ImageJ in Jupyter

To run ImageJ macros in Jupyter, follow the series of installations up to ***. Complete all installations to run ImageJ ops.

Install pyimagej

In order to use ImageJ within Jupyter, an imagej environment must first be created.

Step 1:
Open Anaconda Prompt and enter the following command:

```
conda create -n imagej -c conda-forge openjdk=8 pyimagej
```

Step 2:
After the environment has been created, activate it by using:

- For Windows:

  ```
  activate imagej
  ```

- For Mac and Jupyter hubs:

  ```
  source activate imagej
  ```

Step 3:
In the Anaconda Navigator, click Environments then select “imagej”. Note that you must be in this environment to be able to import ImageJ.

Step 4:
Enter the following command in Anaconda Prompt:

```
pip install imagej
```

Step 5:
To use ImageJ within a Jupyter notebook,

```
import imagej
```

Install JDK 8

In order to build the code for ImgLib2, Java (JDK) 8 must be installed. This version of Java can be downloaded from here:
https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html

For Windows,

- After installing JDK 8, follow these additional steps:
  - Step 1:
    Go to Settings and search for “environment”. Select “Edit Environment variables for your account”
  - Step 2:
    - Under “User variables for User”, click “New”.
    - Set Variable name to: JAVA_HOME
    - Set Variable value to the Java installation directory, which can be found by typing `where java` into Command Prompt. The variable value should look similar to this:
      `C:\Program Files\Java\jdk1.8.0_211`
      Copy the variable value so that we can paste it in the next step.
  - Step 3:
    - Under “System variables”, click on “Path”.
    - Click on “New”.
    - Paste the variable value from Step 2 and add `\bin`. Click OK. It should look similar to this:
      `C:\Program Files\Java\jdk1.8.0_211\bin`
    - Move the newly created variable to the top of the list by clicking on Move Up.

Install Maven

Maven is required for the upcoming ImgLib2 installation. Mac OS X is already equipped with Maven but to ensure it exists, open Terminal and enter: `mvn -v`. The output should be similar to:

```
Apache Maven 3.0.3 (r1075438; 2011-02-28 12:31:09-0500)
Maven home: /usr/share/maven Java version: 1.6.0_29, vendor: Apple Inc.
Java home:
/System/Library/Java/JavaVirtualMachines/1.6.0.jdk/Contents/Home
Default locale: en_US, platform encoding: MacRoman
OS name: "mac os x", version: "10.7.2", arch: "x86_64", family: "mac"
```

If not, proceed with the given steps. The following also applies to Windows which does not come with Maven.

Step 1:
Download and extract the binary zip archive from:
https://maven.apache.org/download.cgi

Step 2:
Go to Settings and search for “environment”. Select “Edit Environment variables for your account”.

Step 3:
Double-click “Path” under “User variables for User”.

Step 4:
Click on “New” and paste the following:
`C:\Users\User\Downloads\apache-maven-3.6.1-bin\apache-maven-3.6.1\bin`

Step 5:
To verify the installation, open a new Command Prompt and enter:
`mvn -v.`

Install imglyb

You must be in the imagej environment for this installation.

In Terminal or Command Prompt, type:
`conda install -c hanslovsky imglyb`

***

If you prefer to work solely in a Python kernel, then skip “Install Beaker X”.

Install BeakerX

When using ImageJ ops, it is easier to do so in Groovy (Java). To make a Groovy kernel available in Jupyter (among other potentially useful kernels),

Enter the following command in Anaconda Prompt:
`conda install -c conda-forge ipywidgets beakerx`

Install ImgLib2

This library is needed to run ImageJ commands on Jupyter.

Step 1:
Download and extract the zip file from GitHub: https://github.com/imglib/imglib2

Step 2:
Enter the zip file directory.

- For Windows:
  Open Command Prompt and type:
  `Cd Downloads/imglib2-master/imglib2-master`
- For Mac:
  Open Terminal (Mac) and type:
  `cd Downloads/imglib2-master`

Step 3:
Enter the following command to build the code:
`Mvn`

Install sci-kit image

(Optional) Scikit-image is useful for image processing. For more information, see https://scikit-image.org/docs/stable/.
You must be in the imagej environment for this installation.

Step 1:
Install scipy first. In Terminal or Command Prompt, type:
`pip install scipy`

Step 2:
Enter the following command:
`pip install sci-kit image`