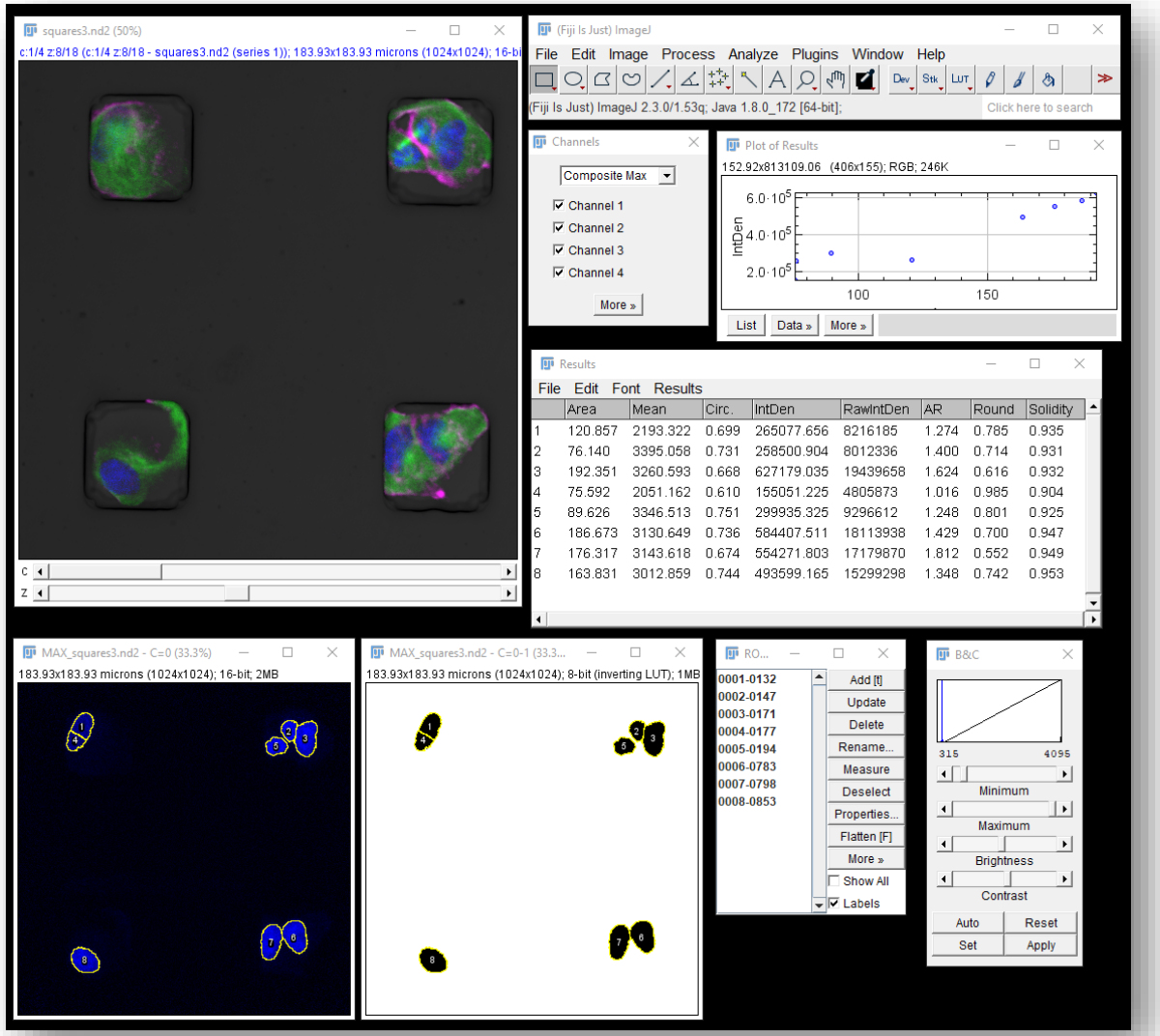

Getting Started with ImageJ

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6/21/22

What is ImageJ and what can it do?

ImageJ is open source software for processing and analyzing scientific images.

ImageJ is good for…

- Working with digital photos or other pixel-based images/data
- Image visualization
- Image processing
- Image analysis (quantification)
- Automation of the above

ImageJ is NOT good for…

- Working with drawings (vector-based images / line art)
- Making digital drawings/sketches
- Annotating (drawing on) images
- Assembling full figures or posters

Why ImageJ?

- It is free and open source
- It is incredibly versatile and extensible via Plugins
- It has a large and vibrant user/developer community
- There are extensive, free online tutorials and resources
- It is designed for *scientific* image processing and analysis

Which ImageJ?

ImageJ
Basic version
https://imagej.nih.gov/ij/

If you're only doing basic stuff or if you want to customize it yourself.

FIJI (FIJI Is Just ImageJ)
"Batteries included" version
https://fiji.sc

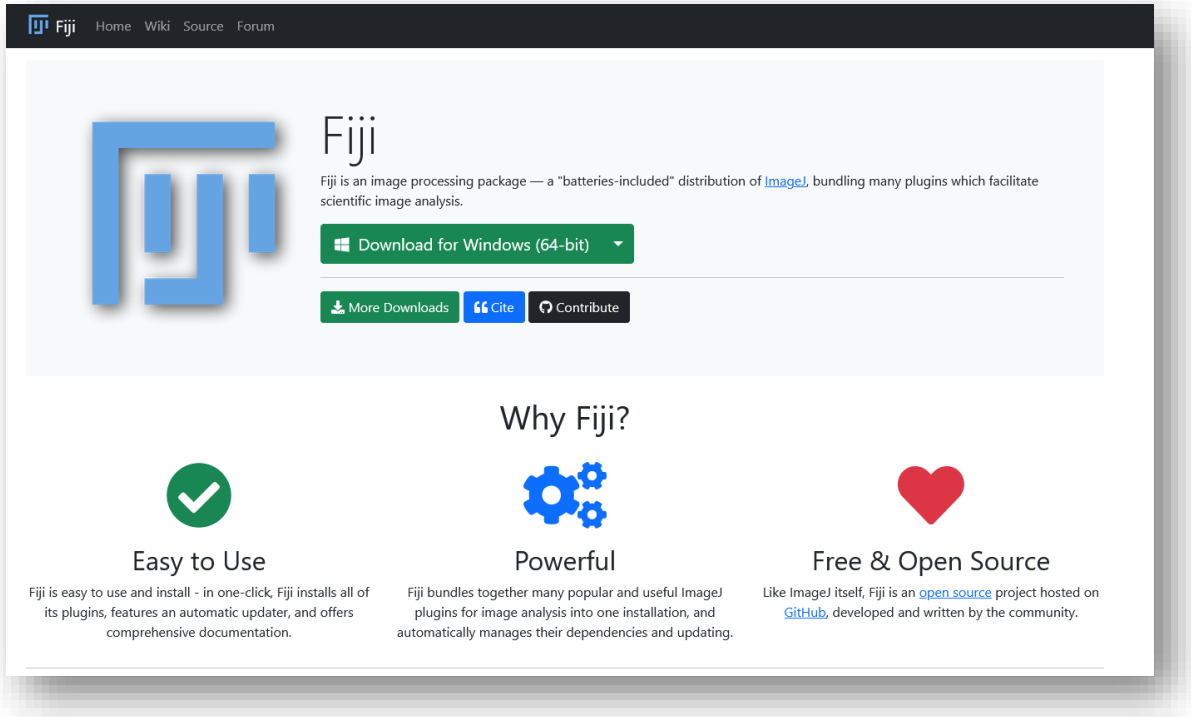
Contains lots of useful plugins.
Best all-purpose version.
You want this one.

IMAGEJ.JS
Powered by ImJoy

ImJoy ImageJ.JS
Web-browser version
https://ij.imjoy.io

Mostly just basic capabilities.
No installation required.

Getting and updating FIJI/ImageJ



1. Go to https://fiji.sc
2. Download the appropriate version for your computer (Windows, Mac, Linux)
3. Unzip the file to wherever you want to keep it on your computer
4. That's it

Troubleshooting:
https://imagej.net/downloads

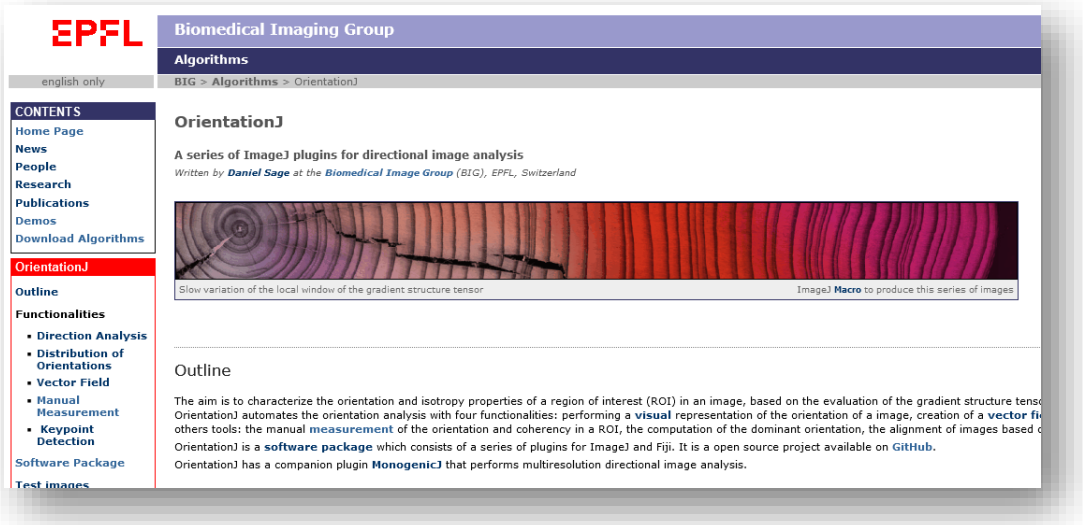
The first time you open FIJI, it will run the Updater to make sure everything is current.

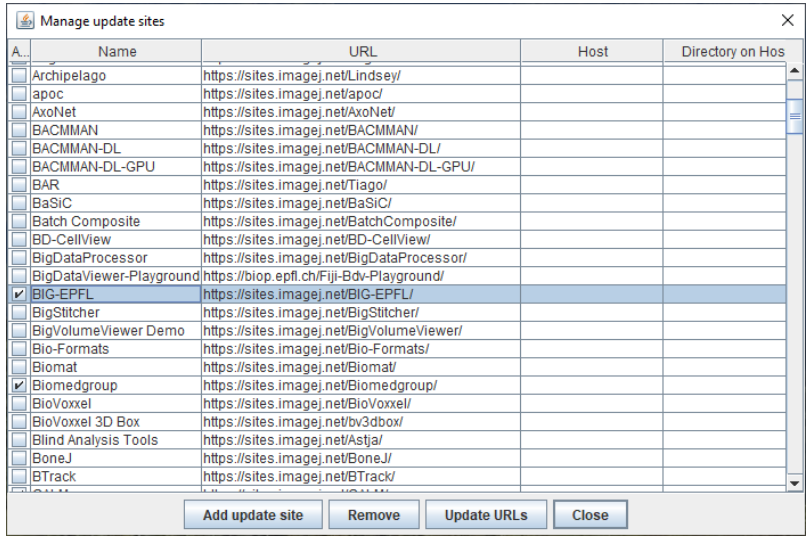
To run the Updater manually, go to Help > Update…

Extending FIJI/ImageJ's capabilities by adding Plugins

FIJI comes pre-loaded with many of the most common/useful plugins, but you can add more…

One way to add plugins is to subscribe to the update site that hosts the plugin
(instructions: https://imagej.net/update-sites/following)

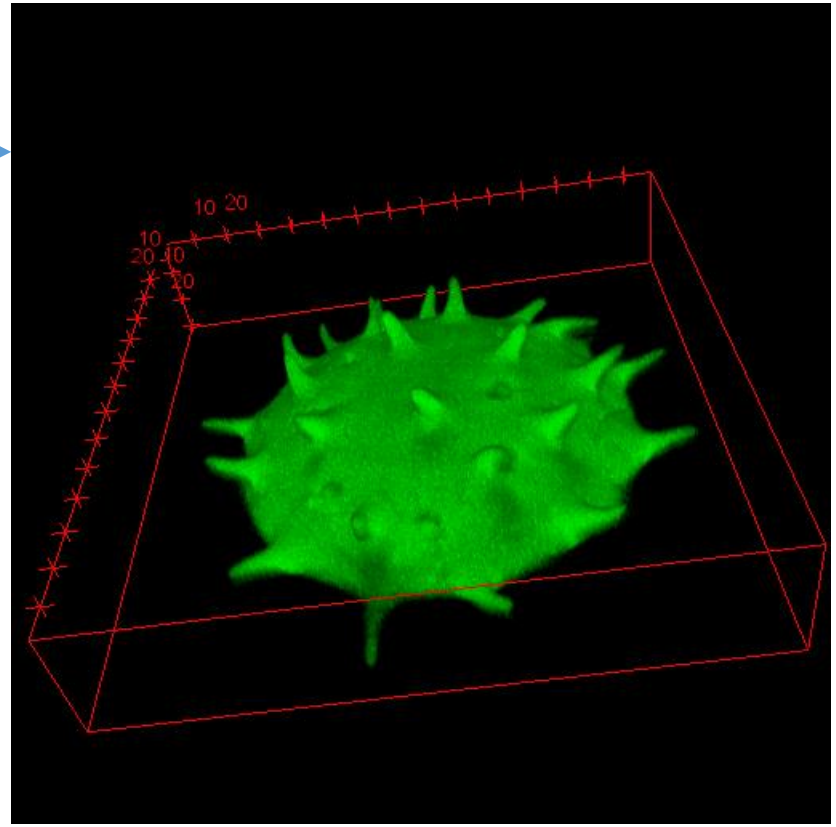


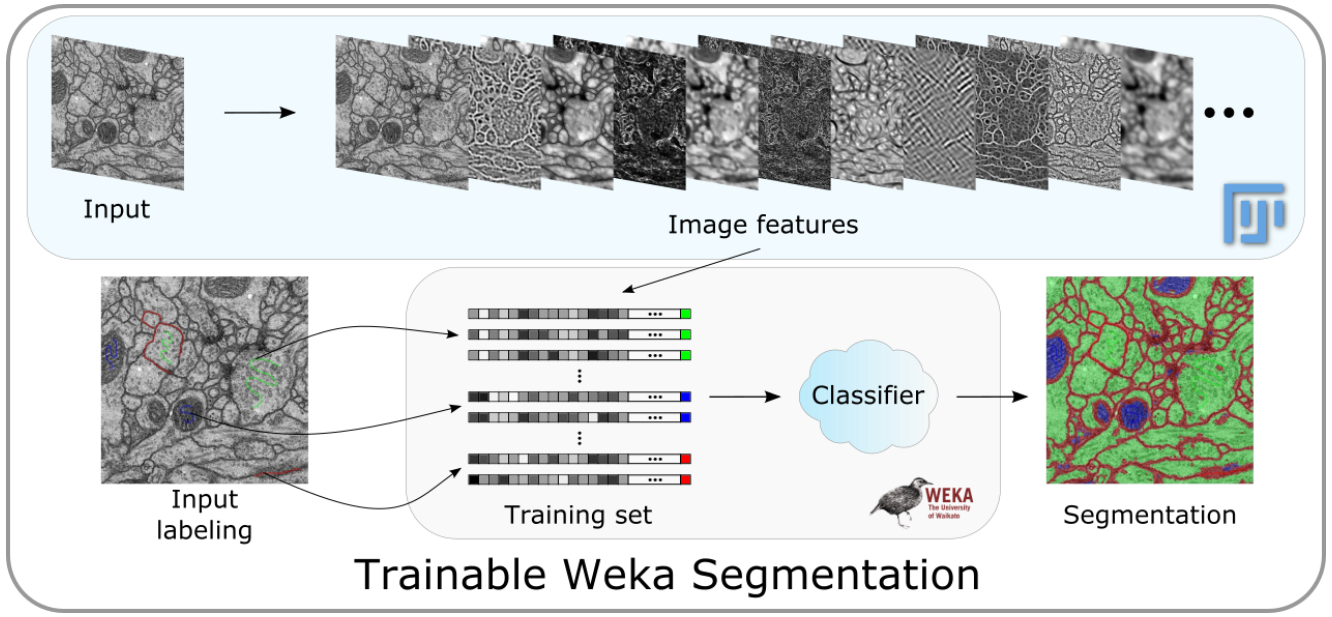


Sometimes you may find a useful plugin that isn't hosted on an update site and will need to be installed manually.
(instructions: https://imagej.net/plugins/)

Examples of some additional features of ImageJ

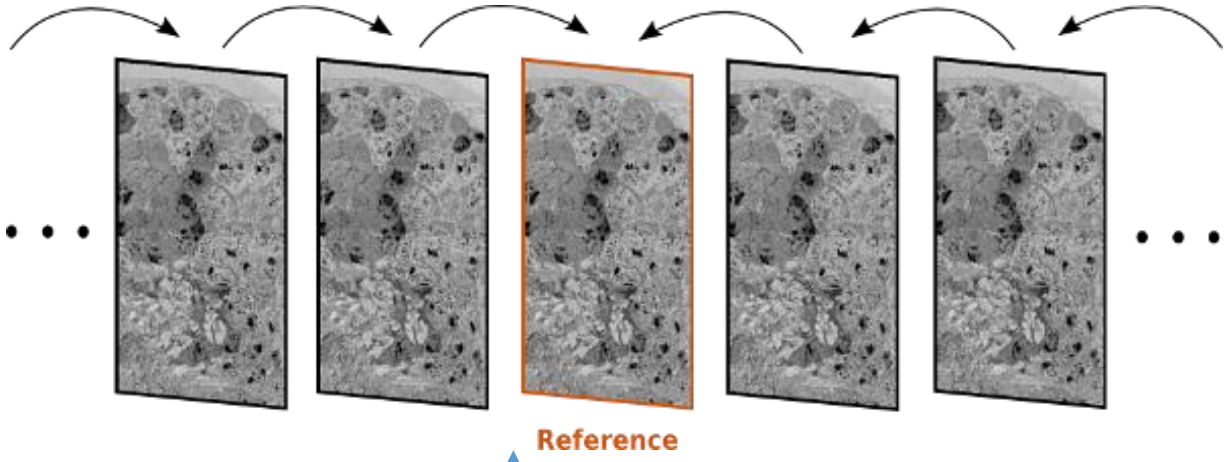
- Wide range of spatial filters (real and Fourier space)
- Image math (adding, subtracting, scaling, etc.)
- Stack and time-series manipulation (rearranging, reducing, etc.)
- Gel analysis
- 3D viewer
- Advanced segmentation algorithms using machine learning
- …



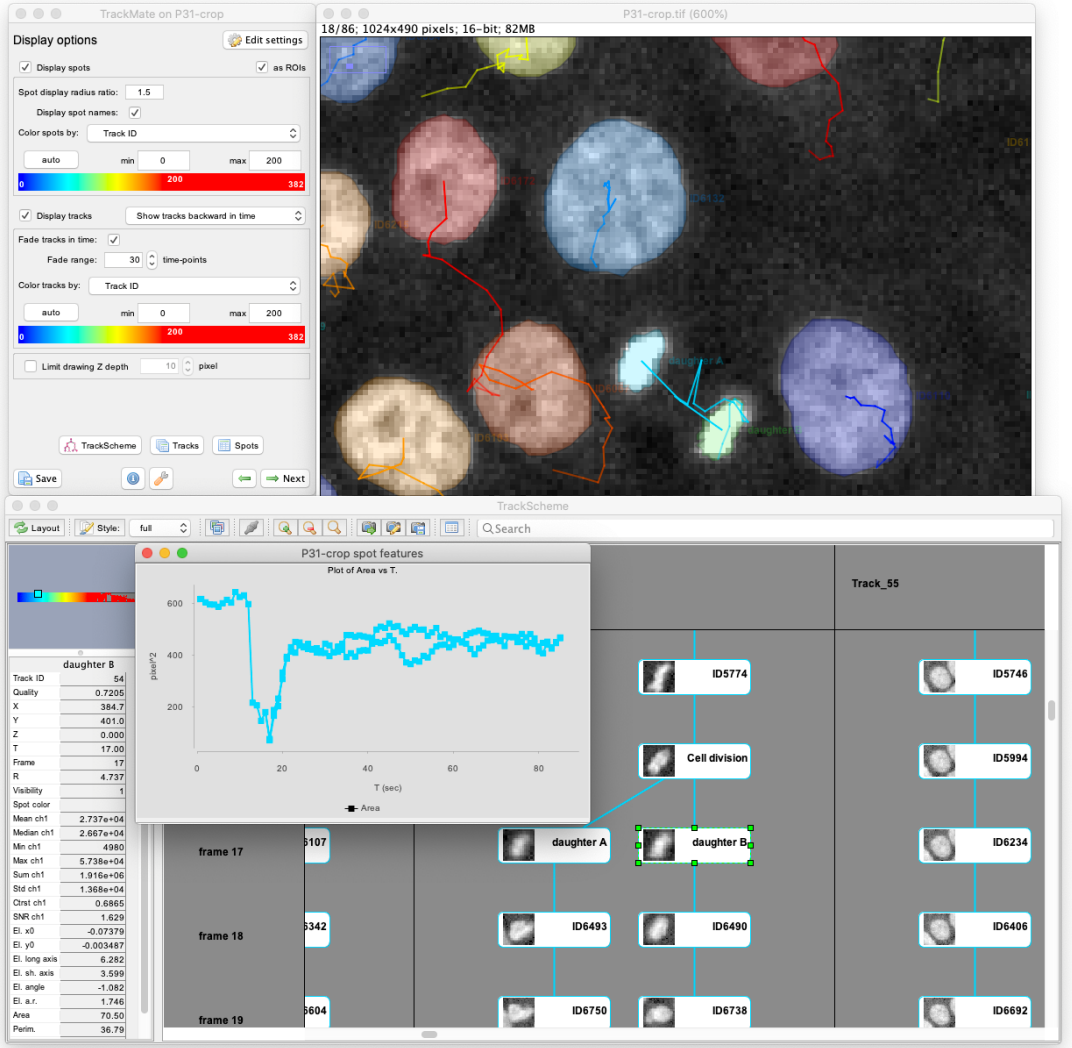


https://imagej.net/plugins/tws/

Examples of some additional features of ImageJ



- …
- Image registration and alignment
- Orientation/alignment/texture analysis
- Object Tracking
- Color segmentation and deconvolution (for color/histology work, I highly recommend a different program that works in tandem with ImageJ: **QuPath** https://qupath.github.io/)
- …



https://imagej.net/imaging/registration

https://imagej.net/plugins/trackmate/

Next steps – where to learn more

- General introduction to image analysis concepts
  - https://www.youtube.com/watch?v=ETq_9YFUQvU&list=PLXSm9cHbSZBCYxzRpqyFmmtIrqOeZMEq2&index=1
- ImageJ video tutorials on basic functions
  - https://www.youtube.com/playlist?list=PLXSm9cHbSZBDh7l7muuDecvWVAoxMfmGD
- More in-depth videos with activities
  - https://microscopy.unimelb.edu.au/optical-microscopy/capabilities/fiji-workshop-resources
- Video tutorials on specific moderate-advanced topics
  - https://www.youtube.com/playlist?list=PL5ESQNfM5lc7SAMstEu082ivW4BDMvd0U
- Excellent online “textbook” with examples and activities
  - https://bioimagebook.github.io/README.html#
- ImageJ reference
  - https://imagej.net/imaging/
- Extensive and well-maintained help forum for scientific image analysis
  - https://forum.image.sc/