

Creating 3D models with Horos

Importing CT Scans Into Horos (Database Window)

1. Open Horos
2. Import scan images: File -> Import Files...
3. Click on the gray arrow next to the newly imported series
4. Click on the scan that is now displayed

To isolate bones, you can either create regions of interest (ROIs) in the 2D viewer use the scissor tool on a 3D volume rendering.

Isolating bones using ROIs

Creating a Region of Interest for a Single Bone

1. Select the study of interest in the Database window
2. Open the 2-D Viewer window by clicking its icon on the top toolbar
3. Set default ROI name: ROI -> Set Default ROI Name...
4. Enter the name of the bone you wish to isolate (e.g. Femur)
5. Select the Closed Polygon Tool from the Mouse button function toolbar
6. Create a polygon around the bone of interest for the first image slice that the bone is visible
7. To create ROIs for all the image slices that contain the bone either:
 - a. create ROI on each slice that contains the bone of interest
 - b. skip a few slices between ROIs and interpolated ROIs at the end (ROI -> ROI Volume -> Generate missing ROIs)
 - c. or create ROI on first slice that contains bone of interest, copy paste it to the next and tweak anchor points if necessary
8. Go back through each slice and make sure that the ROIs are correctly sized and oriented to capture the entire bone of interest without much (if any) other tissue/bone
9. Save the ROIs to a file: ROI -> Save All ROIs of this Series... or Save Selected ROI(s)...
10. Repeat steps 3-10 for each bone

Isolate Bones within Each ROI

1. Select an ROI that you would like to isolate
2. Set all the pixel values outside the selected ROI to black: ROI -> Set Pixel Values to...
 - a. Make sure the 'ROIs with same name as the selected ROI' radio button is selected
 - b. Make sure the 'Outside ROIs' radio button is selected
 - c. Make sure the 'To this new value:' radio button is selected (This value should be the default number for black -3024)
3. Click OK
4. follow instructions below to **Create Surface Model**

Isolating bones using the scissor tool

1. Select the study of interest in the Database window
2. Open the 2-D Viewer window by clicking its icon on the top toolbar
3. Select 2D/3D button. Select 3D volume rendering in the drop down menu. Chose bone CT in the 3D presets and then one of the options. Glossy and glossy II works fine, but YMMV.
4. In the 3D view, use the toolbar at the upper left corner to change the 'lighting', pan, zoom, rotate.
5. Use the scissor tool to isolate your bone. Creating a selection and hitting enter will erase everything outside, hitting delete will erase everything inside the selected area. (Do not use crop. Cropping just blackens the cropped areas, but they will still be present in the surface rendering!)
6. To save your scissor editing: select 3D Viewer/Scissor Editing/Save. You can only save one set of scissor editing per CT scan, but you can save while you are working and then save again at the end.
7. Once you are satisfied with your work, minimize the window and go back to the 2D view window. It should contain the images with everything you scissored out being black.
8. Follow instructions below to **Create Surface Mesh Model**

Create Surface Model

1. Select 2D/3D button -> 3D Surface Rendering
2. Select "3D Surface Rendering"
3. Select amount of decimation you want depending on how dense you want the polygons to be. Default of 0.5 (remove 50% of polygons) is a good place to start. You can also try different amounts of smoothing.

4. Select "CT-Bone" from the "Predefined Values" drop-down menu. Click OK.
5. Try other Pixel values to see what works best.
6. When you change the pixel value and click OK, often the model does not update. To prevent this problem, change the pixel value and then click in the Decimate or Smooth boxes and then click OK. No need to change the Decimate or Smooth value, just click in the box to make Horos recognize that you have changed the Pixel value.

Save Surface Model

1. Select 3D-SR button
2. Save as .obj. If this does not work, the model can also be saved as a VMRL (.vrl), which can be opened in Geomagic. However, the model will have to be saved as a .obj file (using Geomagic) before it can be imported into Maya.

Bone models can be cleaned up with Geomagic or Meshlab.

Short cuts

shift+V* mirror vertically (in 2D viewer)

shift+H mirror horizontally (in 2D viewer)

shift magnifying glass