INSTALLATION INSTRUCTIONS

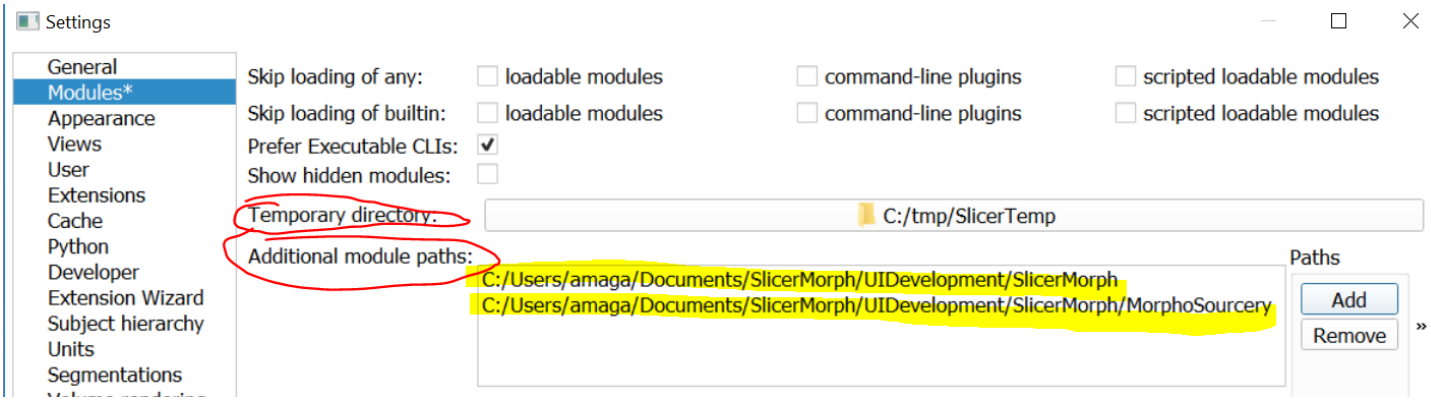
(These steps won't be necessary when SlicerMorph becomes part of the Slicer's extension catalogue)

1. We assume a recent nightly of the 3D Slicer is installed on your computer.
2. Clone SlicerMorph repository (https://github.com/SlicerMorph/SlicerMorph) to your local drive.
3. Make a **SlicerTemp** folder. This folder needs to be created in a place **writeable by Slicer** (e.g., your temp folder in your OS or your desktop).

FIRST TIME SETUP IN SLICER for SLICERMORPH

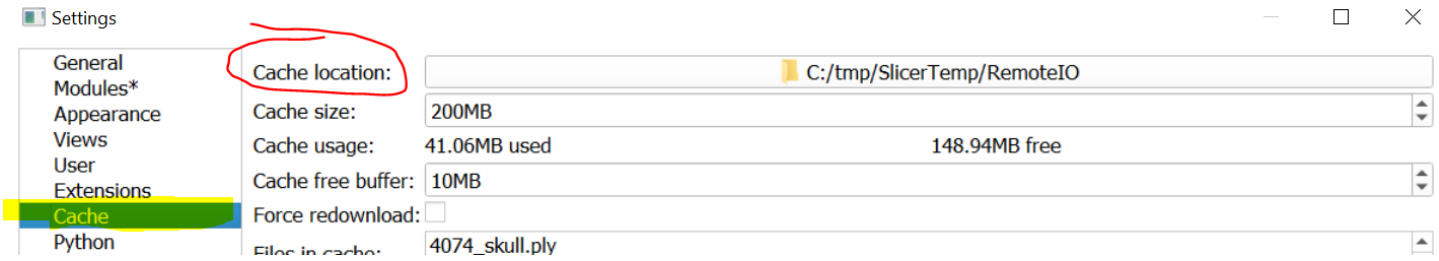
EDIT->APPLICATION SETTING (EDIT->PREFERENCES on Mac and Linux)

1. **Modules tab:**
   - Modify the temporary directory setting to point out to SlicerTemp folder you create above.
   - Add the **SlicerMorph** subfolder from cloned repository (e.g., C:\Users\Murat\Documents\Slicer_Morphometrics\UIDevelopment**SlicerMorph**) to the **additional Module Path field**
   - Similarly, add **SlicerMorph\MorphoSourcery** to the **additional Module Path field**
   - If you don't see **GPA** or **MorphoSourcery** in the list of the modules in the next step #4, it is likely that your module path is incorrect. Make sure you navigate to **SlicerMorph** folder.



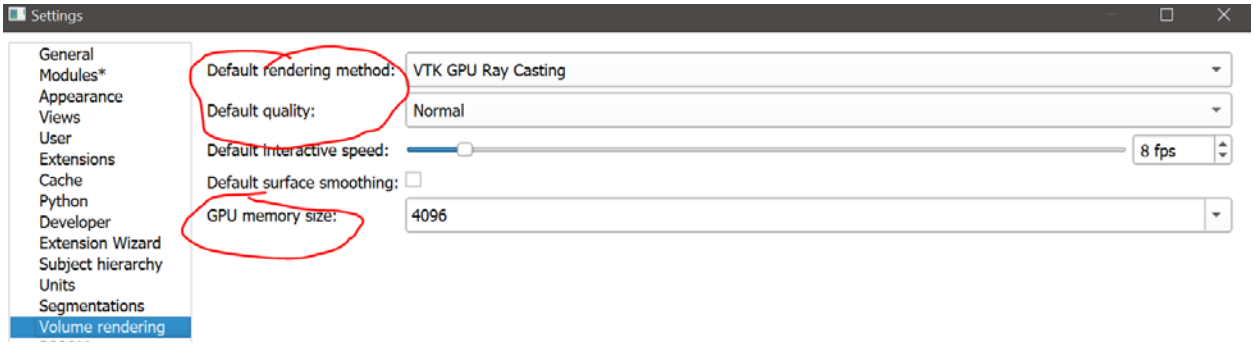
2. **Cache**

- Create a folder called **RemoteIO** under the **SlicerTemp** and specify as the cache location (will be necessary to recover sample data downloaded from internet).



3. **Volume Rendering**

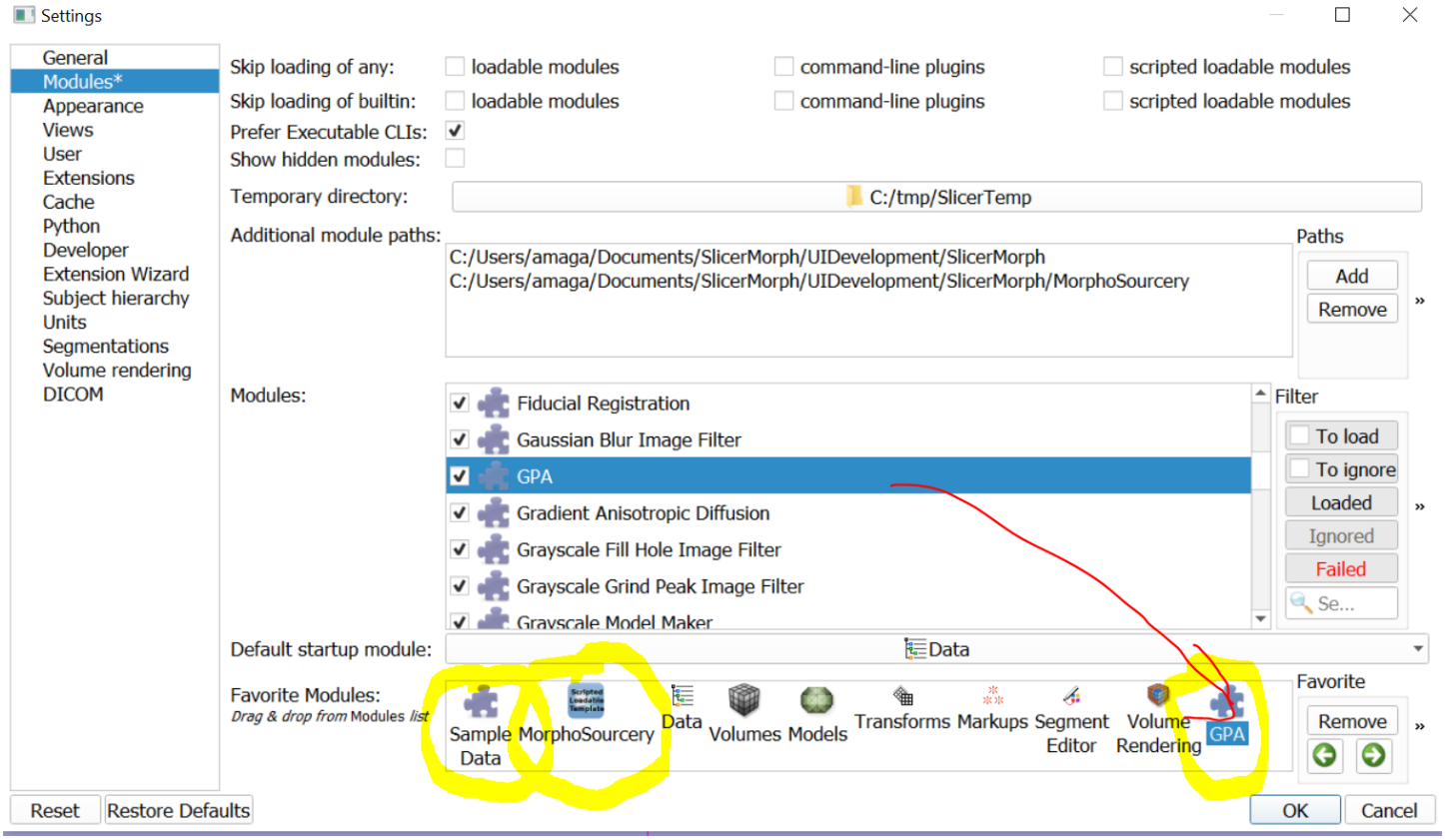
- If you have a dedicated GPU (like a Nvidia Geforce or Quadro card), set the **Default rendering method** to **GPU Raycasting** and **quality** to Normal, and specify the RAM amount on your GPU. If you are using a laptop with both an integrated GPU (like i7 processors from Intel) and a discrete onboard graphics card (e.g., Dell Precision laptops), there are additional steps necessary to make sure Slicer OpenGL operations run on the discrete GPU. Follow the instructions on the forum https://discourse.slicer.org/t/can-i-choose-which-gpu-to-use/3149/5. These are not critical for the demo today, but your 3D rendering speed may not be ideal.



There is one optional customization to be done. For that you need to close and re-open Slicer, which will update the module listing with GPA and other additional modules.

4. **Modules**

- Go back to modules menu and customize the icons on the toolbar: By dragging and dropping these modules into the **Favorites**: **Sample Data, MorphoSourcery, and GPA**. Since we currently don't have application icons, you may want to rearrange the order so that it is a bit more clear to you which is which.



GETTING STARTED WITH SlicerMorph

Getting Data:

SlicerMorph -> MorphoSourcery: To be able to use MorphoSource, you need to be registered with the repository. Please obtain a personal username and password from the M/S prior to the demo. MorphoSourcery uses Slicer's built-in web-browser infrastructure, and M/S can be navigated exactly in the same way through Slicer as if in a desktop browser. Save a few sample datasets of your choosing into your cart, so that you can directly download them to the Slicer through MorphoSourcery. We suggest working with 3D models (ply/stl etc) initially, before moving onto volume datasets (DICOM/TIFFs etc)… 3D models are usually smaller, and are faster to download. Currently there is no mechanism to set the voxel spacing correctly for image stacks. We rely on the user to set voxel spacing through the Volume module and the M/S metadata.

As you navigate the samples, you have an option to just download the dataset as a zip file or download and have Slicer unpack the zipfile and load it directly into the existing scene. Both have its ups and downs. Regardless of the option you choose, downloaded sample data will be available in the **SlicerTemp** folder you specified in step #1.

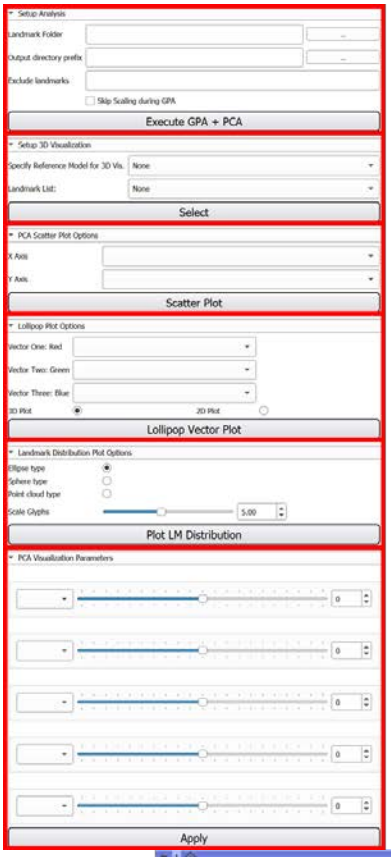
File->Download SampleData: To obtain sample datasets provided with SM, switch to SampleData module and scroll down to find SlicerMorph tab. Currently there are **5 datasets** associated with SlicerMorph project. These datasets become available only after successful addition of SlicerMorph module to Slicer: Two pairs of sample datasets (Mouse and gorilla skulls). Each pair consists of a landmark only dataset and a reference mesh/landmark pair that will be used for 3D visualization. The fifth dataset is sample microCT image sequence output from a popular scanner (Bruker/Skyscan) that is provided to showcase the direct import tool we have in SM. Download them all. They will be located in the SlicerTemp folder, unzip each dataset into their own folders.

Utilities:

SlicerMorph->SkyscanReconImport: This particular module imports a reconstructed image stack from Bruker/Skyscan microCT into Slicer with correct orientation and voxel spacing. It uses the log file (***_rec.log**) found in the reconstruction folder to obtain the right settings. To test the module, a sample output from Bruker is provided in the SampleData. Uncompress the zip contents, and navigate to the **P0_2_Rec.log** file in that folder.

SlicerMorph->ReadLandmarkFile: This utility imports IDAV Landmark Editor's landmark file into the existing scene as a markup (one file at a time). You can use Slicer's default Save function to save the imported file in fiducial file format (fcsv) that can be used with SlicerMorph. Please note that we had very few samples to test this tool. If you encounter issues, please provide us with some sample data.

GPA MODULE



Step1: Providing the inputs to the analysis, output folder location. Currently cannot skip samples, only LMs.

Step2: Model and landmarks to be used as reference for 3D TPS visualizations (for step 6). This step can be skipped initially.

Step3: Provide a bivariate plot of selected PCs.

Step4: Provide 2D/3D visualizations of eigenvectors associated with selected PCs. Up to 3 components can be visualized simultaneously. 2D projections are shown in Slicer View windows.

Step5: Provide 2D/3D visualizations for landmark variances after GPA (as point cloud of all Procrustes aligned coordinates), or spheres/ellipses centered on mean shape. The radius of spheres is mean Procrustes distance associated with LM. 2D projections are shown in Slicer View windows.

Step6: Visualize eigenvectors associated with each PC as 3D TPS deformation of the selected reference model in the Step 2 (required).