

BioVoxel Workshop – “Editing, Processing and Analysis of Scientific Images”

2-day workshop

Aim:

The workshop should give scientists a better understanding about the Do's and Don'ts during digital image processing and insight in the methodology of extracting a multiplicity of information from their images. The participants will gain extensive knowledge about the possibilities to analyze their imaging data partially also more automatically using only one software (Fiji).

Target Group:

PhD Students and PostDocs which are working or plan to work with digital (micrograph) images. The workshop has a *STRONG FOCUS* on microscopic images and life science applications but most of the content also applies for digital images of different origin in general. Some imaging experience is of advantage but not necessary. No previous software knowledge required.

Day 1 (9:00 – 17:00) – Image acquisition, editing and basic processing:

- Introduction to handling of basic *ImageJ* functions
- *Optional:* Correct image acquisition (achieving good quality and high resolution images)
- Basic adjustments on digital images and scientifically correct image handling
 - Understanding the meaning and importance of bit-depth, dynamic image range
 - Understanding the limits of image adjustments in the context of good scientific practice
 - Difference between pseudo-color and true-color images
 - False coloring of fluorescence images and handling channels
 - Correct contrast adjustments and considerations of introduced changes (linear and non-linear methods)
 - Understanding data changes during image transformations
 - How to correctly rotate and size change images for figures
 - Setting the image scale (e.g. μm) and scale bars
- Diverse background subtraction and lighting correction methods and their use cases
- Overview over figure creation tools and guidelines for figure creation

Day 2 (9:00 – 17:00) – Image Processing, Analysis and Automation

- Understanding image filters and their applications in image processing and analysis
- In-depth object extraction (e.g. cells, nuclei, specific stainings) by automatic intensity thresholding
- Image post-processing (improving extraction results on binary images)
- Insight into different object based image analysis techniques
 - 2D Size/area measurements
 - 2D Shape descriptors
 - Automatic counting
 - Creation of automatic selections (ROIs) for intensity quantification and automation
- Insight into the ImageJ macro recordings for automatic image analysis

This course is ***NOT*** about: pure figure making, photoshop, graphs or plots. It is meant to teach scientific image handling and information extraction from image data.