

## Software Installation Instructions for Windows

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

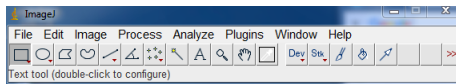
- **ImageJ**: A general-purpose application for editing and manipulating digital images or image stacks; used for image filtering, thresholding, and noise removal.
- **MultiSpec**: An application for multispectral analysis of images developed at Purdue University; used for image analysis and phase segmentation.
- **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.

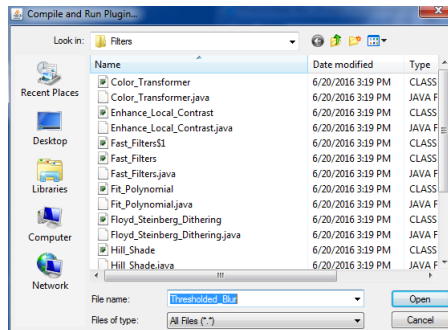
### ImageJ

1. Download the application.
  - (a) Open a web browser and go to <https://imagej.nih.gov/ij/>.
  - (b) Click on the Download link
  - (c) Scroll to the Windows section and choose the correct application
    - Choose “bundled with 64-bit Java 1.6.0\_24” for a **64-bit** Windows computer
    - Choose “bundled with 32-bit Java 1.6.0\_24” for a **32-bit** Windows computer
2. Extract the downloaded application.
  - (a) On your computer, open the downloaded folder.
  - (b) Choose “Extract all files”, and then pick the Desktop to extract the ImageJ folder.
3. Add the Thresholded Blur plugin
  - (a) Direct a web browser to <http://imagejdocu.tudor.lu>
  - (b) On the navigation sidebar of the web page, click Plugins

- (c) Scroll down to the “Filters” section of the loaded web page and click on the link for Thresholded Blur
  - (d) Scroll down to the “Usage:” section of the page.
  - (e) Click on the link in the *first* bullet item Thresholded.Blur.java
  - (f) Save the download as Thresholded.Blur.java (uppercase/lowercase matters) in the folder ImageJ/plugins/Filters
4. Add the Color Segmentation plugin
- (a) Direct a web browser to <http://bigwww.epfl.ch/sage/soft/colorsegmentation/>
  - (b) Just above the section for “Conditions of Use”, click on the link ColorSegmentation.jar
  - (c) Save the download as ColorSegmentation.jar (uppercase/lowercase matters) in the folder ImageJ/plugins/
5. Compile the plugin
- (a) Launch the ImageJ application found in the ImageJ folder
  - (b) Ignore messages and warnings that may be issued
  - (c) An ImageJ menu should appear on your desktop



- (d) Go to the Plugins menu and select “Compile and Run ...”



- (e) When asked for the plugin to compile, navigate to plugins/Filters/Thresholded.Blur
- (f) Click the “Open” button.
- (g) Ignore any warnings that may appear
- (h) Quit ImageJ

## 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 “Windows”
3. Scroll about halfway down the page and click on the link in the *first* bullet item, 2018.07.30 MultiSpec 64-bit version.
4. When asked whether to run or save the download, click the “Run” button
5. Ignore the warning about publisher verification, and select the “Run” button
6. Unzip to the Desktop folder (not the default folder given), and then click the “Unzip” button
7. This will produce a new folder called MultiSpecWin64 on your Desktop

## 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 “Windows”
  - (c) Click on the zip file link near the top of the page appropriate for your architecture (64 bit or 32 bit)
  - (d) When asked whether to open or save, choose “Open”
  - (e) Choose “Extract all files” and then select the Desktop as the target folder (the word Desktop should be the last word in the path), then click “Extract”
  - (f) This will produce a new folder called Profex-BGMN-Bundle-3.13.0-64bit on your Desktop
2. Navigate to the Desktop/Profex-BGMN-Bundle-3.13.0-64bit/Profex folder
3. Double click the profex application
4. Ignore the warning about publisher verification, and click the “Run” button
5. You may get an error saying that the program is not designed to run on Windows. If that happens, then
  - (a) Quit the profex executable
  - (b) In that same folder, delete the files msvcp100.dll and msvcrt100.dll
  - (c) Run the profex application again
6. Install the structure and device files

- (a) Open a web browser and go to the workshop web page where you downloaded these instructions.
- (b) Scroll down to the section entitled **Hardware and Software Requirements**
- (c) Click on the `workshop-2018-XRD.zip` link to download the data.
- (d) When asked whether to open or save, choose “Open with ...” and press the OK button
- (e) Extract all files to the Desktop. This will create a folder named Workshop-2018-XRD on the Desktop.
- (f) The Workshop-2018-XRD folder has the following folders:
  - PROFEX
    - CementPhases
    - Devices
    - FlyAsh
    - InternalStandards
  - Reference
  - XRD\_Data
    - 177
    - 178
    - ID Exercises
    - Quartz
    - SRM2686a
    - SRM2688
- (g) Open the Profex-BGMN-Bundle-3.13.0-64bit folder on the desktop.
- (h) Drag the PROFEX/CementPhases folder to the Profex subfolder.
- (i) Drag the PROFEX/InternalStandards-Structures folder to the Profex subfolder.
- (j) Drag the PROFEX/Devices folder to the Profex subfolder.
- (k) Launch profex as before.
- (l) On the menu bar, select `Edit/Preferences`. A Preferences window will pop up.
- (m) In the left sidebar of the Preferences window, single-click on BGMN

- (n) On the right side of the window, look for an entry called “Structure Files Directories”
- (o) Click the “+” button.
- (p) Navigate one folder up to the Profex folder.
- (q) Select the CementPhases folder, then press the “Select Folder” button.
- (r) Repeat the previous three steps for the the following two folders: FlyAsh and InternalStandards
- (s) Click the OK button at the bottom of the Preferences window to save the changes
- (t) Close the Profex application.

## MicroChar

1. Open a web browser and go to <https://www.nist.gov/services-resources/software/microchar>
2. Download the application by clicking on the Windows Installation Package link.
3. Download the user guide by clicking on NIST-TN-1876.pdf
4. When asked if you want to open or save, choose “Open”
5. A new installer window should appear. Select the “Next” button
6. In the next window that appears, choose “I accept the agreement” and click the “Next” button
7. In the next window, choose the Desktop as the installation directory, and **then** add MicroChar to the end. That is, the end of the installation folder should be Desktop/MicroChar
8. A new folder should appear on the Desktop, called MicroChar, and a shortcut to the application should also appear on the Desktop. Double-clicking on the shortcut will open the application.