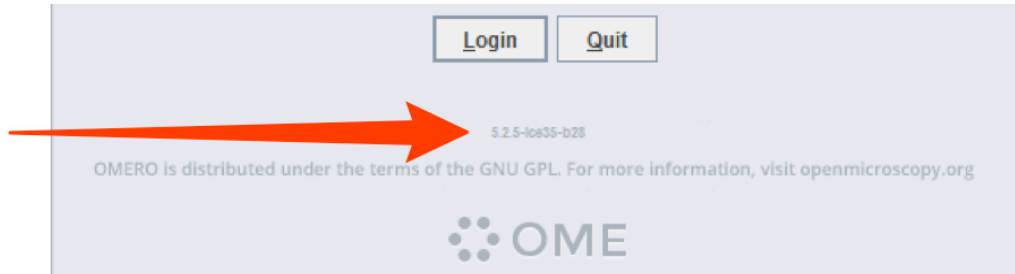# Using ImageJ with OMERO

This covers all OMERO versions from 5.1.0 and newer, and assumes you have never installed ImageJ or Fiji before.

You can tell what version your OMERO is from the fine print at the bottom of the login screen.

In order to connect to an OMERO server and use the data stored there directly in ImageJ and Fiji, plugins have to be installed. The following instructions guide you through the download and installation and use of ImageJ, Fiji and the plugins.

Note: The OMERO.insight-ij plugin requires Java 1.7 or later to function.

Downloading and installing ImageJ

1   Download the latest version of ImageJ for your platform from the website:

        http://rsbweb.nih.gov/ij/download.html

2   On Windows, run the set-up programme (either from the Downloads folder or when prompted by the download Wizard) and follow instructions, and security prompts as appropriate, to install ImageJ.
On Mac OS X, extract the .zip archive and drag the ImageJ folder to your applications folder.
On Linux, extract the .gz archive and double click the "run" script.
Further installation instructions can be found on the ImageJ web site (URL above).

Downloading and Installing Fiji

Fiji (Fiji is Just ImageJ) is a distribution of ImageJ together with Java, Java3D and a lot of plugins organized into a coherent menu structure.

1   Download the latest version of Fiji for your platform from the website:

http://imagej.net/Fiji/Downloads
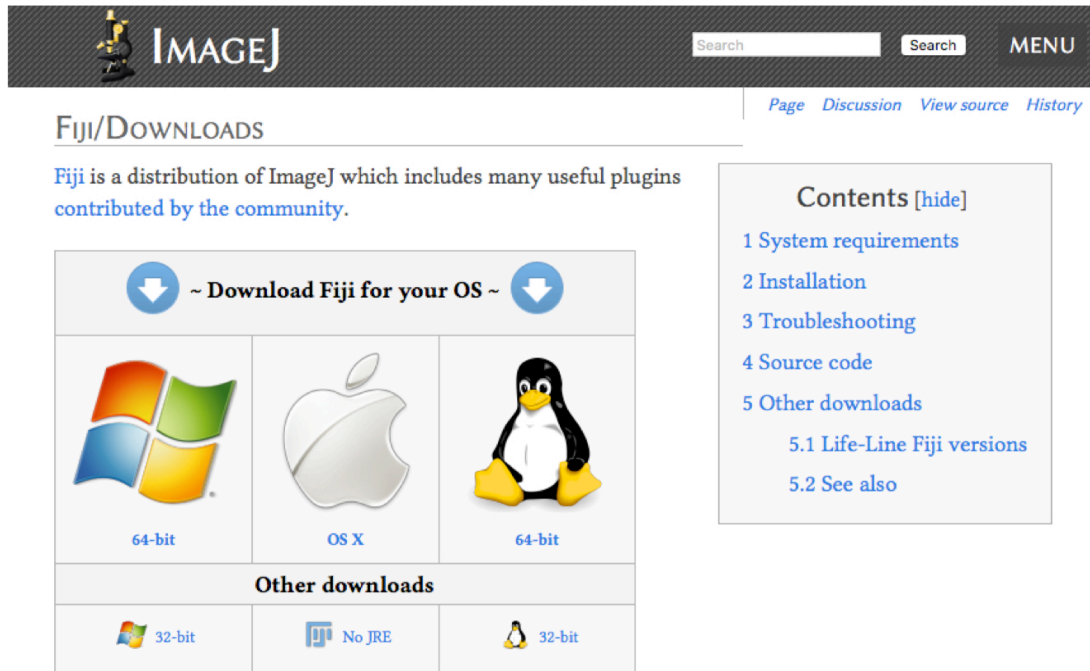
2   The Fiji downloads page includes installation instructions.
On Windows it is recommended you install the Fiji executable within your user space cyfor example: `C:\Users\[your name]\Fiji.app`, not in the normal `C:\Programs` directory, otherwise future updating may fail.
On Mac OS X, mount the .dmg and drag the Fiji folder to your applications folder.
On Linux extract the .gz archive and double click the "run" script.

3   On Windows, depending on how the downloaded archive was expanded, the ImageJ executable can appear one level deeper in the Fiji.app folder than in ImageJ.
On Mac OS X, Fiji.app appears as a single .app.
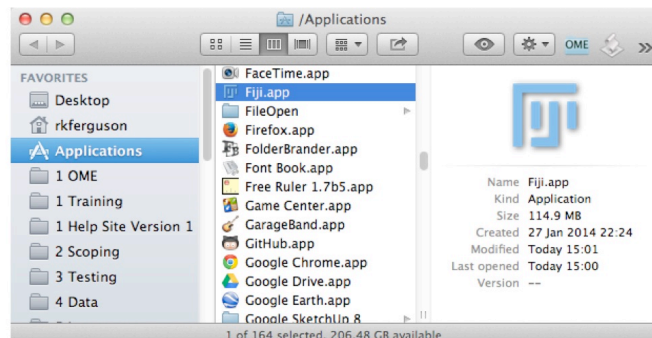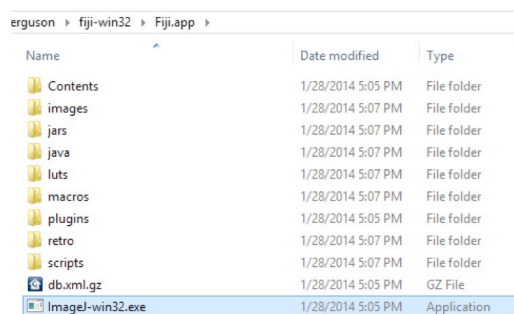
Installing Plugins for ImageJ and Fiji

The location for the plugins in ImageJ and Fiji are essentially the same, with the following differences in gaining access to them:
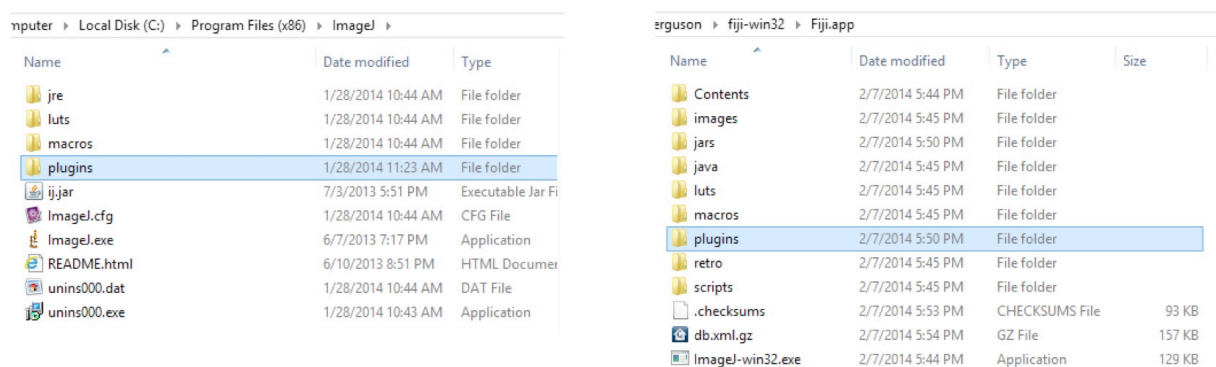
- on Windows, Fiji sometimes has an additional level of hierarchy, depending on how the downloaded archive was expanded, for example:
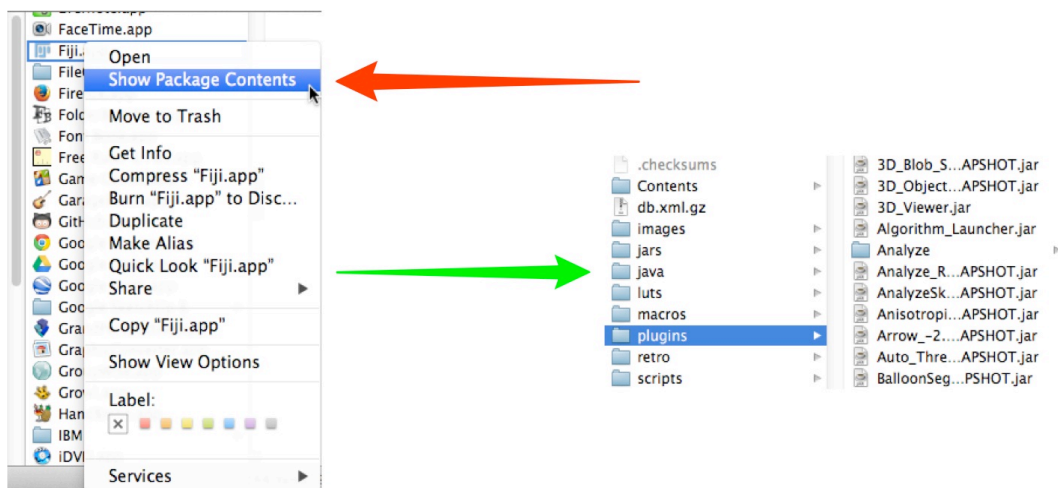
  ImageJ - Windows (32 bit):
  ```
  Local Disk (C:) > Program Files (x86) > ImageJ > plugins
  ```

  Fiji - Windows (32 bit):
  ```
  Local Disk (C:) > username > Fiji-win32  > Fiji.app > plugins
  ```


- on Mac OS X, Fiji is an .app package, so to see the plugins folder you must right-click the Fiji.app and select **Show Package Contents**:

Note: After installing or upgrading plugins, you need to restart ImageJ or Fiji to be able to use the plugins.

Using ImageJ with OMERO

Two plugins are required:

- `bioformats_package.jar`
- `OMERO.insight-ij`

1   Download the latest 5.1.x version of the **Bioformats Package** plugin from:

http://downloads.openmicroscopy.org/latest/bio-formats5

Check there is a "Bio-Formats 5.1.x Downloads" heading on the page.

2   Save or move the downloaded file into the `ImageJ > plugins` folder.

OMERO

3   Download the latest 5.x.x version of the `OMERO.insight-ij` plugin from:

http://downloads.openmicroscopy.org/latest/omero5

Check there is a "OMERO 5.x.x Downloads" heading on the page.

4   Save or move the .zip archive to the `ImageJ > plugins` folder.
Extract the archive into the plugins folder to give a folder named "`OMERO.insight-ij-x`" where x is the version number.
Leave the complete `OMERO.insight-ij plugin` folder with its components in the `ImageJ > plugins` folder.

Note: Some Windows unzip apps create a double folder enclosing the plugin. Check, and if this has happened, copy the inner `OMERO.insight-ij-5.x.x` folder into the `ImageJ > plugins` folder.

The `OMERO.insight-ij-5.x.x.zip` archive can be left in the plugins folder or deleted.

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Using Fiji with OMERO

As Fiji comes bundled with the components of Bioformats Package, there is no need to download and install this plugin.

Two actions are required for an installation:

- select the Bio-Formats jars using the update menu
- add the `OMERO.insight-ij` plugin

1   Select **Help > Update Fiji**.
Fiji will check for updates and after following prompts you will end up at the ImageJ Updater Window.
Click on **Manage update sites**.

2   In the Manage update site window, select **Bio-Formats 5**.
Click **Close**.
Click **Apply Changes**.
Fiji will fetch and install the updates.

OMERO

3 Download the latest 5.x.x version of the `OMERO.insight-ij` plugin from:

http://downloads.openmicroscopy.org/latest/bio-formats5

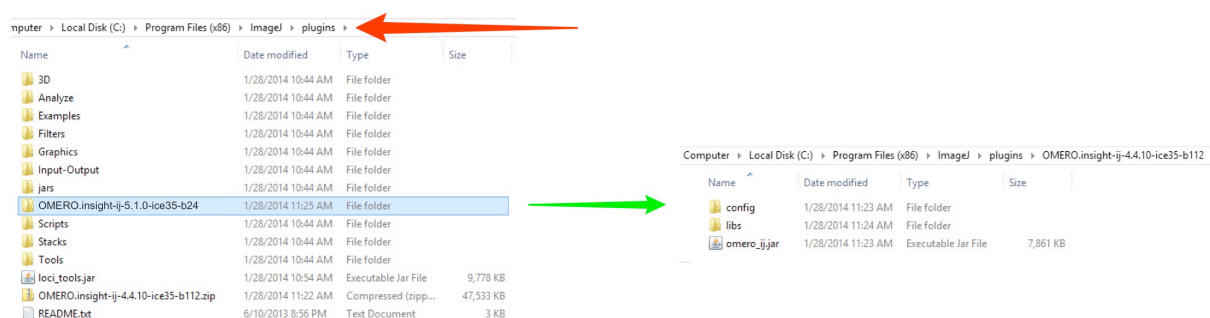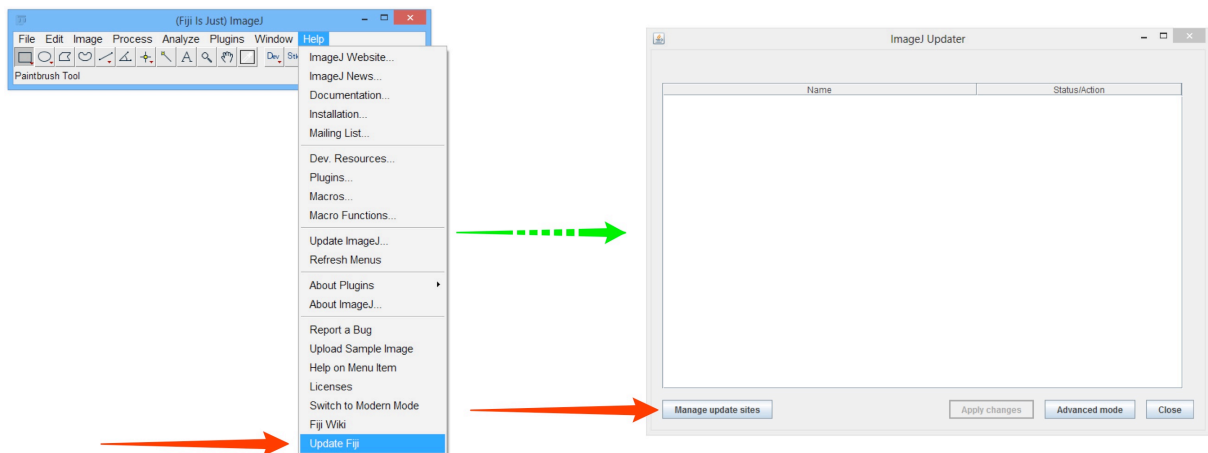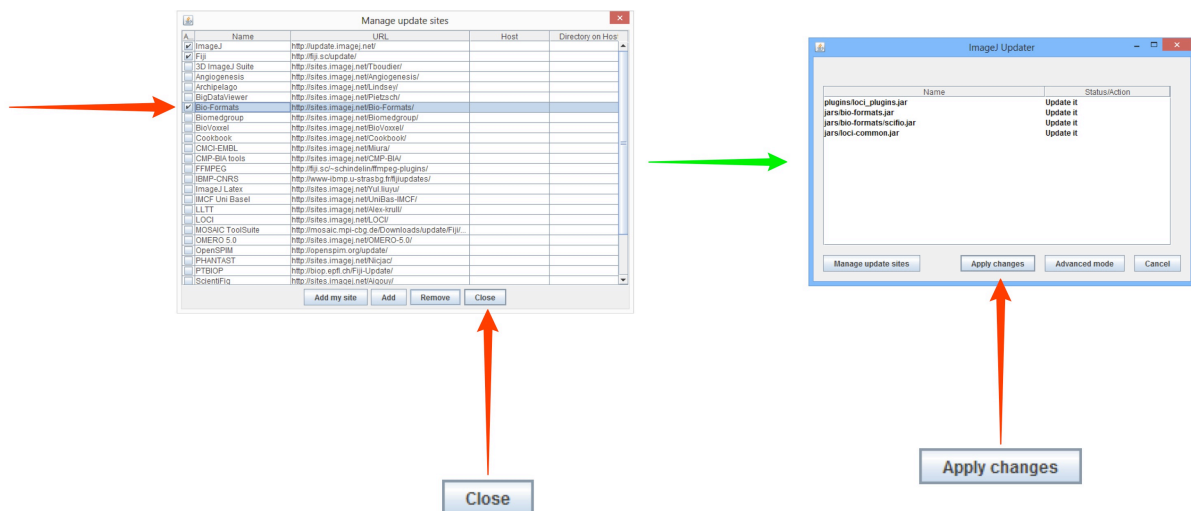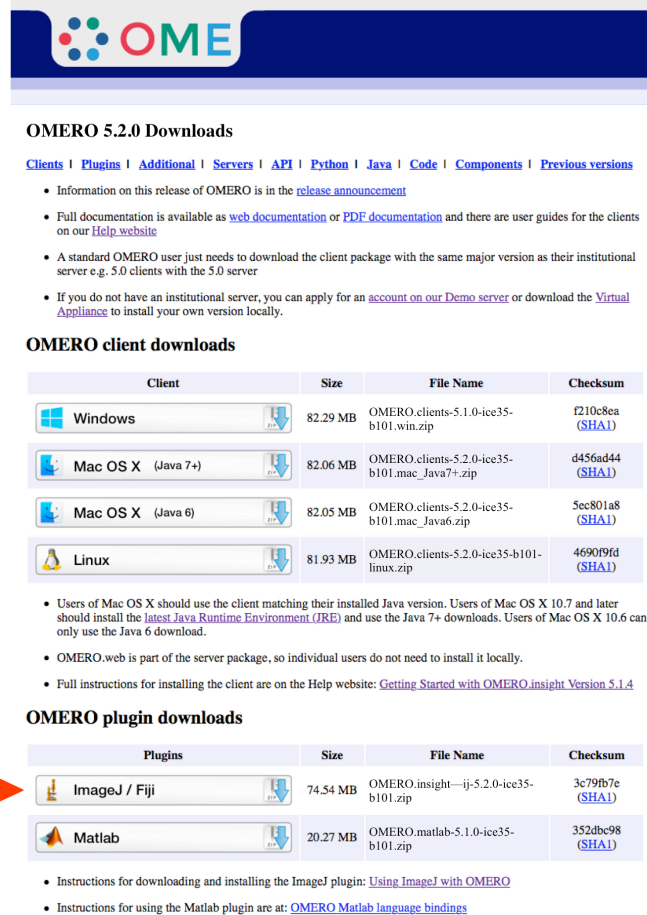Check there is a "OMERO 5.x.x Downloads" heading on the page.

4 Save or move the .zip archive to the `Fiji.app > plugins` folder.
Extract the archive into the plugins folder to give a folder named "`OMERO.insight-ij-x`" where x is the version number.
Leave the complete `OMERO.insight-ij` plugin folder with its components in the `Fiji.app > plugins` folder.

Note: Some Windows unzip apps create a double folder enclosing the plugin. Check, and if this has happened, copy the inner `OMERO.insight-ij-5.x.x` folder into the `Fiji.app > plugins` folder.

Delete the `OMERO.insight-ij-5.x.x.zip` archive from the plugins folder.

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Accessing OMERO using ImageJ and Fiji

1   Launch the ImageJ or Fiji application and click on the **Plugins** menu.
        Select **OMERO > Connect to OMERO**.
        A version of OMERO.insight will open and can be used as normal.
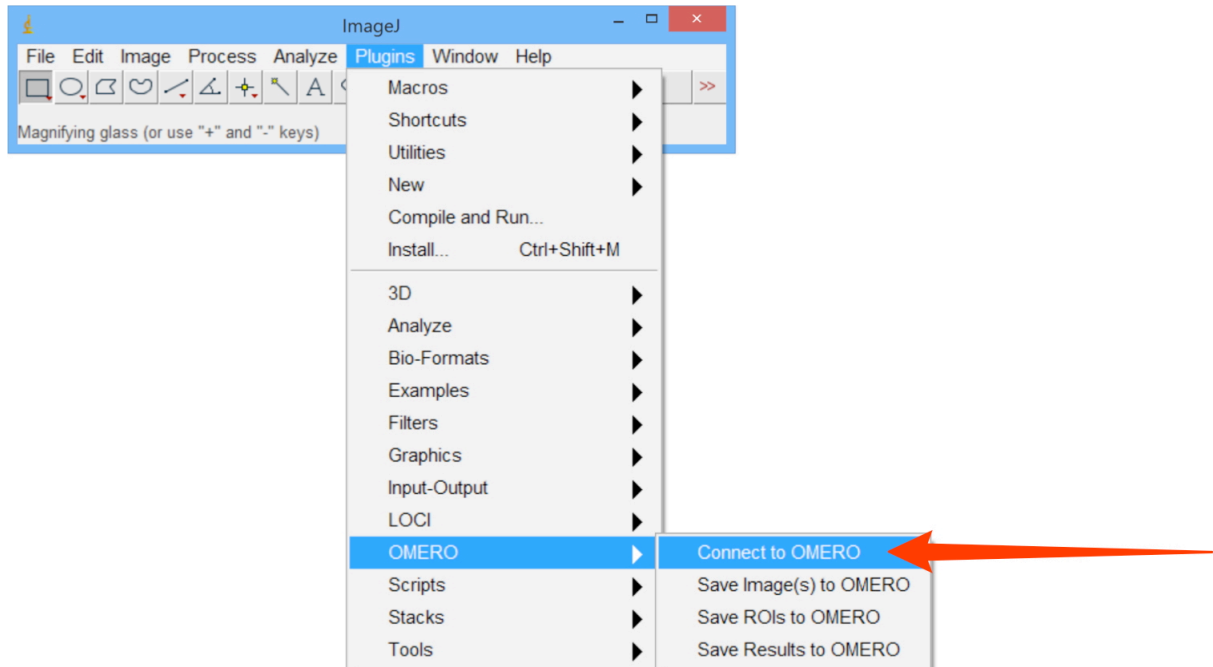
2   As ImageJ needs to load the plugin software, it can take a minute or two for the
        OMERO login screen to appear, and then another minute for the progress bar to start
        moving and complete.
        Enter your OMERO server address, if needed, and **Username** and **Password**.
        Click **Login**.
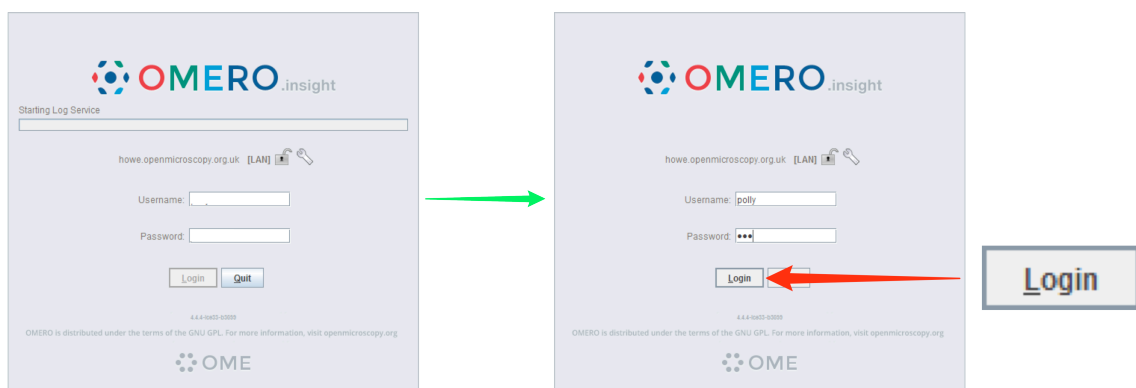
You will then be taken to the OMERO.insight Data Manager screen.

Note: If you quit OMERO.insight and then connect again during the same ImageJ session,
          logging in and launching the OMERO plugin will be much quicker. So if you intend
          using the OMERO plugin through ImageJ again soon, it may be worth leaving your
          ImageJ application running.

OME

If you receive the following error message in a dialogue box, this indicates there is a different Java version being used by Fiji from the version required by the OMERO plugin.

> (Fiji Is Just) ImageJ 2.0.0-rc-38/1.50b; Java 1.6.0_65 [64-bit]; Mac OS X 10.8.5; 33MB of 1171MB (2%)
>
> java.lang.UnsupportedClassVersionError: org/openmicroscopy/shoola/MainIJPlugin : Unsupported major.minor version 51.0
>
> This plugin requires Java 1.7 or later.

Update your operating system to the latest version of the Java Development Kit (JDK) using the Java Control Panel (Windows) or the Java System Preference Pane (Mac).

If the message persists after you have updated your operating system's JDK, download the latest version of Fiji from the website, which is bundled with Java 8, and this should work with the latest OMERO.insight plugin.

http://downloads.imagej.net/fiji/latest/

3   Double click on the image in the data tree or select the image and **View > View in ImageJ** in the contextual menu.

Select the check box to set Bio-Formats to automatically check for updates.
Click **OK** and the Bio-Formats Import Options window opens.
Set parameters and click **OK**.
Your image will open in the ImageJ viewer.
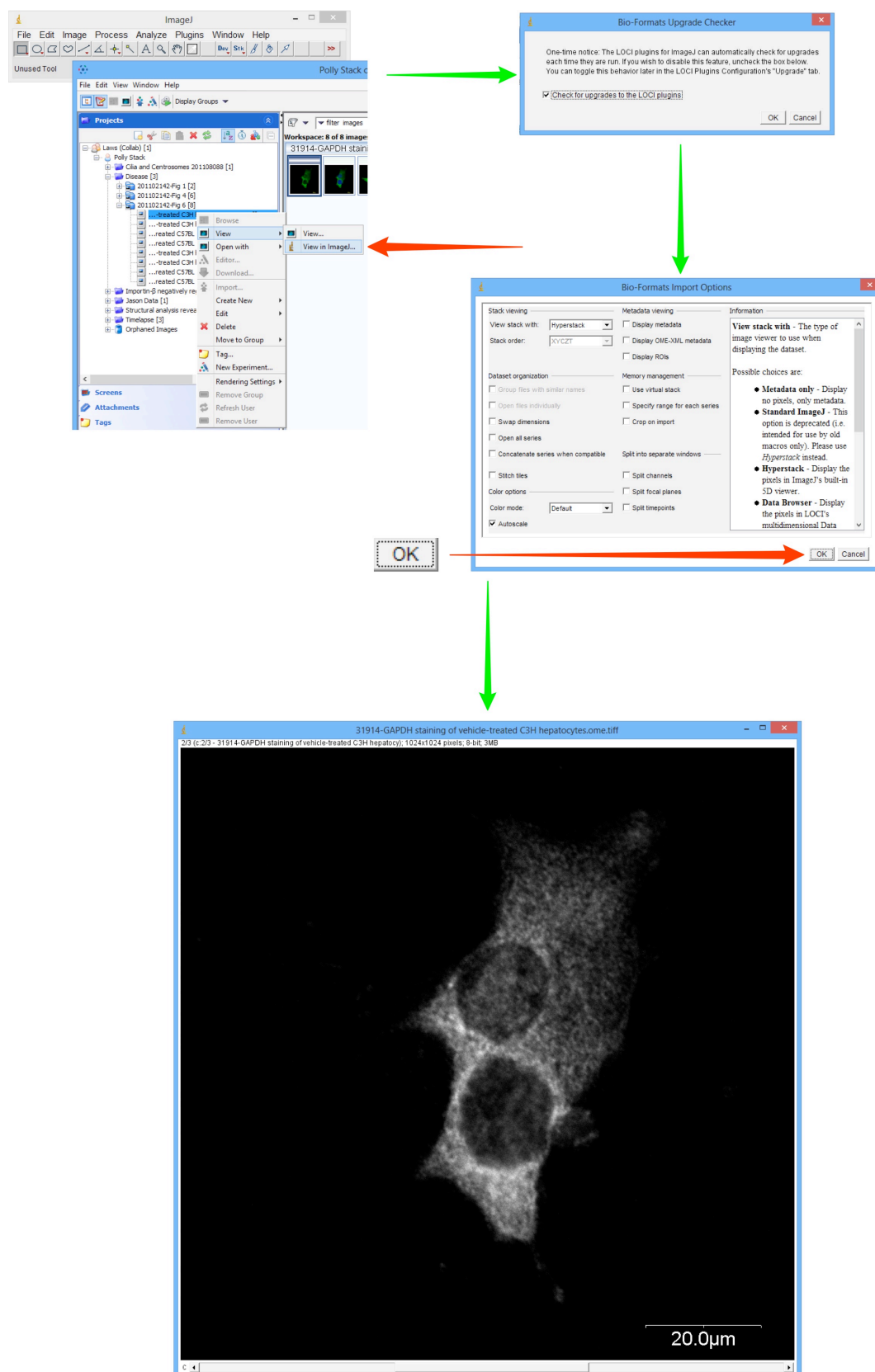
Saving images from ImageJ to OMERO

With OMERO version 5.1.0 and newer, it is possible to save images directly from ImageJ or Fiji to your OMERO server.

Use ImageJ or Fiji to open an image from a local disk.

Select

Plugins > OMERO > Save Image(s) to OMERO

A version of OMERO.insight will open automatically.

The image will be imported into OMERO in its original format.

If the image has been modified, e.g. a cropped image, it will be imported as an OME-TIFF.

Note: Normal ImageJ conventions with respect to overlays and ROIs are respected when saving to the OMERO server.

Saving ROIs drawn in ImageJ to OMERO

Use ImageJ or Fiji to open an image from a local disk or from the OMERO server as described above.
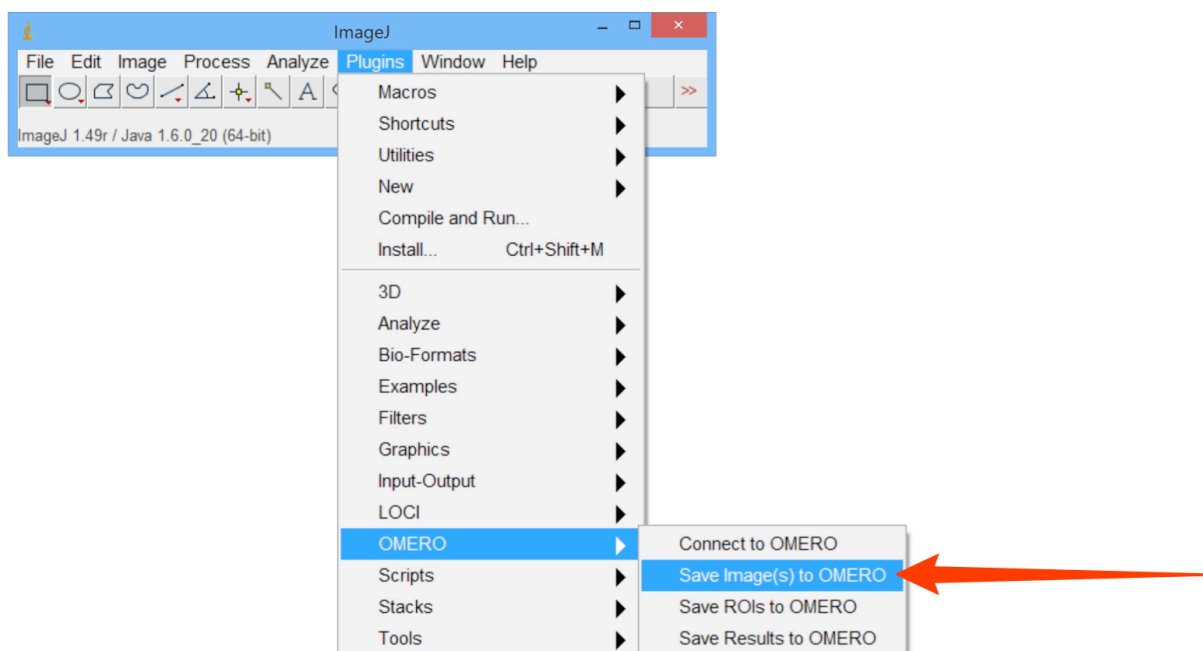
Draw ROIs in ImageJ or Fiji as normal.

If the image is from a local disk select

Plugins > OMERO > Save Image(s) to OMERO

A version of OMERO.insight will open automatically and the image, including the ROIs, will be imported.

If the image is from the OMERO.server select

Plugins > OMERO > Save ROIs to OMERO

Once saved to the OMERO server the ROIs become standard OMERO ROIs and can be used as normal.

Any existing ROIs on an image in the OMERO server will be displayed and can be manipulated as normal in ImageJ.

Note: There is no duplication of data, new or existing ROIs are saved back to the original image on the OMERO server.

To save analysis results back to OMERO select

Plugins > OMERO > Save Results to OMERO

The results will be uploaded and attached to the image in OMERO as a CVS file.
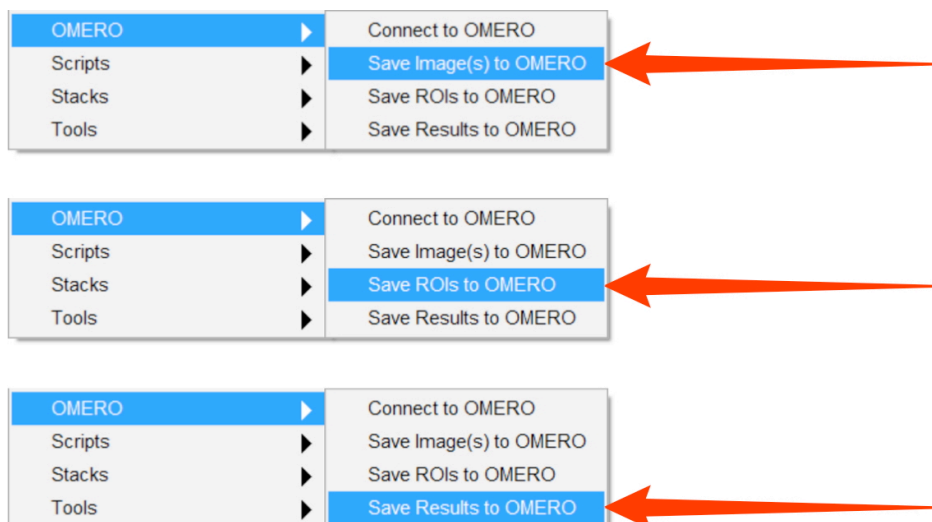
Videos are available demonstrating the Fiji-OMERO workflows:

Fiji-OMERO workflow

(http://downloads.openmicroscopy.org/movies/omero-5-2/mov/fiji_omero_manual_workflow.mov)

Scripting with Fiji and OMERO

(http://downloads.openmicroscopy.org/movies/omero-5-2/mov/fiji_scripting_demo.mov)