

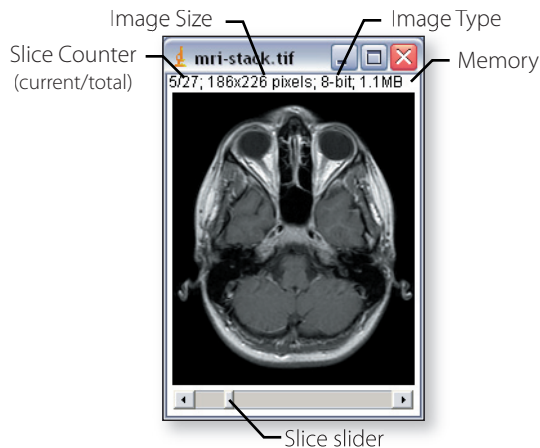
# Stacks & Animation



**ImageJ  
Skill**

## What is a stack?

A stack is a series of two or more images in a single window. These images, called *slices*, can represent motion, time, space, or wavelength. Slices can be displayed in sequence either manually or automatically, and can be used to create two- and three-dimensional views of a scene or object. The features of a stack window are shown below.



## Moving through a stack

- **Manually**—Use the > and < keys or the scroll bar (slice slider) to move forward and backward through the slices in a stack. (Hold the > and < keys down to move quickly through many slices.)
- **Animation**—Choose **Image > Stacks > Animate** or press the backslash (\) key to start and stop the animation. (You can also click on the image to stop the animation.)

## Making a stack

To make a stack, all images must be the same type and have the same dimensions (height, width, and bit depth).

**From a series of open images**—Choose **Image > Stacks > Convert Images to Stack**. The new stack window is named **Stack**. (The original image names are shown to the right of the slice counter, but are lost when you save the stack.)

**From a series of saved files**—Choose **File > Import > Image Sequence**, and specify the sequence options for the slices you want to import.

## Order of slices

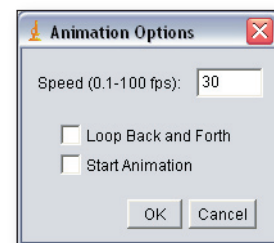
When you make a stack, the slices are arranged in the order in which they were created or opened, which is shown at the bottom of the **Windows** menu. When you *import* an image sequence, images are opened in alphanumeric order by image name.

## The slice counter

The stack window status bar shows the current slice number and the total number of slices.

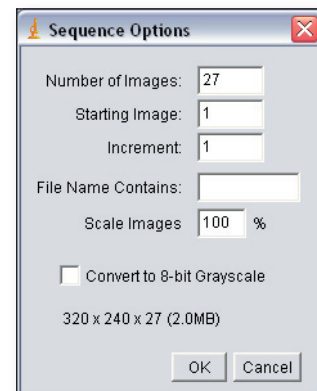
## Setting the animation speed and direction

Choose **Image > Stacks > Animation Options...**, and enter the desired speed in frames per second (0.5 = one frame every two seconds).



Normally, the animation plays in 1-2-3-1-2-3 order. By checking the **Loop Back and Forth** option, the animation will play in 1-2-3-2-1 order.

## Sequence options



## Unstacking a stack

To separate a stack into separate windows, choose **Image > Stacks > Convert Stack to Images**. The windows are numbered 001, 002, 003, etc.

## Editing a stack

To add a slice *after* the current slice—choose **Image > Stacks > Add Slice**.

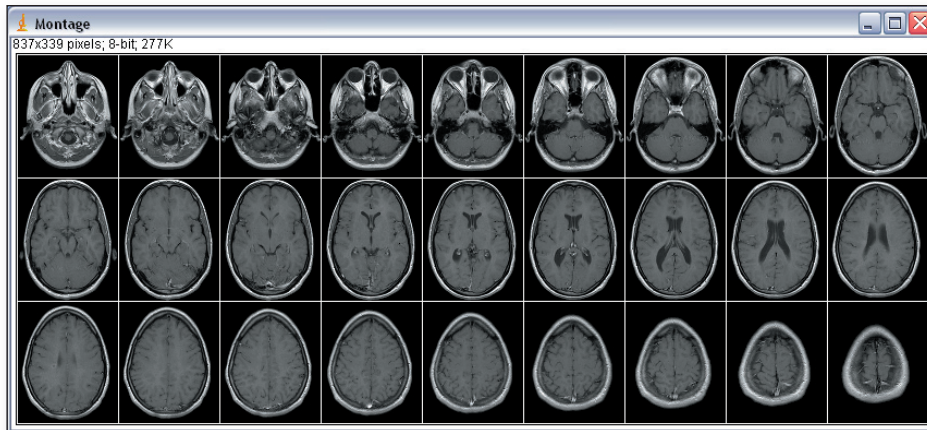
To add a slice *before* the current slice—hold down the **Alt** (Win) or **Option** (Mac) key, then choose **Image > Stacks > Add Slice**.

To delete a slice—choose **Image > Stacks > Delete Slice**.

## Creating a montage

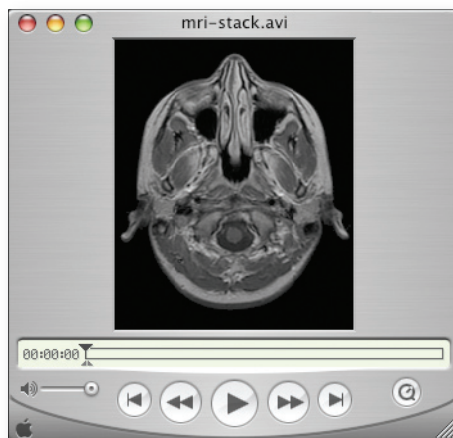
Since a stack cannot be printed for a report or poster, ImageJ provides a way to arrange the slices of a stack in rows and columns as a single image called a *montage*.

To make a montage, choose **Image > Stacks > Montage...**, specify the number of rows and columns, and click **OK**.



## Converting a stack to an .avi movie

To convert a stack into an .avi movie that can be played on many freeware movie player applications such as QuickTime Player, choose **File > Save As... > AVI...** and save the file. Optional plugins are available from the ImageJ download site that may allow users to save stacks in other movie formats.



## Processing stacks

When you conduct processing operations on a stack, you are given the option to process the current slice only (**No**), all slices (**Yes**), or cancel the process.



## Montage options

In addition to the number of rows and columns, you can resize the images, include every Nth image, and other options.

