AIM on ClearCanvas Workstation 3.0 User's Guide

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This guide explains how to use Annotation and Image Markup (AIM) on the ClearCanvas Workstation. The information presented explains key procedures for creating and working with AIM annotation objects. The intended audience for this guide is a biomedical researcher familiar with the AIM information model.

The ClearCanvas workstation also has an extensive user's guide that can be found on the main menu at **Help** > **User's Guide**.

For more information on AIM and ClearCanvas, go to the following links:

- https://cabig.nci.nih.gov/tools/AIM
- http://www.clearcanvas.ca/dnn 🖼️

Setting AIM Data Service Options

The purpose of AIM on the ClearCanvas workstation is to connect to multiple AIM Data Services that can accommodate the AIM 3.0 information model. As a result, these data services are collectively known as the AIM 3.0 Data Service.

While by default the workstation is not configured to connect to any AIM 3.0 Data Services, it can use the AIM 3.0 Data Service. An end user can enter any valid URL for the AIM Data Service and click the **Save** button to have that URL remain on the workstation for future sessions.

Click to configure the AIM Data Service. You can access the data service configuration from the explorer toolbar, shown in Figure 1, or through an opened study's toolbar, shown in Figure 2.
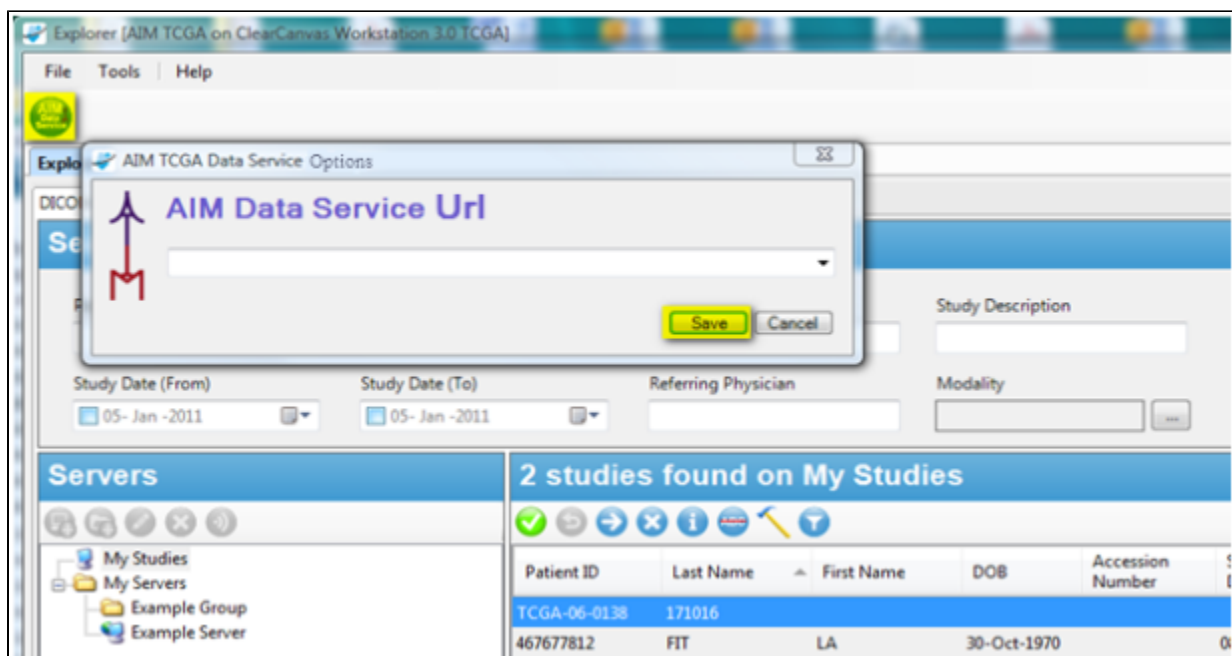
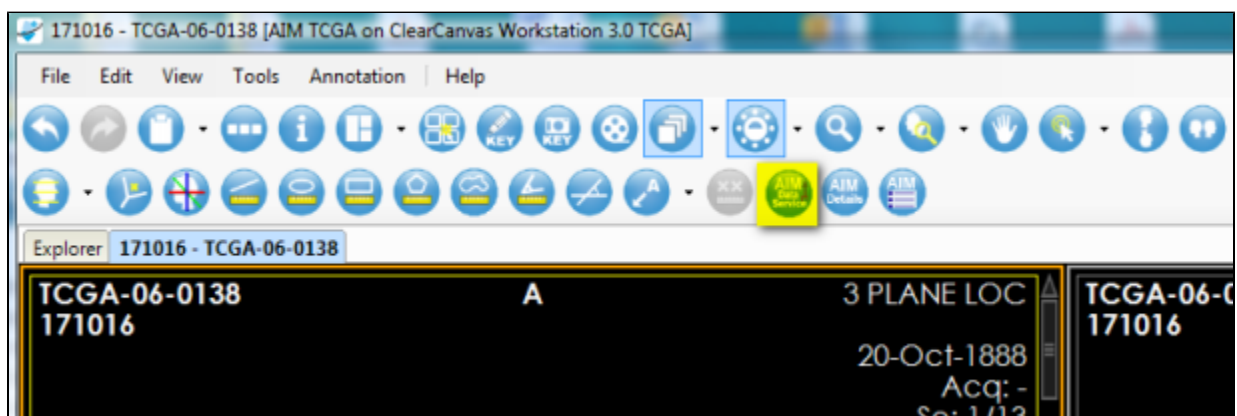*Figure 1. Access AIM Data Service Options from Explorer Toolbar*

Figure 2. Access AIM Data Service Options from an Opened Study

Setting AIM Options

To access the AIM settings, on the ClearCanvas menu, select **Tools** > **Options** > **AIM**. When finished, click **Apply** to commit the changes. This is demonstrated in Figure 3.
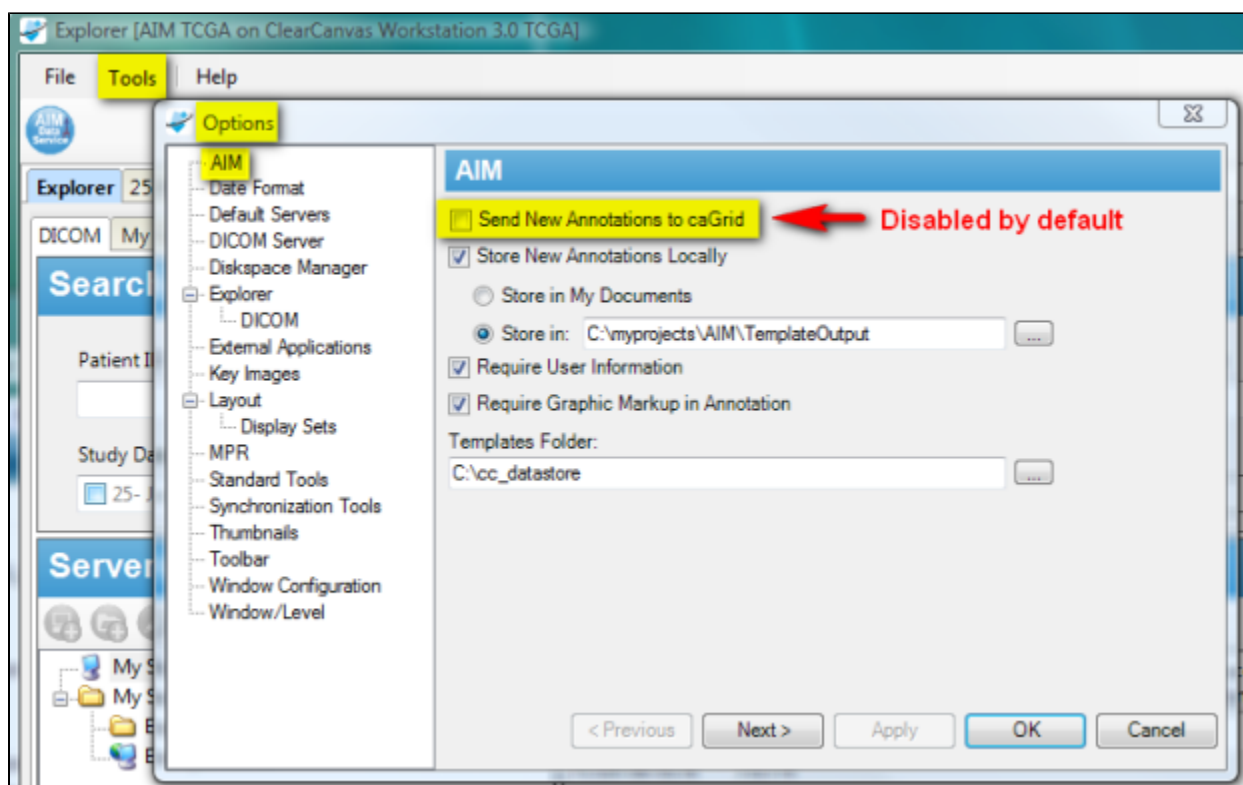
Figure 3. AIM Options

> ⓘ **Sending AIM XML documents to the AIM 3.0 Data Service**
>
> By default, the setting for sending AIM XML documents to the AIM 3.0 Data Service is disabled. You must enable this option in order to have new AIM XML documents sent to the AIM Data Service. If you have neither set the AIM Data Service destination nor enabled the **Send New Annotations to caGrid** option, your existing AIM XML documents will not be sent to the AIM 3.0 Data Service.

A user may change the following AIM options, which are described in Table 1.

Option	Description
Send New Annotations to caGrid	If selected, the workstation will send new annotations to the assigned caGrid location. Also see Setting AIM Data Service Options.
Store New Annotations Locally	If selected, the workstation will store a copy of new annotations in the AIM XML format on the local computer. A user can assign where the AIM annotation documents can be stored on the local computer.
Required User Information	If selected, user credentials need to be entered before creating an AIM annotation document.
Require Graphic Markup in Annotation	If selected, a user must create at least one graphical drawing on an image before creating an AIM annotation document.
Templates Folder	If entered, the directory will be used to search for AIM template XML documents.

Table 1. AIM Options Setting

Setting Toolbar Options

The ClearCanvas workstation allows a user to change the size of icons and show all icons on one screen. To do so, select **Tools** > **Options** > **Toolbar**. The recommended icon size is medium and you should select the **Wrap long toolbars** option. See Figure 4.
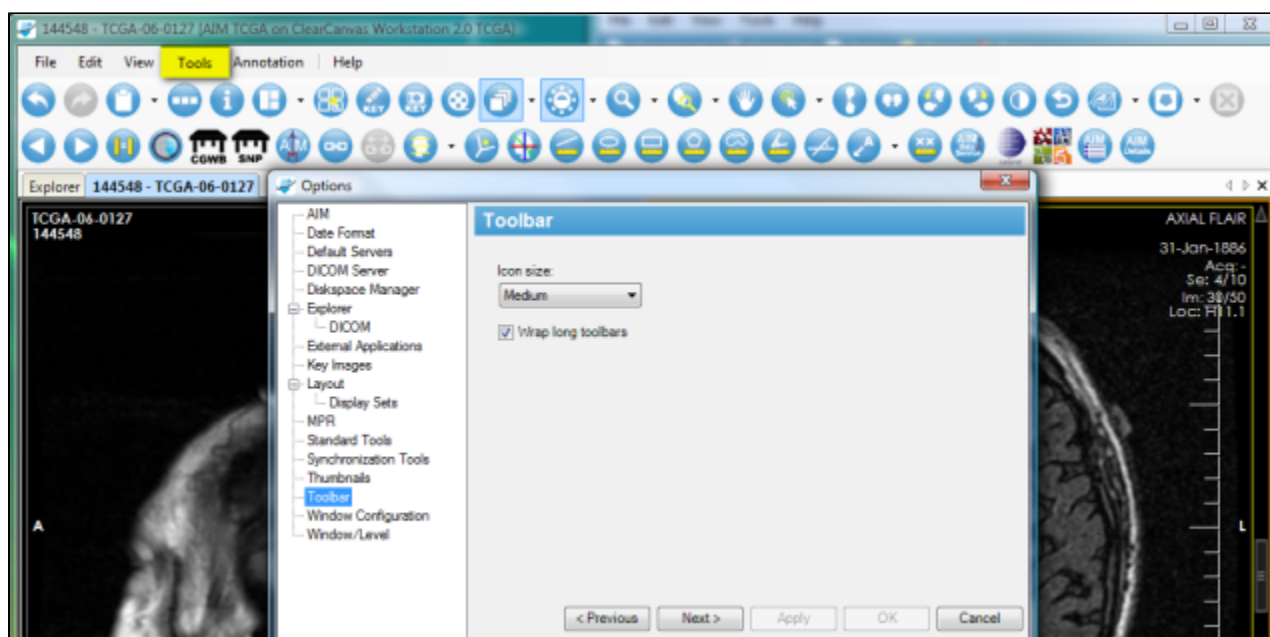
Figure 4. Setting Toolbar Option

Using AIM Tools

Table 2 describes four AIM tools that are available on the ClearCanvas workstation.

Tool	Description
	AIM Template displays a template based form with a set of questions and choice(s) of answers for each question. A user can import a new AIM template to that location. Create new annotation objects by completely filling out this form and clicking the **Create Annotation** button.
	AIM Object Locator depicts available AIM objects in the currently displayed study without searching through every image in the study or series.
	AIM Details provides the ability to view specific areas of a selected graphic markup for an existing annotation.
	Closed Polygon Markup tool allows creation of a free hand graphical markup. This tool can be used in addition to existing ClearCanvas tools in creating graphical markup.

Table 2. Available AIM Tools

AIM Template

To activate the AIM template tool in Figure 5, click the AIM template tool button (#1). If you put the pin down (#2), you can detach the AIM Template tab by putting the mouse pointer at the header (#3) and dragging it out, as illustrated in Figure 6.
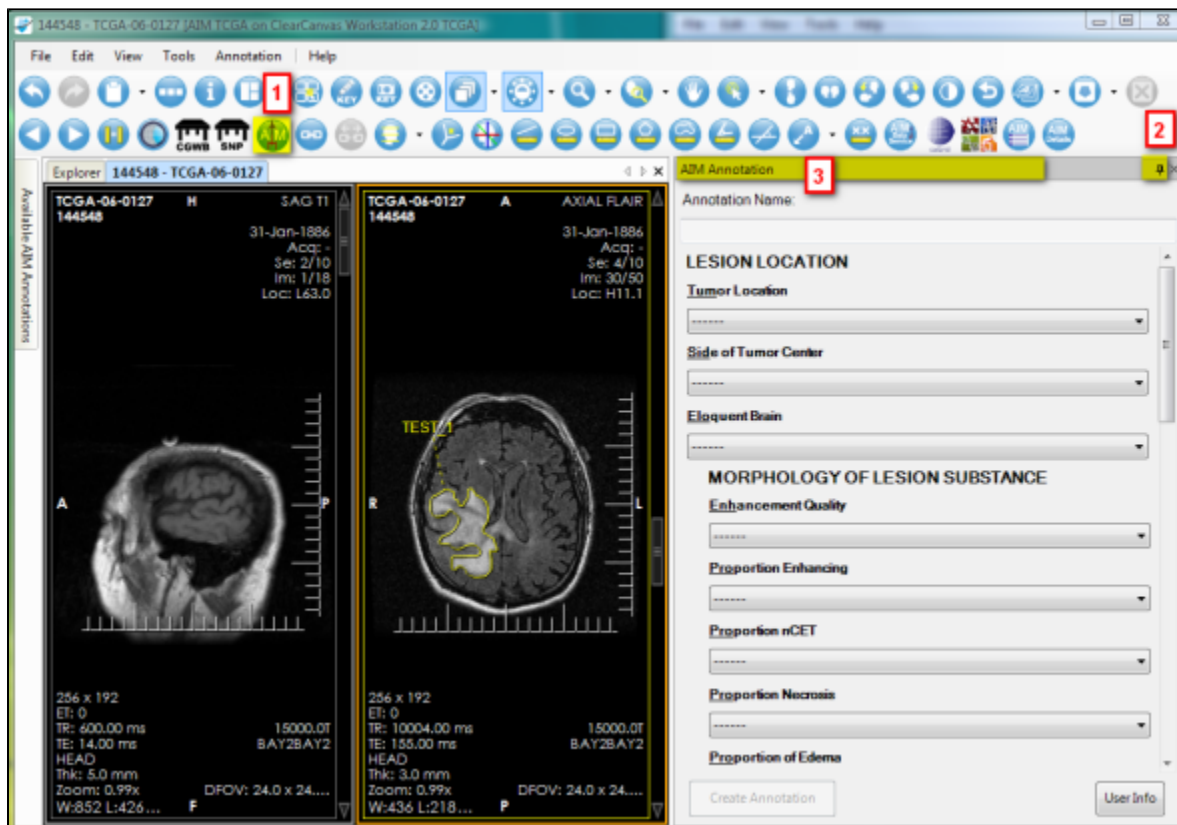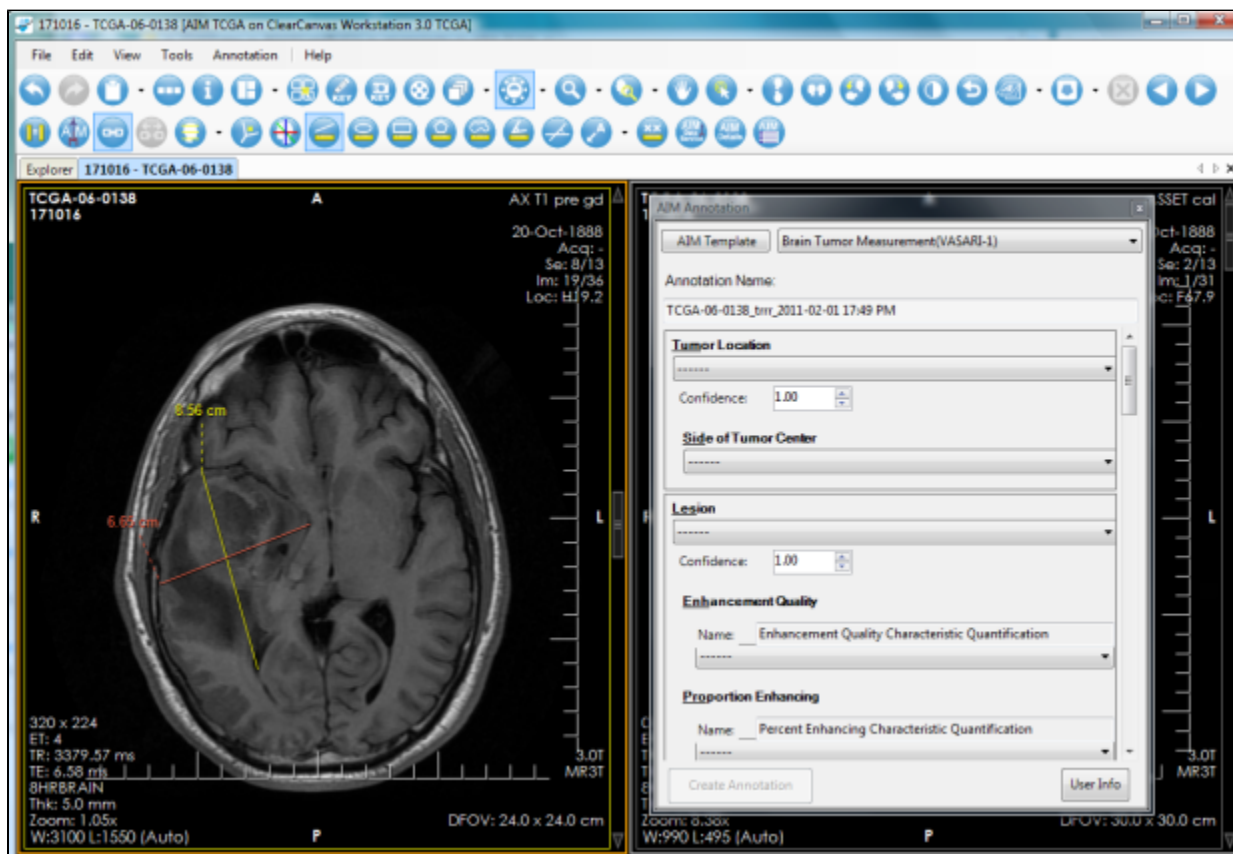
Figure 5. Activate AIM Template

Figure 6. Detached AIM Template Tool

ⓘ

> **ⓘ Important**
>
> When an AIM annotation is created, the following conditions are applied (based on AIM default settings described in Setting AIM Options)
>
> 1. A user must answer all questions presented in the AIM Annotation window.
> 2. A graphical markup is required on an image if *Require Graphic Markup in Annotation* is selected before an AIM annotation can be saved to the AIM Data Service and/or stored locally.
> 3. User information must be entered if *Require User Information* is selected.

Importing a New AIM Template

Import an AIM template XML document by clicking the **AIM Template** button, as shown in Figure 7. Windows Explorer opens a predefined folder described in Setting AIM Options.
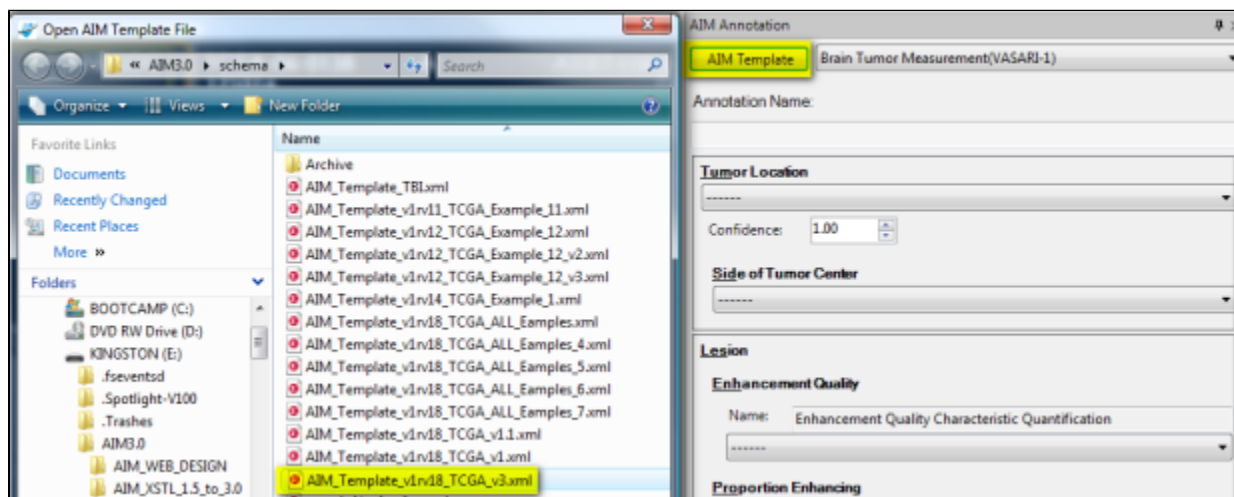
Figure 7. Importing an AIM Template

User Information

Author information as depicted in (Figure 8) can be changed. To use this feature, click the **User Info** button to activate the AIM User Information form. Enter appropriate information and click **Save**.

> **ⓘ User information is saved**
>
> The user information will be saved on the workstation for future use. If you are sharing the workstation with another reader, you must change or at least verify that the information in the "User Info" section reflects your personal credentials.

The AIM Template Manager is a tool used to create an AIM template XML document.
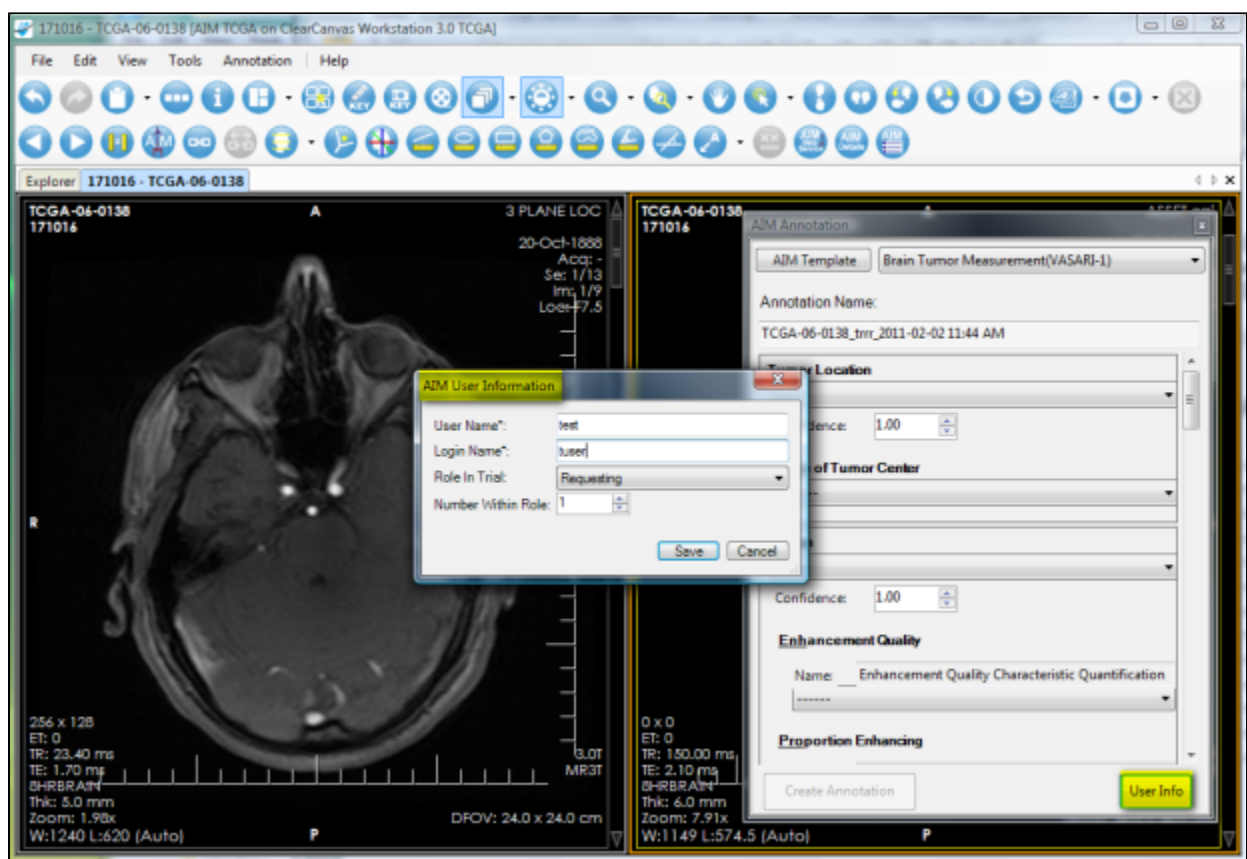
Figure 8. AIM User Information

Detailed Description of a Question

A detailed description of a question can be seen by placing the mouse pointer over the first three characters of each feature name, as shown in Figure 9.

Figure 9. Detail Description of a Question

AIM Locator

The AIM locator, depicted in (Figure 10), allows users to see existing AIM instances available in a study. A list of available AIM instances is displayed below the Available AIM Annotations section, which is #2 in the following image. To access this feature and see an AIM annotation, click **Show Study**, which is #3 in the following image.
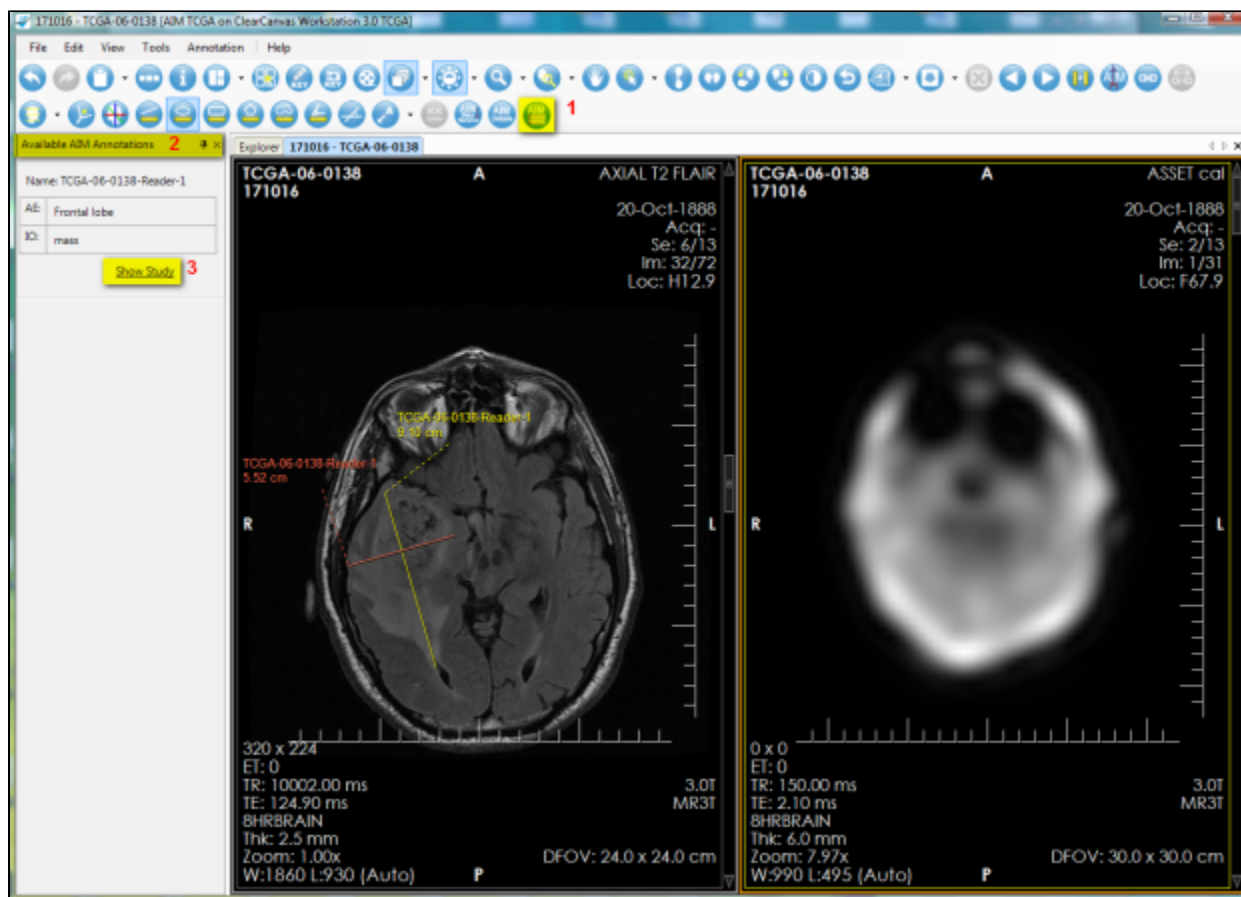
Figure 10. AIM Locator

AIM Annotation Details

The AIM annotation details, as illustrated by Figure 11, allow a user to examine detailed information captured in an AIM instance. To access this feature, you select an image containing an AIM instance and then click the **AIM Details** button, as shown in (#1). The AIM Annotation Details panel appears. This panel contains information tabs including Anatomic Entity, Imaging Observation, Calculations, and All Details. The All Details tab (shown in #3) allows a user to see information related to both Anatomic Entity and Imaging Observation and their characteristics.
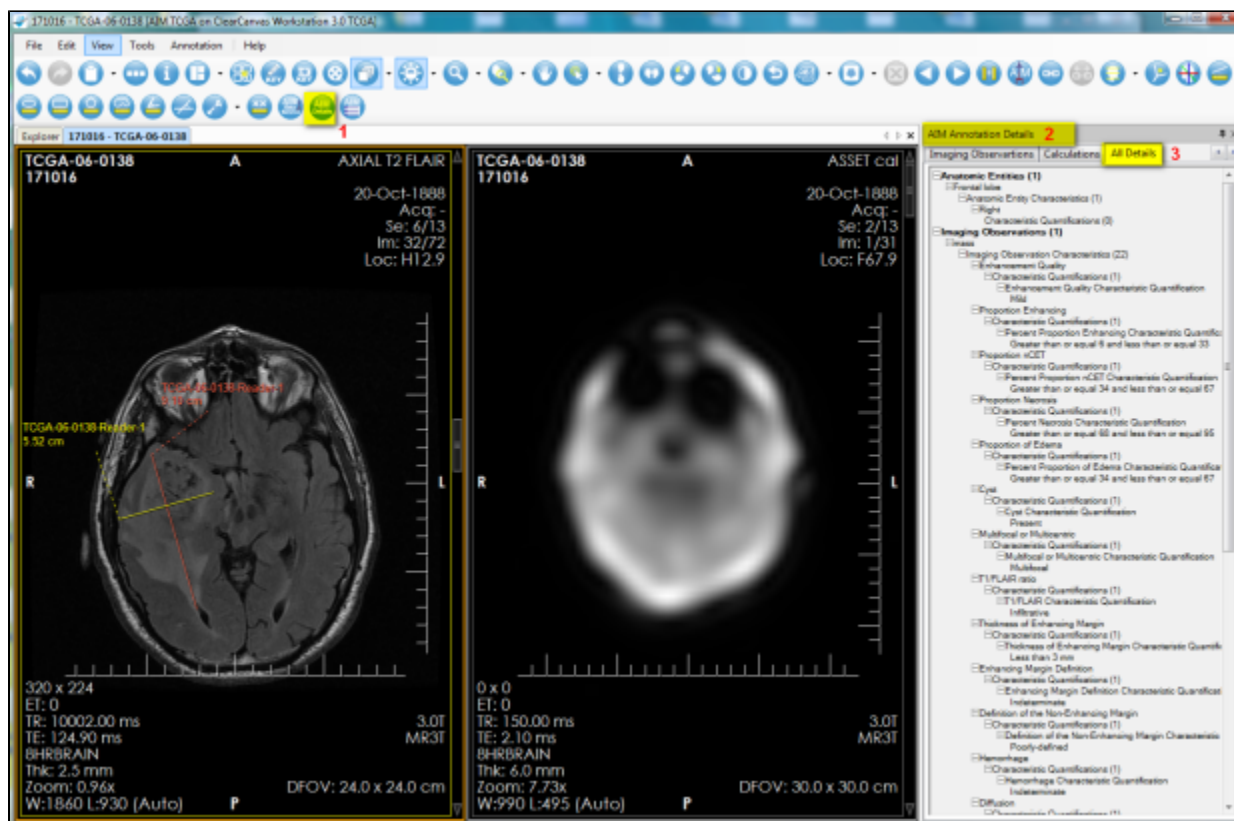
Figure 11. AIM Details

AIM Display Markups from Different Users

For a given image in an imaging study that has more than one reader interpreting and creating AIM annotations, the workstation can display every annotation while allowing you to turn off markups from a selected group of readers. Figure 12 depicts an image with three markups from three readers. The markup from reader named *qwe-3* was turned off.

A right-mouse click on the image activates a pop-up menu with a Visible AIM Users option to turn readers' markups on or off.
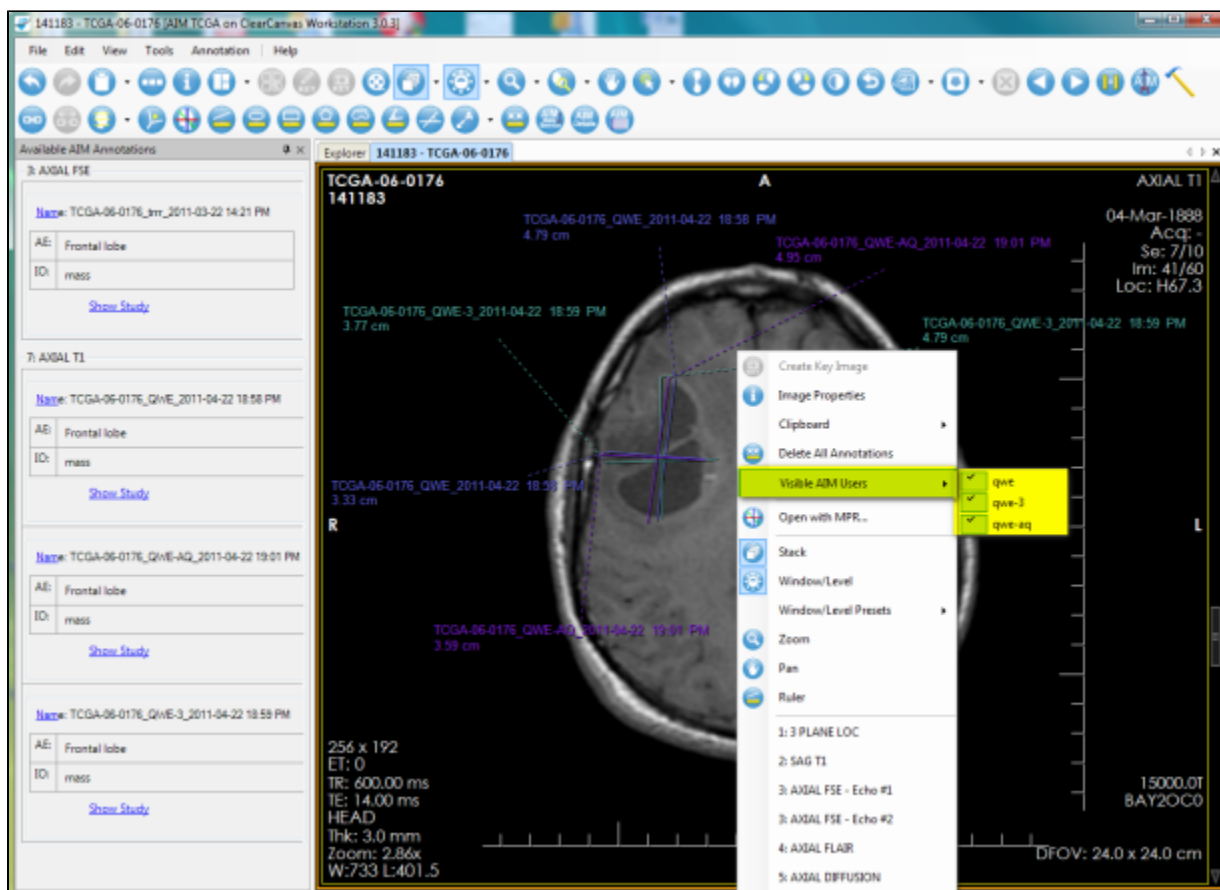
Figure 12. AIM Markup Display

By default, the workstation also displays annotations created by different users in different colors. You can change which colors are used for which user's AIM annotations Figure 12. To assign a color to a user, go to **Tools** > **Options** > **AIM** > **Markup**.

By default, the Random checkbox (#2) is selected, which assigns a random color to each user's markup drawings. By clearing the Random checkbox, a default color is used instead. Colors may be assigned to a single user's markup drawings by selecting the color next to the user's name in the list.
Click the **Add Login** button (#3) to add a new user to the list.

Selected users may be removed from the list by clicking the **Remove Selected** button (#4). Users removed from the list will have their annotations reset to the default color.
Select all users in the list by clicking the **Select All** button (#5). Click the **Reset To Default Color** button (#6) to reset the color assigned to selected users to the default color.
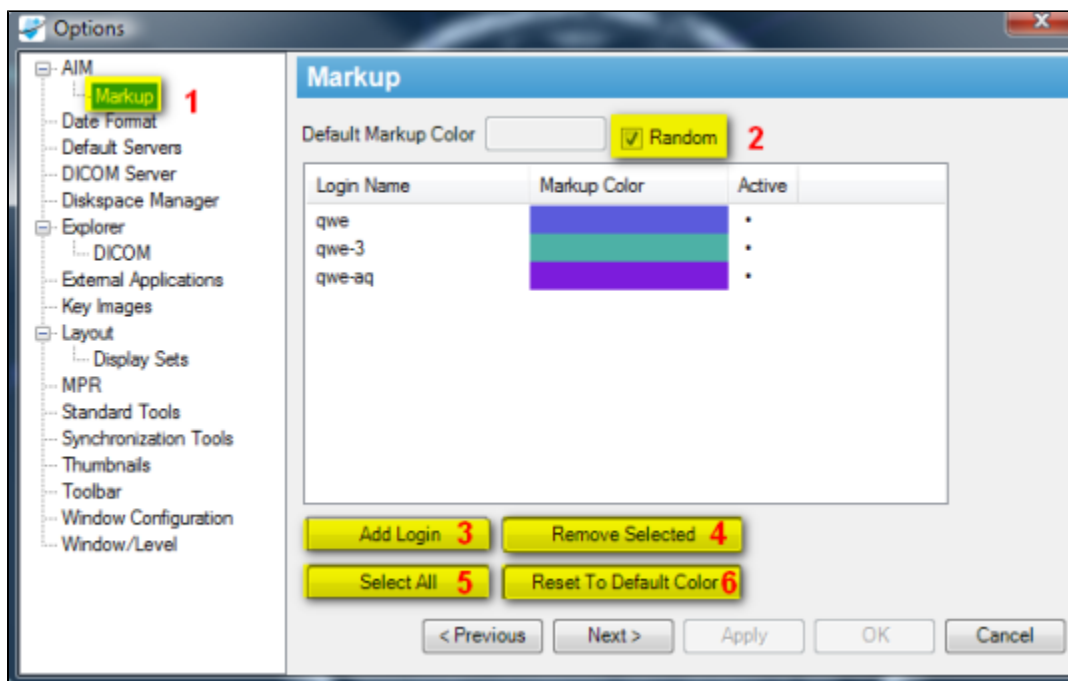
Figure 13. AIM Markup Display

Viewing AIM Data for Each Image Series

You can see AIM annotations for an imaging study grouped by image series in the Available AIM Annotations section. Figure 14 shows two different image series. The first, Axial FSE, includes one AIM instance. The second, Axial T1, includes three AIM instances.
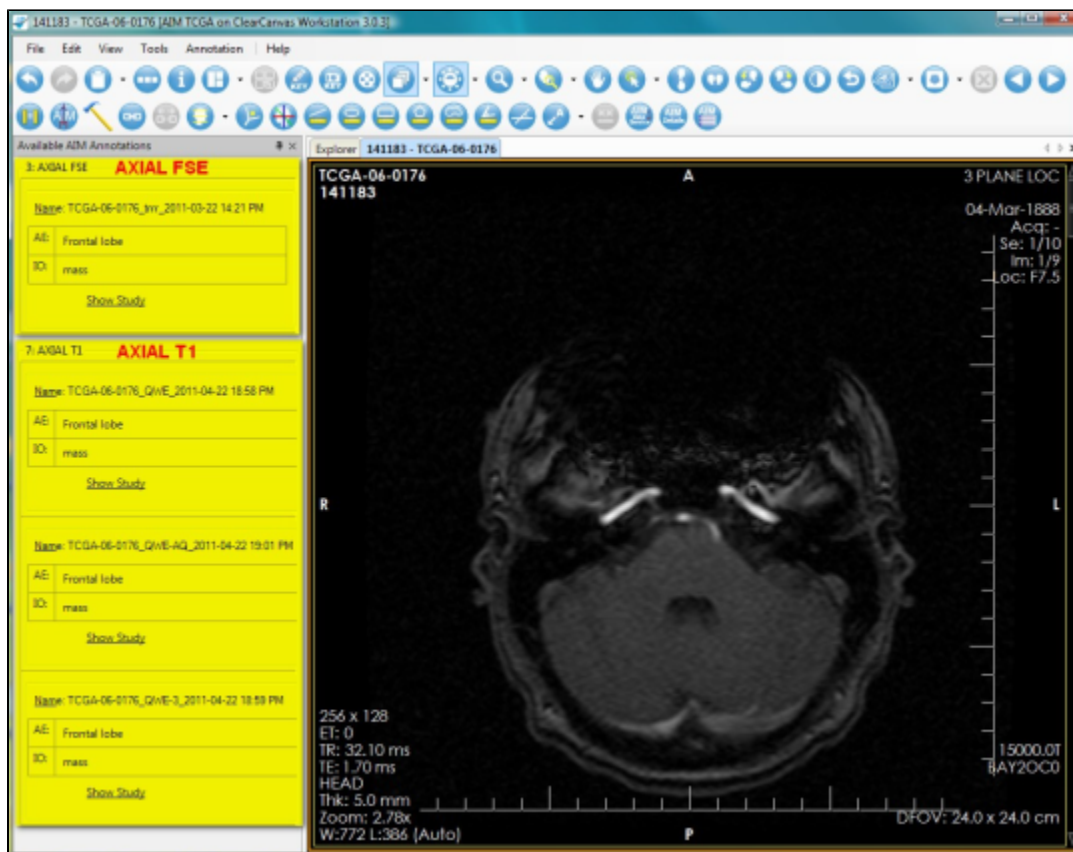
Figure 14. AIM Data in Each Image Series

Using Data Services

National Biomedical Imaging Archive (NBIA) Data Service

The NBIA Data Service (Figure 15) tab provides the ability to connect and retrieve studies from NBIA directly within the workstation. Holding the **Ctrl** key allows you to click on and select multiple studies. Right-clicking activates a feature that allows you to retrieve selected studies.
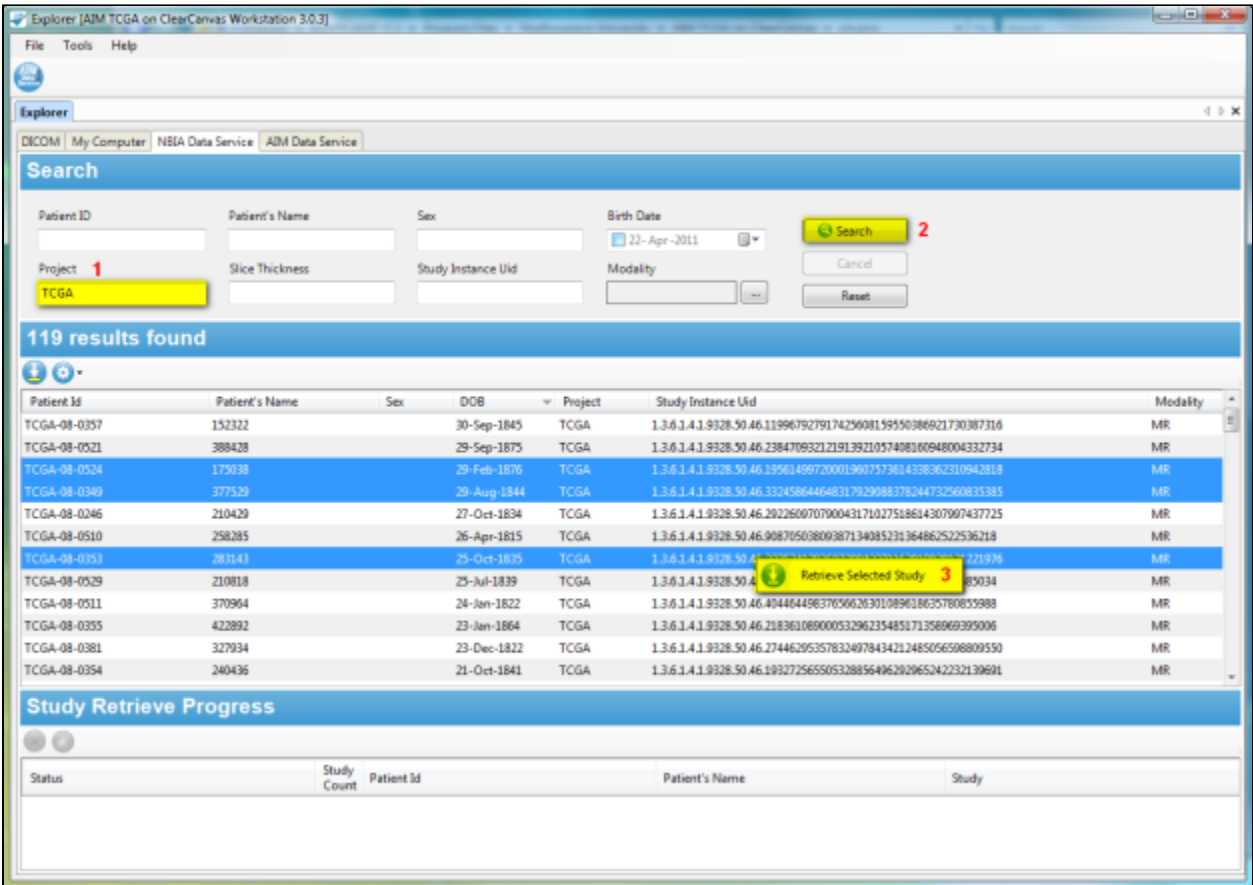
Figure 15. NBIA Data Service

Users can enter search parameters (Figure 16) based on a single value or multiple values of Patient ID, Patient's Name, Sex, Birth Date, Project name at NCI, Slice Thickness, Study Instance UID, and Modality.
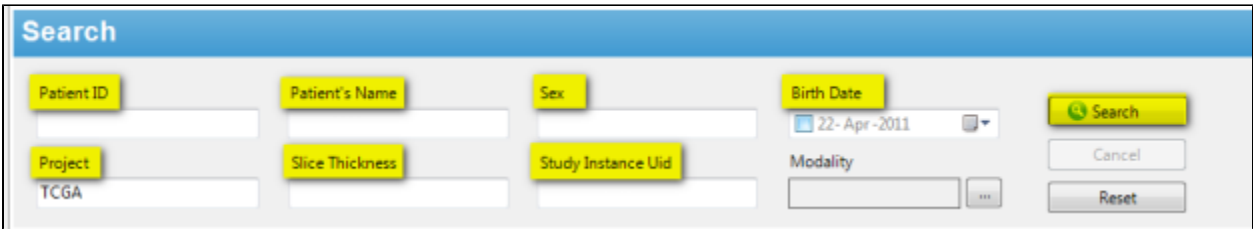
Figure 16. Search NBIA Data Service

Columns in the NBIA Data Service page can be selected or deselected to display or hide an available result. Figure 15 depicts that all available columns for the service have been selected.

Figure 17. Select NBIA Data Service Display Columns

AIM Data Service

The AIM Data Service tab (Figure 18) provides the ability to connect and retrieve AIM XML documents from an AIM 3.0 Data Service (see Setting AIM Data Service Options). It also allows a user to retrieve both AIM documents and studies from NCI's NBIA. Right-clicking activates a feature that allows you to retrieve studies.

Figure 18. AIM Data Service

You can enter search parameters (Figure 19) based on a single value or multiple values of Anatomic Entities, Anatomic Entity Characteristics, the user who created the AIM XML documents, Imaging Observation, Imaging Observation Characteristics, and Study Instance UID.

> (i) **The AIM Data Service search is case-sensitive.**

A type of AIM XML document, Imaging Annotation, or Annotation Of Annotation, must be selected. The default value is Imaging Annotation.

Figure 19. Search AIM Data Service

Columns in the AIM Data Service page can be selected or deselected to display or hide an available result. Figure 20 depicts that all available columns for the service have been selected.

Figure 20. Select AIM Data Service Display Columns

Additional Information

Follow the links below for more information on how to set up AIM, information on the AIM Template Manager, and AIM Template Manager software.

- AIM Terms and Concepts
- AIM Template Manager User's Guide
- AIM Template Software Setup manual
- AIM Template Creator Software