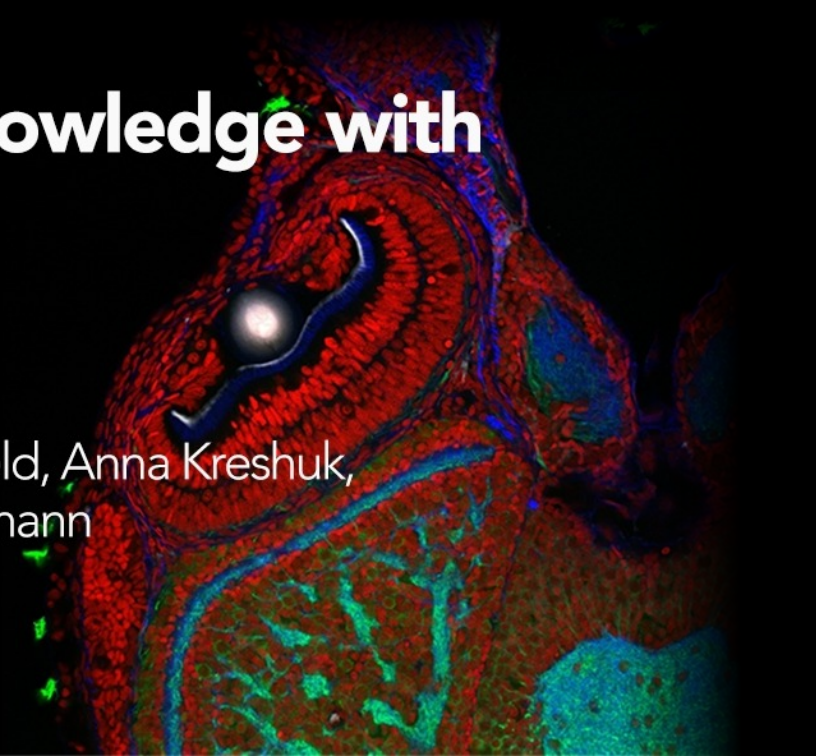


# From Images to Knowledge with ImageJ & Friends

virtual conference

**Nov 30 - Dec 2, 2020**

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



## Reproducible 3D animations using natural language with 3Dscript

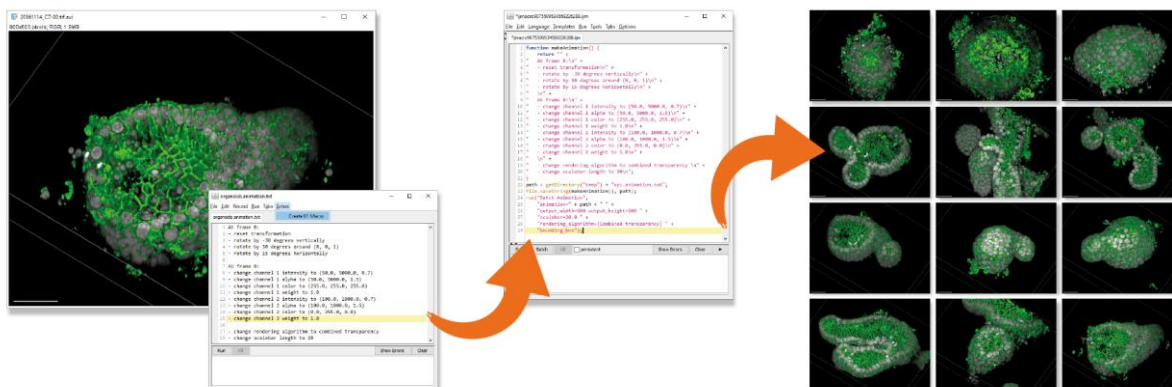
**Tutors:** Benjamin Schmid ([benjamin.schmid@fau.de](mailto:benjamin.schmid@fau.de))

**Session 1:** 2020-12-01 08:00 UTC – 2020-12-01 12:00 UTC

**Session 2:** 2020-12-02 12:00 UTC – 2020-12-02 16:00 UTC

# Reproducible 3D animations using natural language with 3Dscript

Benjamin Schmid, Optical Imaging Centre Erlangen, University of Erlangen-Nuremberg, Germany



## Summary

In this tutorial I will demonstrate in depth how to operate 3Dscript to create high-quality 3D/4D animations of microscopy data. Many software applications already exist for 3D rendering, all of which face the same challenge: How to provide an intuitive interface to users so that they can teach the software how they anticipate the final animation. In most applications, the user adjusts spatial transformation and other rendering properties at certain keyframes and the software produces an animation by interpolating between them. With 3Dscript we introduced a new concept to address the challenge: The user literally tells the software, like in a communication with another human, in natural English sentences what and how to animate. The animation language is still a formal language, but in contrast to a typical programming language it offers non-programmers a familiar way to instruct the computer, supported by a dedicated, autocompletion-enabled editor. In the end, the animation text fully describes the animation, in a human-readable way, saved as a simple text file. This implies a number of benefits: First, a once generated movie can fully be reproduced from the animation text. Moreover, it is also straightforward to alter the text to re-render a previously generated movie, e.g. upon recommendation of a reviewer. Finally, 3D animation can easily be applied to a collection of datasets in batch, to render them with identical settings and produce scientifically comparable movies, facilitating, e.g., the detection of phenotypical differences between different experimental conditions. In this tutorial I will show how to setup 3Dscript, I will step through its user interface and explain adjustable parameters. We will then assemble an animation step-by-step. Finally, I will show how to render animations in batch, with a focus on considerations to make the resulting movies directly comparable with each other.

## Requirements

To attend the workshop, please install Fiji (<https://fiji.sc>) and 3Dscript (<https://github.com/bene51/3Dscript>) in advance and test that your graphics card works with 3Dscript.

**Benjamin Schmid** is a research fellow at the Optical Imaging Centre Erlangen. He is the founder of ImageJ's 3D Viewer and of 3Dscript, a software for creating 3D animations from natural language, which is the topic of this workshop.