Introduction

of new applications in KONFMI

Image analysis and data processing in superresolution microscopy workshop 2021, Faculty of Science, Charles University

Brief History of the Core Facility KONFMI

- open access core facility established 2004 by Doc. Forstová.
- Since 2006 it is under the maintenance of Mgr Šebesta, who was nominated as a head in 2018.
- In 2015 the core facility expanded and equipped with another confocal microscope and super-resolution microscope
- In 2018 core facility expanded again equipped with Lightsheet microscope, live-cell imaging system and another confocal microscope.
- Since 2019 core facility hire more staff to offer the best services to users
- The core facility will be a part of Czech Bioimaging infrastructure soon.

Our staff

Head: **Ondřej Šebesta**

Lightsheet expert: **Zuzana Burdíkov**á

Super-Resolution expert: **Peter Hoboth**

Image analysis guru: **Martin Schätz**

Administrative support: **Iva Hůleová** and **Kateřina Jánská**

Workshop support: **Natálie Skoupá** and **Jan Skoupý**

Our Equipment

- **Wide-field systems**
  - **Olympus Cell-R / Scan-R**
  - **Nikon TiE 2**
- **Confocal systems**
  - **Leica SP8**
  - **Zeiss LSM 880 NLO**
  - **Leica SP2**
- **Lightsheet systems**
  - **Zeiss Lightsheet Z.1**
- **High Throughput systems**
  - **Zeiss Axioscan**
- **High-end stage incubators**
- **High-end server**

Modalities we offer

- **Wide-field, Confocal, Super-Resolution, TIRF and Lightsheet imaging**
- **Spectral detection, Two-photon excitation, SHG**
- **FLIM measurements**
- **FRAP, FLIP, FRET measurements**
- **RICS, FCS, FCCS**
- **High Throughput Imaging**
- **Live cell imaging**
- **Image analysis**

Our services

- Consultation about experiment designs
- Trainings and education in microscopy
- Help with data acquisition, processing and analysis
- … and more.

Available open source software

Ilastik - Leverage machine learning algorithms to easily segment, classify, track and count your cells or other experimental data. **No machine learning expertise required.**

QuPath - an open, powerful, flexible, extensible software platform for **whole slide image analysis**. Powerful annotation & visualization tools, built-in algorithms for common tasks, including cell and tissue detection, interactive machine learning, both for object and pixel classification.

Available open source software

CellProfiler - free, open-source software for quantitative analysis of biological images. No prior experience in programming or computer vision is required – this page is intended to help you get up and running.

KNIME Analytics Platform - the open source software for creating data science. Intuitive, open, and continuously integrating new developments, KNIME makes understanding data and designing data science workflows and reusable components accessible to everyone.

Available commercial software

Arivis Vision4D 3.4.0

- **Machine Learning processing and object classification.**
- Change color, opacity and material properties for whole subsets of objects in one go.
- **Python scripting integrated in the analysis pipeline.**
- Improved Compartments module for easy localization of objects and options for several outputs per operation.
- Extended integration with arivis VisionHub and new Analysis Home Screen.

Available commercial software

Huygens 21.04

- Huygens Everywhere
- Widefield, Confocal & Multiphoton Deconvolution
- PSF Distiller
- Chromatic Aberration Corrector
- Crosstalk Corrector
- Deconvolution Express
- Image Stitcher & Deconvolution
- Lightsheet Stitching & Deconvolution
- Object tracking
- Object Analyzer Advanced
- Workflow Processor
- Full File-readers
- TCL scripting

Available commercial software

NIS elements

- Full license kindly borrowed us by Laboratory Imaging company till the end of 2021
- Image analysis
- AI modules
- JOBS
- General Analysis 3

Some practical notes for this workshop !!!

- See the program
- For lunch we will have sandwiches
- Keep your cups
- Informal discussion tomorrow in Mrtvá Ryba
- …every wishes direct to our reception staff

Thank You

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