SOFTWARE

Educational Training Guide

Albira Si Software Suite + PMOD Workflow Basics

SOFTWARE

Educational Training Guide

Albira Si PET/SPECT/CT Study Workflows Basics

Albira Si Study Workflows
1. Albira Si Software Suite Modules

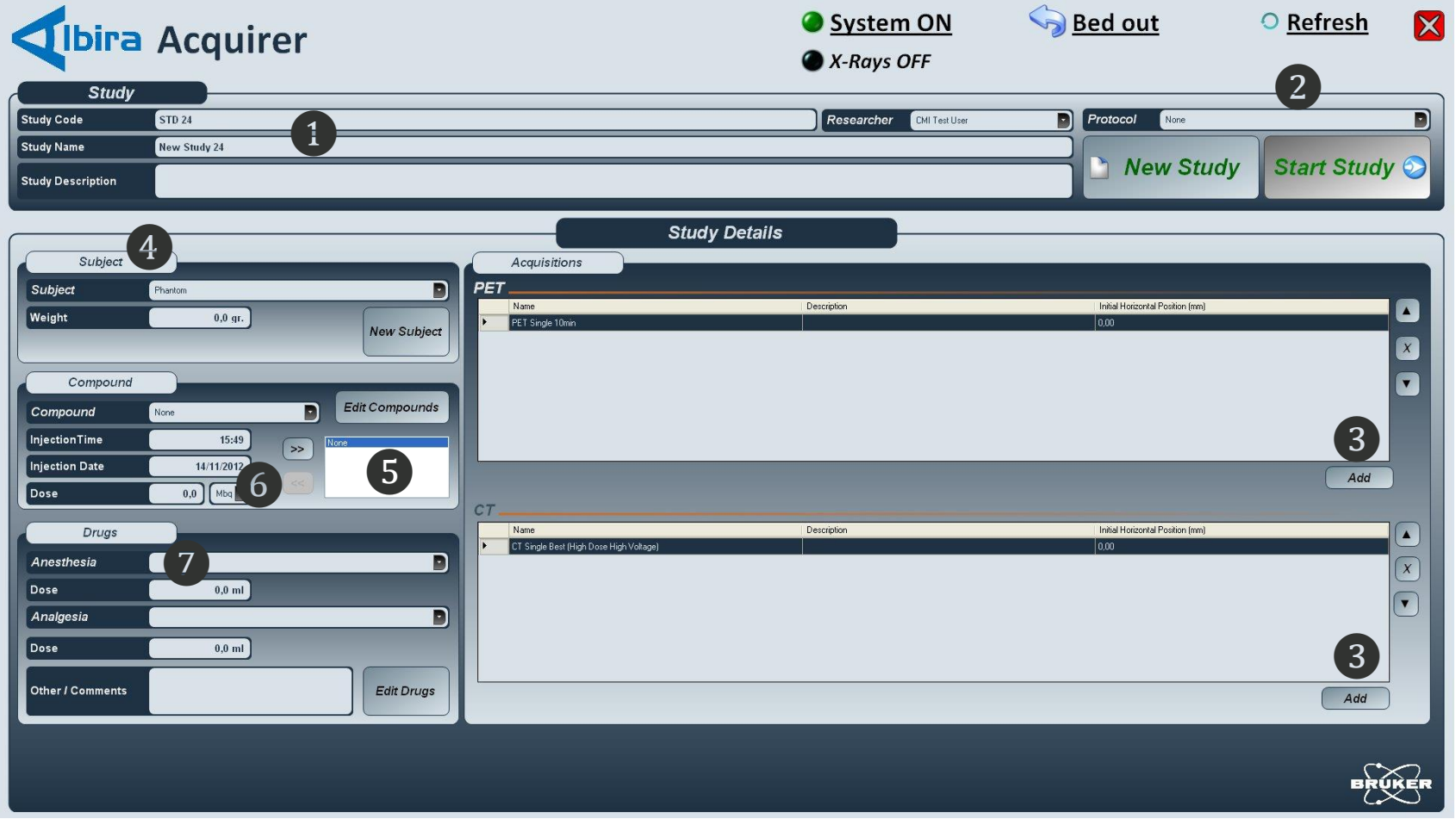
1. **Acquirer.** Study Registration and scan acquisitions.

2. **Reconstructor.** Location for reconstructing PET, SPECT, and CT data.

3. **Manager.** Parameters and defining the various properties of samples and reagents.

4. **Supervisor.** Quality control tool.

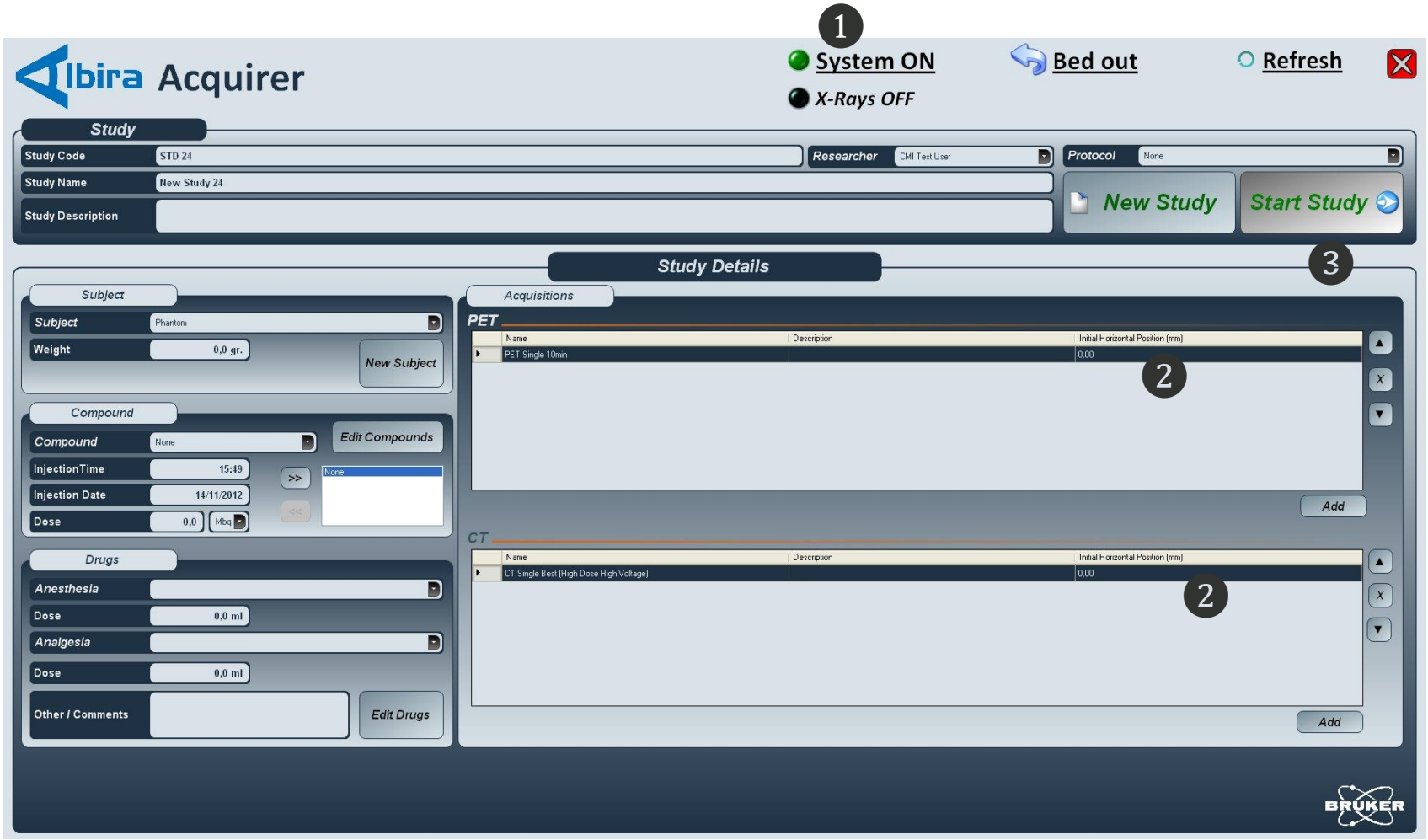
Albira Si Study Workflows
2. Albira Acquirer – Initiating Study/Acquisition



1. Enter a **Study Name**
2. Select a predefined PET/CT or SPECT/CT **Protocol**, OR
3. Select individual PET OR SPECT + CT Acquisitions using **Add.** ***Required*: See the Albira Si User Guide for details on Manager and defining custom parameters.**
4. Enter **Subject** details
5. Select the **Compound** (e.g. 18F-FDG or 18F-NaF) and move to the active position using the >> button
6. Input the activity at **Dose** calibration
7. Note **Drugs** (e.g. isoflurane) if desired

***Required*: In preparation for your animal study, complete the "PET Daily Point Source QA" at the start of each day. Include the CT scan protocol at the same time to ready warm up and flat-fielding.**

Albira Si Study Workflows
2. Albira Acquirer – Initiating Study/Acquisition

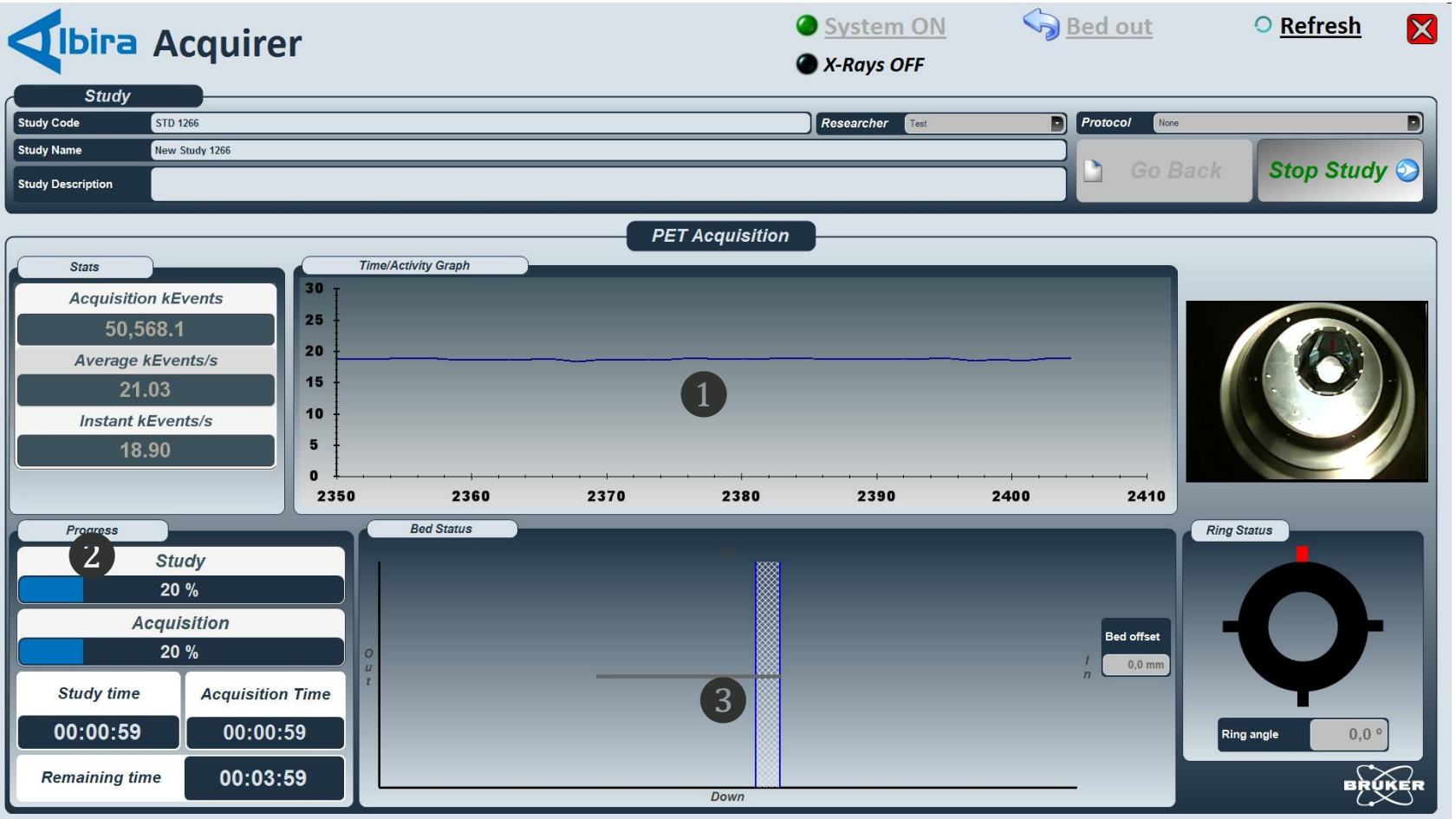


1. Select **System ON** to initialize if indicator is not already green.

2. Set the **Horizontal Position**. The position value (mm) should be the measured value from the front end of the cradle to the center of the target region. (A CT scout view may be initiated by selecting the “+” button).

3. Select **Start Study** to initiate scans.

Albira Si Study Workflows
2. Albira Acquirer – PET Acquisition Status

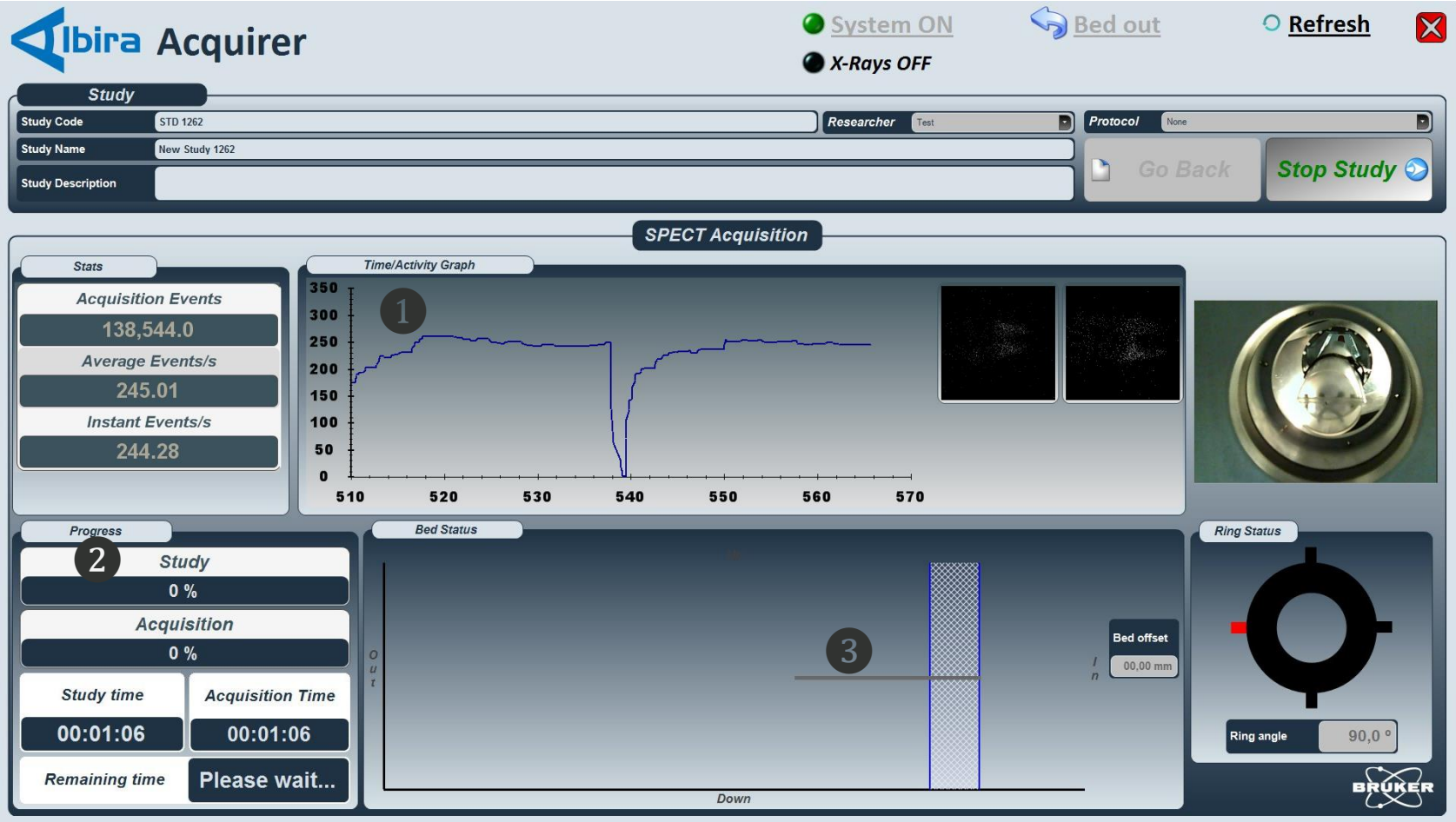


1. **Status**, **Time/Activity Graph** (100-200 Instant kEvents/s typical)

2. **Progress** shows the estimated study and acquisition progress

3. Live video feed, **Bed Status** (horizontal position), and Ring Status are displayed

Albira Si Study Workflows
2. Albira Acquirer – SPECT Acquisition Status

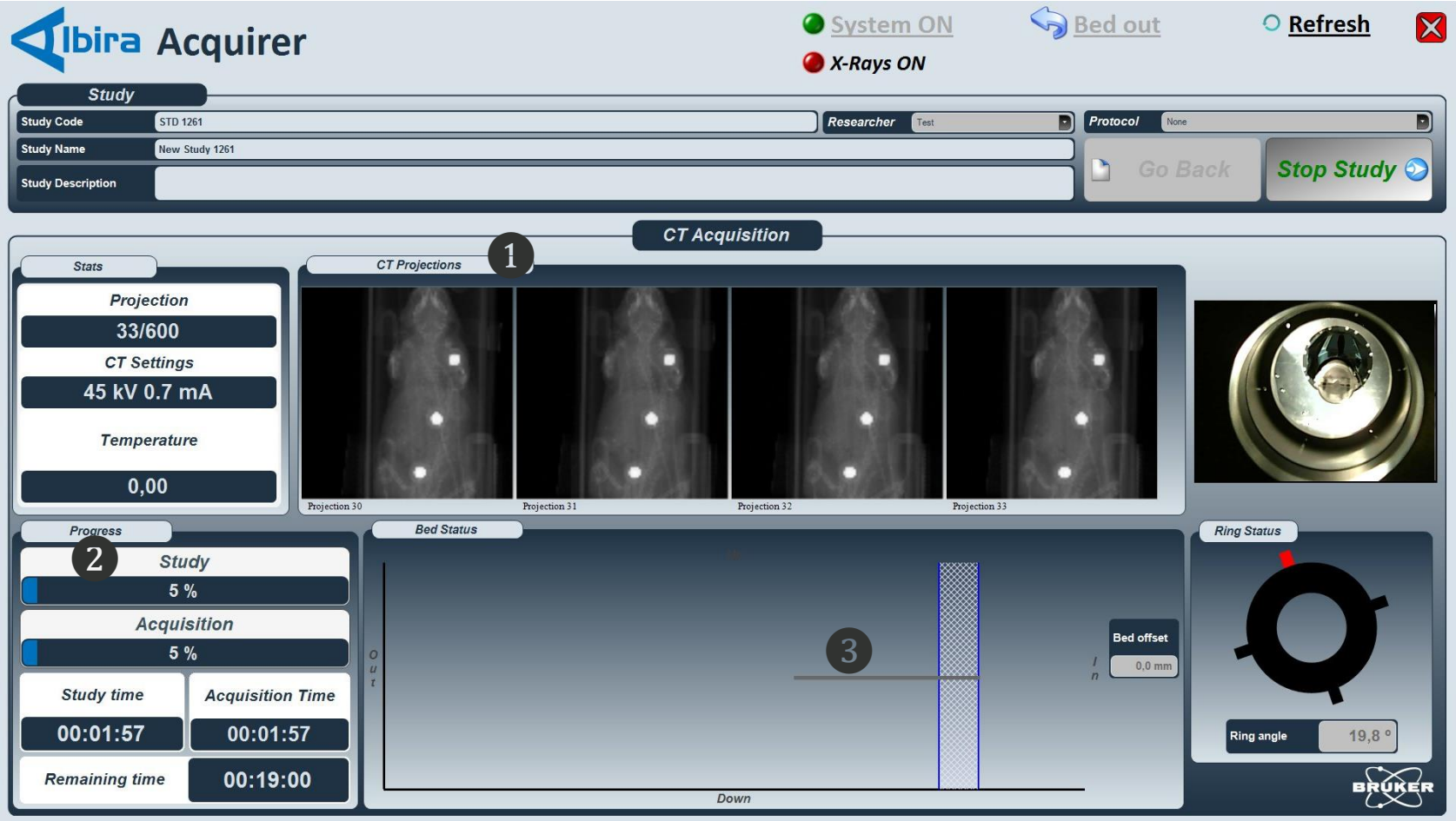


1. **Status**, **Time/Activity Graph** (1800-2200 Instant Events/s typical) and acquisition image for two cameras at current projection

2. **Progress** shows the estimated study and acquisition progress

3. Live video feed, **Bed Status** (horizontal position), and Ring Status are displayed

Albira Si Study Workflows
2. Albira Acquirer – CT Acquisition Status

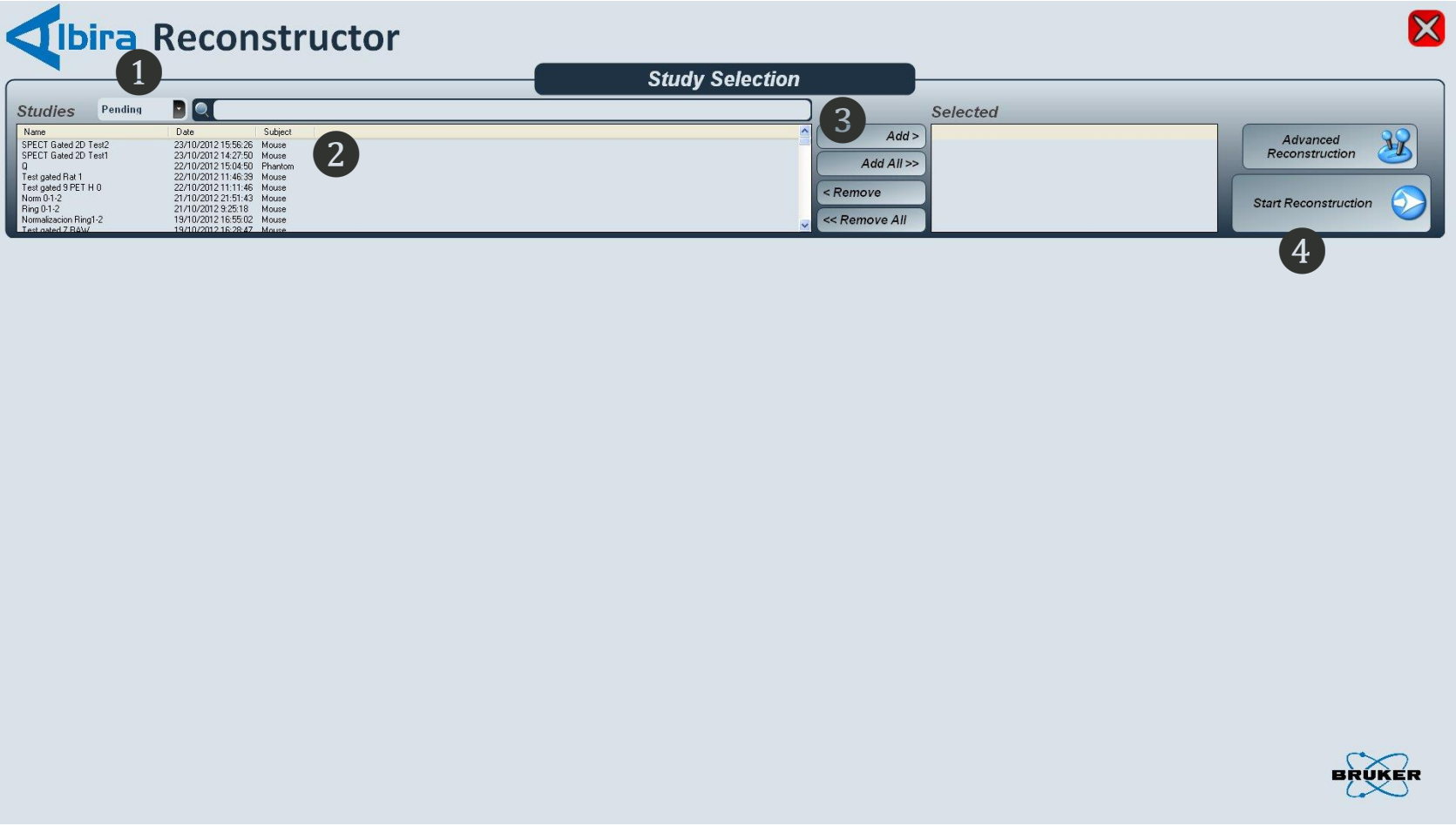


1. **CT Projections** shows the last 4 projections.

2. **Progress** shows the estimated study and acquisition progress.

3. Live video feed, **Bed Status** (horizontal position), and Ring Status are displayed

Albira Si Study Workflows
3. Albira Reconstructor – Standard Reconstruction



1. Select **Pending or All.**
2. Highlight the Study in the list.
3. Select **Add >.**
4. Select **Start Reconstruction.** Progress indicators will appear. **Tip: Reconstruction parameters applied are using this selection are as defined in the selected Acquisition protocol defined in the Manager module.**

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Educational Training Guide

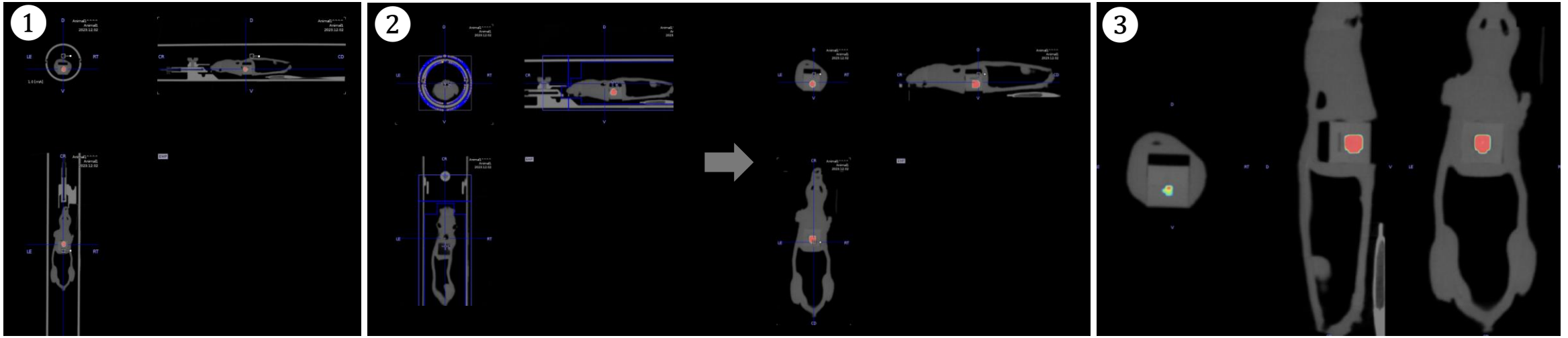
Albira Si & PMOD Multimodal Image Fusion & Display Workflows

Albira Si: PMOD Multimodal Image Fusion & Display Workflow Basics

1. **Multimodal Image Fusion.** Workflow for fusion of PET OR SPECT data to CT data.

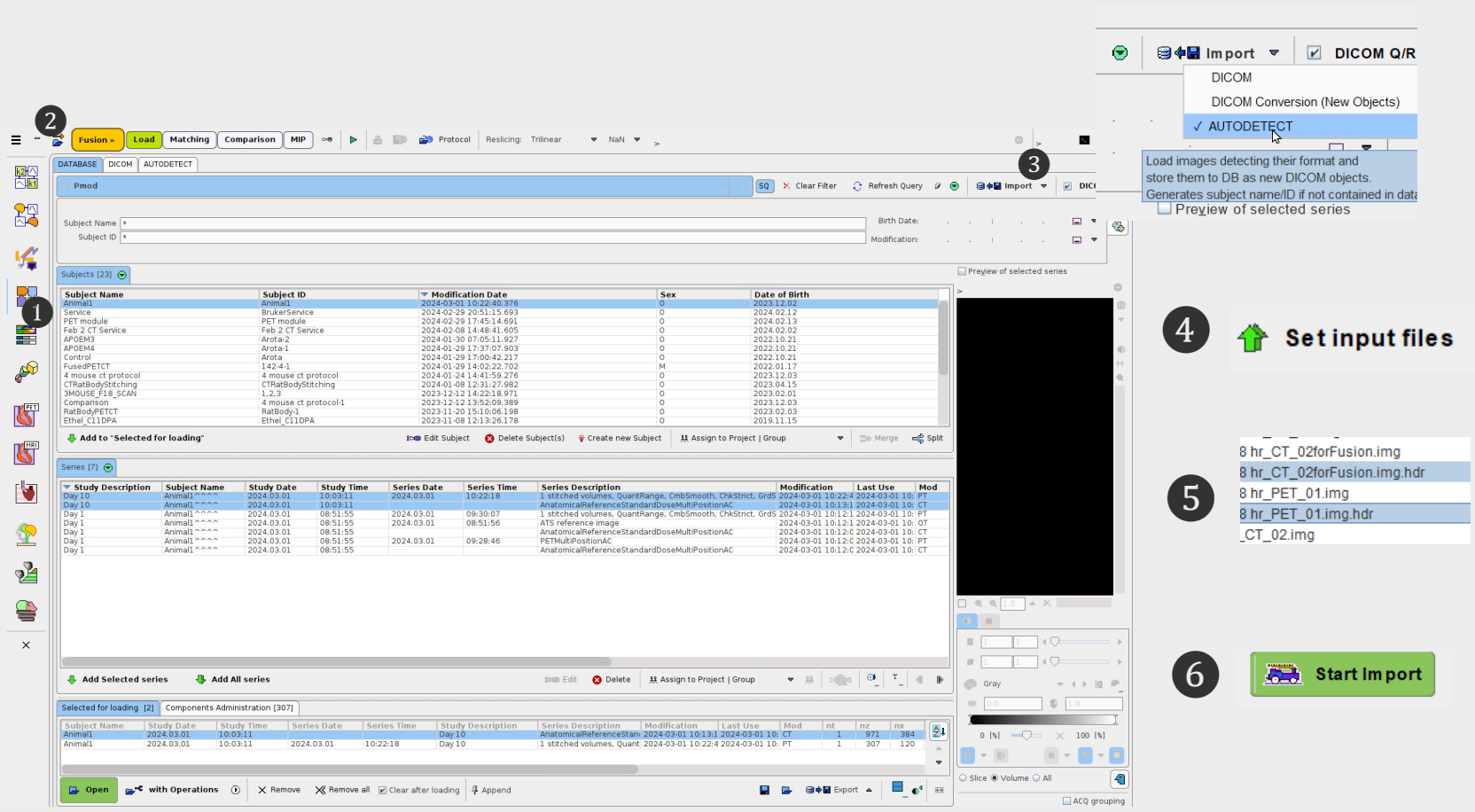
2. **Multimodal Image Masking.** Process for subtraction of hardware components in CT image.

3. **Multimodal Image Display.** Workflow for Image Capture of Linear and/or MIP image display.



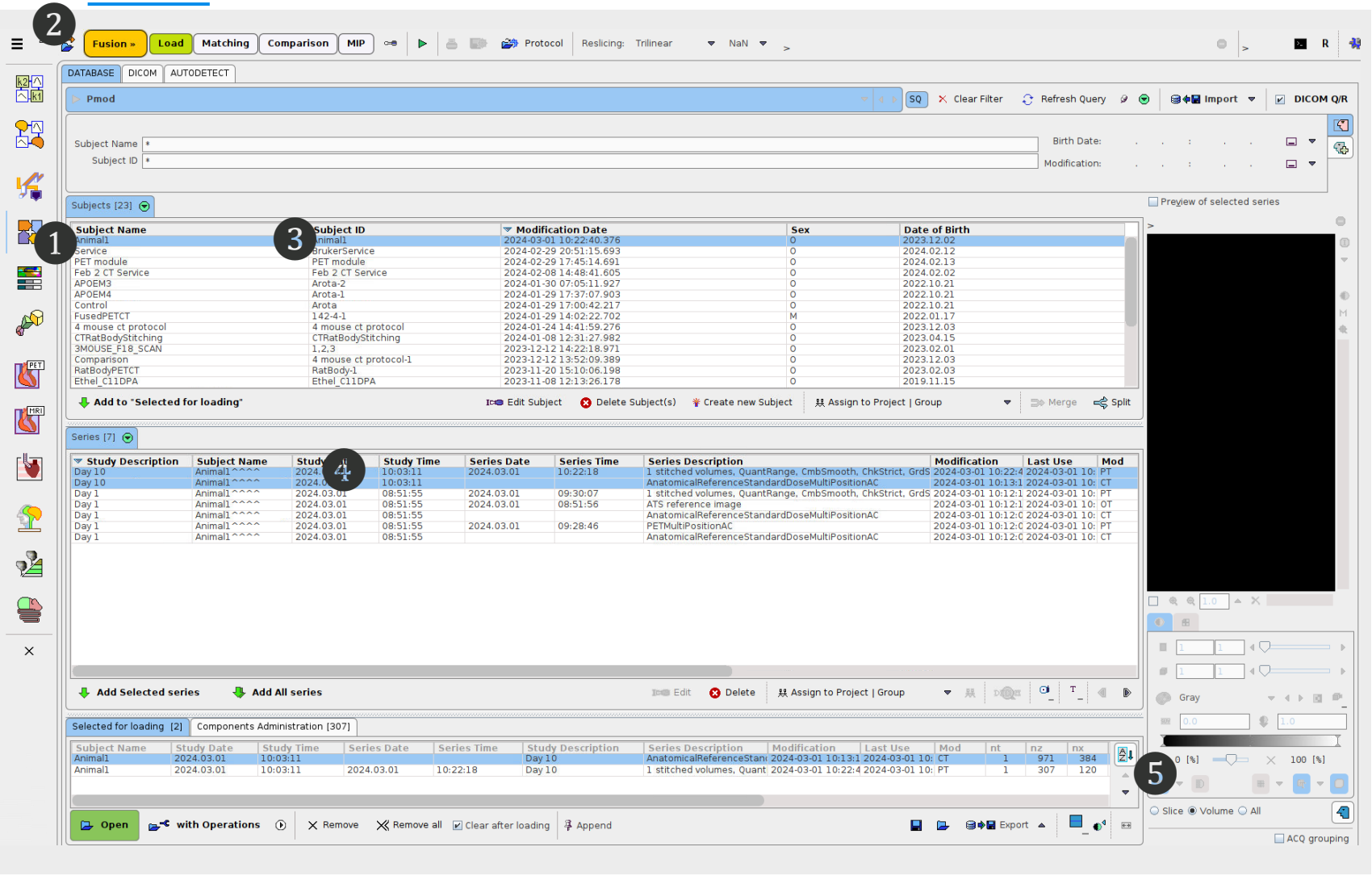
Tip: Begin by referencing the "PMOD File Management & Starting Reference For Bruker PET Data" to configure default application menus for simple workflows.

Albira Si: PMOD Multimodal Image Fusion & Display
1. Importing Albira Si MicroPET Datasets



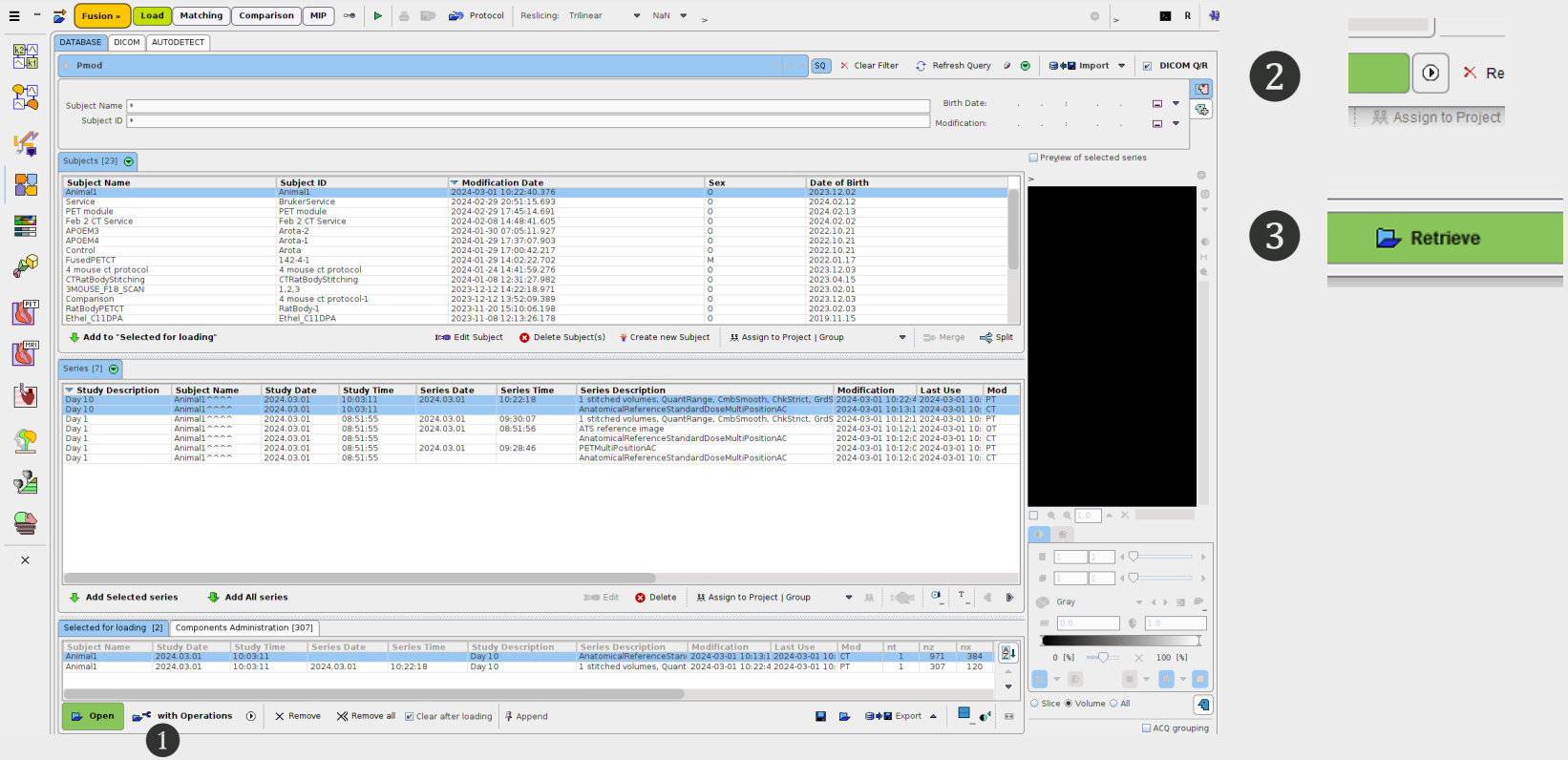
1. **PMOD PFUS.** Open the PMOD PFUS module.
2. Select **“Load Select Data”** button to access the database.
3. Select **“Import>AUTODETECT”.**
4. Select **“Set Input Files”**
5. Select the PET/CT or SPECT/CT study files **Tip: Use “forFusion or Fusion file version where available”.** Select **“Add to Selected”.**
6. Select **“Start Import”.**

Albira Si: PMOD Multimodal Image Fusion & Display
1. Multimodal Image Fusion Data Loading



1. **PMOD PFUS.** Open the PMOD PFUS module.
2. Select **“Load Select Data”** button to access the database.
3. Select the **Subject Name** from the menu (in this Example Animal 1).
4. Highlight a PET/CT or SPECT/CT in the **Series menu. Select Add Selected series**.
5. Set the Anatomical (CT) to the top and PET (PT) to bottom in the menu before opening using the arrow key at right.

Albira Si: PMOD Multimodal Image Fusion & Display
1. Multimodal Image Fusion Data Loading



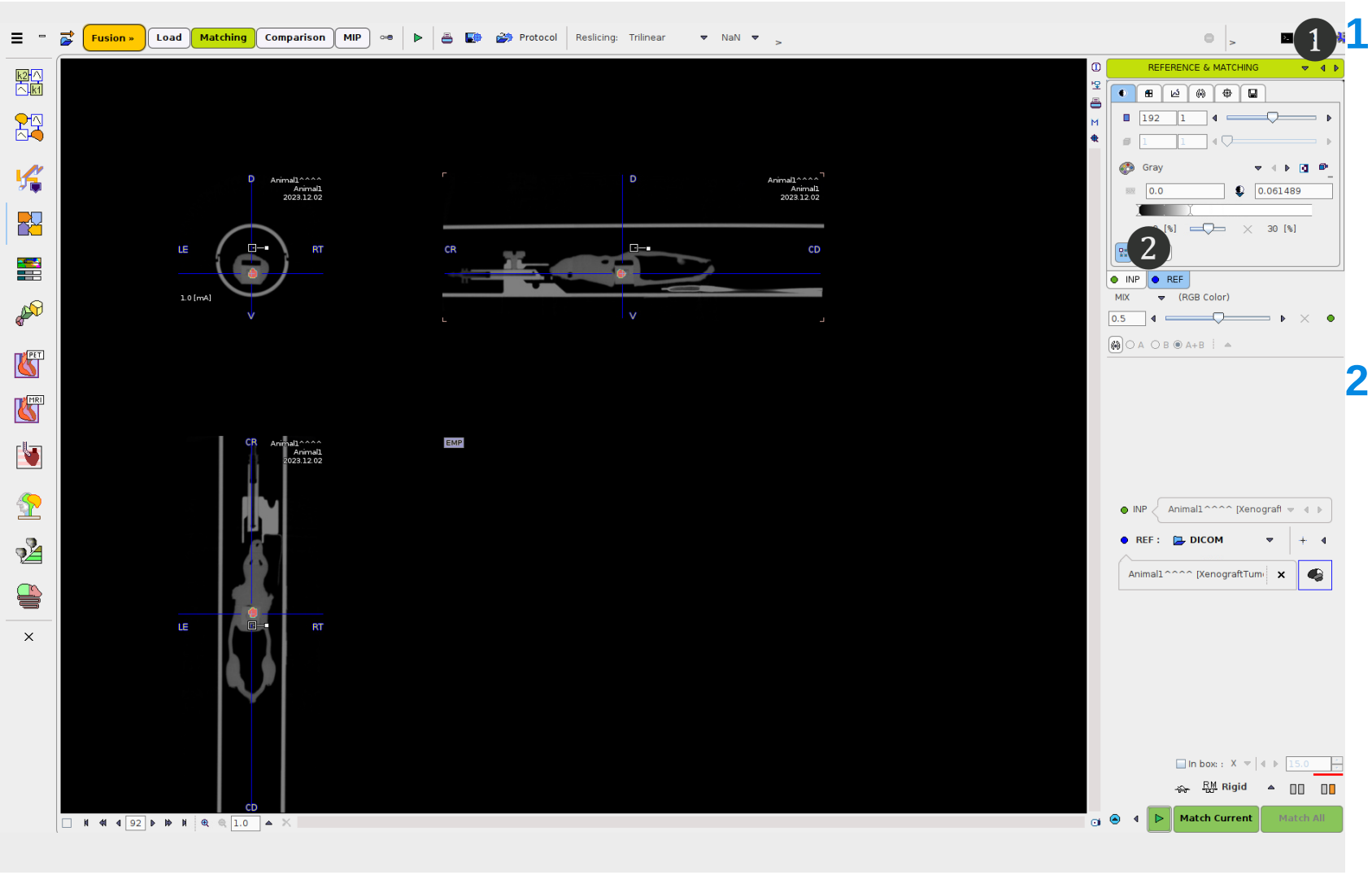
1. If this is the first instance of opening the data after Import, select **with Operations** to apply initial image rotations and orientations*.

2. Select the **“Load Image Processing Macro”** button.

3. Select your Image Macro in the list and select “**Retrieve”.**

***Required: Define a Macro with appropriate image rotations and orientations to enable subsequent processing. See “PMOD File Management & Starting Reference For Bruker PET Data”.**

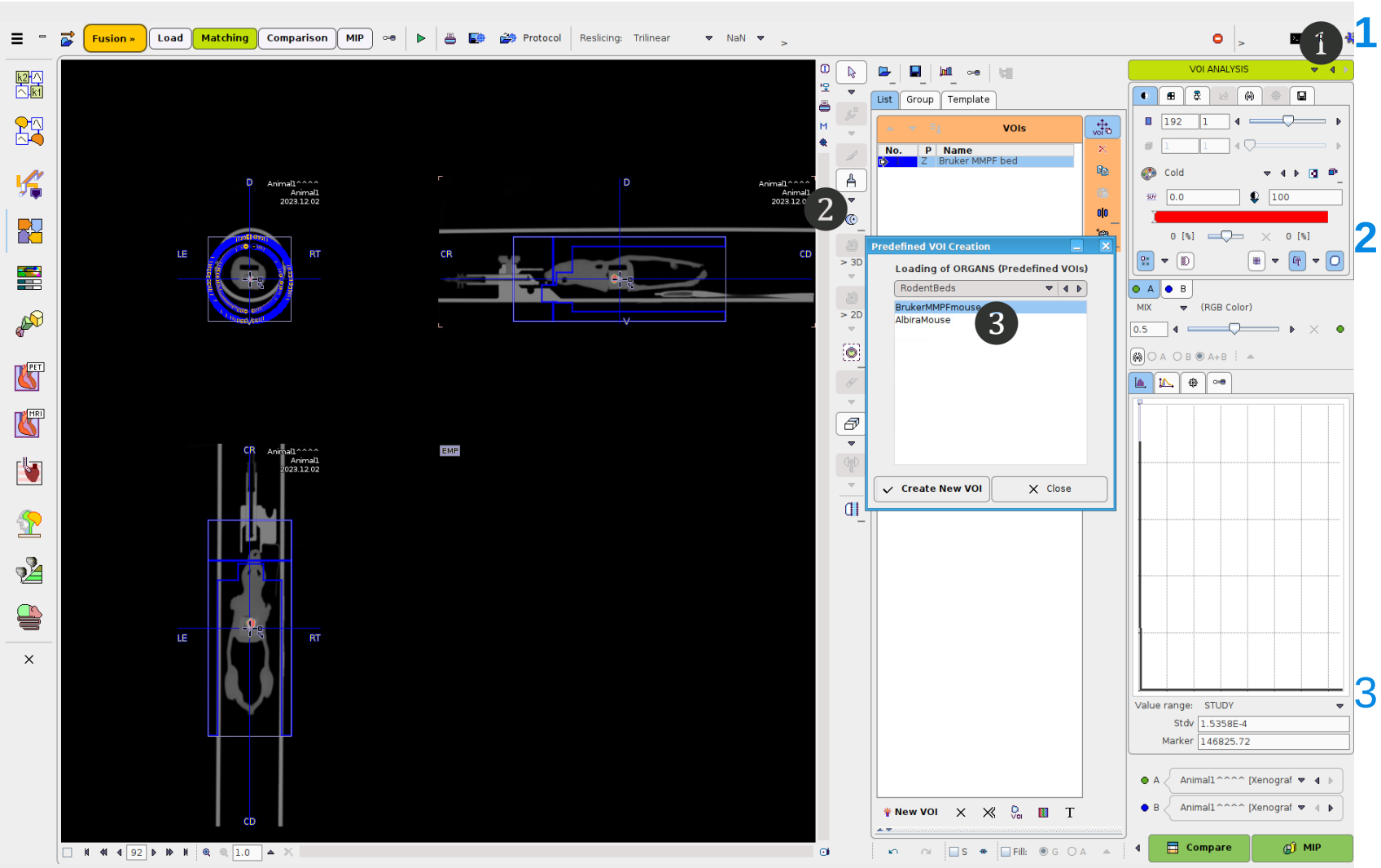
Albira Si: PMOD Multimodal Image Fusion & Display
1. Multimodal Image Fusion



1. **Reference & Matching.** Select Reference & Matching in the pull-down menu to display PET fused to the CT (or MR).

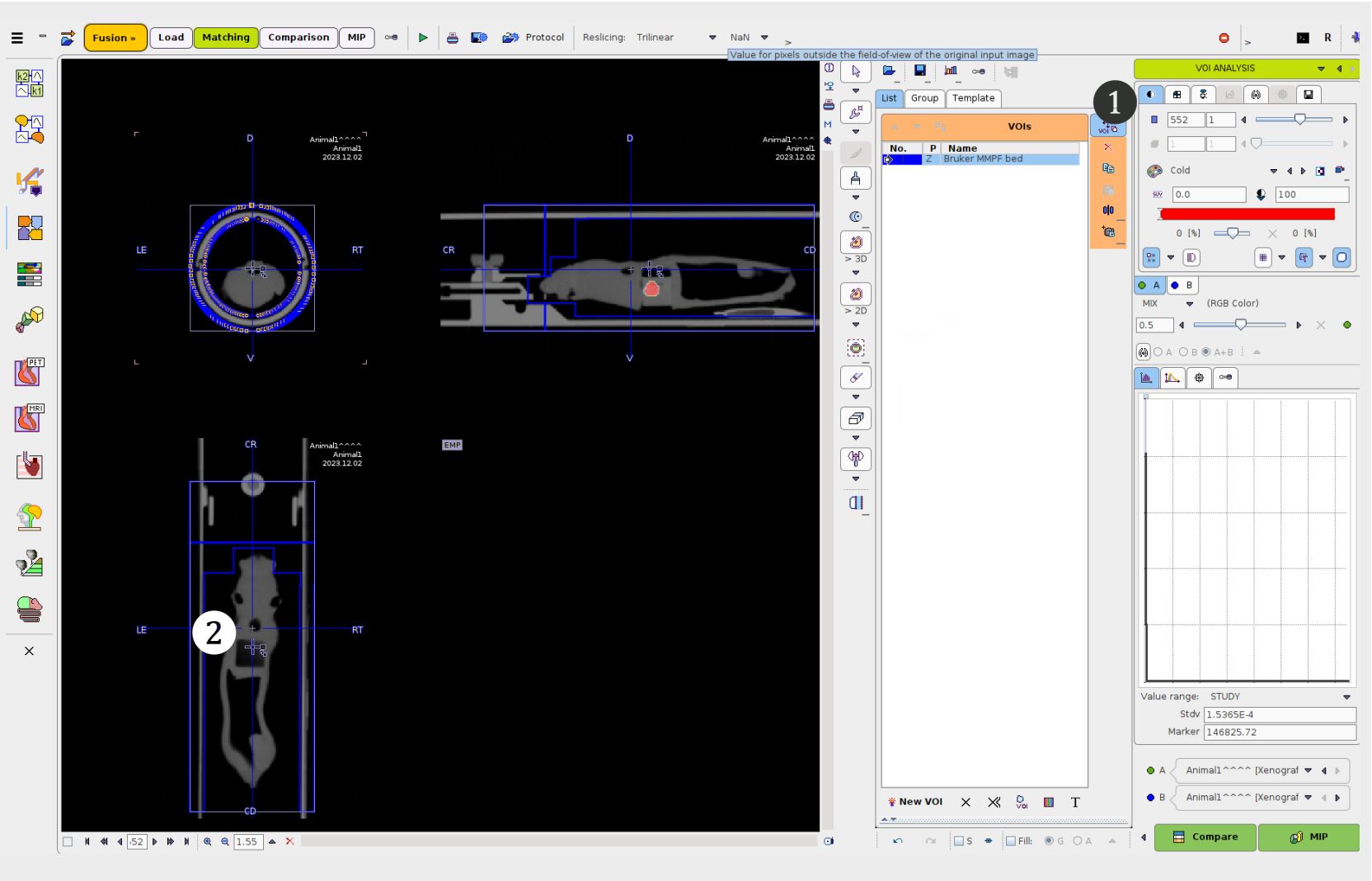
2. **INP & REF.** Toggle between INP & REF tabs for image controls for the PET & CT (or 3D MR) Respectively. Adjust image display as desired.

Albira Si: PMOD Multimodal Image Fusion & Display
2. Multimodal Image Masking



1. **VOI Analysis.** Select **VOI ANALYSIS** in the pull-down menu.
2. **Create Regular VOI.** Place the orthogonal crosshairs in the image center. To create a VOI based on the Bruker MMPF cradle, first select **Create Regular VOI > Organs (Predefined VOI).**
3. Select **Rodent Beds > Bruker MMPF Mouse.**

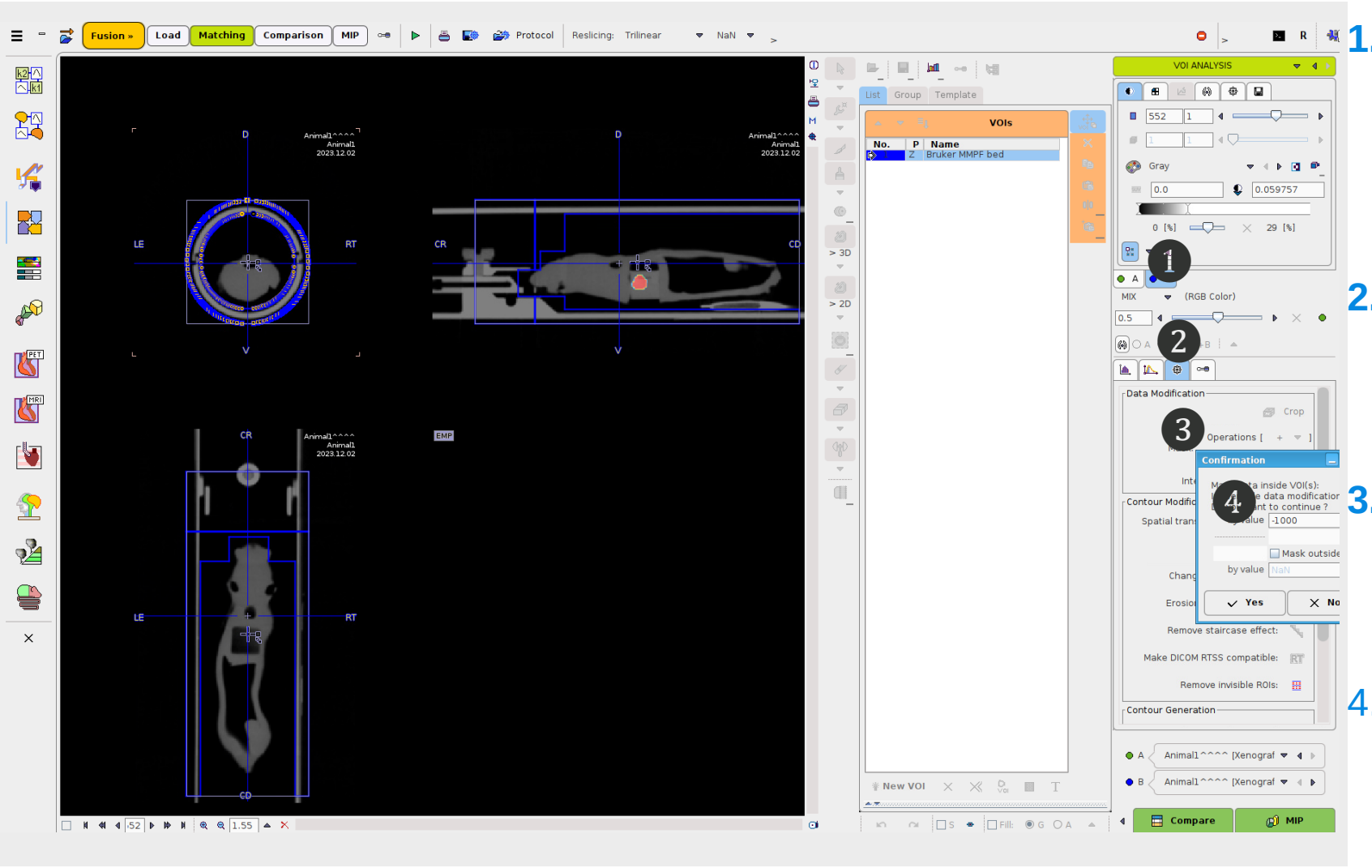
Albira Si: PMOD Multimodal Image Fusion & Display
2. Multimodal Image Masking



1. **Operation on Entire VOI.** Select the **Operation on Entire VOI** button.

2. **Drag the VOI at the crosshair to align with the cradle.**

Albira Si: PMOD Multimodal Image Fusion & Display
2. Multimodal Image Masking



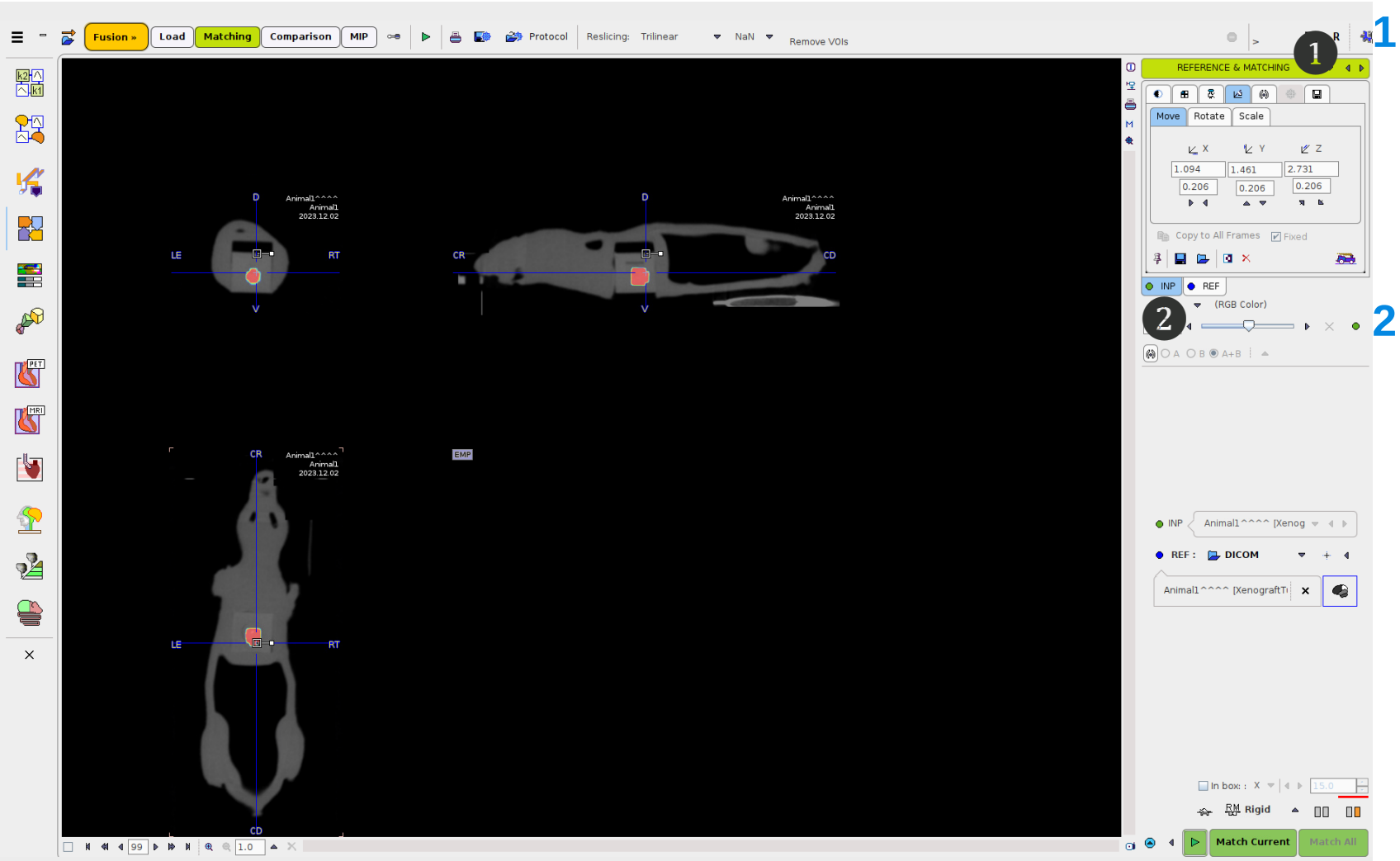
1. **Tab B.** Select Tab B to set the current active working image data to the CT (or 3D MR) data.

2. **Masking Tab.** Select the **“Masking…”** tab.

3. **Mask In.** Select the “Mask voxels inside selected VOI(s)” button.

4. For Hounsfield calibrated CT enter “-1000” in the dialogue, and select yes.

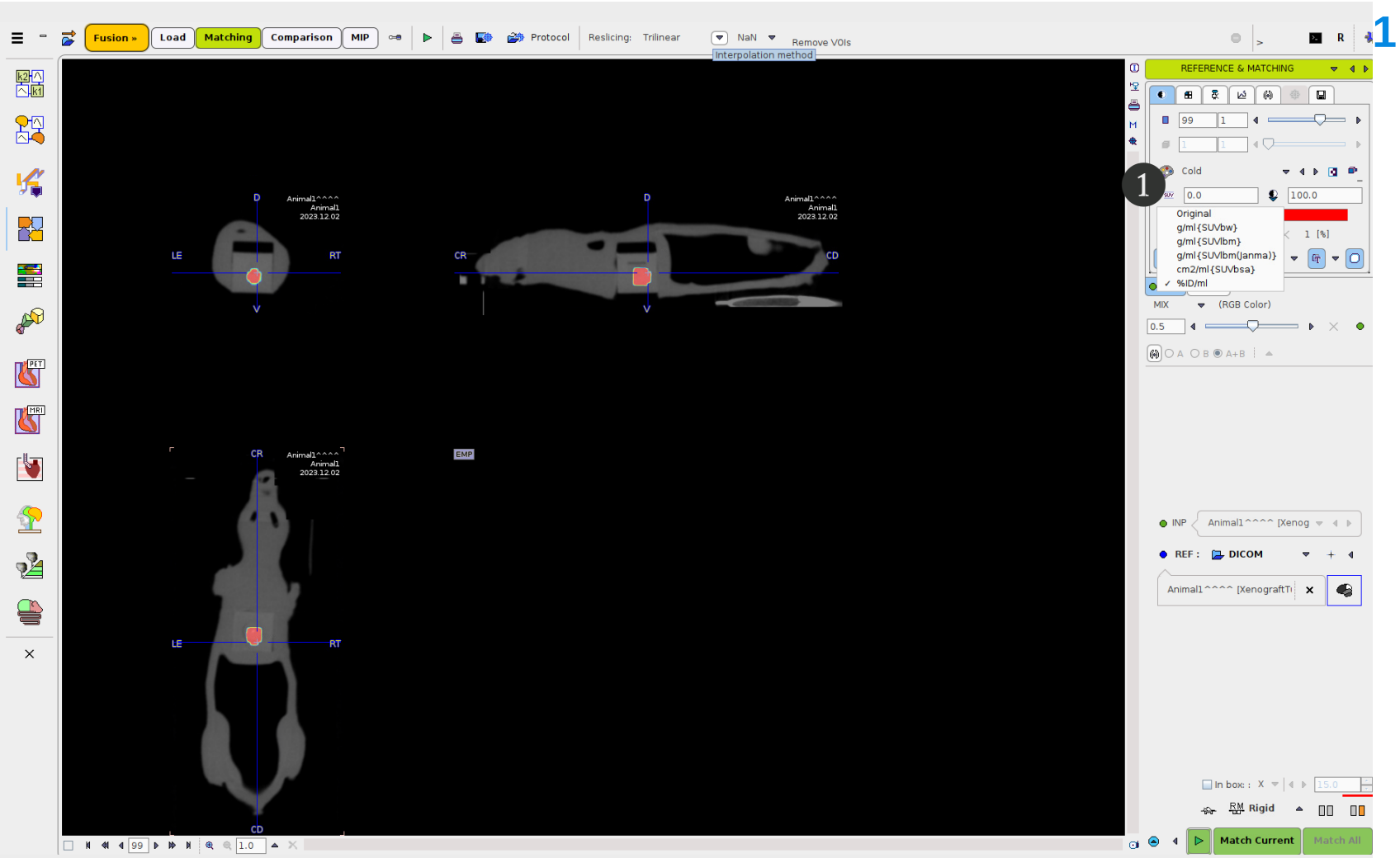
Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



1. **Reference & Matching.** Select in the pull-down menu to display PET fused to the CT.

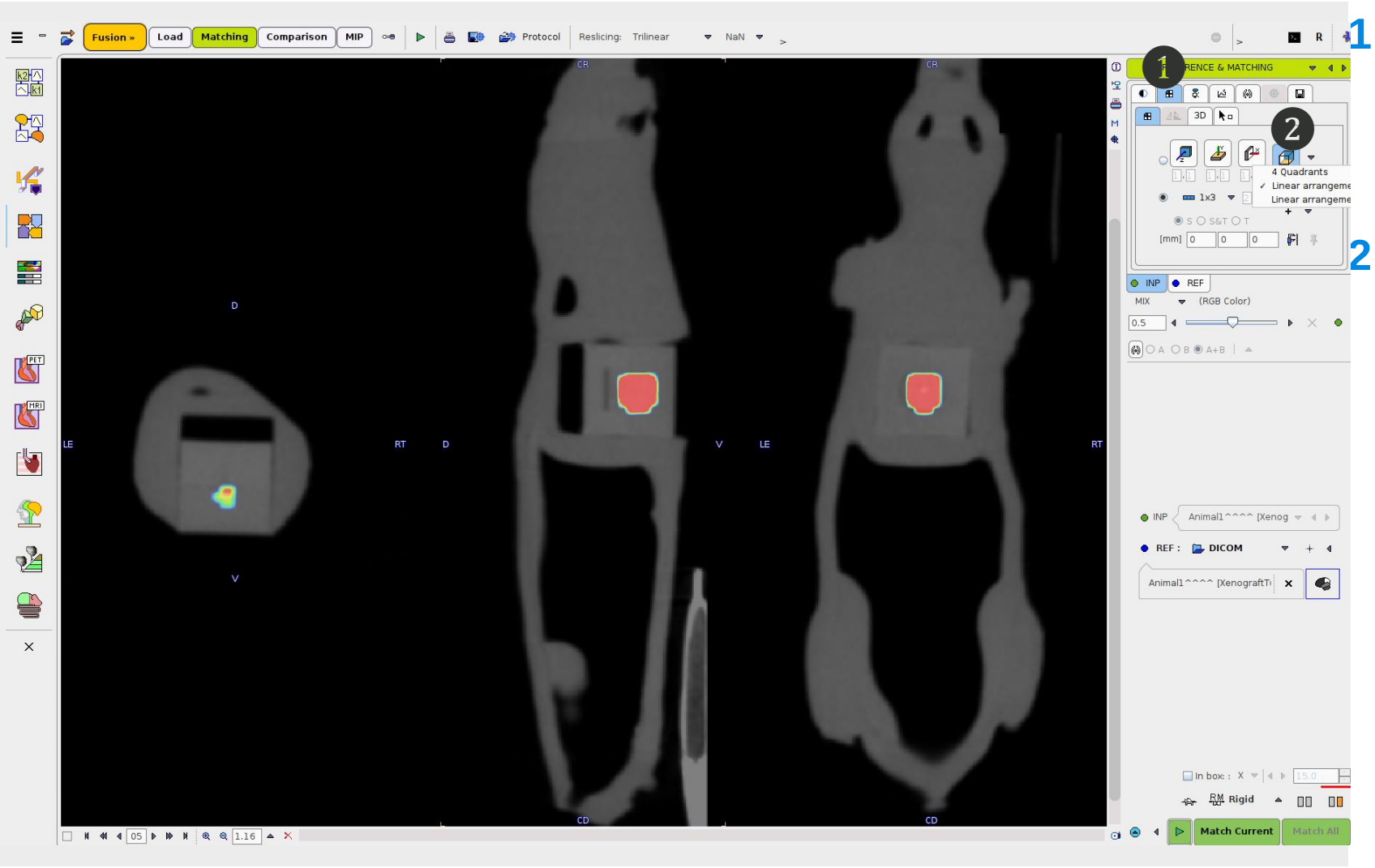
2. **INP & REF.** Toggle between the tabs to adjust contrast for the PET & CT images as desired.

Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



1. **SUV.** If not already predefined in the PFUS application menu, select the unit for display. This is often %ID/ml.

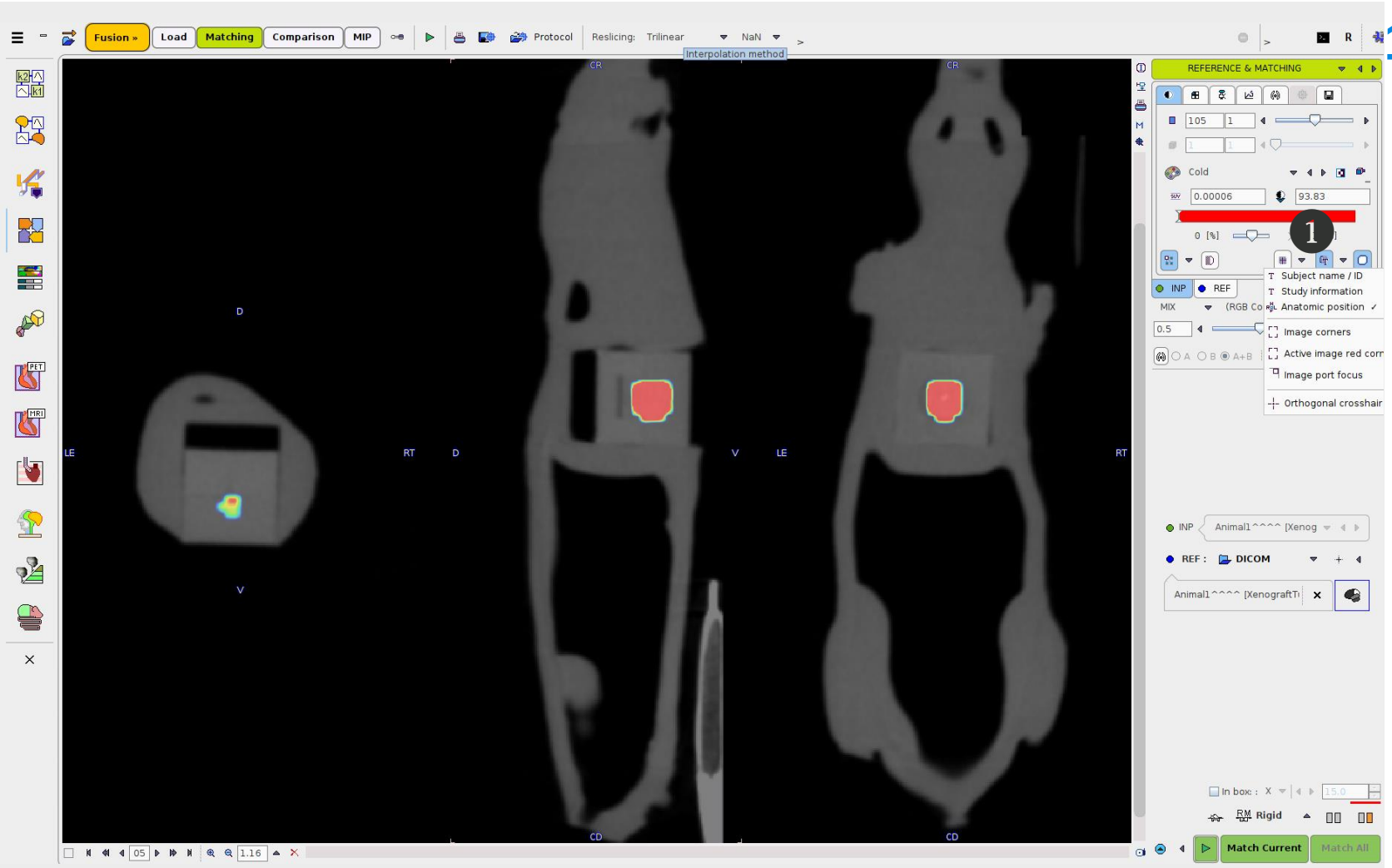
Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



1. **Image Display Layouts.** Select the **Image Display Layout** tab.

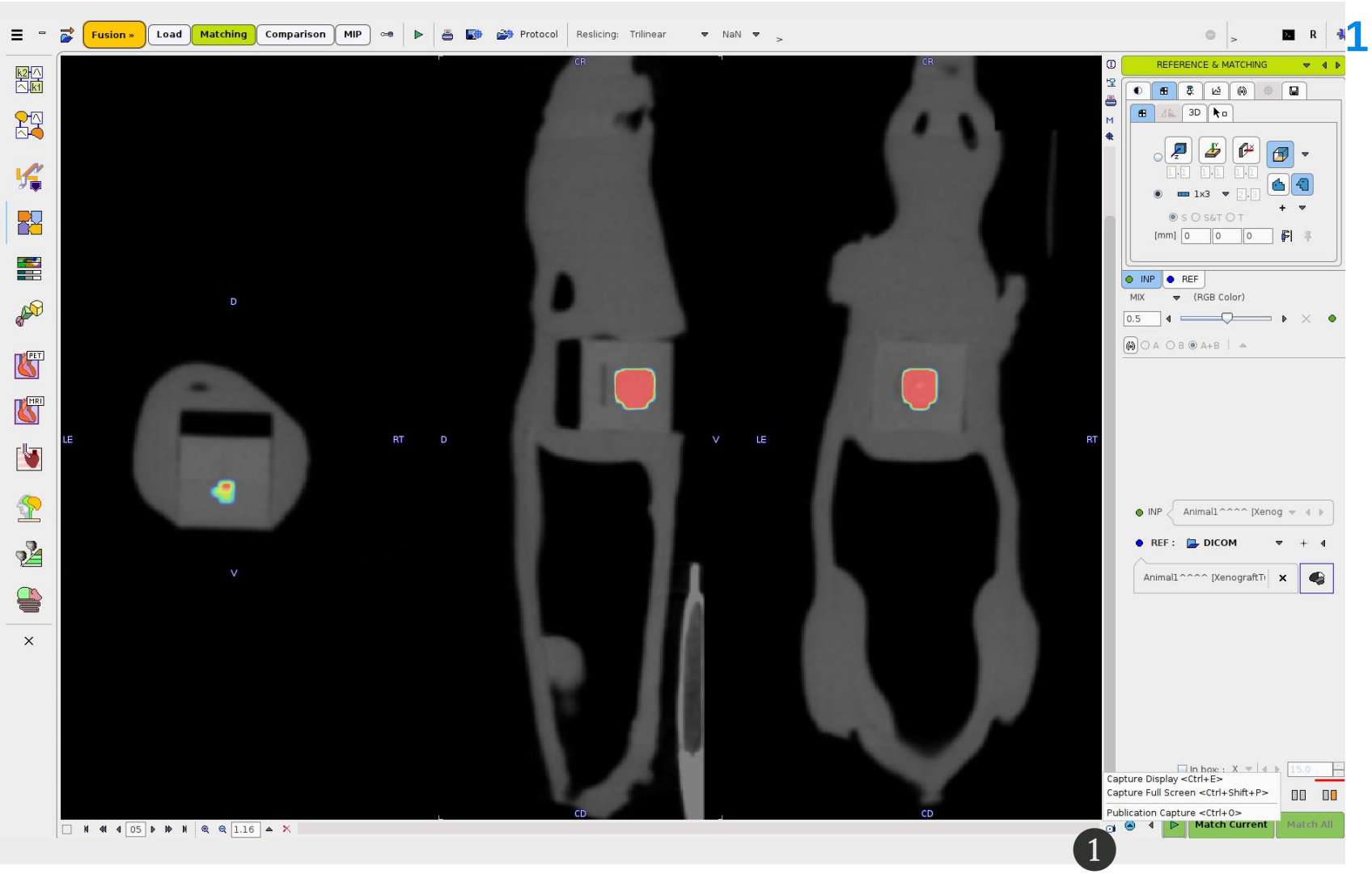
2. **Linear Arrangement.** Select the **Linear arrangement** display selection, common for display in figures.

Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



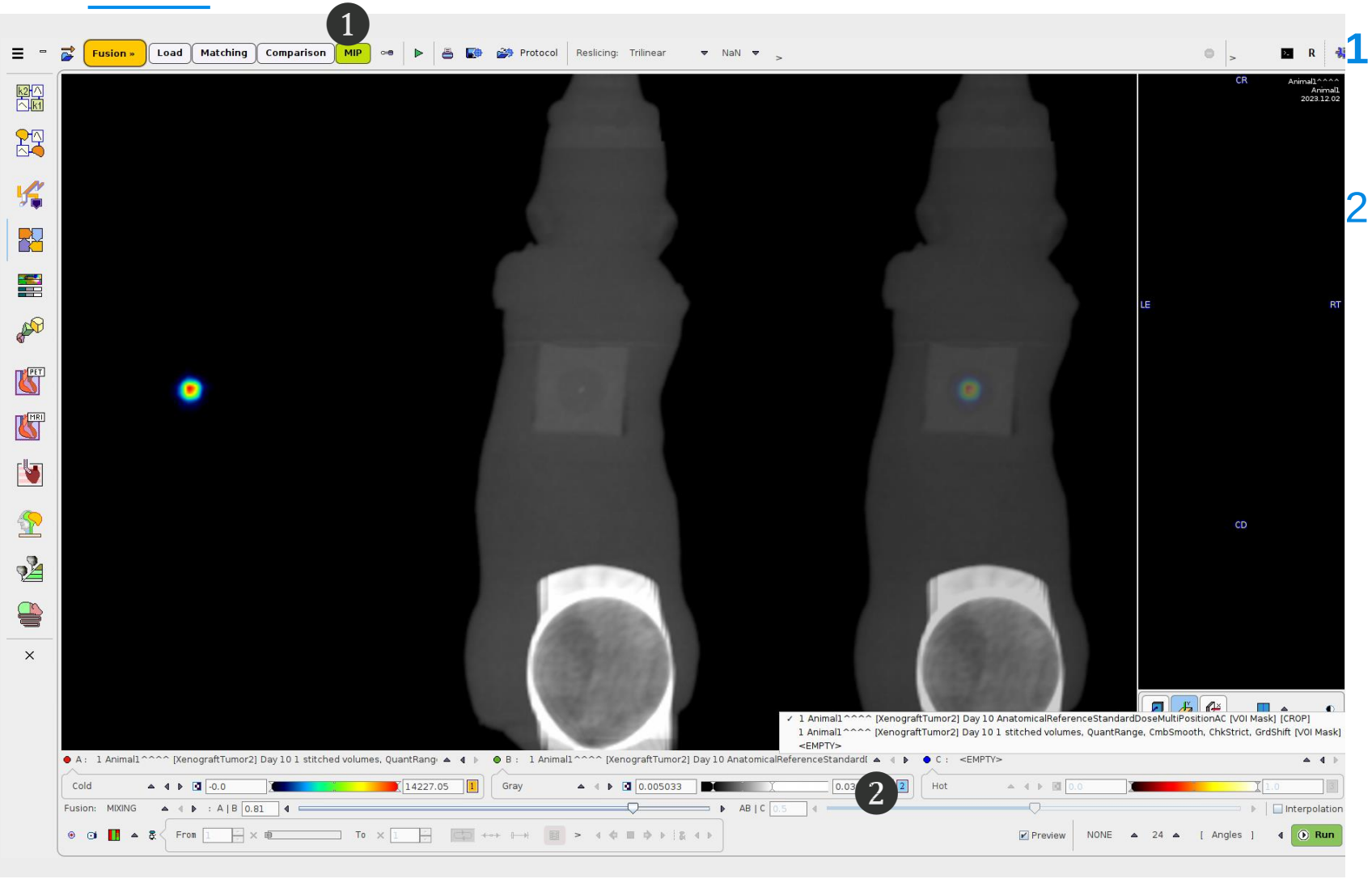
1. Image Annotation and overlay elements. Select the Image and overlay elements menu to add or remove elements to the display.

Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



1. **Capture Image Display.** Select the **Capture Image Display** button, and select the Publication Capture button.

Albira Si: PMOD Multimodal Image Fusion & Display
3. Multimodal Image Display



1. **MIP.** Select the **MIP** tab at top.

2. Set the left image to PET and right image to MR or CT using the pulldown menus. Adjust he contrast and display as described and compete the image capture.

Tip: Save the modified dataset to the database before closing to save your progress.

SOFTWARE

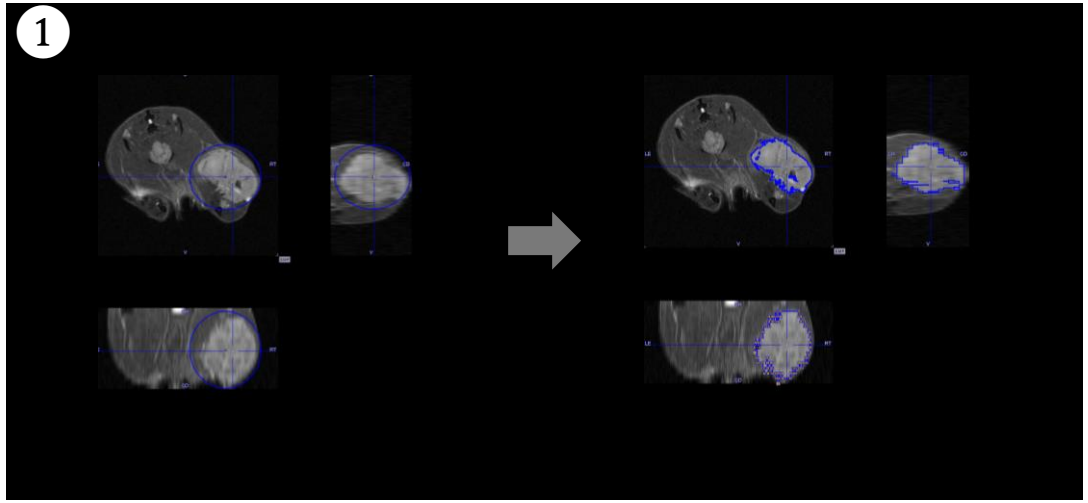
Educational Training Guide

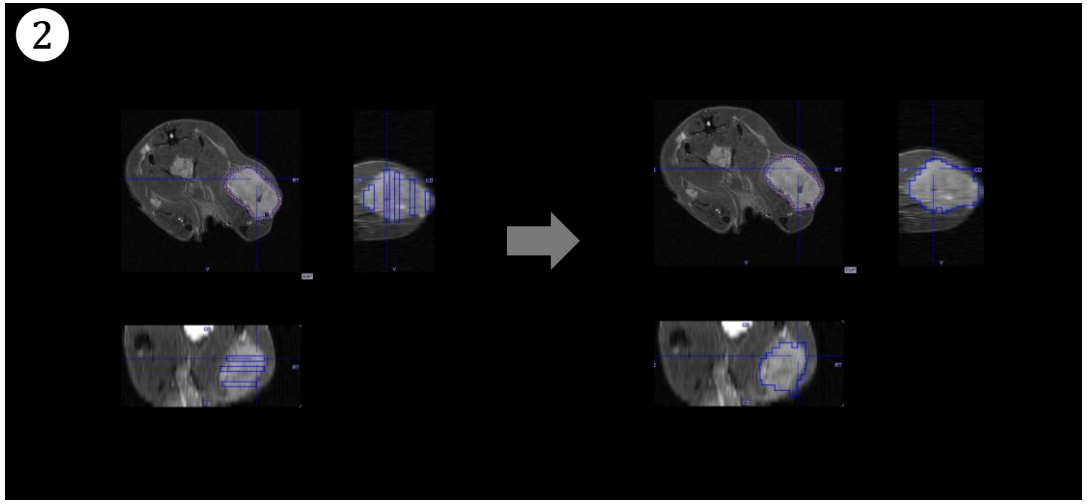
PET/MR & PET/CT Software Workflows: PMOD VOI Basic Workflows

PET/MR & PET/CT: PMOD VOIs Basics
VOIs by Iso-Contouring and Contour Interpretation

1. **VOIs** & Iso-Contouring by Region Growing

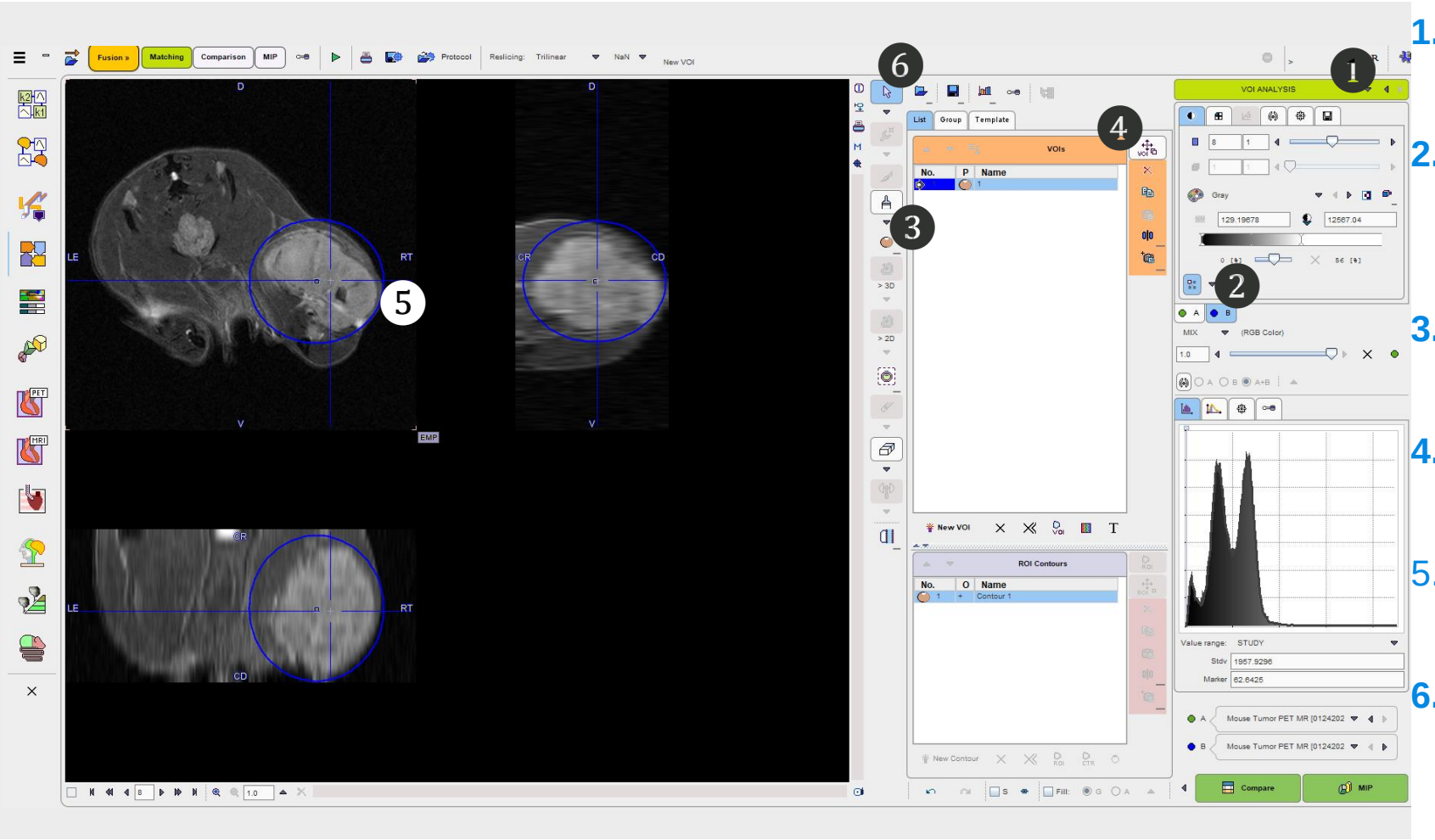
2. **VOIs** & Freehand with Contour Interpretation





Study data (courtesy Virginia Tech) was acquired in a BioSpec 9.4 MRI with a PET Insert Si103 and analyzed using PMOD v4.4

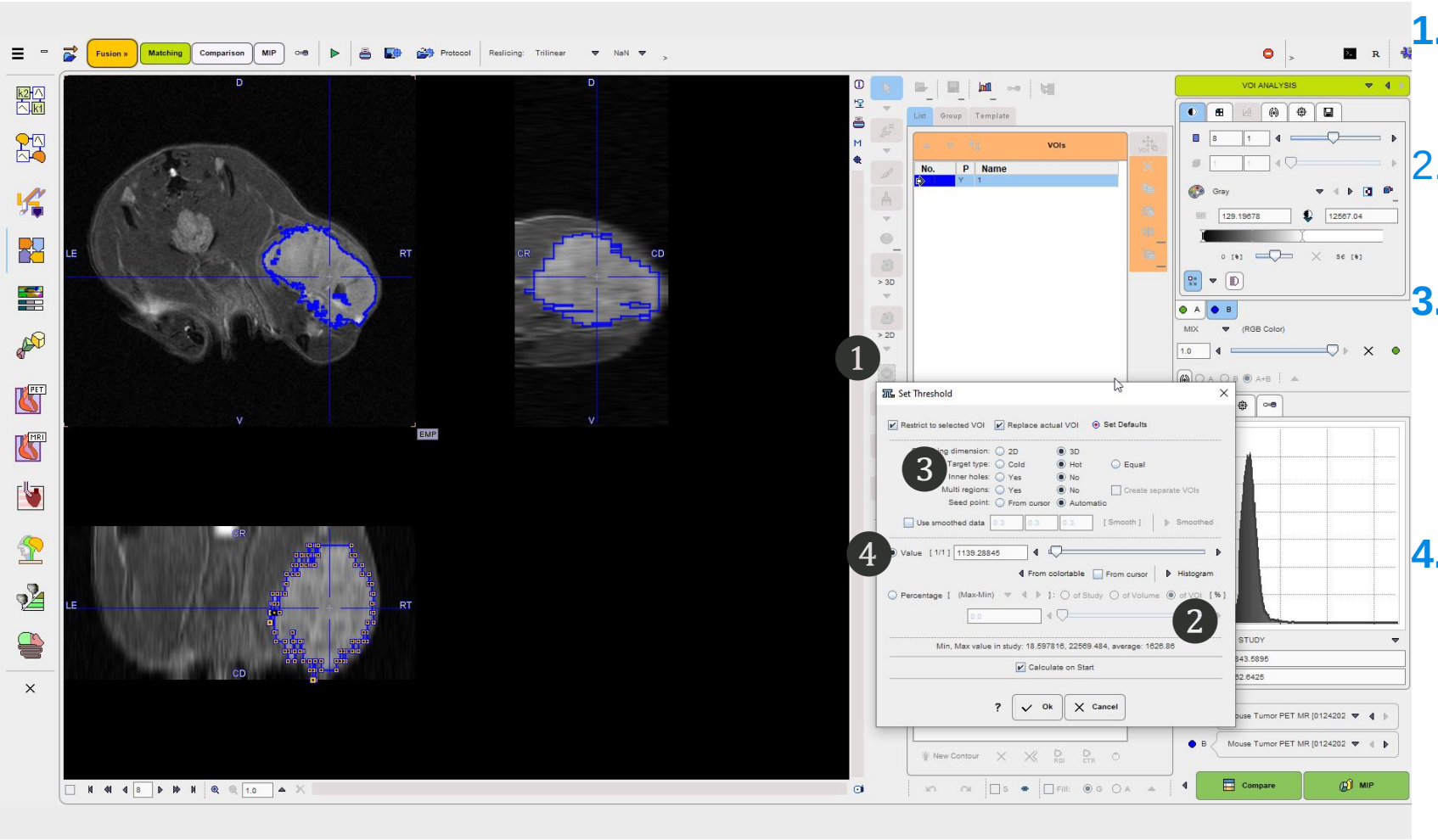
PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
1. PMOD PFUS VOIs & Iso-Contouring by Region Growing



1. **VOI ANALYSIS.** Select in the pull-down menu to access VOI tools.
2. **Tab B.** Select to set the current active working image to the CT or MR reference data.
3. **Create regular VOI.** Select and choose SPHERE.
4. **Operation on Entire VOI.** Select the Operation on Entire VOI button.
5. Adjust the location and boundaries of the sphere to outside the tumor margins.
6. **Save VOI.** Tip: If additional studies will be analyzed, it may be useful to save the sphere VOI to the database for recall.

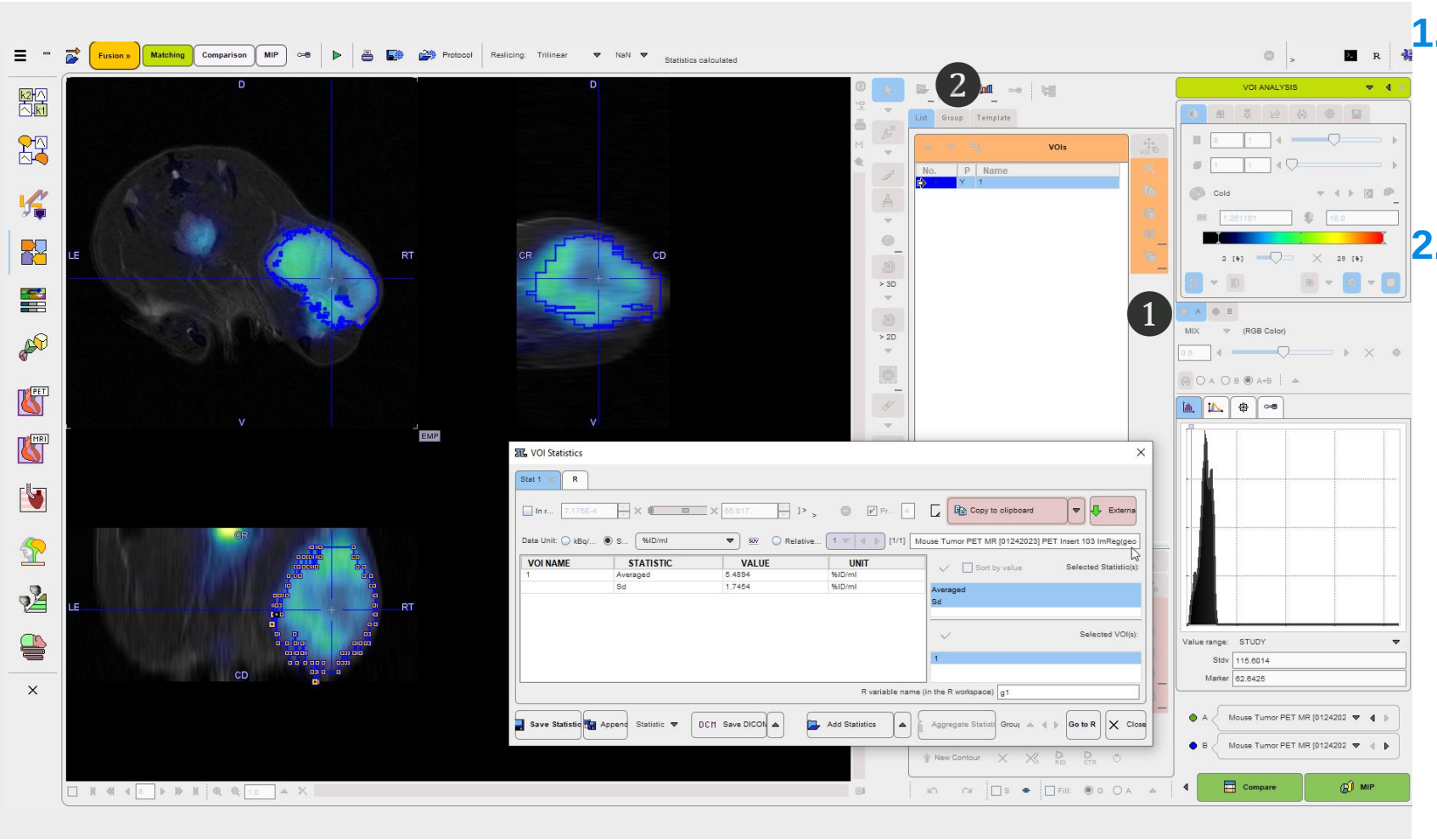
Tip: The Iso-Contouring By Region Growing VOI method is suitable with targets with well defined anatomical or PET signal boundaries

PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
1. PMOD PFUS VOIs & Iso-Contouring by Region Growing



1. **Iso-contouring by Region Growing.** Select in the VOI tools menu.
2. Check the Percentage “**of VOI**” selection.
3. **Check the “Hot” target type for e.g. PET signal, and “Cold” target type for negative contrast tissues (e.g. CT lung contrast).**
4. **Set Threshold.** Set the thresholding boundaries value and select OK. Tip: Where Iso-contouring by Region Growing is applied directly to the PET image, users most often use a defined %ID/mL (e.g. 10%) value to threshold all data for consistency.

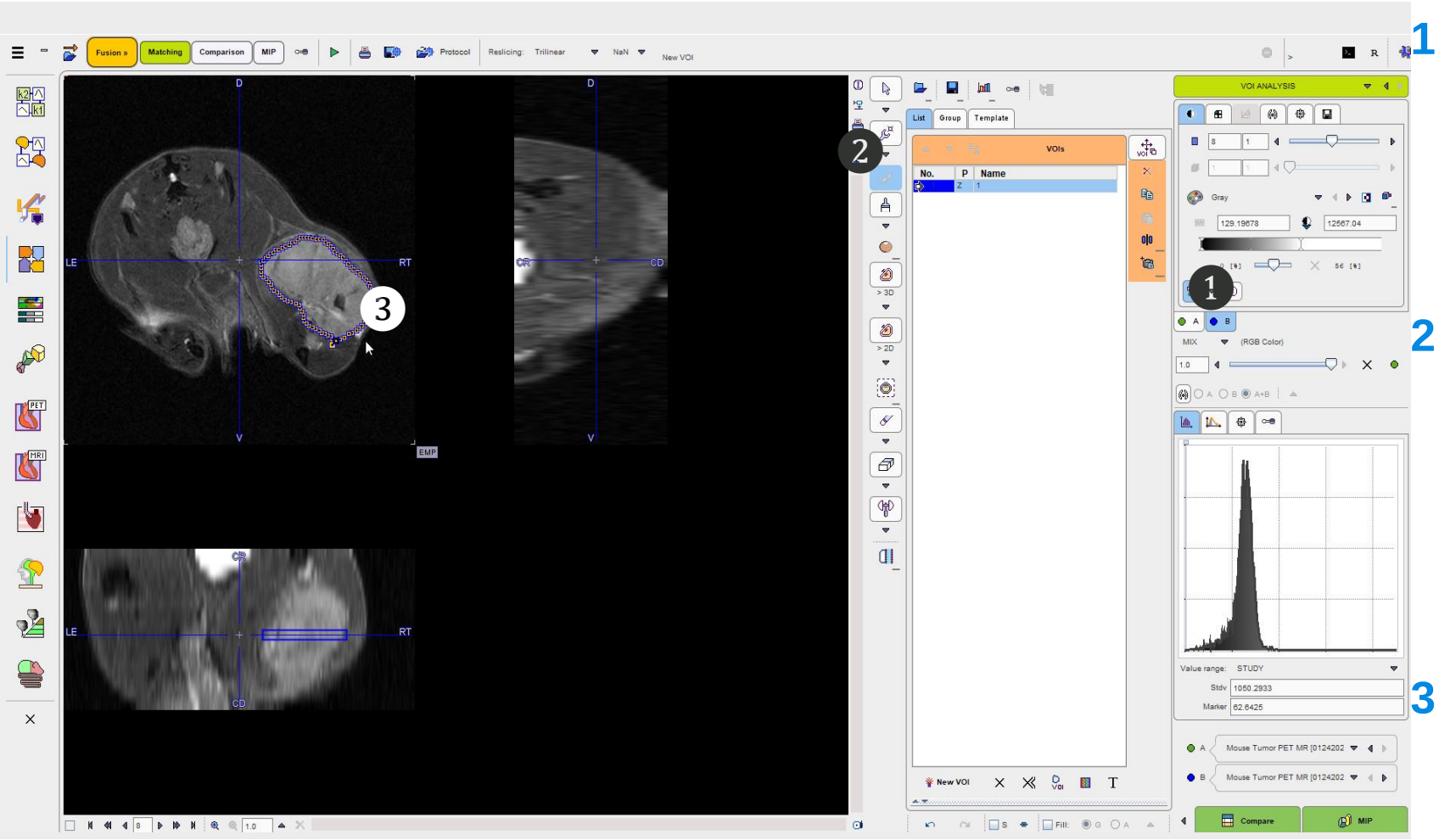
PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
1. PMOD PFUS VOIs & Iso-Contouring by Region Growing



1. **Tab A.** Select Tab A to set the active image to the PET input data.

2. **VOI Statistics.** Select the VOI Statistics button to view VOI statistic. Tip: Choose “Selected Statistics” or “Default Statistics” when prompted to view your predefined subset of statistics or an interactive menu of statistics respectively.

PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
2. PMOD PFUS VOI & Freehand with Contour Interpretation

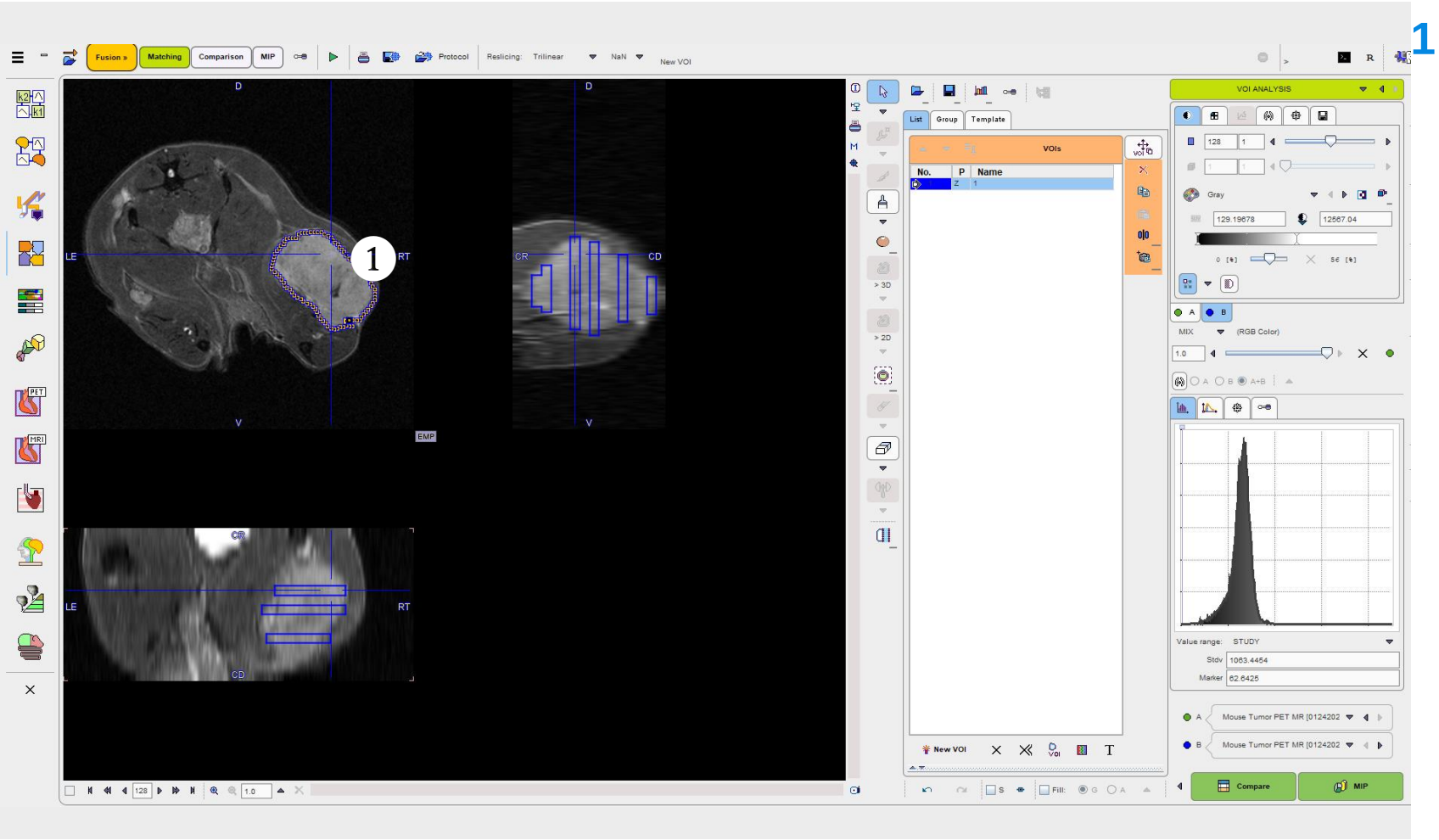


1. **Tab B.** Select Tab B to set the active working image to CT or MR reference data.

2. **Draw Polygon with Dense Vertices.** Select the Draw Polygon with Dense Vertices button.

3. **VOI.** Tracer the ROI boundaries on a selected slice.

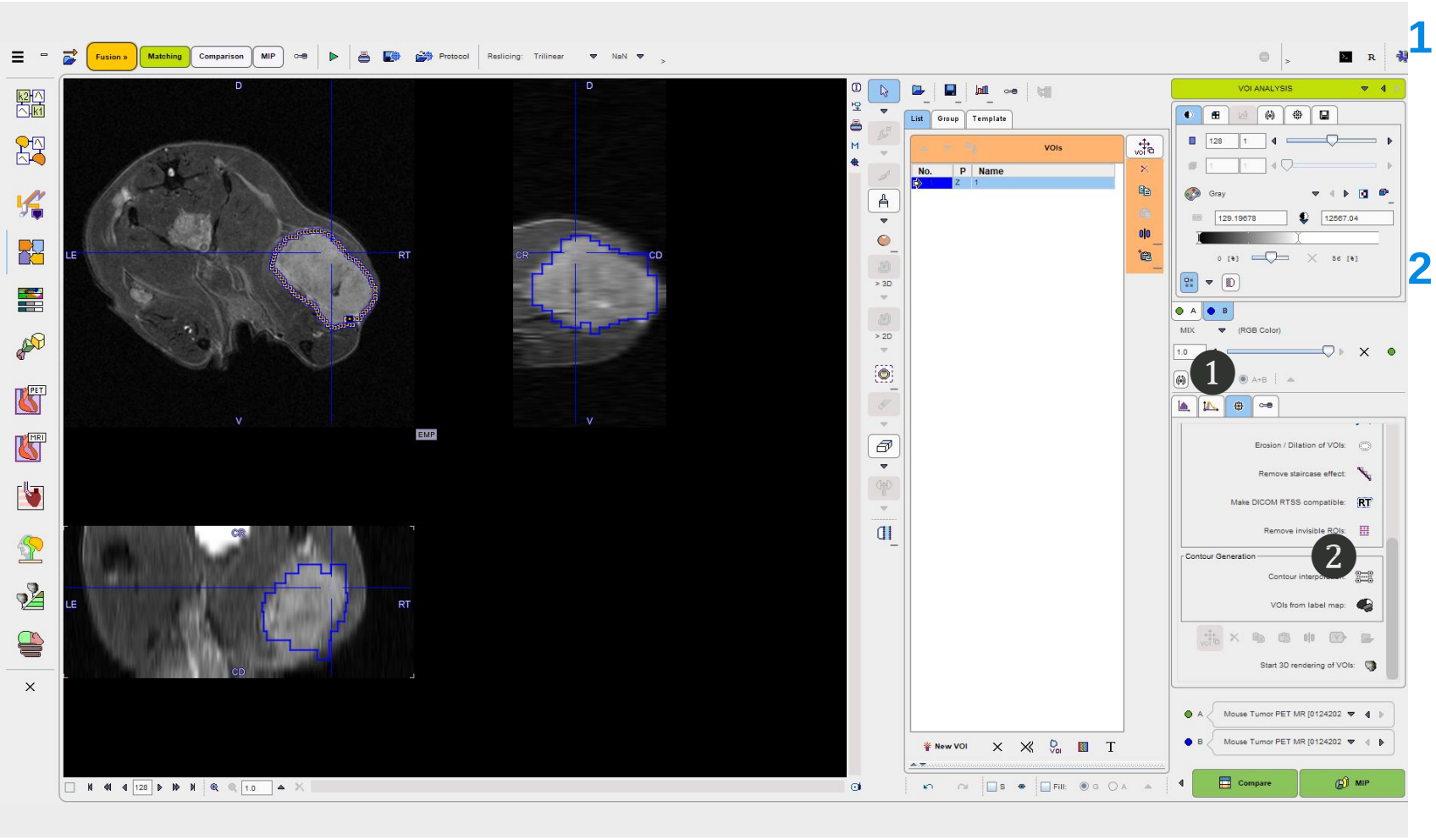
PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
2. PMOD PFUS VOI & Freehand with Contour Interpretation



1. **VOI.** Trace the ROI boundaries on additional non-contiguous slices. Slices must be draw in a single axis only.

Tip: The Freehand with Region Growing VOI method is useful for targets with faint boundaries.

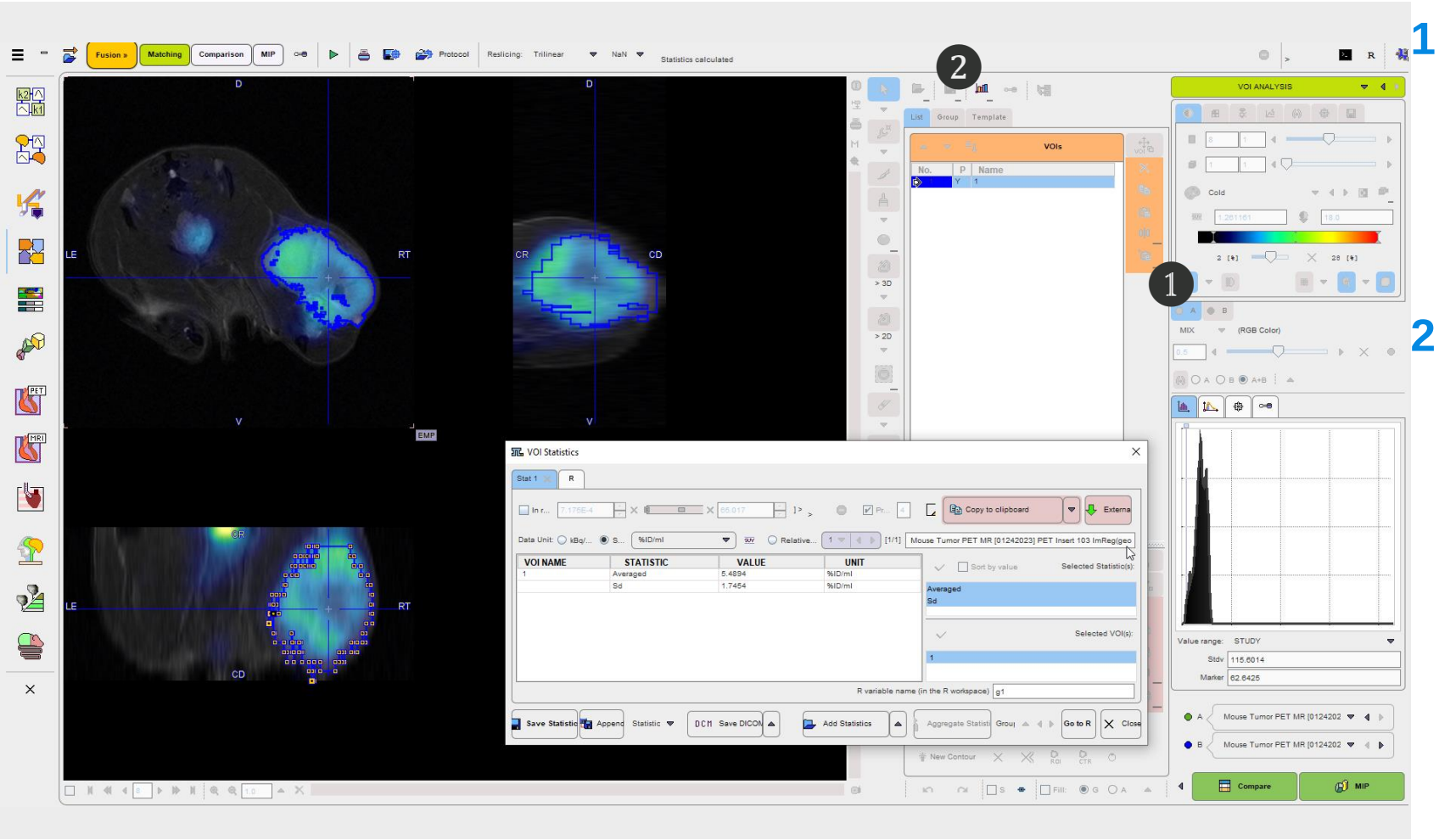
PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
2. PMOD PFUS VOI & Freehand with Contour Interpretation



1. **Masking Tab.** Select the **“Masking…”** tab.

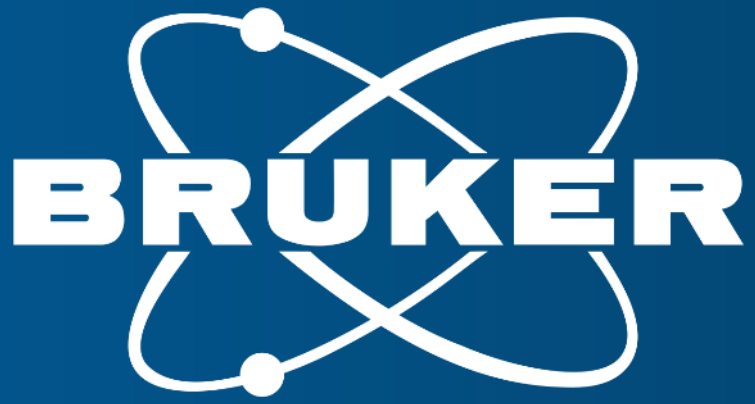
2. **Contour Interpolation.** Select the **Contour Interpolation** button to full the non-contiguous spaces.

PET/MR & PET/CT: PMOD Multimodal Imaging Fusion & Display
2. PMOD PFUS VOI & Freehand with Contour Interpretation



1. **Tab A.** Select Tab A to set the active image to the PET input data.

2. **VOI Statistics.** Select the VOI Statistics button to view VOI statistic.



Innovation with Integrity