2-day BioVoxxel Workshop (A)
"Comprehensive Image Processing and Analysis"

Basics in Digital 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

Scientifically Correct Image Adjustment

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

Image Segmentation

- Thresholds (8-bit images)
- Binary images
- Feature extraction
- Thresholding true-color images
- Image segmentation decision tree
- Segmentation by structure

Higher Dimensional Images

- 3D, 4D, 5D images
- Visualization of n-dimensions
- 3D-Reconstruction
- 3D-Segmentation (optional)
- Montages

Counting and Tracking

- Computer assisted counting
- Automatic counting of objects
- Manual tracking of moving objects
- Automatic tracking of moving objects

- 3D-Network tracking (optional)

Quantitative Image Analysis

- Prerequisites for image quantification
- Scaling and calibration
- Area and length measurements
- Quantification of 3D objects
- Measuring intensities

- Statistical co-localization analysis (opt.)

Image Annotation

- Labeling with overlays
- Time-stamps
- Scale bars
- Calibration bars

Batch Processing (handling many images)

- Stitching (optional)
- Batch conversions
- Creating macros for repetitive tasks

Publication Figures

- Documentation and ethics
- Image data integrity preservation

- Effective figure composition
  - FigureJ and Inkscape

2-day intensive workshop (~16 hours)

All you need for good digital image acquisition, image processing and quantitative image analysis as well as publication figure preparation

BioVoxxel

2-day BioVoxxel Workshop (B)
"Handling Digital Images, Diagrams and Publication Figures, Image Data Management"

Digital Images

- Theory about image resolution
- Pixels and voxels
- Pixels and correct resolution
- Signal-to-noise and background
- Image formats
- Image compression and artifacts
- Metadata handling
- Bit-depth
- Human vision and digital images
- True-color and pseudo-color images

Scientifically Correct Image Adjustment

- The histogram
- Correct contrast adjustments
- Color spaces
- Image transformation (size, rotation,...)
- Background subtraction

Higher Dimensional Images

- Time series and movies
- 3D-Reconstructions
- Montages

Insight into Image Analysis

- Correct scaling of images
- Area and length measurements
- Computer assisted manual counting
- Manual tracking of moving objects

Publication Figures

- Documentation and ethics
- Image data integrity preservation
- Effective figure composition
  - FigureJ

Diagrams and vector graphics

- working with Inkscape
- publication figures with Inkskape
- preparing diagrams/workflows

Image Data Management

- Basics of good data organization
- Filing systems
- Image database - OMERO
  - installation and basic handling
  - tagging images
  - searching and filtering
  - figure preparation using OMERO

Image Annotation (labeling)

- Labeling with overlays
- Time-stamps
- Scale bars
- Calibration bars

Batch Processing (handling many images)

- Image stitching (fusing images)
- Batch conversions
- Basics of the macro language
- Creating macros for repetitive tasks

2-day (~16 hours) intensive workshop

This workshop covers basic knowledge about digital images and their correct handling, Image labeling, vector graphic diagram preparation as well as image data management.

BioVoxxel

2-day BioVoxxel Workshop (C)
"Basic Image Processing and Analysis, Publication Figures and Image Data Management"

Digital Images

- Theory about image resolution
- Pixels and voxels
- Pixels and correct resolution
- Signal-to-noise and background
- Image formats
- Image compression and artifacts
- Metadata handling
- Bit-depth
- Human vision and digital images
- True-color and pseudo-color images

Image Annotation

- Labeling with overlays
- Time-stamps
- Scale bars
- Calibration bars

Batch Processing (handling many images)

- Batch conversions
- Creating macros for repetitive tasks

Quantitative Image Analysis

- Prerequisites for image quantification
- Scaling of images
- Area and length measurements
- Computer assisted manual counting
- Automatic counting of objects
- Manual tracking of moving objects

Scientifically Correct Image Adjustment

- The histogram
- Correct contrast adjustments
- Color spaces
- Image transformation (size, rotation,...)
- Background subtraction

Image Segmentation

- Thresholds (8-bit images)
- Binary images
- Feature extraction

Higher Dimensional Images

- 3D, 4D, 5D images
- Visualization of n-dimensions
- Time series and movies
- 3D-Reconstruction (optional)
- Montages

Publication Figures

- Documentation and ethics
- Image data integrity preservation
- Effective figure composition
  - FigureJ and Inkscape
- Diagrams and vector graphics

Insight in Image Data Management

- Basics of good data organization
- Filing systems
- Basics of image database - OMERO

2-day (~16 hours) intensive workshop

This workshop covers basic knowledge for scientists about digital images and their correct handling, basic processing and analysis techniques and gives insight into image data management.

BioVoxxel

2.5-day BioVoxxel Workshop
"Image Processing, Analysis and Data Management"

Basics in Digital 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

Scientifically Correct Image Adjustment

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

Image Segmentation

- Thresholds (8-bit images)
- Binary images
- Feature extraction
- Thresholding true-color images
- Image segmentation decision tree
- Segmentation by structure

Higher Dimensional Images

- 3D, 4D, 5D images
- Visualization of n-dimensions
- 3D-Reconstruction
- 3D-Segmentation (optional)
- Montages

Counting and Tracking

- Computer assisted counting
- Automatic counting of objects
- Manual tracking of moving objects
- Automatic tracking of moving objects
- 3D-Network tracking

Quantitative Image Analysis

- Prerequisites for image quantification
- Scaling and calibration
- Area and length measurements
- Quantification of 3D objects
- Measuring intensities
- Statistical co-localization analysis

Image Annotation

- Labeling with overlays
- Time-stamps
- Scale bars
- Calibration bars

Batch Processing (handling many images)

- Stitching (optional)
- Batch conversions
- Creating macros for repetitive tasks
- Basics of macro language

Publication Figures

- Documentation and ethics
- Image data integrity preservation
- Effective figure composition
   - FigureJ and Inkscape
- Diagrams and vector graphics

Image Data Management

- Basics of good data organization
- Filing systems
- Image database - OMERO

2.5-day intensive workshop (~20 hours)

All you need for
- good digital image acquisition
- image processing and analysis as well as
- publication figure and diagram preparation
- data management