

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

home | news | docs | download | plugins | resources | list | links

Download

Platform Independent

To install ImageJ 1.49 on a computer with Java pre-installed, or to upgrade to the latest full distribution (including macros, plugins and LUTs), download ij149.zip (4MB) and extract the ImageJ directory. Use the *Help>Update ImageJ* command to upgrade to newer versions.

Mac OS X

Download ImageJ 1.49 (6MB) as a double-clickable Mac OS X application. Also available bundled with Java 1.8.0_60 (requires OS X 10.8 or later). Instructions.

Linux

Download ImageJ 1.49 bundled with Java 1.6.0_24 (40MB) or bundled with Java 1.8.0_45 (62MB) Instructions.

Windows

Download ImageJ 1.49 bundled with Java 1.6.0_24 (37MB), bundled with 32-bit Java 1.6.0_24 (44MB), bundled with Java 1.8.0_60 (70MB) or without Java (4MB). Instructions.

Documentation

Tiago Ferreira's comprehensive ImageJ User Guide is available as an 8MB PDF document and as a ZIP archive. The online JavaDoc API documentation is also available as a ZIP archive.

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



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.

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lame Contents images jars java	Date modified 1/28/2014 5:05 PM 1/28/2014 5:07 PM 1/28/2014 5:07 PM 1/28/2014 5:07 PM	Type File folder File folder File folder File folder	FAVORITES Desktop rkferguson Applications	Image: Second secon	p
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ImageJ-win32.exe	1/28/2014 5:05 PM	Application	d Data	Google Earth.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
```

lame	Date modified	Туре	Name	Date modified	Туре	Size
jre	1/28/2014 10:44 AM	File folder) Contents	2/7/2014 5:44 PM	File folder	
luts	1/28/2014 10:44 AM	File folder	🐌 images	2/7/2014 5:45 PM	File folder	
macros	1/28/2014 10:44 AM	File folder	鷆 jars	2/7/2014 5:50 PM	File folder	
plugins	1/28/2014 11:23 AM	File folder	鷆 java	2/7/2014 5:45 PM	File folder	
ij.jar	7/3/2013 5:51 PM	Executable Jar Fi	iuts 🔒	2/7/2014 5:45 PM	File folder	
ImageJ.cfg	1/28/2014 10:44 AM	CFG File	macros	2/7/2014 5:45 PM	File folder	
ImageJ.exe	6/7/2013 7:17 PM	Application	퉬 plugins	2/7/2014 5:50 PM	File folder	
README.html	6/10/2013 8:51 PM	HTML Documer	🍌 retro	2/7/2014 5:45 PM	File folder	
unins000.dat	1/28/2014 10:44 AM	DAT File	퉬 scripts	2/7/2014 5:45 PM	File folder	
unins000.exe	1/28/2014 10:43 AM	Application	.checksums	2/7/2014 5:53 PM	CHECKSUMS File	93 K
			🙆 db.xml.gz	2/7/2014 5:54 PM	GZ File	157 K
			ImageJ-win32.exe	2/7/2014 5:44 PM	Application	129 K

• 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**:

Fiji.	Open Show Package Contents				
Fire Folc Fon	Move to Trash	R.			
Free Sari Gari Gari GitH Goc Goc Goc Goc Goc Goc	Get Info Compress "Fiji.app" Burn "Fiji.app" to Disc Duplicate Make Alias Quick Look "Fiji.app" Share	•	 .checksum: Contents db.xml.gz images jars java luts 	4	3D_Blob_SAPSHOT.jar 3D_ObjectAPSHOT.jar 3D_Viewer.jar Algorithm_Launcher.jar Analyze Analyze Ana
😽 Grai	Copy "Fiji.app"		macros plugins		AnisotropiAPSHOT.jar
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. 104	Services	•			

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:

1

- bioformats_package.jar
- OMERO.insight-ij

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.

Bio-Formats 5.1.5 Downloads	
Tools API Components Code Previous versions	
• Full documentation is available as web documentation or PDF documentation.	

- Internet Explorer sometimes renames JAR files to ZIP (e.g., bioformats_package.jar becomes bioformats_package.zip); if this happens to you, simply rename the file back to its original name after the download is complete.
- For some browsers, you may need to right-click or control-click the link and choose "Save link as..." or a similar
 option to download the file.

Bio-Formats tools downloads

Clients	Size	File Name	Checksum
 📚 Bio-Formats Package	29.48 MB	bioformats_package.jar	9dc74091 (SHA1)
Command Line Tools	27.98 MB	bftools.zip	3d8fb109 (<u>SHA1</u>)
See MATLAB Toolbox	27.99 MB	bfmatlab.zip	e31cc8b1 (<u>SHA1</u>)

bioformats_package.jar is the complete bundle (for end users) containing everything needed to read images into
ImageJ using Bio-Formats. Instructions for installing Bio-Formats in ImageJ are available in the <u>user guide</u>.

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

lame	Date modified	Туре	Size	
3D	1/28/2014 10:44 AM	File folder		
📙 Analyze	1/28/2014 10:44 AM	File folder		
Examples	1/28/2014 10:44 AM	File folder		
Filters	1/28/2014 10:44 AM	File folder		
Graphics	1/28/2014 10:44 AM	File folder		
📔 Input-Output	1/28/2014 10:44 AM	File folder		
📙 jars	1/28/2014 10:44 AM	File folder		
Scripts	1/28/2014 10:44 AM	File folder		
Stacks	1/28/2014 10:44 AM	File folder		
📙 Tools	1/28/2014 10:44 AM	File folder		
🖆 bioformats_package.jar	2/6/2014 12:34 PM	Executable Jar File	15,297 КВ	
README.txt	6/10/2013 8:56 PM	Text Document	3 KB	





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

5

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

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

OME							
OMERO 5.2.0 Downloads							
Clients Plugins Additional Servers API	Python I	Java Code Components F	Previous versions				
• Information on this release of OMERO is in the n	elease annou	incement					
 Full documentation is available as <u>web document</u> on our <u>Help website</u> 	ation or PDI	⁷ documentation and there are user gu	uides for the client				
A standard OMERO user just needs to download server e.g. 5.0 clients with the 5.0 server	the client pa	ckage with the same major version as	s their institutional				
• If you do not have an institutional server, you can <u>Appliance</u> to install your own version locally.	apply for ar	a account on our Demo server or dow	nload the Virtual				
OMERO client downloads							
Client	Size	File Name	Checksum				
Windows	83.02 MB	OMERO.clients-5.1.0-ice35- b101.win.zip	5712f4bc (<u>SHA1</u>)				
Mac OS X	82.8 MB	OMERO.clients-5.2.0-ice35- b101.mac_Java7+.zip	8dae773c (<u>SHA1</u>)				
👌 Linux 🔛	82.67 MB	OMERO.clients-5.2.0-ice35- b101.mac_Java6.zip	5c05fd76 (<u>SHA1</u>)				
 OMERO.web is part of the server package, so individual users do not need to install it locally. Full instructions for installing the client are on the Help website: <u>Getting Started with OMERO insight Version 5.2.0</u> OMERO plugin downloads							
Plugins	Size	File Name	Checksum				
🖠 ImageJ / Fiji	75.28 MB	OMERO.insight—ij-5.2.0-ice35- b101.zip	4ae3f188 (SHA1)				

Instructions for downloading and installing the ImageJ plugin: Using ImageJ with OMERO

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.insightij-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.

ie 🔨	Date modified	Туре	Size				
	1/28/2014 10:44 AM	File folder					
ze	1/28/2014 10:44 AM	File folder					
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ers	1/28/2014 10:44 AM	File folder					
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	1/28/2014 10:44 AM	File folder		Name	Date modified	Туре	Size
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ots	1/28/2014 10:44 AM	File folder		🐌 libs	1/28/2014 11:24 AM	File folder	
ks	1/28/2014 10:44 AM	File folder		🄬 omero_ij.jar	1/28/2014 11:23 AM	Executable Jar File	7,861 K
ls	1/28/2014 10:44 AM	File folder					
_tools.jar	1/28/2014 10:54 AM	Executable Jar File	9,778 KB				
MERO.insight-ij-4.4.10-ice35-b112.zip	1/28/2014 11:22 AM	Compressed (zipp	47,533 KB				

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



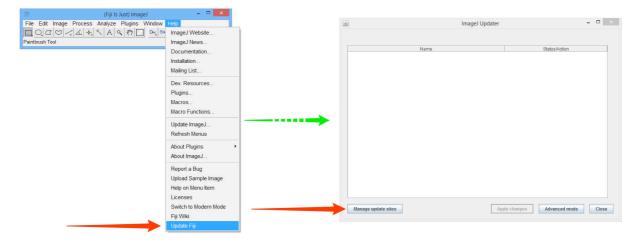
Using Fiji with OMERO

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

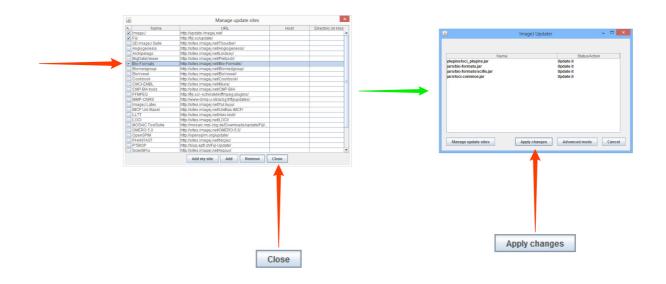
1 Select Help > Update Fiji. Fiji will check for updates and after following prompts you will end up at the ImageJ Updater Window. Click on Manage update sites.



2 In the Manage update site window, select Bio-Formats 5. Click Close.

Click Apply Changes.

Fiji will fetch and install the updates.





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.

OMERO 5.2.0 Downloads			
Clients Plugins Additional Servers AP	Python	Java Code Components Pi	evious version
Information on this release of OMERO is in the	release annoi	ancement	
 Full documentation is available as <u>web docume</u> on our <u>Help website</u> 	ntation or PD	F documentation and there are user gui	des for the clier
 A standard OMERO user just needs to downloa server e.g. 5.0 clients with the 5.0 server 	d the client pa	ckage with the same major version as	their institution
 If you do not have an institutional server, you c <u>Appliance</u> to install your own version locally. 	an apply for a	n account on our Demo server or down	load the Virtual
OMERO client downloads			
Client	Size	File Name	Checksum
H Windows	82.29 MB	OMERO.clients-5.1.0-ice35- b101.win.zip	f210c8ea (<u>SHA1</u>)
Mac OS X (Java 7+)	82.06 MB	OMERO.clients-5.2.0-ice35- b101.mac_Java7+.zip	d456ad44 (SHA1)
Mac OS X (Java 6)	82.05 MB	OMERO.clients-5.2.0-ice35- b101.mac_Java6.zip	5ec801a8 (<u>SHA1</u>)
👌 Linux	81.93 MB	OMERO.clients-5.2.0-ice35-b101- linux.zip	4690f9fd (<u>SHA1</u>)
 Users of Mac OS X should use the client match should install the latest Java Runtime Environn only use the Java 6 download. 	tent (JRE) and	l use the Java 7+ downloads. Users of l	
 OMERO.web is part of the server package, so it 			
 Full instructions for installing the client are on 	ne Help webs	ite: Getting Started with OMERO.insig	ght Version 5.1.4
OMERO plugin downloads			
Plugins	Size	File Name	Checksum
🛓 ImageJ / Fiji	74.54 MB	OMERO.insight-ij-5.2.0-ice35- b101.zip	3c79fb7e (<u>SHA1</u>)

- 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.insightij-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.

son → fiji-win32 → Fiji.app → plugins →			-				
ie 🔺	Date modified	Туре	Size				
lyze	2/7/2014 5:44 PM	File folder					
xamples	2/7/2014 5:44 PM	File folder		Computer > Local Di	isk (C:) → Program Files	(v86) > Imagel > n	luging > OME
uby	2/7/2014 5:44 PM	File folder		computer y Ebear Di	sk (c.) 7 Programmes	(xoo) / image / p	ingins r omer
acros	2/7/2014 5:44 PM	File folder		Name	Date modified	Туре	Size
MERO.insight-ij-5.1.0-ice35-b24	2/7/2014 5:50 PM	File folder		Config	1/28/2014 11:23 AM	File folder	
	2/7/2014 5:44 PM	File folder		libs	1/28/2014 11:24 AM	File folder	
cripts	E) 17 E014 3144 1 141						
Scripts Utilities	2/7/2014 5:44 PM	File folder		🤹 omero ii.iar	1/28/2014 11:23 AM	Executable lar File	7 861 KB
	2/7/2014 5:44 PM	File folder Executable Jar File	10 KB	🍰 omero_ij.jar	1/28/2014 11:23 AM	Executable Jar File	7,861 KB

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





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.

	ImageJ		×	
File Edit Image Process Analyze	Plugins Window Help))))	× >>	
	LOCI		Con	nect to OMERO
	Scripts	•		e Image(s) to OM
	Stacks		Save	e ROIs to OMERO
	Tools	•	Save	e Results to OMERC

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**.

Starting Log Service		
howe.openmicroscopy.org.uk [LAN] 🖬 🔨	howe openmicroscopy, org. uk. [LAN] 📓 🚫	
Usemame:	Username: polly	
Password:	Password: •••	
Login Quit	Login	— <u>L</u> ogin
44.4-005-0009 OMERO is distributed under the terms of the GNU GPL. For more information, visit openmicroscopy.org	4.4+est5-0009 OMERO is distributed under the terms of the GRU GPL. For more information, visit openmicroscopy	org
••• OME	••• OME	

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.





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.

4 ImageJ – 🗆 🗡	🛓 Bio-Formats Upgrade Checker
File Edit Image Process Analyze Plugins Window Help	
	One-time notice: The LOCI plugins for ImageJ can automatically check for upgrades each time they are run. If you wish to disable this feature, uncheck the box below.
Unused Tool Polly Stack c	You can toggle this behavior later in the LOCI Plugins Configuration's "Upgrade" tab.
🔄 😰 📰 🖪 🛊 ᇌ 😓 Display Groups 🛩	Check for upgrades to the LOCI plugins
► Projects	OK Cancel
Carded (1) C	
	Bio-Formats Import Options
	ing Metadata viewing Information
Constant of the second s	
Move to Group	er: Display OME-XML metadata image viewer to use when
🎦 Tag	Display ROIs
New Experiment Rendering Settings >	ganization Memory management Possible choices are:
Screens Remove Group	files with similar names Use virtual stack
🖉 Attachments 🗳 Refresh User	Ties individually Specify range for each series no pixels, only metadata. • Standard ImageJ - This
	dimensions Crop on import option is deprecated (i.e.
Copen al	macros only). Please use
	tenate series when compatible Split into separate windows
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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.

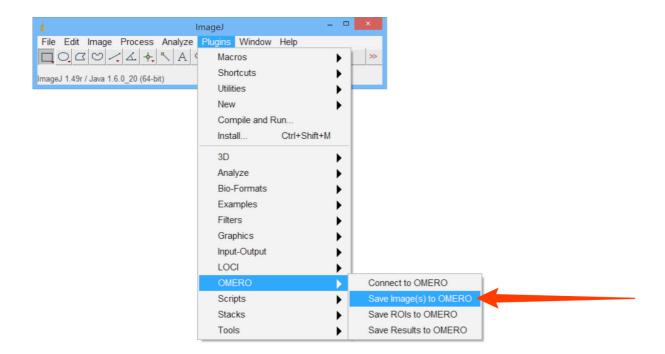
Select

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)

