2-day BioVoxxel Workshop
"Basics in Image Processing and Analysis"

Basics in Microscopy and Imaging

- Correct Illumination
- Signal-to-noise and background
- Pixels and voxels
- Resolution and its limit
- Imaging artifacts
- Correct image sampling

Digital Images

- Image formats
- Image compression and artifacts
- Metadata handling
- Bit-depth
- Human vision and digital images
- True-color and pseudo-color images

Introduction into the ImageJ/Fiji software

Scientifically Correct Image Adjustment

- The image histogram
- Correct contrast adjustments
- Image transformation (size, rotation,...)
- Background subtraction methods
- Image filters

Image Segmentation

- Basic image pre-processing
- Basic feature extraction methods
  - e.g. from fluorescent images

- Post-processing to improve analyses

- Feature Extraction from Color Images
  - e.g. Histological Sections
  - Color spaces

Image Annotation/Labelling

- Labeling with overlays
- Image scaling (setting units like μm)
- Scale bars
- Calibration bars

Publication Figures

- Documentation
- Scientific image ethics
- Image data integrity preservation
- Do's and Dont's during figure preparation

Optional:
- Introduction to Western Blot analysis

Automatic Counting and Measuring

- Automatic counting of objects
  applying different methods
- Quantification by distinction of
  size and shape
- Diverse analyses possibilities

Quantitative Intensity Analysis (optional)

- Prerequisites for intensity quantification
- Correct intensity measurements
- Analysis of histological staining

Insight into Analysis Automation
- Recording ImageJ macros

2-day intensive workshop (~14 hours)

The basic preparation for good microscopic image acquisition, image processing and quantitative image analysis as well as publication figure preparation.

Target Group: PhD-Students and PostDocs working with microscopic images

The course has a strong focus on microscopic images and fluorescent imaging but the methods tought are similarly applicable to images from other imaging device types

BioVoxxel