# Basics of Bioimage analysis

## Course Material:

1. Please download and unzip: [**https://github.com/NEUBIAS/training-resources/archive/master.zip**](https://github.com/NEUBIAS/training-resources/archive/master.zip)

2. Enure you can open the images in the **image\_data** folder in Fiji

3. The online resource of the course can be found [**https://neubias.github.io/training-resources/index.html**](https://neubias.github.io/training-resources/index.html)

The course is best rendered with Firefox.

## Follow up material for self study:

Analysis of fluorescence data in ImageJ: <https://petebankhead.gitbooks.io/imagej-intro/content/>

ImageJ Macro: <https://www.youtube.com/watch?v=o8tfkdcd3DA>

Colocalisation: <https://www.youtube.com/watch?v=P2JvFe0hB_M>

Advanced MorpholibJ:<https://www.youtube.com/watch?v=_SiM33C3KcE>

NEUBIAS youtube channel (more specialized topics): <https://www.youtube.com/channel/UC-oy7UpEhRfHQ-5ePCviKFg>

How to ask for help (active and responsive): <https://forum.image.sc/>

**Python:**

* <https://www.youtube.com/watch?v=2KF8vBrp3Zw>
* <https://scikit-image.org/docs/dev/api/skimage.html>

**R:** <https://www.bioconductor.org/packages/release/bioc/html/EBImage.html>

## **Course schedule:**

#### Monday, 25. January 2021, 14:00 – 17:00 CET

* [Basic image properties (pixels)](https://neubias.github.io/training-resources/pixels/index.html)
* [Spatial calibration](https://neubias.github.io/training-resources/spatial_calibration/index.html)
* [Lookup tables](https://neubias.github.io/training-resources/spatial_calibration/index.html)

#### Tuesday, 26. January 2021, 14:00 – 17:00 CET

* [Binarization](https://neubias.github.io/training-resources/binarization/index.html)
* [Connected component labeling](https://neubias.github.io/training-resources/connected_components/index.html)
* [Data types](https://neubias.github.io/training-resources/datatypes/index.html)
* [Object shape measurements](https://neubias.github.io/training-resources/measure_shapes/index.html)
* Optional homework [Workflow - simple 2D object analysis](https://neubias.github.io/training-resources/workflow_segment_2d_nuclei_measure_shape/index.html)
  + The workflow summarizes what we have learned during the first 2 days.
  + We can discuss it on Monday

#### Monday, 1. February 2021, 14:00 – 17:00 CET

1. Please download again and unzip (there are new images) [**https://github.com/NEUBIAS/training-resources/archive/master.zip**](https://github.com/NEUBIAS/training-resources/archive/master.zip)

* [Workflow - simple 2D object analysis](https://neubias.github.io/training-resources/workflow_segment_2d_nuclei_measure_shape/index.html) Discuss if there has been problems
* [Object intensity measurements](https://neubias.github.io/training-resources/measure_intensities/index.html)
* [Global background correction](https://neubias.github.io/training-resources/global_background_correction/index.html)
* [Neighbourhood filters (introduction)](https://neubias.github.io/training-resources/filter_neighbourhood/index.html)

#### Tuesday, 2. February 2021, 14:00 – 17:00 CET

1. Please download again and unzip (there are new images) <https://github.com/NEUBIAS/training-resources/archive/master.zip>

* Self introduction (please paste name in chat)
* Self study recommendations (see above follow up material for self study)
* [Median filter](https://neubias.github.io/training-resources/median_filter/index.html)
* [Local background subtraction](https://neubias.github.io/training-resources/local_background_correction/index.html)
* [Filter objects](https://neubias.github.io/training-resources/filter_objects/index.html)
* [Workflow - 2D segmentation of noisy images with object filtering](https://neubias.github.io/training-resources/workflow_segment_2d_noisy_nuclei_filter_objects_measure_shape/index.html)

## Before the course:

Please, ***before*** the course:

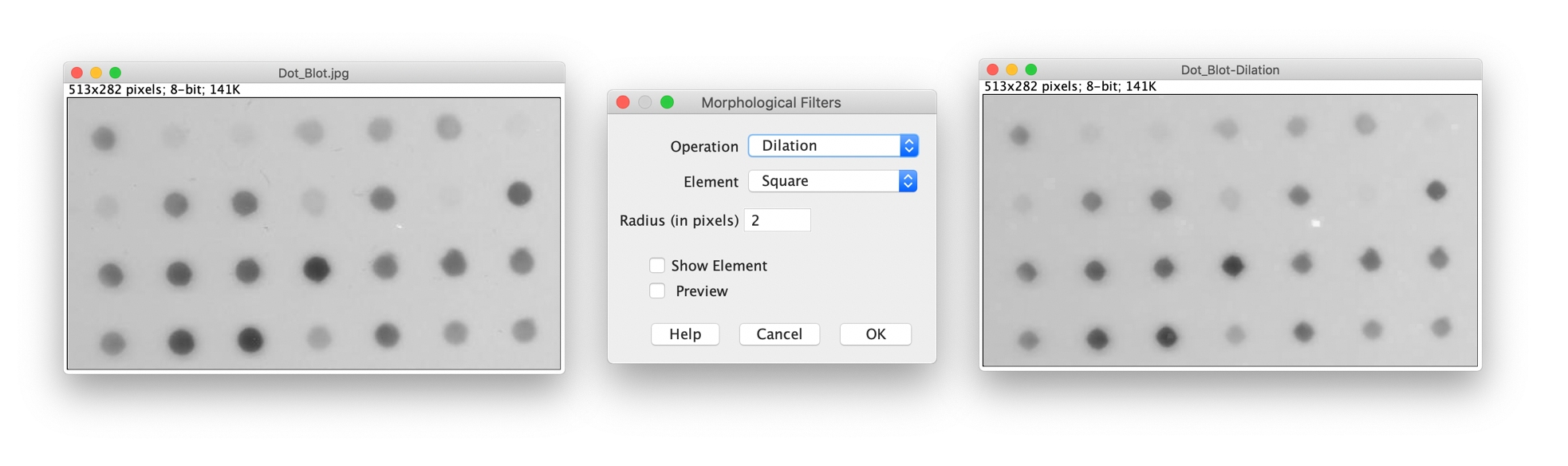
1. Install Fiji

* Download and install Fiji on your computer<https://fiji.sc/>

2. Install the MorpholibJ Fiji update site

* Install the Fiji update site for MorpholibJ.
* In Fiji: [Help > Update > Manage update sites], scroll down the list and check **IJPB-plugins**.
  + For general information on how to install update sites see [Update Sites](https://imagej.net/Update_Sites)
* Restart Fiji
* Make sure you now find **MorpholibJ** in the Fiji Plugins menu: [Plugins > MorpholibJ > …]

3. Test your installation

* Start Fiji.
* Open a sample image [File > Open Sample > Dot Blot]
* Apply a MorphoLibJ filter to this image.
* [Plugins > MorpholibJ > Morphological Filters]
* 
* You do *not* need to understand what happened; you will learn this *during* the course :-)

Please

1. Write your name (you also may paste a (small) funny photo of yourself, if you want)  
   2. Did the above installation work? Do you need help?  
   3. What do you expect from this course?

**Upfront information that has been sent to the students**

**Upfront information for participants 1**

Dear Participants,

Thank you for registering to the course on Basics of Bioimage Analysis.

The course will **start on Monday 25th of January (i.e. in three days) at 14:00 CET**.

The course is distributed across four afternoons:

Monday, 25. January 2021, 14:00 – 17:00 CET

Tuesday, 26. January 2021, 14:00 – 17:00 CET

Monday, 1. February 2021, 14:00 – 17:00 CET

Tuesday, 2. February 2021, 14:00 – 17:00 CET

Please **before the course** make sure to install all the necessary software as explained in this document [Basics in Bioimage Analysis](https://docs.google.com/document/d/1aMLpAJklbcnzjB3TYWHeizwlmRYGbOeX-_p1iMcVBUA/edit?usp=sharing). You will receive additional information Monday by noon.

Looking forward to “meet” you

Christian (aka Tischi) and Antonio

### Second mail

Dear Participants,

You can now find additional information *in red* *at the top* of the online document [Basics in Bioimage Analysis](https://docs.google.com/document/d/1aMLpAJklbcnzjB3TYWHeizwlmRYGbOeX-_p1iMcVBUA/edit?usp=sharing) about the course location (zoom link) and the course material (download link).

See you in a bit!

Tischi & Toni

**Links to course material (for teachers)**

[**https://github.com/NEUBIAS/training-resources**](https://github.com/NEUBIAS/training-resources)

[**NEUBIAS/training-resources: Resources for teaching/preparing to teach bioimage analysis**](https://github.com/NEUBIAS/training-resources)

**Detailed course schedule (for teachers):**

**1h45min 15minBreak 1h every day intro by 8 students (we had in total ~ 30 students)**

**There is a common document that students can acces**

**Assessments and exercises in general:**

- Students do assessments on their own

- In breakout rooms of two

- Students leave rooms if they are done with the assessments

- If 50% are done we will close the breakout rooms and take questions

- It is up to the teacher whether to do the exercises and assessments in one or two sessions.