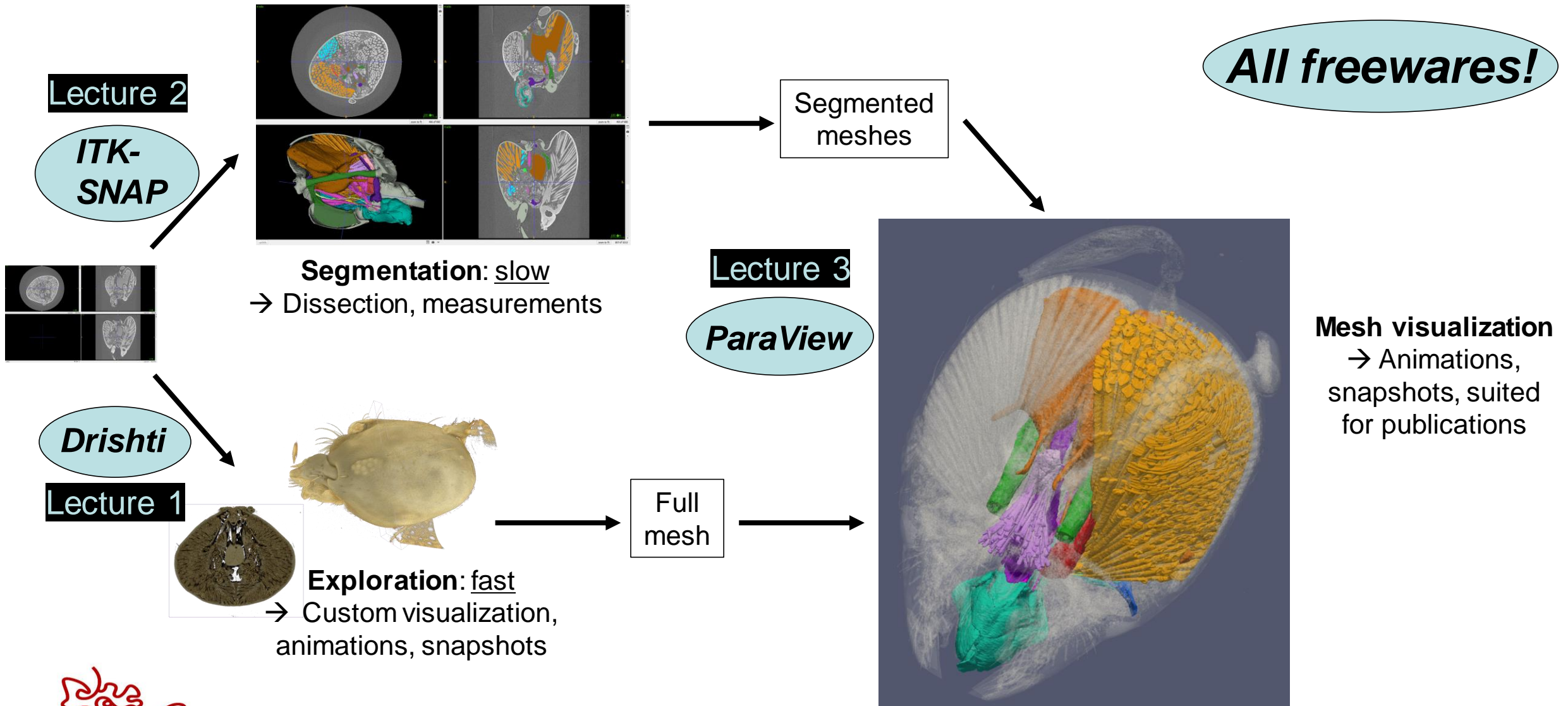# SKILLPILLS

SKILL PILL: Visualizing Tomography Data (for free!)

Lecture 3: ParaView

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OIST

A free Tomography Data analysis workflow

All freewares!

Lecture 2

ITK-SNAP

Segmented meshes

Segmentation: slow
→ Dissection, measurements

Lecture 3

ParaView

Mesh visualization
→ Animations, snapshots, suited for publications

Drishti

Lecture 1

Full mesh

Exploration: fast
→ Custom visualization, animations, snapshots

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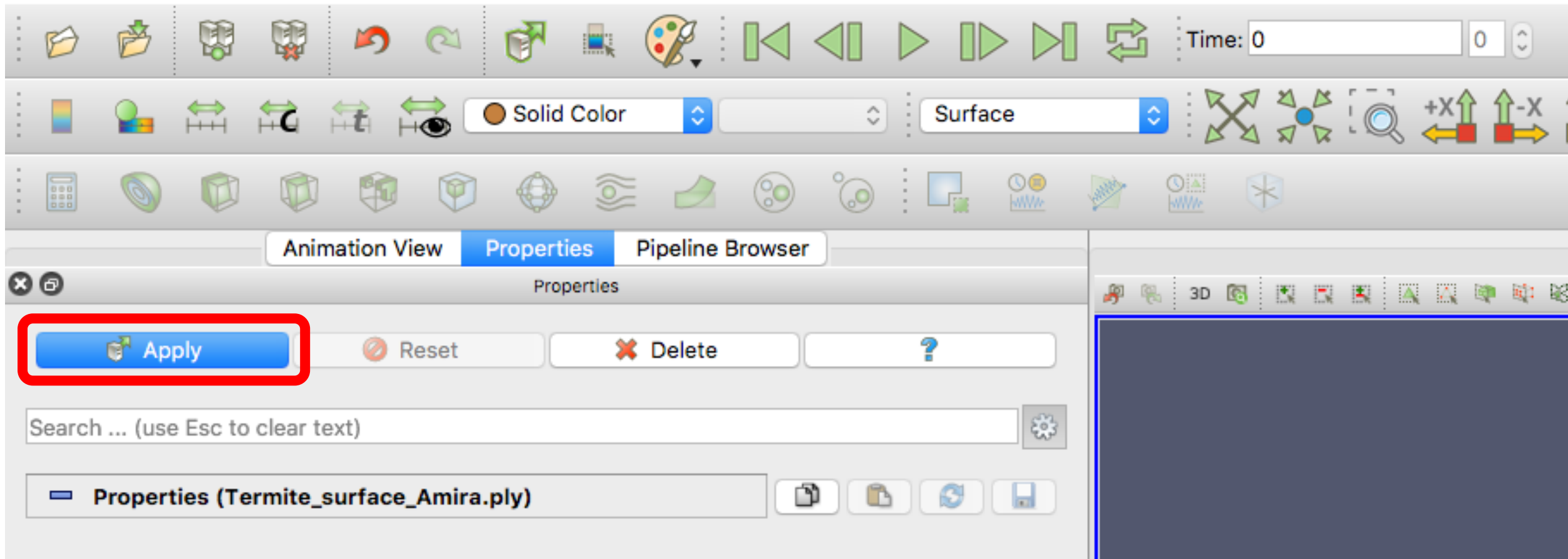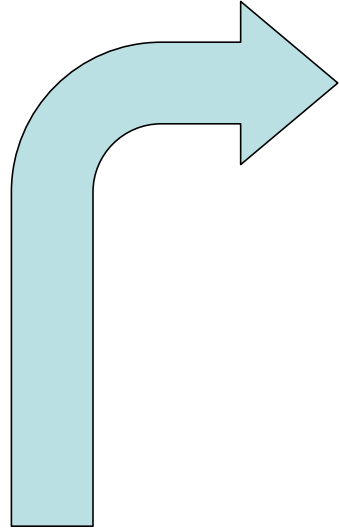- Open-source <u>data visualization and analysis</u> software

- Developed by <u>Kitware</u>

- Useful resources and links: <u>https://www.paraview.org</u>

- Originally developed for big datasets
  - Interactive 3D window
  - ParaView/Python scripting → batch processing

- # Open ParaView
- # Drag and drop the mesh files (one by one)
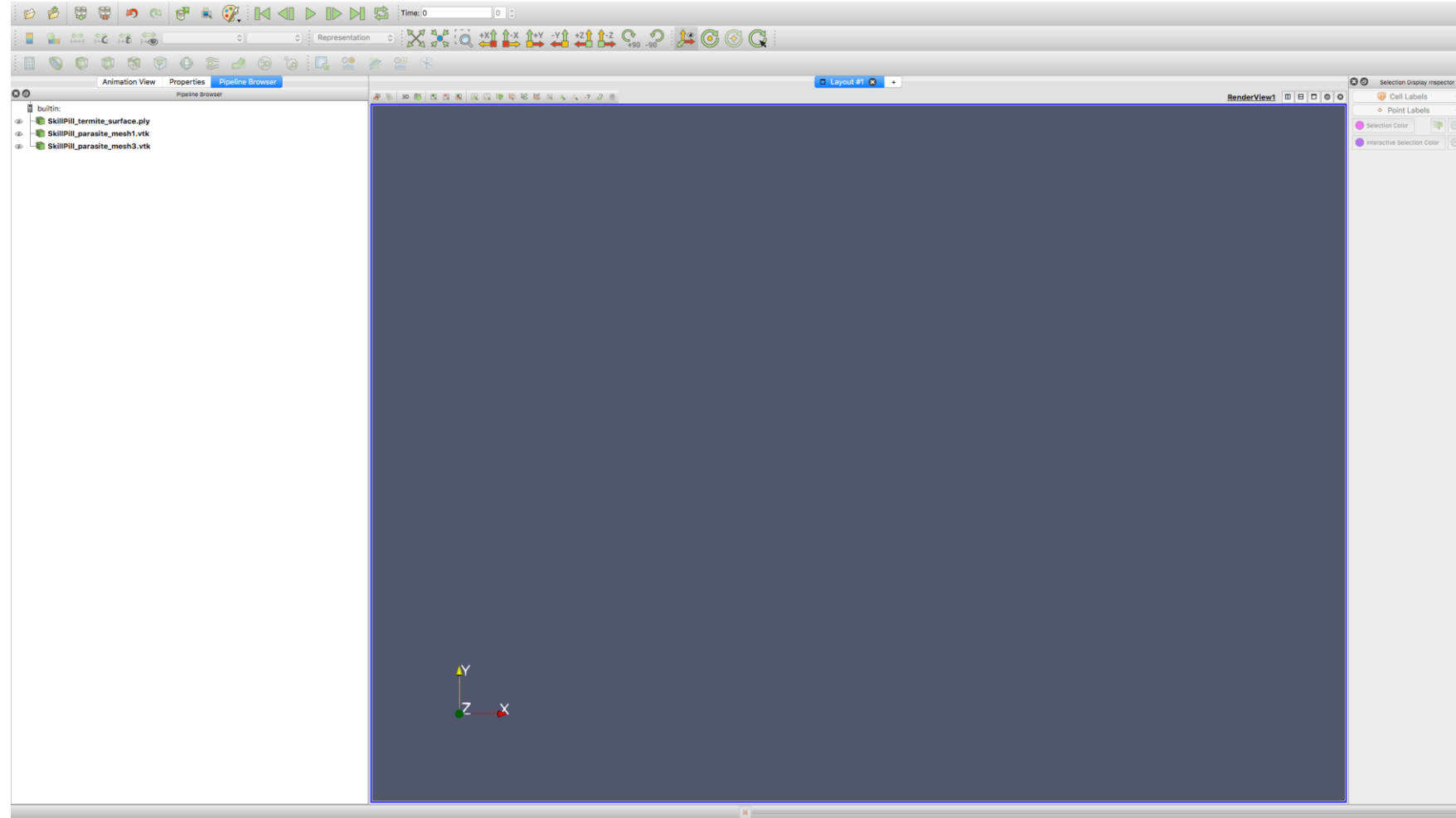
- To visualize the files, go to the Properties tab and click Apply
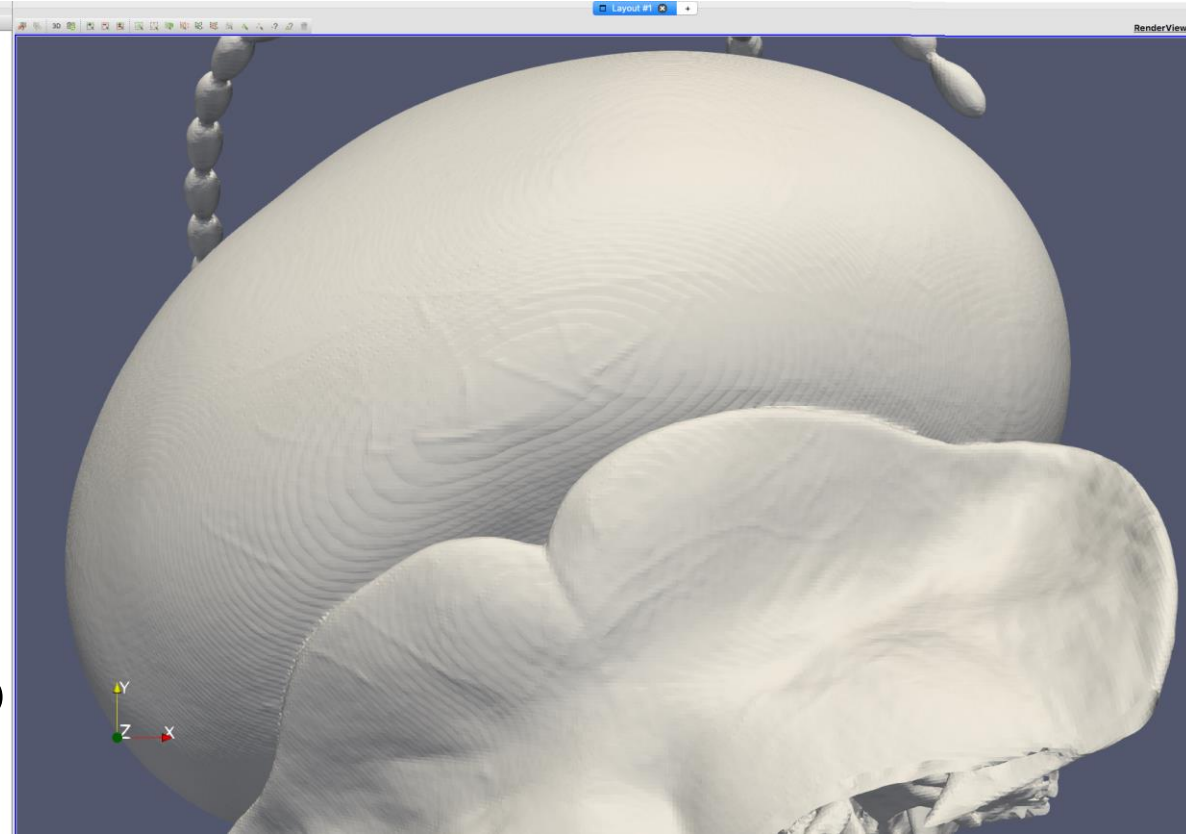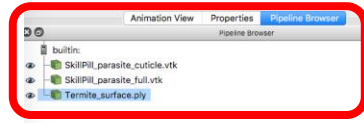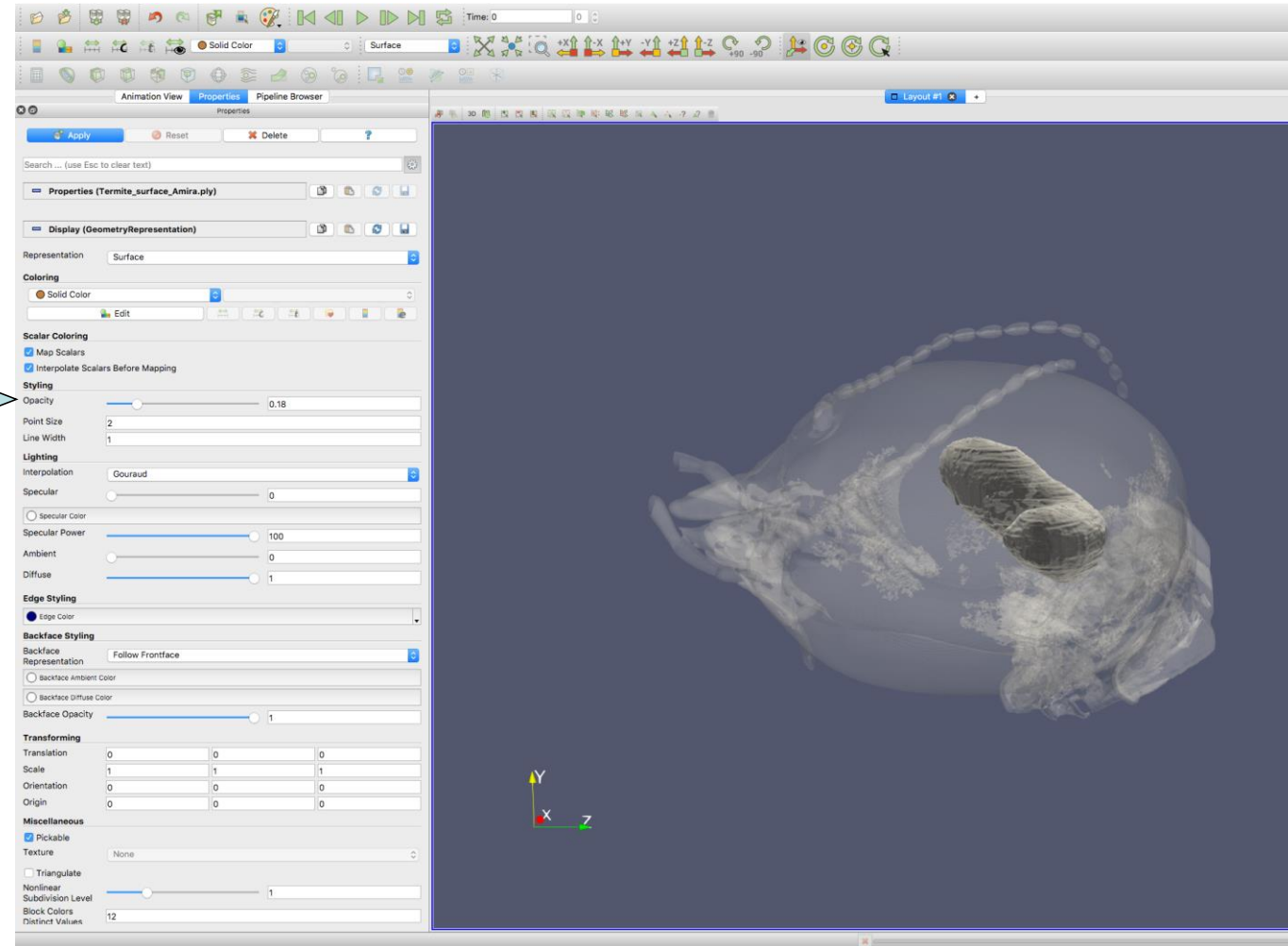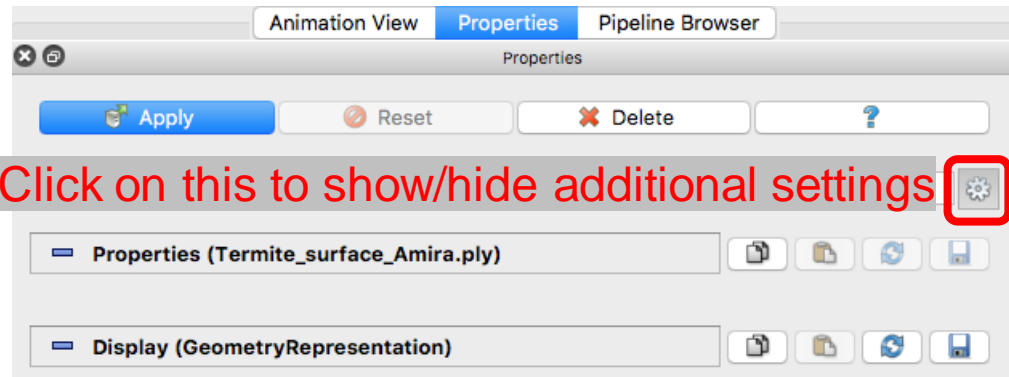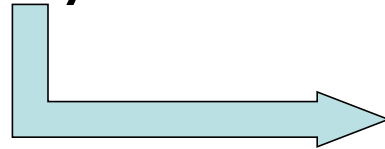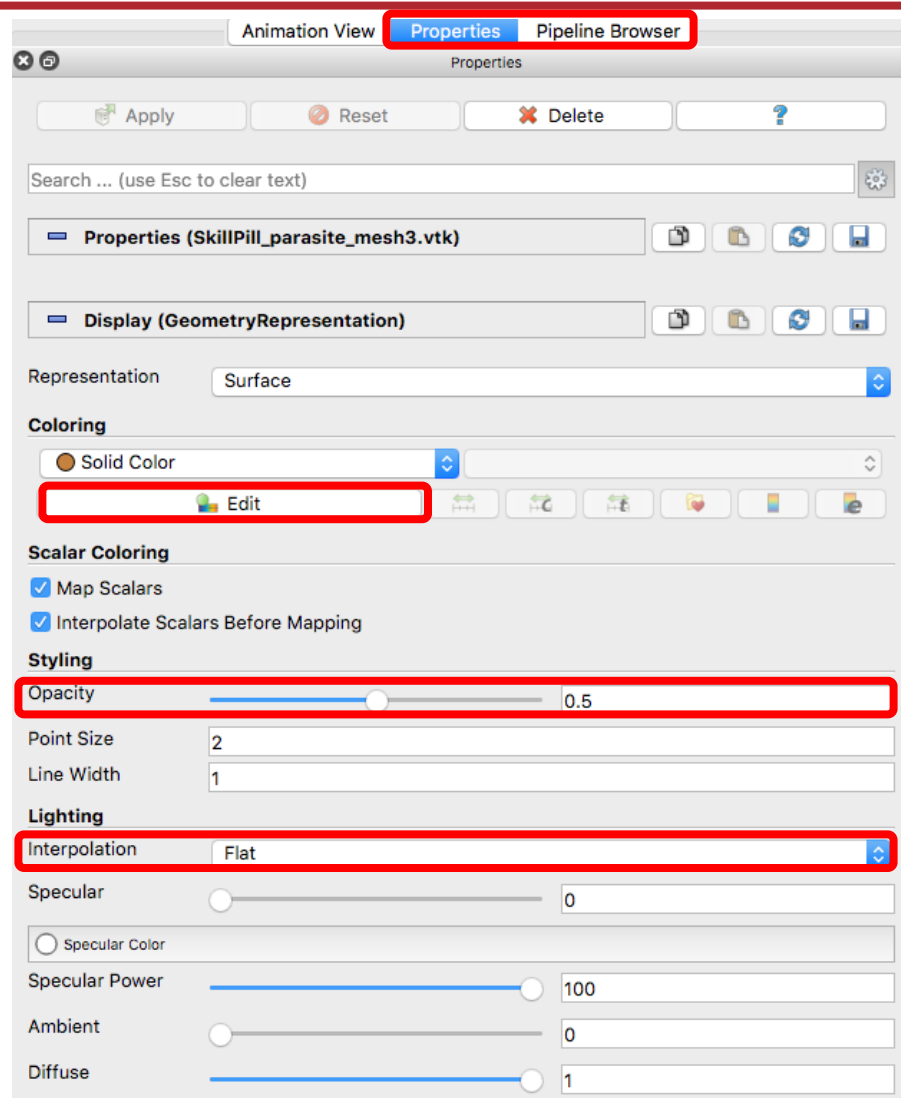
- <u>Pipeline Browser</u> is a crucial tab

- You can select meshes in this tab

- Modifications and filters will only be applied to the mesh(es) selected in the Pipeline Browser

- ## Make the head transparent
  - Go to the Properties tab
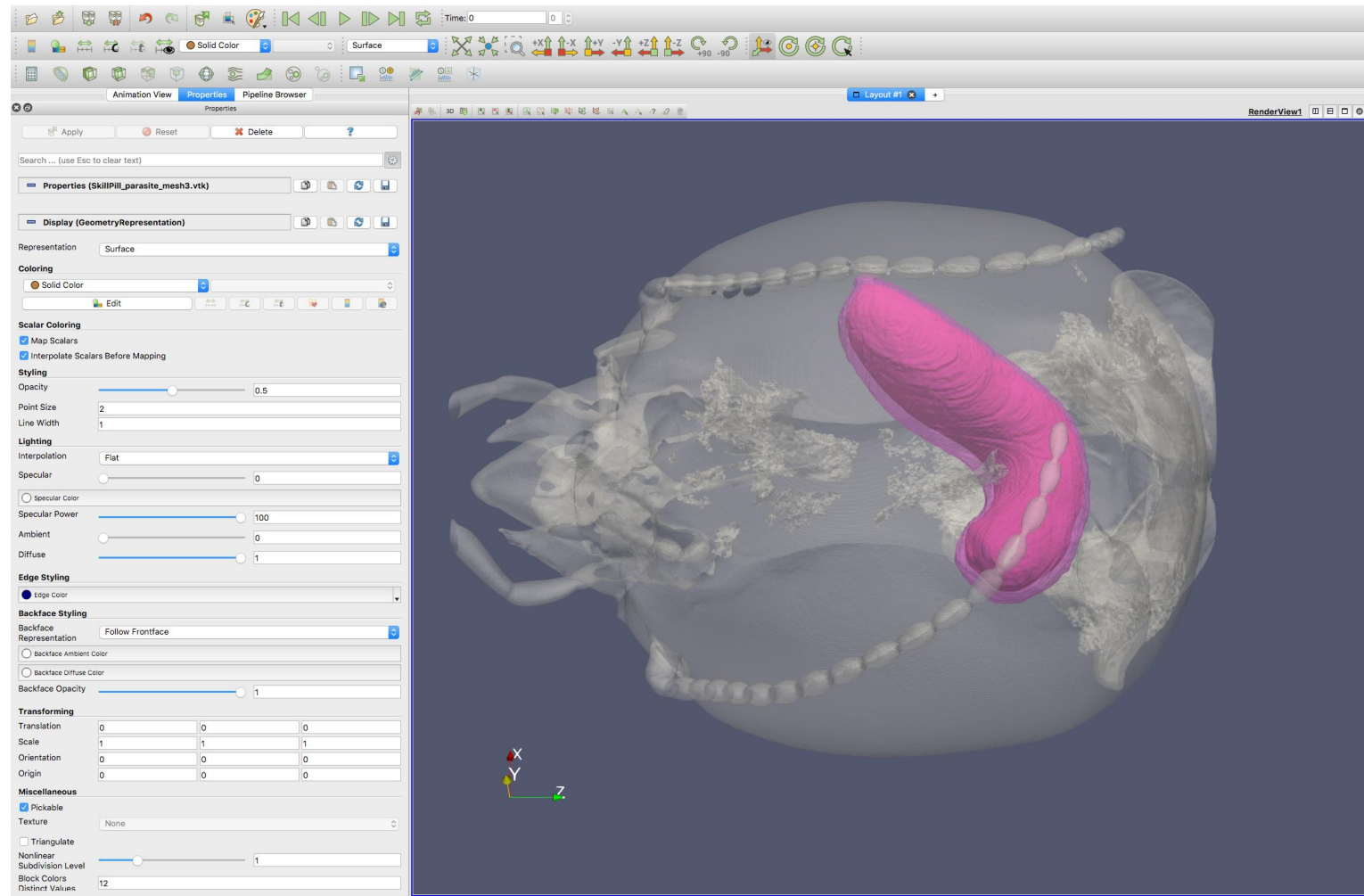 - Change the Opacity value
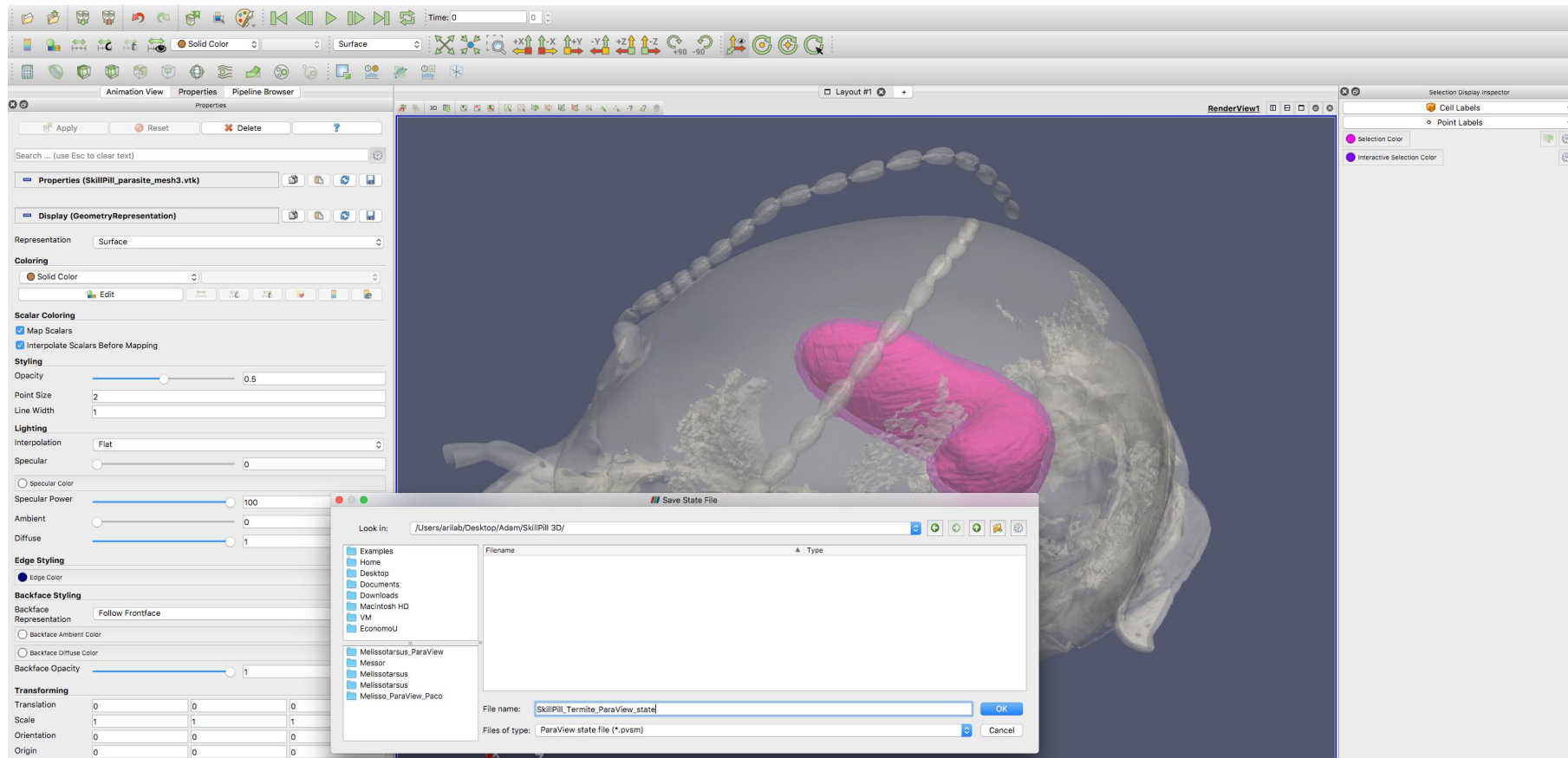
Change opacity and colors

- Select the cuticle mesh in the Pipeline Browser
- Go back to the Properties tab
- Change the color of the cuticle

- Decrease its opacity (e.g. around 0.5)
- Change its lighting (from Gouraud to Flat)
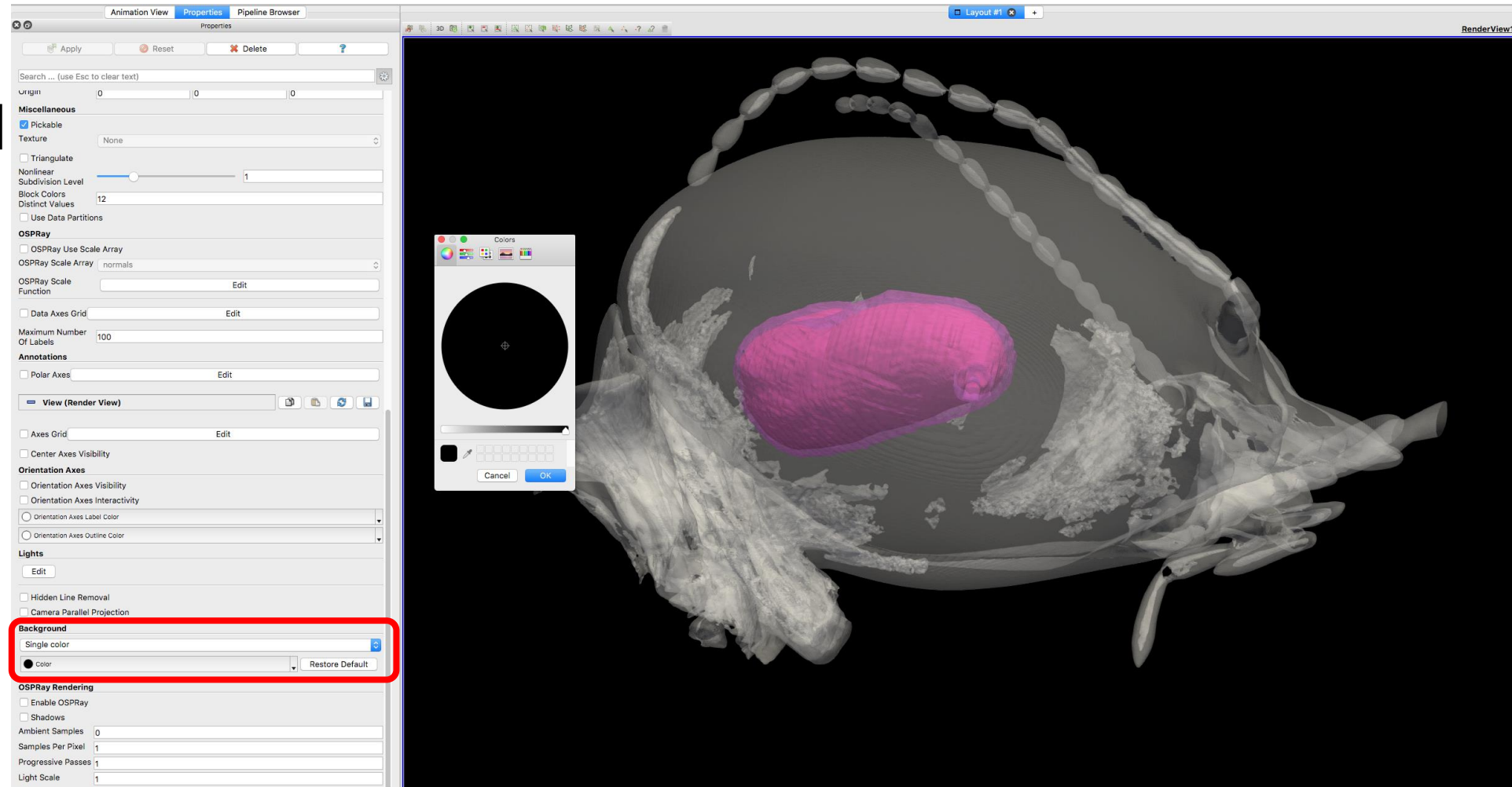
Change opacity and colors

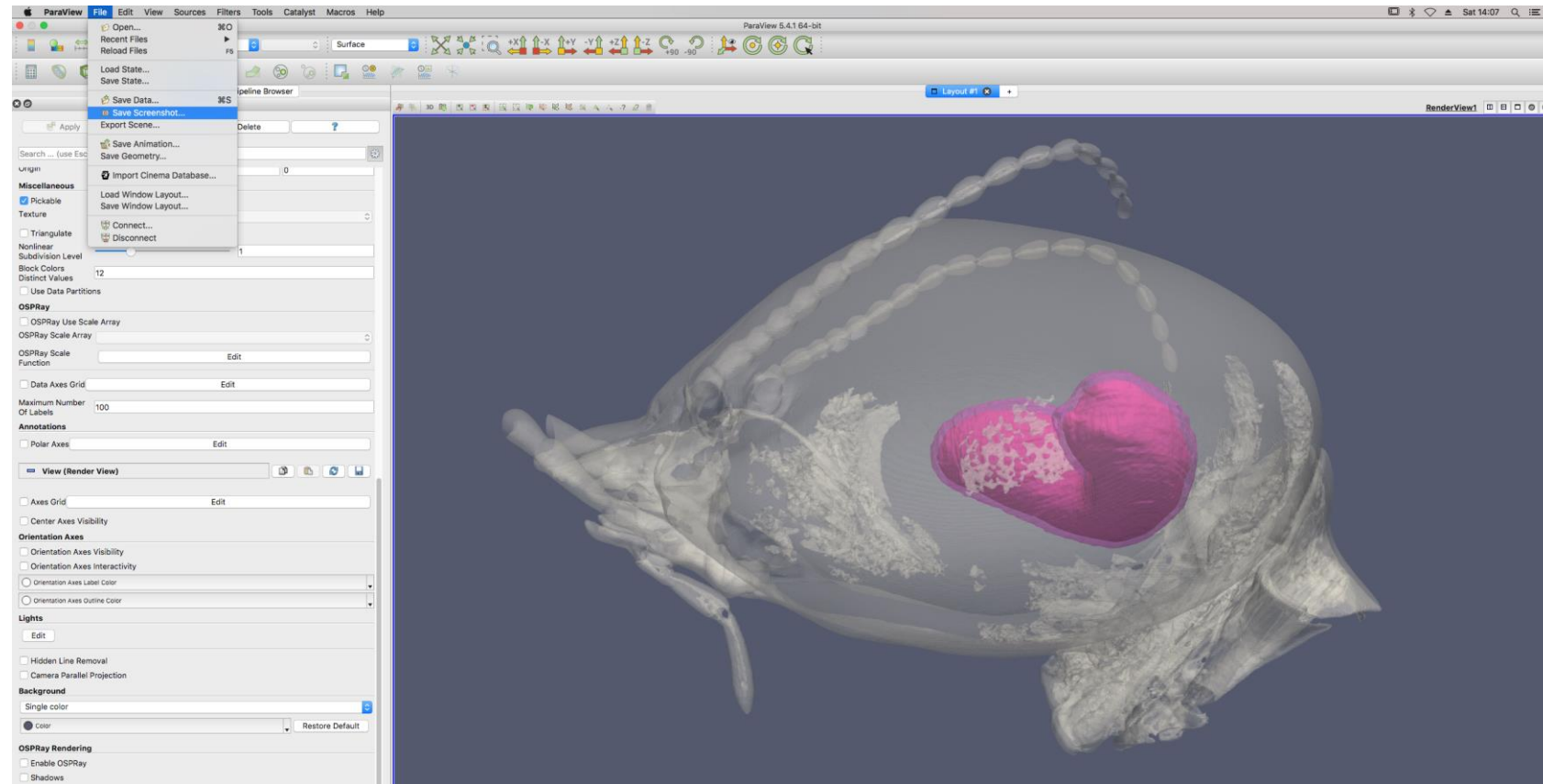- Similarly, change the color and lighting of the parasite mesh

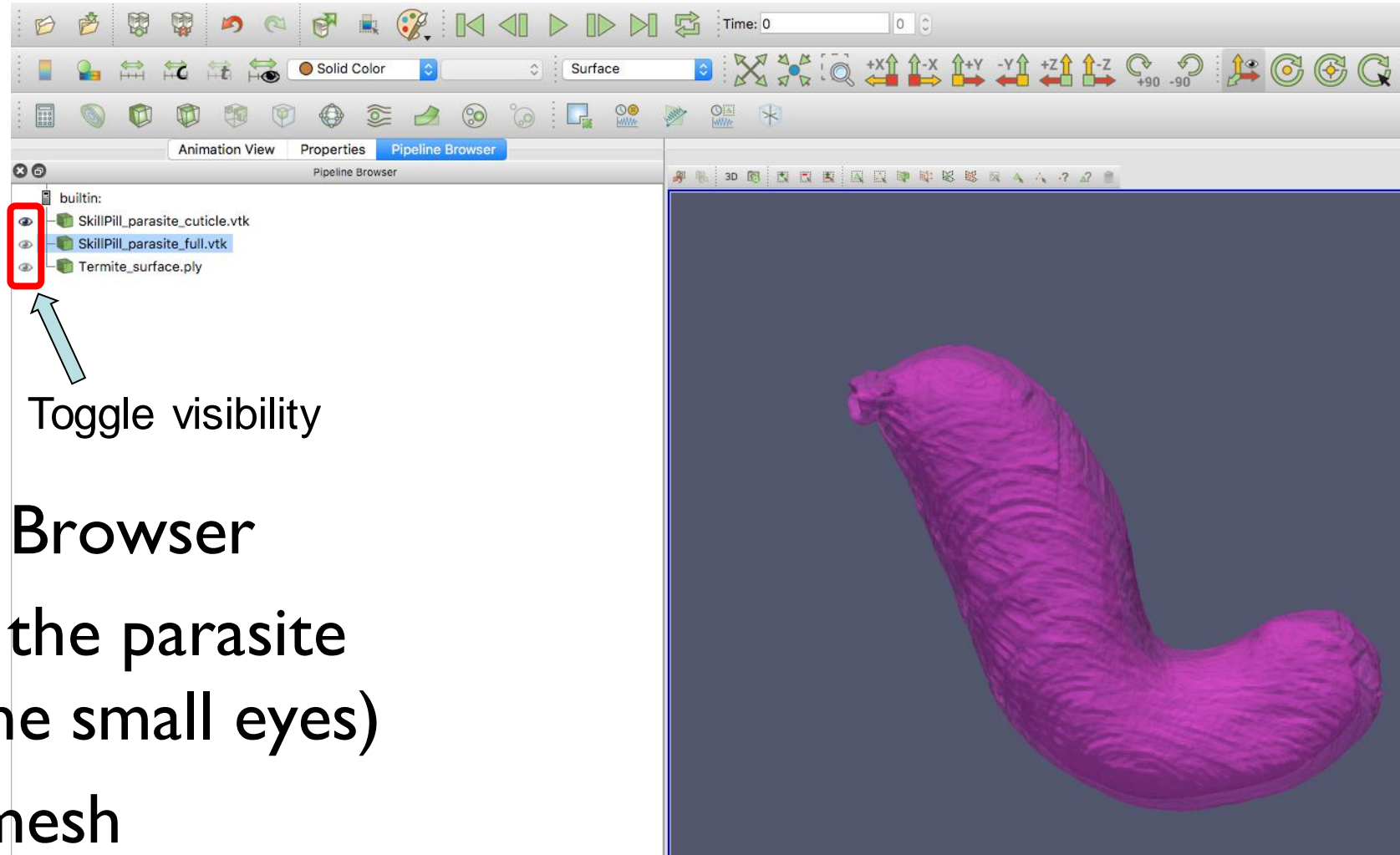- Go to File > Save State

- Save a .pvsm file (ParaView state file)

- In the Properties tab, go to the View section
- Edit the Background settings

- Set the scene as you want by rotating the volume
- Go to File
  > Save Screenshot
- Choose the dimensions of the image

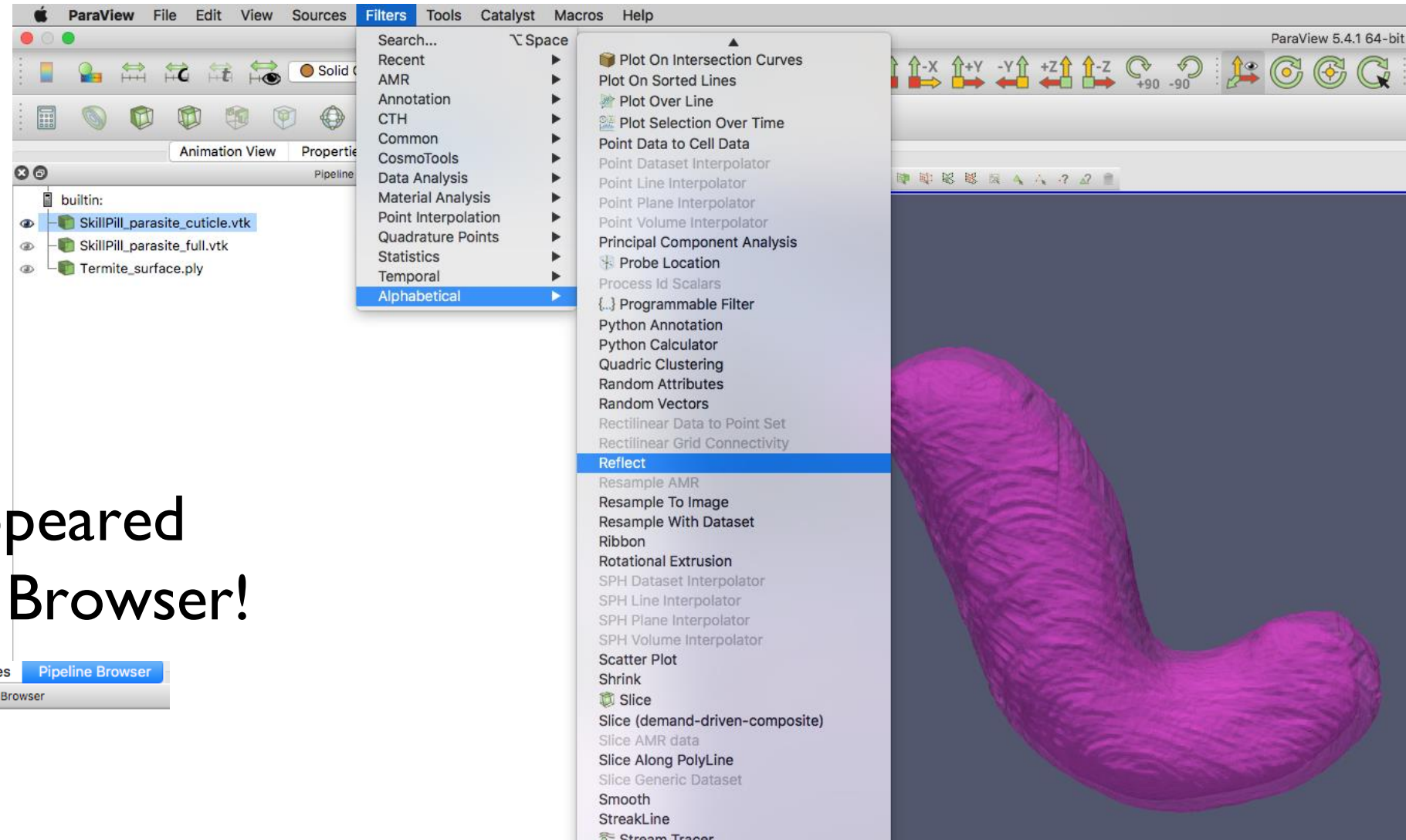- Let's say we want to create a mirror image of the cuticle mesh

Toggle visibility

- Go to the Pipeline Browser

- Hide the head and the parasite meshes (click on the small eyes)

- Select the cuticle mesh
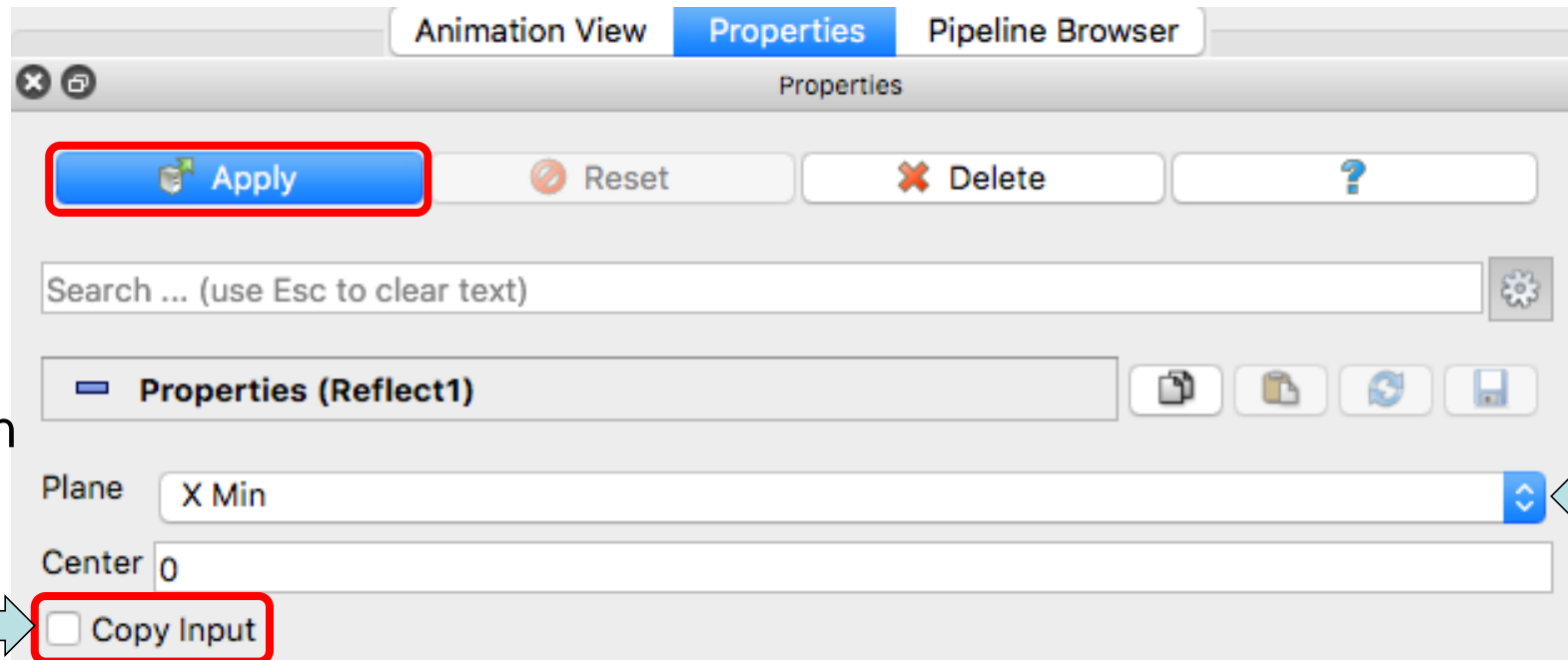
- Go to Filters
  > Alphabetical
  > Reflect

- A new item appeared
  in the Pipeline Browser!

- Go to the Properties panel
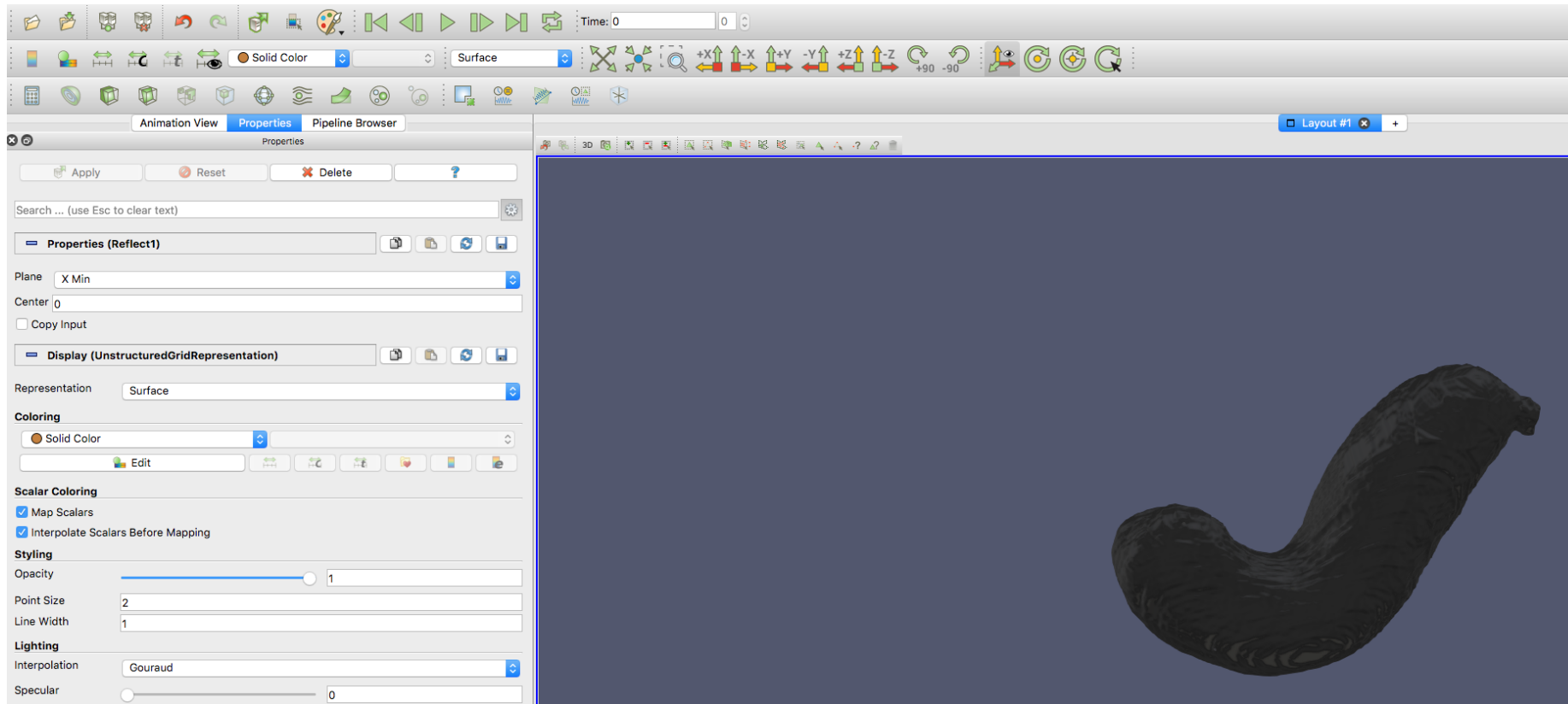- Untick Copy Input and click on Apply

If ticked: output will be reflection + union of both meshes.
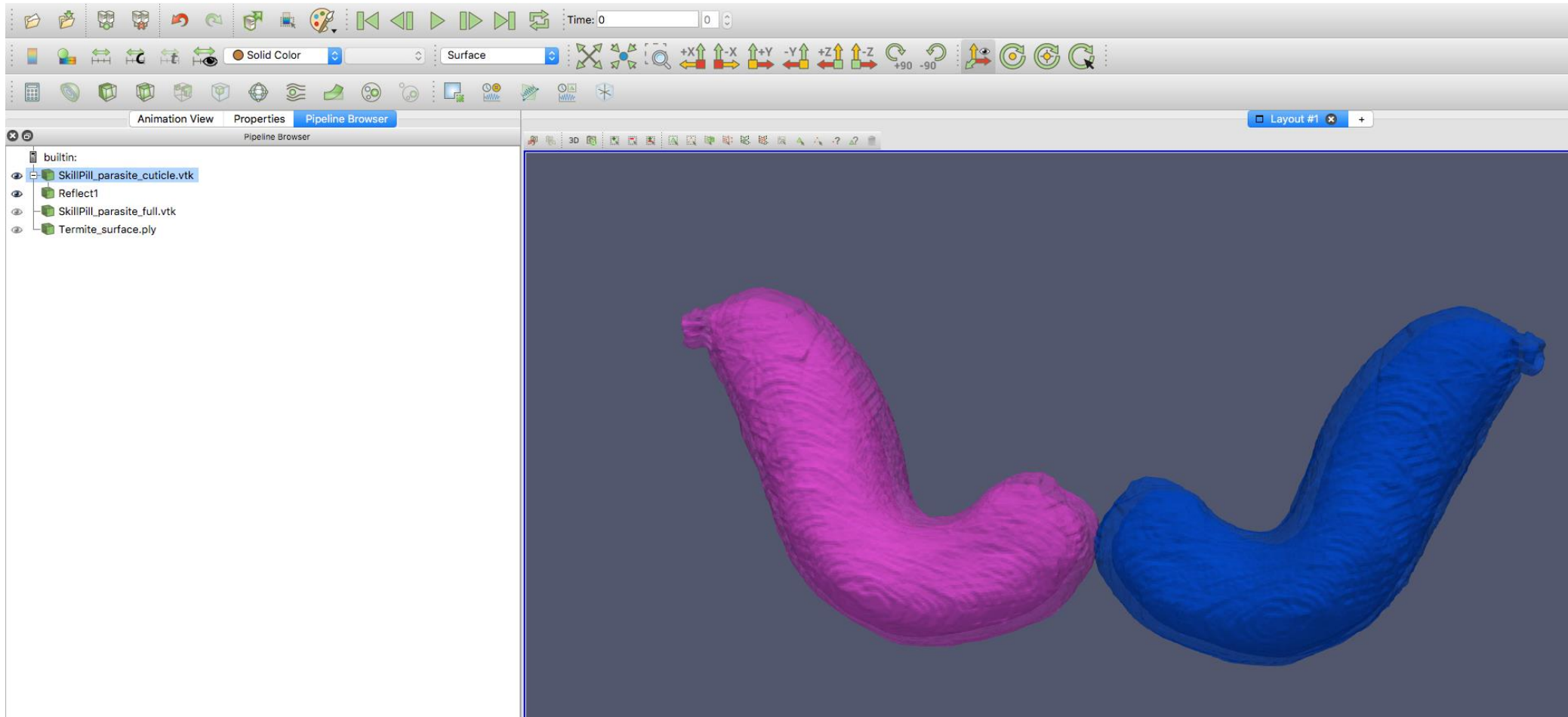
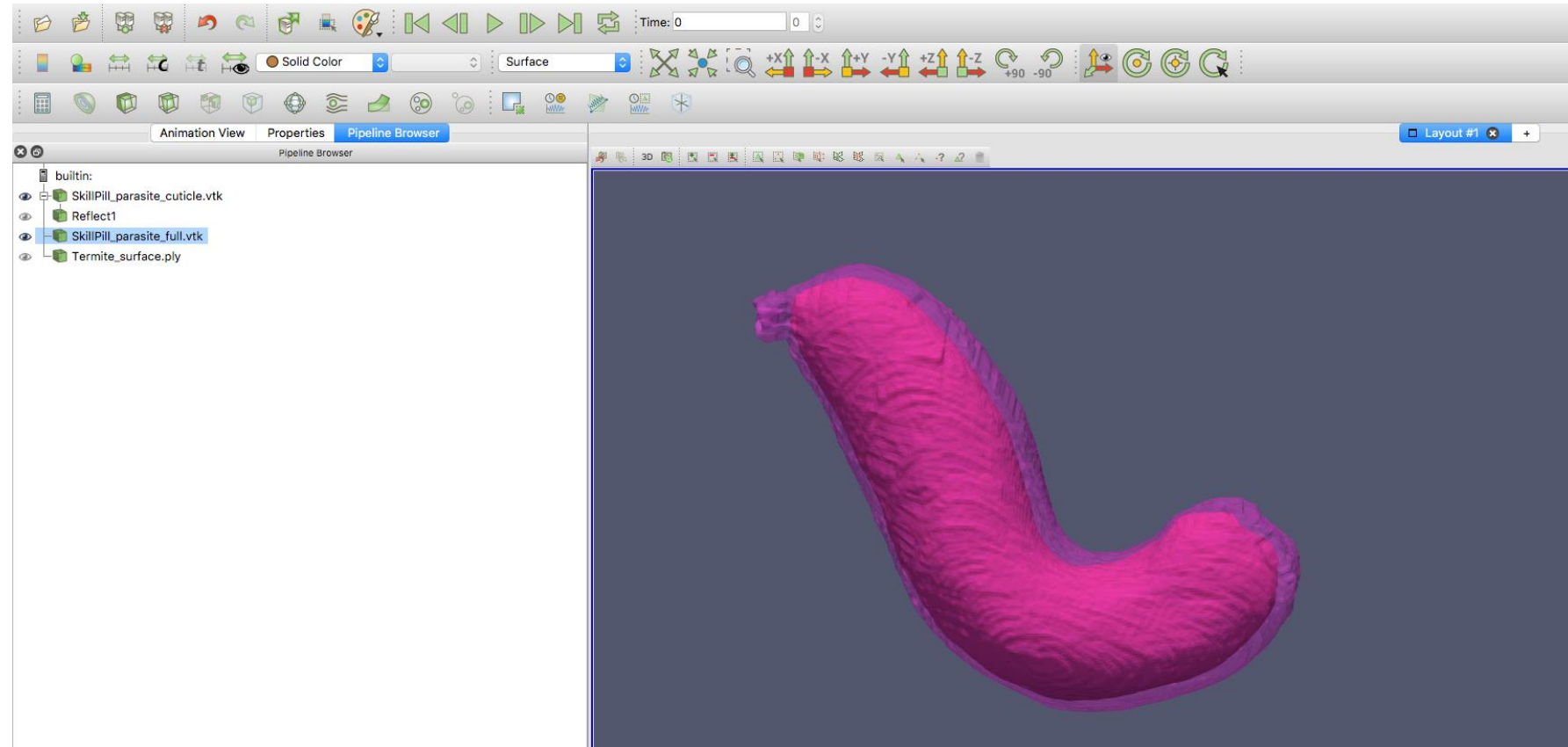Choose the reflection plane you want

- Your object is gone and some weird reflection appeared!
- Adjust the settings of the reflection object (color, opacity…)

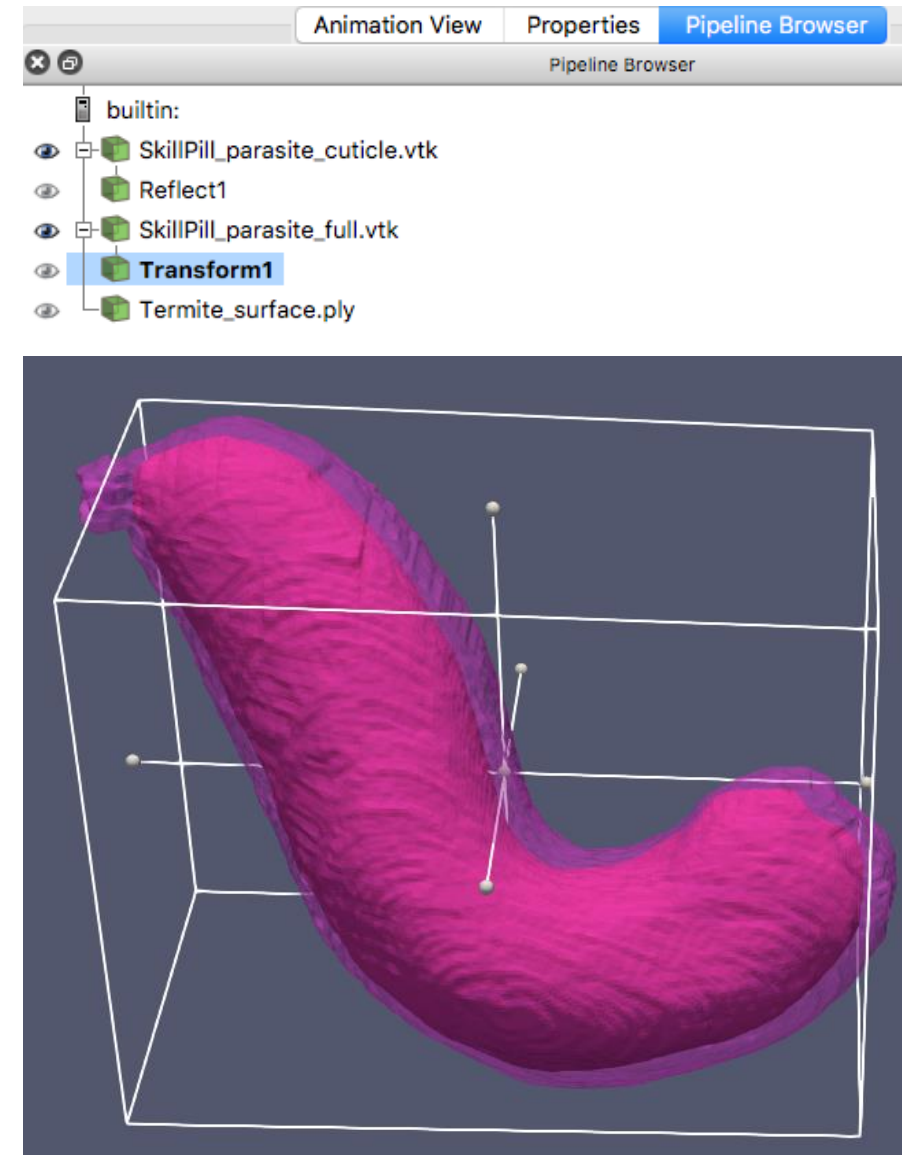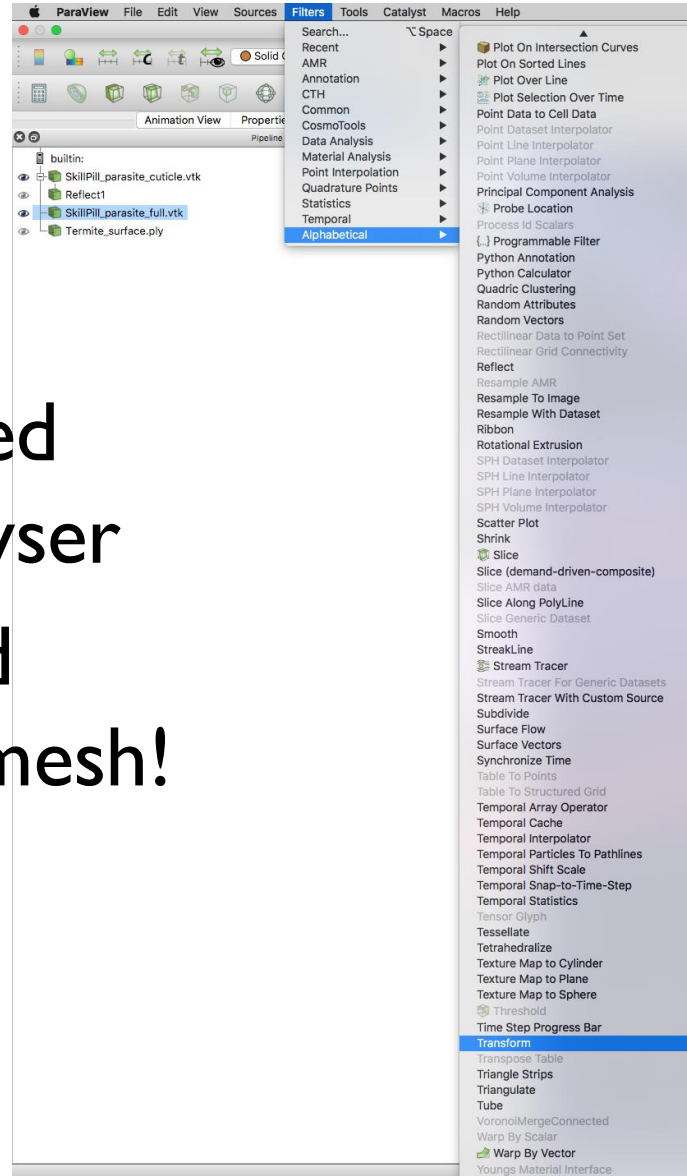- Go to the Pipeline Browser and reveal your original cuticle mesh

- And now we want to visualize the cuticle and the parasite side by side
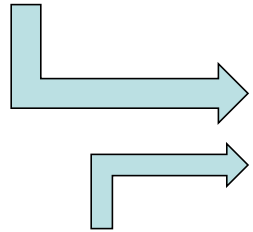- Select the parasite mesh

- Go to Filters
  > Alphabetical
  > Transform

- A new item appeared
  in the Pipeline Browser
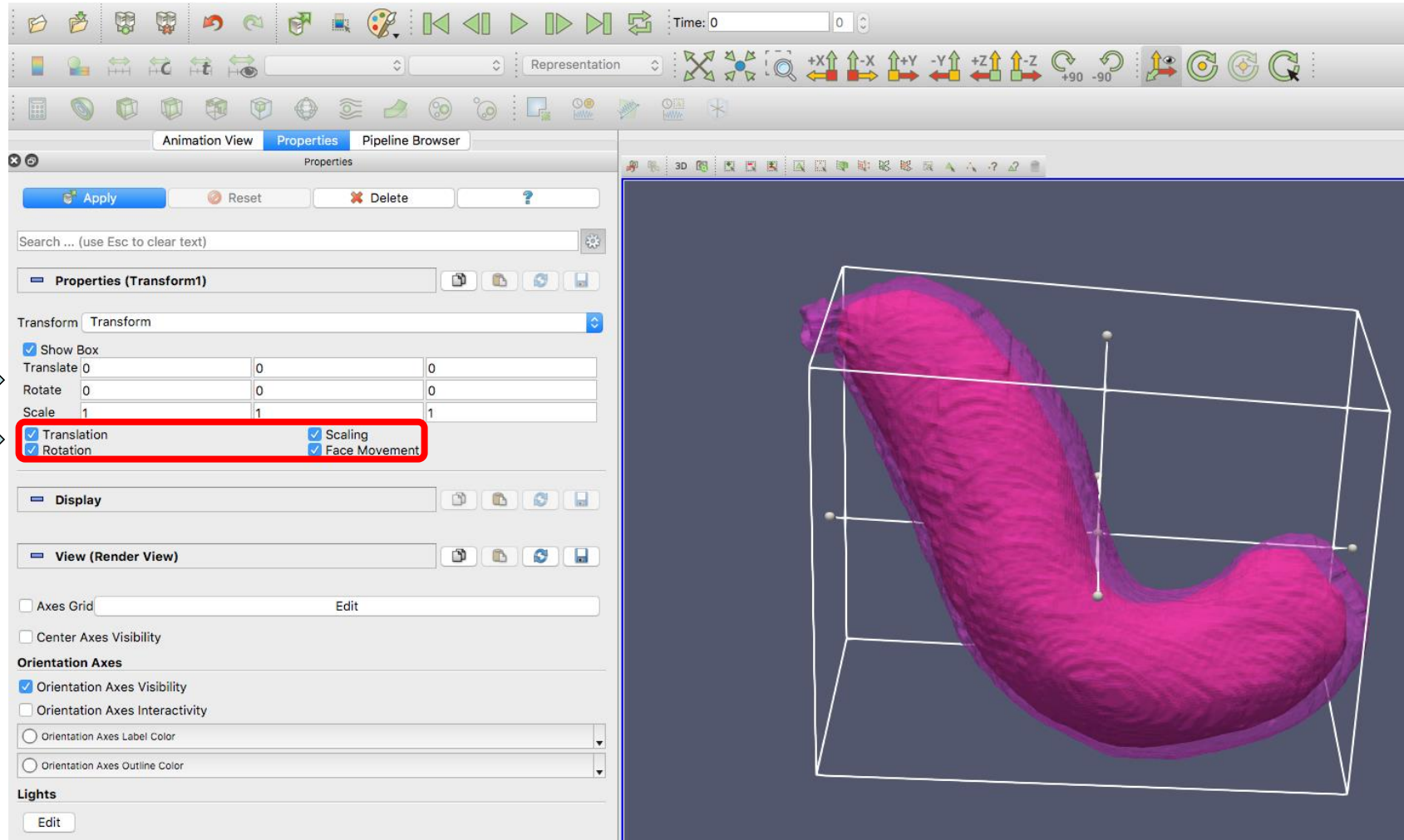
- And a box appeared
  around the cuticle mesh!
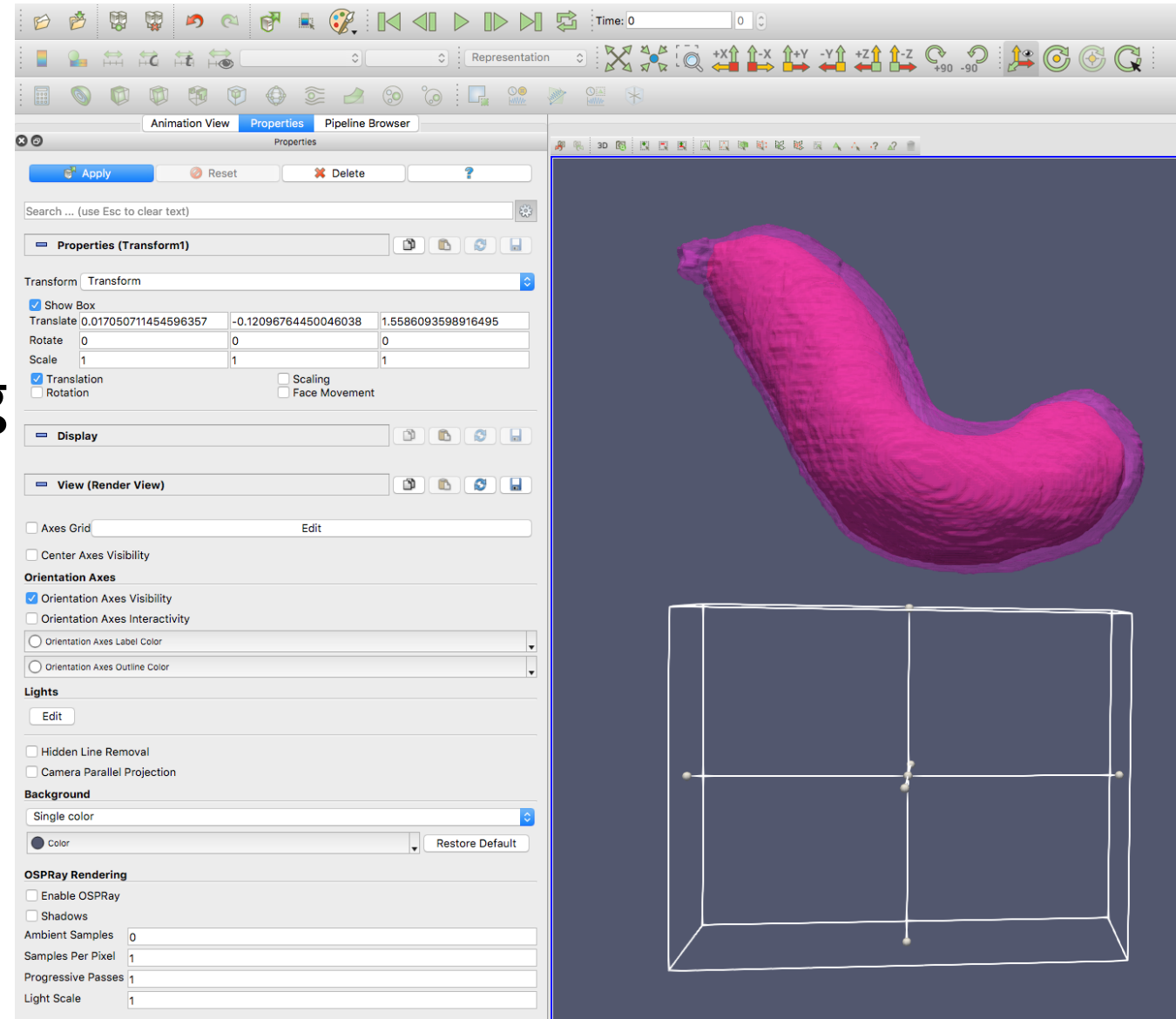
- ## Go to the Properties tab

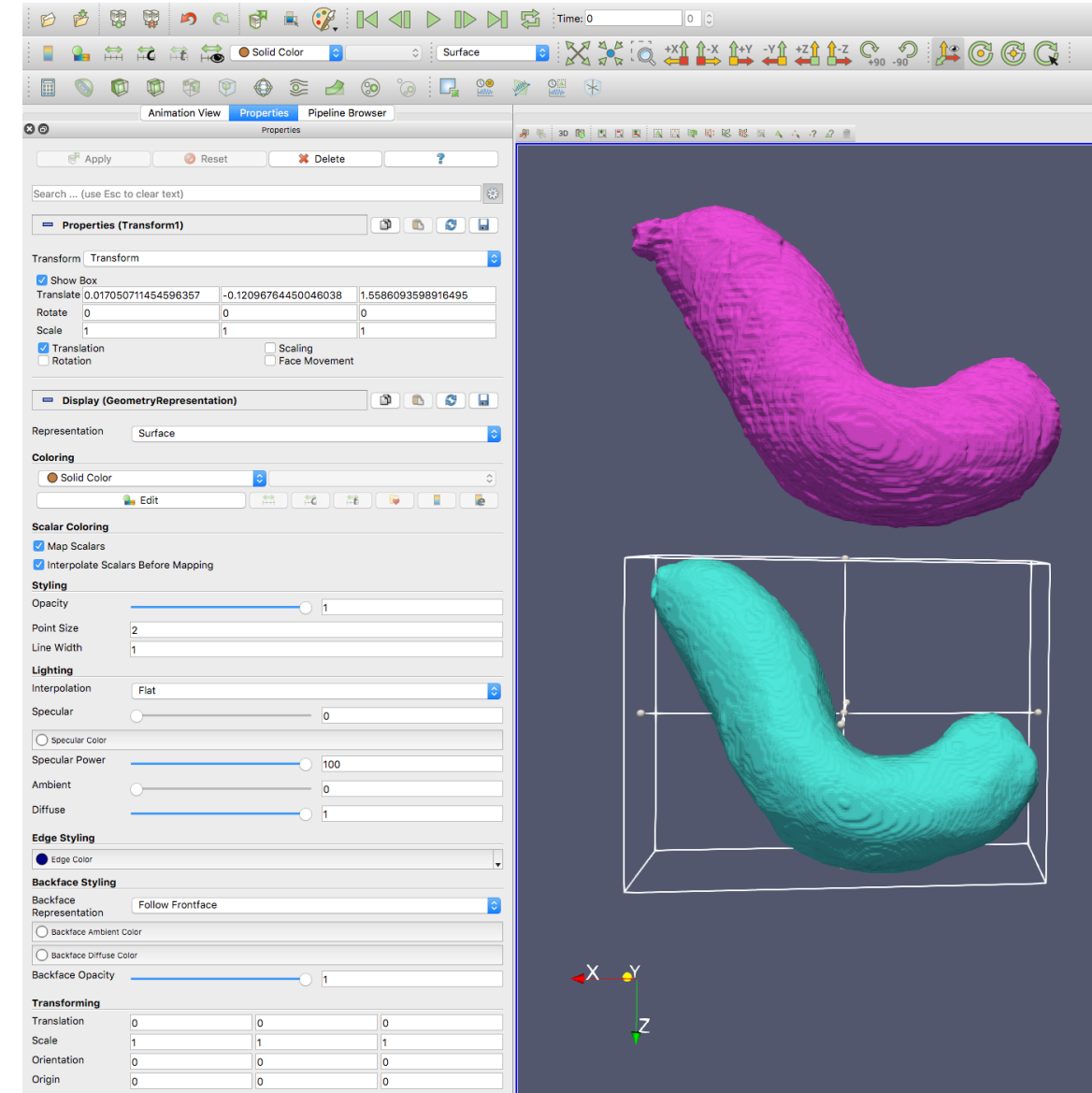Manually input values or watch it change by moving the box

Restrict the modifications permitted by moving the box

- Translate the box
  (on the right or down)

- Click on Apply

- Adjust the color and lighting

- Wonderful!

- Try to move it again and take some snapshots showing the cuticle and parasite side by side
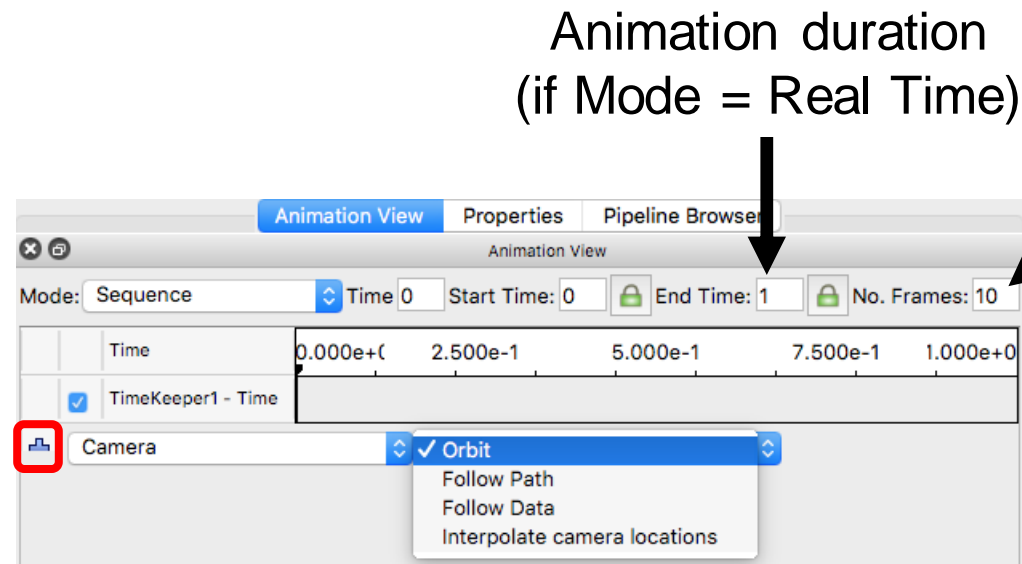
- Hide the box by unticking Show Box

- Filters are numerous in ParaView

- Remember you have to pick your item in the Pipeline Browser first
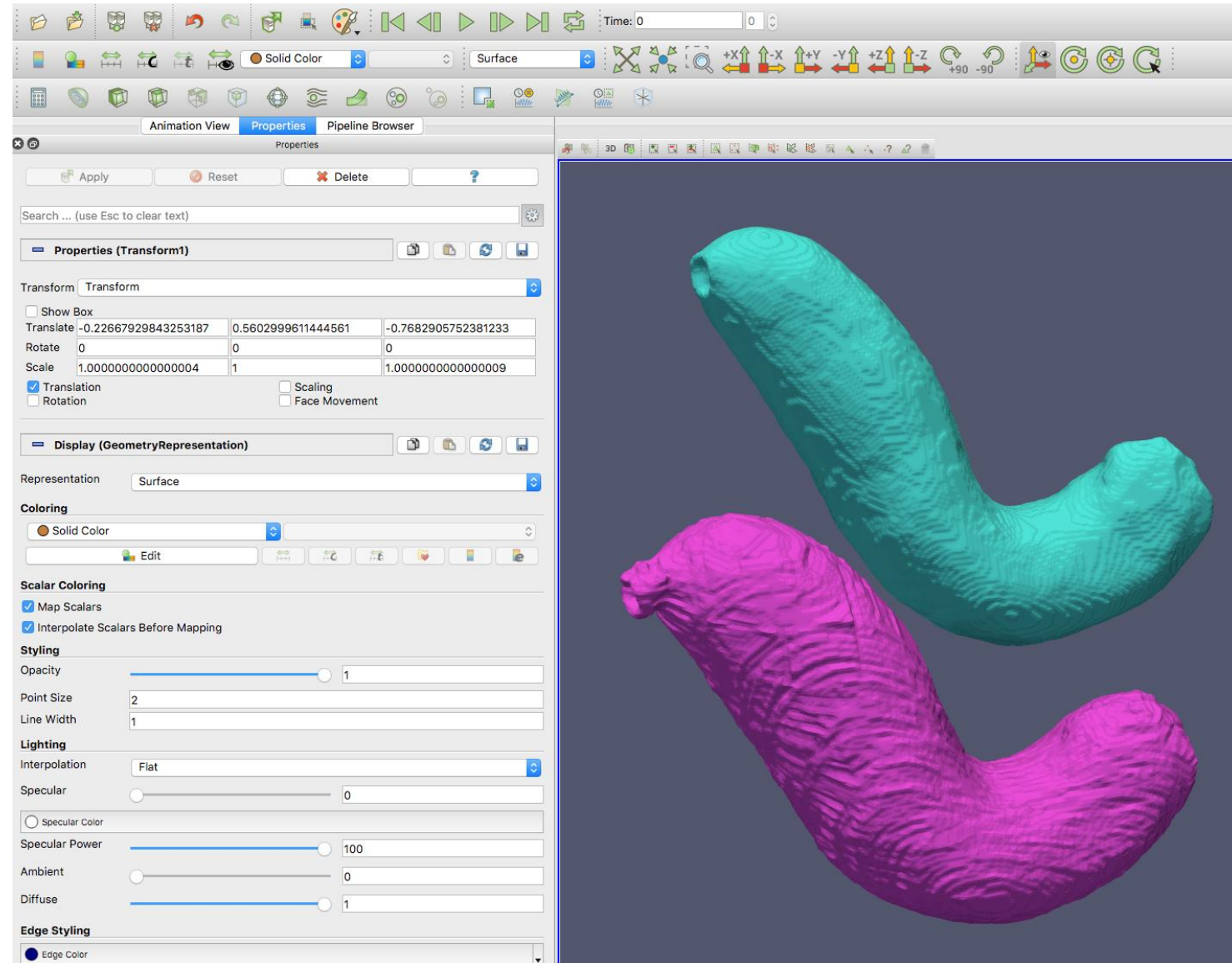
- Let's do an animation!
- Re-set the intial scene with the parasite, cuticle and head meshes
- Set the center of rotation to the center of the head
  – Click on the head mesh on the Pipeline Browser
 – Click on the Reset Center icon
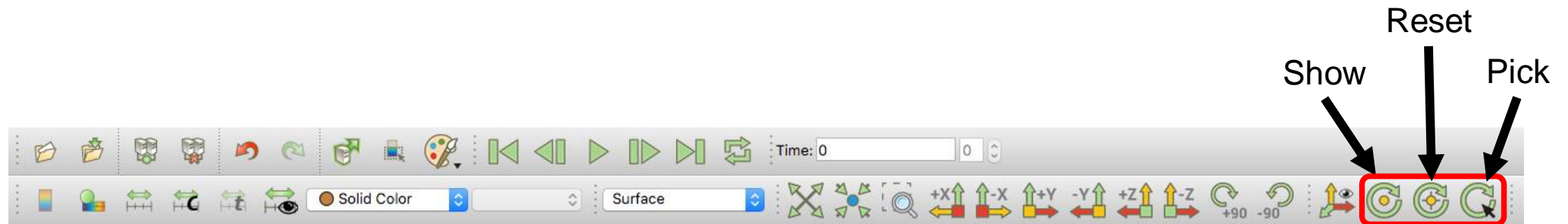
- Open the Animation View tab (View > Animation View)
- Change the values of End Time and No. Frames
- Add a Camera Orbit to the animation
- Click on +, accept the pop-up about the center position

Animation duration
(if Mode = Real Time)

Number of images used
to create the full animation
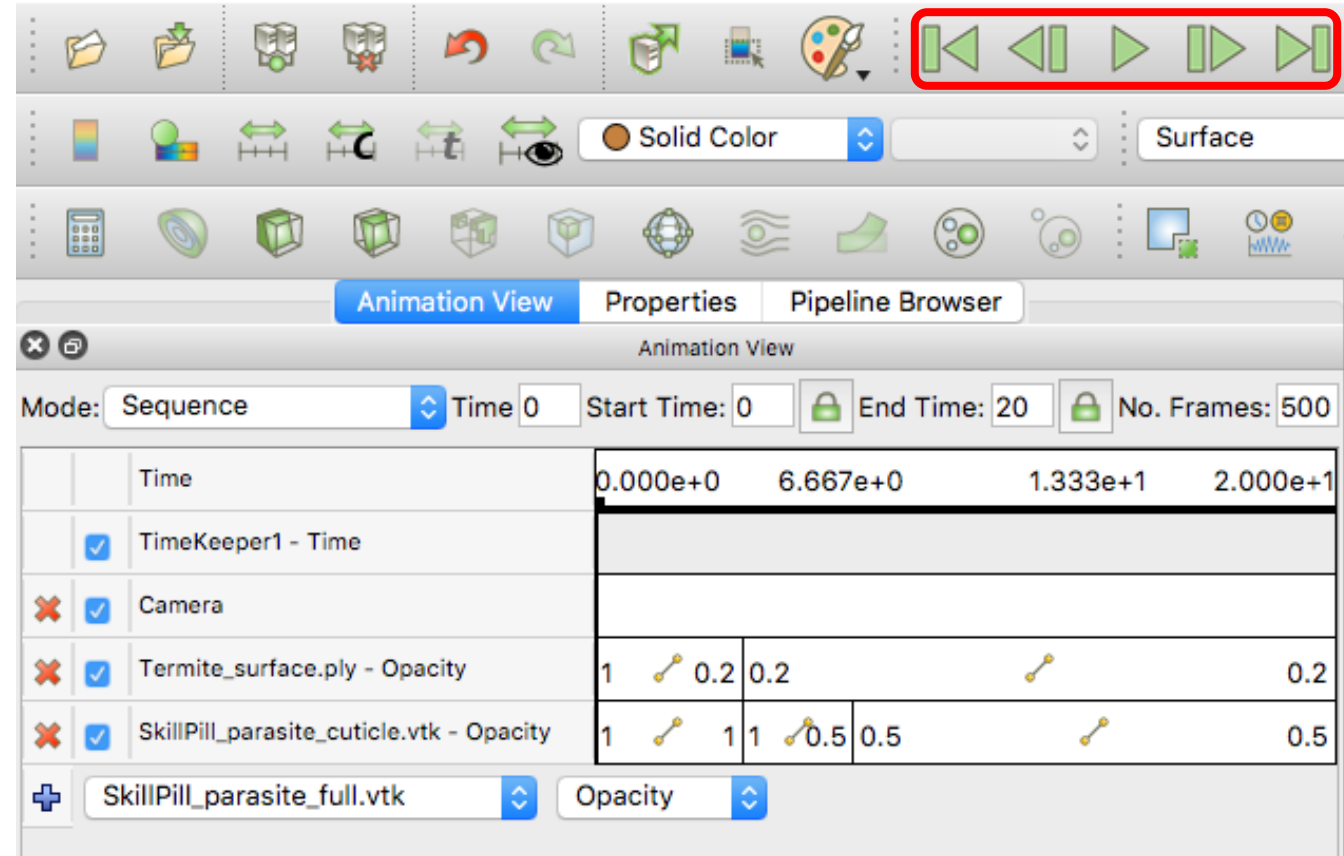(if Mode = Sequence)

- Add an animated parameter: full head mesh, opacity

- Double-click on its track to open the Animation Keyframes

- Default Keyframes are:
  - 1) Time = 0, opacity = 0
  - 2) Time = final, opacity = 1
 - Interpolation between both is linear (Ramp)
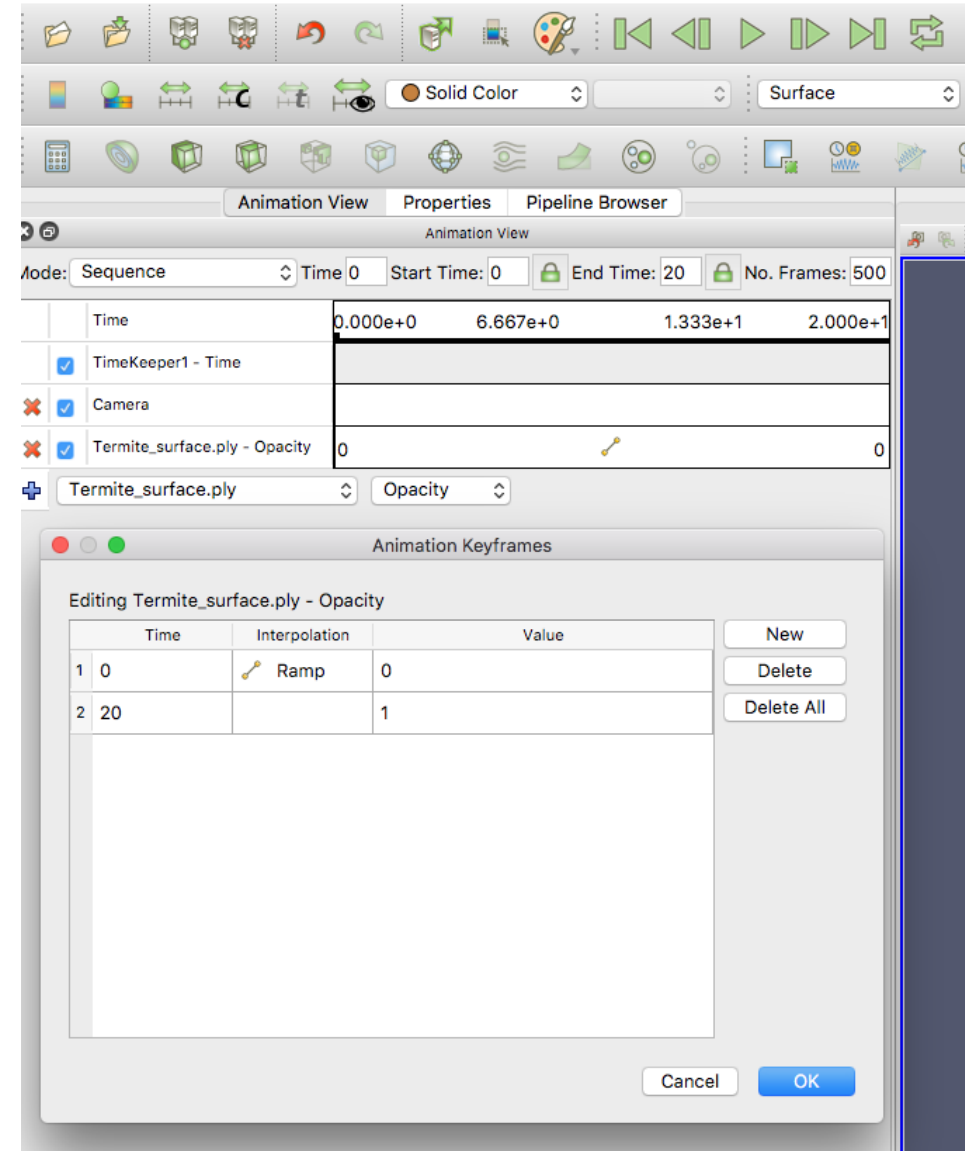
- # Change the Keyframes:
  - – Initial opacity: 1
  - – Goes to 0.2 after 1/5 of the animation
  - – Final opacity: 0.2
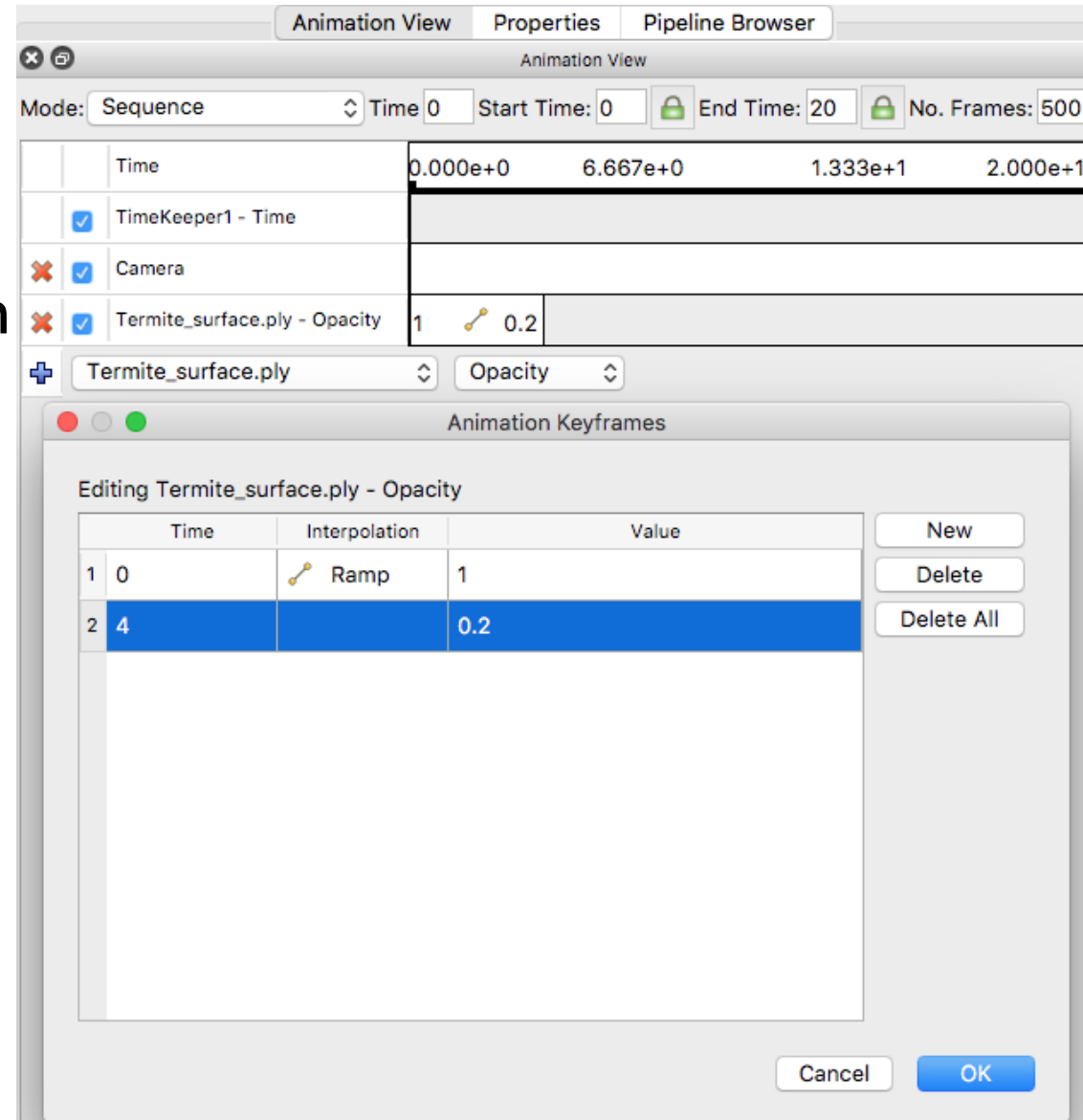
- **Similarly, set Keyframes for the parasite cuticle:**
  - Initial opacity = 1
  - When head = 0.2, opacity = 1
  - Later, opacity = 0.5
  - Final opacity = 0.5

- **When you're done, press Play to simulate your animation**

- ## Satisfied?

- ## Go to File
  ## > Save Animation

- ## Save a .avi movie file
  ## or image sequences
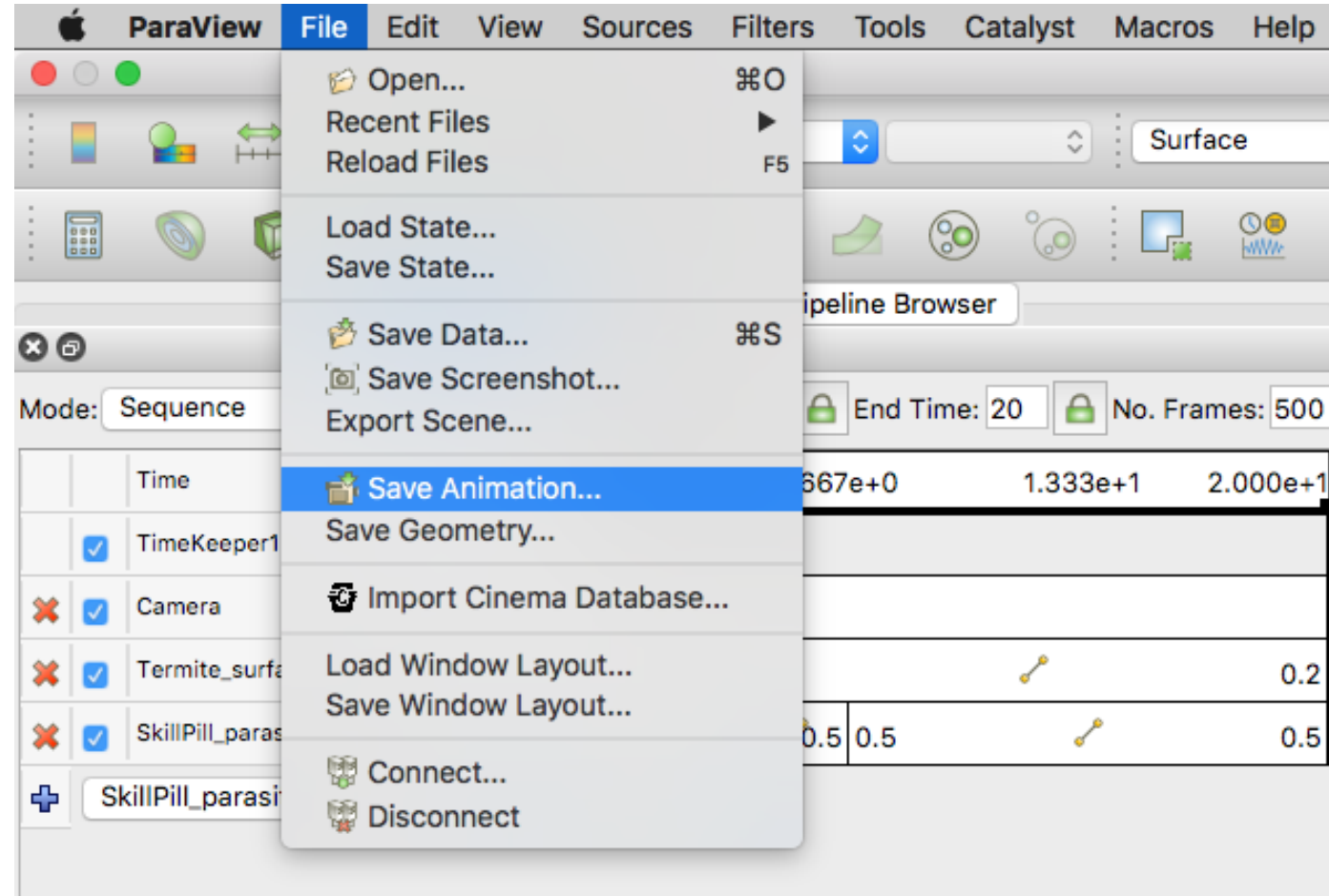
- ## Check your video file:
  ## in Sequence mode, computer power affects the video length

Questions?

- Ask me now

- Ask me later

  - OIST mail: adam.khalife@oist.jp

  - UPMC mail: adam.khalife@etu-upmc.fr

- Ask Google (really!)

- Get some tutorials and documentation on
https://www.paraview.org/documentation/