Workshop – “Image Processing and Analysis for Scientific Publications”

This workshop has been designed for doctoral students, postdocs and scientific staff of natural sciences (total duration 16 hours, 2 dates, 15 participants).

Dates: 17.07. and 18.07.2018, each 9:00 am – 5:00 pm,
Lecturer: Dr. rer. nat. Jan Brocher (BioVoxsel),
Venue: Campus Herrenhausen, Gebäude 4104-Seminarraum 063, Herrenhäuser Straße 2, 30149 Hannover

Description:
The workshop aims to teach natural scientists from different areas of life science how to handle and process digital images starting from e.g. microscopic image acquisition until the incorporation into the final publication figure. This includes important theory about high quality digital images in general (e.g. how to achieve good resolution) as well as a broad spectrum of methods for scientifically correct image processing and specific analytical purposes according to high scientific standards. Participants learn how to extract different types of information from your images and how to quantify objects and intensities. Additionally, the workshop includes a lot of hands-on sessions, methods to automate repetitive tasks to decrease time investment while reducing user bias. Furthermore, it provides a theoretical guideline about do’s and don’ts during publication figure preparation.

Participants will be able to revisit the learned material using the provided exercises and script also later on. The workshop content is generally of importance for scientists working with digital images but it has a strong focus on microscopy, image processing and analysis as well as scientific correct image adjustments! Optional topics will be adjusted to meet the participants needs as good as possible if there is time left. Furthermore, specific participant questions regarding image processing or solutions for analysis issues can be personally discussed if communicated beforehand (e-mail with question and example images).

During the practical parts of the workshop we mainly use the professional software Fiji. No previous software knowledge required. All necessary software will be provided (open source).

→ PLEASE BRING YOUR OWN LAPTOP!

Specific Topics:

- Basics about correct image acquisition
  - How to achieve good image resolution (if of interest for the majority of participants)
  - Image formats - which formats serve scientific images and which should be avoided
  - Metadata - information saved beyond the visible image
  - Information content of images - learn about bit-depth, color spaces and different image Types
    (or: how much information can be saved in and retrieved from an image).
- Correct image adjustments avoiding alterations - contrast and brightness, image rotation, size changes, different background subtraction methods.
- Use of different image filters to improve visibility and object extractability for further analyses
  - How to extract specific objects of interest
- Automated object counting, 2D measurements and automatic ROI creation for quantifications
- Image Quantifications (selected topics depending on participants field of interest):
  - Measurements of areas, shape, ...
  - How to correctly measure fluorescent intensities in images (e.g. fluorescence)
- Optional: analysis of histological sections or color images (such as photographs)
- Labeling of images and time series/movies (text, numbers, scale bars, calibration bars, ...)
- Ethics in image handling and processing - where are the limits?!
- Software recommendations for publication figure preparation

Registration: online until 04.06.2018
www.granat.uni-hannover.de/scientific_image_processing