From Images to Knowledge with ImageJ & Friends
virtual conference

Nov 30 - Dec 2, 2020

Stephan Preibisch, Stephan Saalfeld, Anna Kreshuk,
Pavel Tomancak and Virginie Uhlmann

hhmi | janelia
Conferences

Fiji-based open technologies for super-resolution microscopy through NanoJ

Tutors: Ricardo Henriques (rjhenriques@igc.gulbenkian.pt)
Romain Laine (r.laine@ucl.ac.uk)
Lucas von Chamier (lucas.chamier.13@ucl.ac.uk)
Guillaume Jacquemet (guillaume.jacquemet@utu.fi)

Session 1: 2020-12-01 11:00 UTC – 2020-12-01 15:00 UTC
Session 2: 2020-12-02 08:00 UTC – 2020-12-02 12:00 UTC

Title: Fiji-based open technologies for super-resolution microscopy through NanoJ
Tutors: Romain F. Laine, Lucas von Chamier, Guillaume Jacquemet, Ricardo Henriques

Abstract:
In this workshop, we'll provide a walkthrough on open-source technologies we have created to enable or enhance super-resolution microscopy. We'll focus on the NanoJ framework, introducing features such as: NanoJ-SRRF, which enables super-resolution microscopy, NanoJ-Core, which provides the capacity to drift correct and channel align images with subpixel accuracy, and NanoJ-Fluidics, providing the ability to quickly build and control Lego-based fluidic devices at the microscope. During the workshop, we will give examples of biological studies enhanced by these technologies, such as the use of fluctuation-based super-resolution traction force microscopy to characterise cellular forces imposed into substrates. In addition, we will provide a preview of new developments to these techniques in development.

Outline:
During the workshop, participants will have a chance to follow live walkthroughs on how to use the NanoJ software, with test data made available to them online. The walkthroughs will be of the "follow along" nature, where the participants are encouraged to repeat the same procedures as the tutor. Participants will be encouraged to ask questions and interrupt as much as needed. They will also be encouraged to try these algorithms on their own data, with support of the tutors.

Requirements:
It is expected that users have a modern computer (preferably a MacBook) with Fiji pre-installed and the NanoJ repositories enabled in the Fiji updater. Download example data, tutors will provide a link near the date.

Breakdown of the practical:
- 15 min: setup, download of data and overview of the characteristics of super-resolution data
- 30 min: basics of drift correction and channel alignment
- 30 min: basics of single-molecule imaging, SRRF and data analysis
- 30 min: hands-on super-resolution microscopy image analysis with SRRF
- 30 min: building and using NanoJ-Fluidics - a Fiji controlled fluidics system
- 15 min: outlook on NanoJ platform