

Software Installation Instructions for Mac OS X

The workshop will provide hands-on instruction for image processing and analysis. To gain the most benefit from the workshop, several open-source applications should be installed on your laptop before arriving at NIST. The software packages are

- **ImageJ:** A general-purpose application for editing and manipulating digital images or image stacks; used for image filtering, thresholding, and noise removal.
- **MultiSpec:** An application for multispectral analysis of images developed at Purdue University; used for image analysis and phase segmentation.
- **Profex:** Application and graphical user interface for Rietveld refinement of powder X-ray diffraction data using the program BGMN.
- **MicroChar:** A NIST-developed application for structure and phase analysis of segmented digital images of cement microstructures.

These instructions assume that all software is being installed on the Windows Desktop. Users should feel free to install the software elsewhere on the computer, but some computers may require administration permissions to install software elsewhere on the computer.

ImageJ

1. Download the application.
 - (a) Open a web browser and go to <https://imagej.nih.gov/ij/>.
 - (b) Click once on the download link
 - (c) ImageJ should automatically download to your Downloads folder
2. Add the Thresholded Blur plugin
 - (a) Direct a web browser to <http://imagejdocu.tudor.lu/doku.php?id=plugin:filter:thresholded.blur:start>
 - (b) Scroll down to the “Usage:” section of the page.
 - (c) Find the link in the *first* bullet item, called `Thresholded.Blur.java`
 - (d) Right-click on this link and choose Download Linked File As . . .
 - (e) Call the downloaded file `Thresholded.Blur.java` (uppercase and lowercase is important), and save it in `Downloads/ImageJ/plugins/Filters`.
3. Move the ImageJ folder to the Applications folder
4. Open ImageJ

- (a) Navigate a Finder window to Applications/ImageJ, and double-click on ImageJ.app
- (b) This might produce an error that says ‘ “ImageJ.app” cannot be opened because it is from an unidentified developer.’ If this happens
 - i. Close the error dialog.
 - ii. Right-click on the ImageJ.app icon, and select Open from the popup menu.
 - iii. A warning might appear; go ahead and choose Open.
 - iv. In the future, you should be able to simply double-click on the ImageJ.app icon to open it without errors or warnings.
- 5. Compile the plugin
 - (a) There should be an ImageJ application window open on your Desktop
 - (b) Click on the that window once with the mouse to bring it into focus
 - (c) In the ImageJ menu bar at the top of the screen, choose Plugins/Compile and Run.
 - (d) A file chooser dialog will open. Navigate to the Filters folder and choose Thresholded.Blur.java.
 - (e) Click the Open button.
 - (f) You may receive a warning that there are no images to process. Close this warning window.
 - (g) Open a Finder window and navigate to /Applications/ImageJ/plugins/Filters and verify that the Thresholded.Blur.class java class has been created in that folder.
- 6. Close the ImageJ application.

MultiSpec

1. Open a web browser and go to <https://engineering.purdue.edu/~biehl/MultiSpec/>
2. Click on the “Download” pull-down menu and select “Macintosh”
3. Scroll about halfway down the page and click on the link in the *first* bullet item, Intel version.
4. The download will automatically be saved and uncompressed in your Downloads folder as a folder named MultiSpec.2.8.16f.
5. Drag the MultiSpec.2.8.16f folder from Downloads to the Applications folder.

6. Verify that you can open the application by navigating the Finder window to `/Applications/MultiSpec.2.8.16f` and double-clicking on the `MultiSpec.app` item.
7. This might produce an error that says ‘“MultiSpec.app” cannot be opened because it is from an unidentified developer.’ If this happens
 - (a) Close the error dialog.
 - (b) Right-click on the `MultiSpec.app` icon, and select Open from the popup menu.
 - (c) A warning might appear; go ahead and choose Open.
 - (d) In the future, you should be able to simply double-click on the `MultiSpec.app` icon to open it without errors or warnings.
8. When MultiSpec opens successfully, it should show a simple terminal window with the title “MultiSpec Text Output”.
9. Close the MultiSpec application from the upper menu bar by choosing `MultiSpec/Quit MultiSpec`.

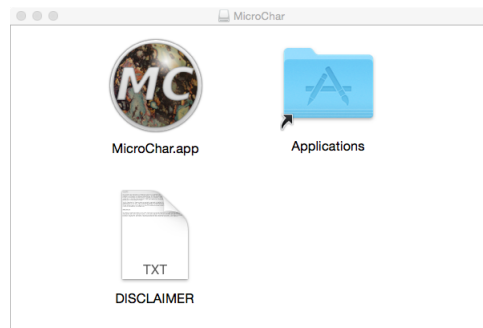
Profex

1. Download the application
 - (a) Open a web browser and go to <http://profex.doebelin.org/>
 - (b) Click on the Download pull-down menu and select “OS X”
 - (c) Click on the zip file link near the top of the page
 - (d) The download will automatically be saved as a disk image (`Profex-BGMN-Bundle.dmg`) in your Downloads folder.
2. Install Profex
 - (a) Double-click on the `Profex-BGMN-Bundle.dmg` file in the Downloads folder.
 - (b) This will create a disk icon called `Profex-BGMN` on your Desktop.
 - (c) Double-click on the `Profex-BGMN` disk icon. This will open a window with a single folder called `Profex-BGMN`.
 - (d) Drag this folder to your Applications folder.
 - (e) When the move is complete, close the disk window and drage the `Profex-BGMN` disk icon to the Trash.
3. Verify that you can open Profex
4. Navigate the Finder to `/Applications/Profex-BGMN` and double-click on the `profex.app` item.

5. This might produce an error that says ‘“profex.app” cannot be opened because it is from an unidentified developer.’ If this happens
 - (a) Close the error dialog.
 - (b) Right-click on the profex.app icon, and select Open from the popup menu.
 - (c) A warning might appear; go ahead and choose Open.
 - (d) In the future, you should be able to simply double-click on the profex.app icon to open it without errors or warnings.

MicroChar

1. Download the application.
 - (a) Open a web browser and go to <http://concrete.nist.gov/~bullard/MicroChar/macosx/>
 - (b) Download the application by clicking on MicroChar.dmg
 - (c) Download the user guide by clicking on NIST-TN-1876.pdf
2. On your computer, double-click on the downloaded MicroChar.dmg



3. Drag the MicroChar icon on the left to the image of the Applications folder on right.
4. Move the user guide to a convenient place on your computer.