

From Images to Knowledge with ImageJ & Friends

virtual conference

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Conferences



3D Analysis with the 3D ImageJ Suite

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Session 1: 2020-12-01 07:00 UTC – 2020-12-01 11:00 UTC

Session 2: 2020-12-02 14:00 UTC – 2020-12-02 18:00 UTC

3D Analysis with the 3D ImageJ Suite

Tutors

Thomas Boudier is associate professor at Sorbonne University in Paris, France. He has more than 20 years experience in biomedical image analysis, specializing in multi-dimensional biological imaging. He developed the 3D ImageJ Suite for ImageJ/Fiji and has more than 40 articles in peer-review journals.

Nicolas Heck is associate professor at Sorbonne Université, Paris, and works in the Institut de Biologie Paris Seine. Being a cellular neuroscientist, he focuses his research on the analysis of neuronal morphology and spatial organization of synapses. For this, he is developing 3D automated segmentation and analysis workflows.

Jean-François Gilles is engineer on the Institut de Biologie Paris-Seine imaging facility at Sorbonne Université, Paris. He is in charge of image processing and analysis. He focuses his developments on 3D image analysis, and he is the main developer of the DiAna plugin.

Summary

The 3D ImageJ Suite is a set of algorithms and tools (mostly ImageJ plugins) developed since 2010, originally for 3D analysis of fluorescence microscopy. Since then, the plugins have been widely used and cited more than 250 times in biological journals. In this tutorial we will give a general introduction to the tools available in the 3D ImageJ Suite : filtering, 3D segmentation for spots and nuclei, and 3D analysis. A graphical interface to manage 3D objects, the 3D Manager, will also be presented. Finally, a brief introduction to a new system for automated workflow, TAPAS, will be presented.

https://imagej.net/3D_ImageJ_Suite

Starting from raw data, focusing on nuclei imaging data, we will first quickly review available 3D filters and segmentation algorithms. We will then import segmented labeled data into the 3D Manager and explore some visualization capabilities. We will then focus on the analysis available within the 3D Manager and the 3D ImageJ suite such as co-localisation, distances or interaction analysis. We will review more advanced analysis such as layer analysis with EVF. Using the macro-recorder we will build a first macro for 3D automated analysis with the 3D ImageJ Suite; we will take 10 minutes to present a new system for automation, called TAPAS. After the tutorial participants should be able to set up a 3D workflow for 3D analysis for classical fluorescence cellular imaging.

Installation of ImageJ with the 3D ImageJ Suite is required. Installation for TAPAS is optional.

