Manual Electrode Localization with 3D Slicer

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1. Download and install 3D Slicer (https://download.slicer.org/)
   3D Slicer runs on Windows, MacOS and Linux. The following steps are demonstrated on MacOS, however the GUI of 3D slicer on other platforms are similar.

2. Launch 3D Slicer
   If use for the first time: On the top menu, select View -> Layout -> Conventional Widescreen. This layout maximizes the size of 3D viewer (middle), where the manual localization is conducted.
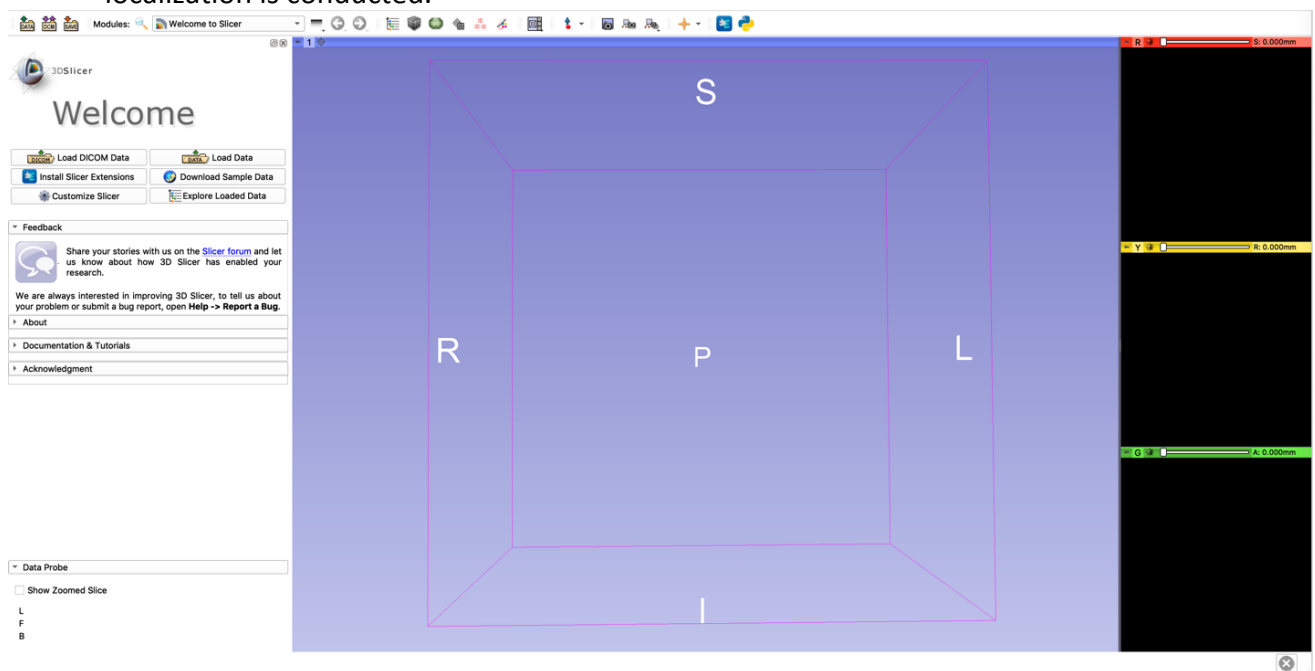
3. From the left sidebar: Load Data -> Choose File(s) to Add -> Select subj_elec_preop.nii.gz
   Do NOT use subj_elec_preop_cortex (i.e. the skull-striped version).
   GUI operation on the three orthogonal view panel on the right:
   - Change slices in current view - use slider on top
   - Change slices in other two views - hold shift and move mouse
   - Change image brightness and contrast - hold left mouse key and move mouse

4. Select "Volume Rendering" from the top-left model list

Select a present for 3D rendering (pointed by mark A in red below, recommend CT-AAA). Left-click the eye icon (mark B) to display rendering. Move mouse cursor to the pin icon (mark C) to open customization menu; link the 3D viewer (mark D). You also need to link the slice viewers. The same link button (mark D) can be found in the pin menu from any of the three slice panels. Finally, customize the background of 3D viewer as showed below (mark E).
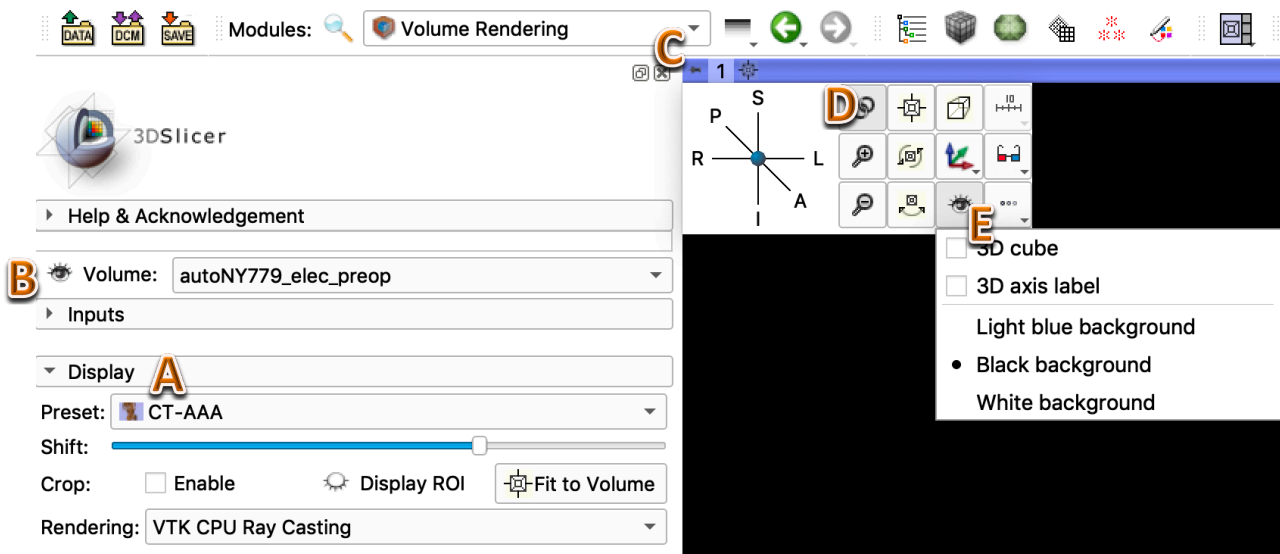
Next customize the crosshair, recommended settings showed below.
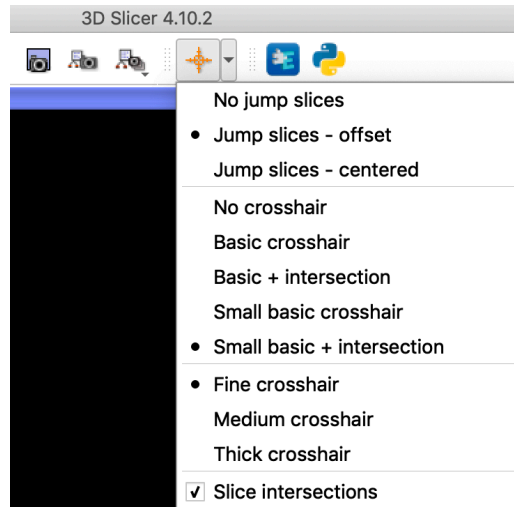
5. Adjust the Shift in volume rendering model panel (mark A in red below), until the skull disappears and electrodes showed up in 3D viewer (mark B). Move crosshair to an electrode by moving mouse while holding shift. If you just press shift, the crosshair won't move to mouse cursor immediately. You have to move the mouse cursor in order for the crosshair to start following. Change camera position/angle in 3D viewer to ensure crosshair is placed at the center of electrode:

- Rotate - hold left key and move mouse
- Translate – hold left key and shift key and move mouse
- Zoom in/out - hold right key and move mouse

Once you are satisfied with the crosshair position, move mouse to the crosshair in one of the slice viewers on the right (e.g. mark C), the T1 coordinate info can be found in Data Probe panel on the left (mark D).