

BioVoxel Workshop – “Scientific Image Processing and Analysis”

Content:

The BioVoxel Workshop – “Scientific Image Processing and Analysis” aims to teach scientists how to acquire and especially handle digital images starting from the microscope/imaging device on until the incorporation into the final publication figure. This includes some important theory about digital images in general and their high quality acquisition, as well as methods for image processing and specific analytical purposes according to high scientific standards, such as correct contrast adjustments, scaling and calibration of images, extensive feature extractions, automated counting, object tracking or 3D reconstruction. Additionally, the workshop includes a lot of hands-on sessions and provides methods to save time during repetitive image processing steps and while building your publication figures in a way that preserves image quality and stores processing data. You will be able to revisit the learned material using the provided exercises and script also later on.

Furthermore, specific participant question regarding image processing and solutions for analysis issues can be personally discussed.

Specific Topics (among others):

- Basics about correct image acquisition
 - Resolution and sampling (avoiding imaging artifacts)
 - Image formats
 - Metadata
 - Bit-depth, color spaces and different image types
- Correct image adjustments (contrast, rotation, size changes, background subtractions)
- Use of image filters
- Image Segmentation - extraction of specific features
- Automated feature counting and tracking of moving objects
- Basic 3D reconstructions
- Image Quantifications:
 - Measurements of area, length, volume, surface,...
 - 3D object analysis
 - Image scale and intensity calibration
 - Intensity quantification
- Labeling of images and time series/movies (scale bars, calibration bars,...)
- Ethics in image handling and processing
- Efficient publication figure preparation

Aim:

The workshop should give scientists a better understanding about the Do's and Don't's 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 they have to analyze their imaging data.

Target Group:

Undergraduate students, PhD Students and PostDocs which do or plan to do any kind of imaging experiments.

Methodology

During the practical part of the workshop we mainly use the professional software Fiji. All necessary software will be provided. PLEASE BRING YOUR OWN LAPTOP!

Trainer:

Dr. rer. nat. Jan Brocher (www.biovoxxel.de)