

From Images to Knowledge with ImageJ & Friends

virtual conference

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Conferences



Deep Learning in Fiji — Existing Image Restoration and Image Segmentation Solutions (and how to go beyond)

Tutors: Florian Jug (jug@mpi-cbg.de)
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Session 1: 2020-11-30 13:00 UTC – 2020-11-30 17:00 UTC

Session 2: 2020-12-01 17:00 UTC – 2020-12-01 21:00 UTC

Deep Learning in Fiji — Existing Image Restoration and Image Segmentation Solutions (and how to go beyond)

Deep learning based methods can be useful for a wide array of analysis tasks. Unfortunately, there is often quite a gap between the impressive results experts can achieve with their methods and the possibilities that are given to biologists to also benefit from such developments.

While the developer community is trying to address this issue in various ways (e.g. via initiatives like the CSBDeep website csbdeep.bioimagecomputing.com , or the great work on making methods available on free computing services (<https://github.com/HenriquesLab/ZeroCostDL4Mic>). Arguably the most user-friendly approach would be to make deep-learning methods available to users directly within a tool that is most familiar to many — Fiji!

If you are a user, in this I2K tutorial we will:

- show you how to benefit from existing deep learning plugins in Fiji.
- share with you a number of thoughts on how to think about deep learning.
- talk about advantages and challenges of deep learning in your scientific life.
- show you how your research might benefit from using the tools available within the CSBDeep toolkit.
- share a image labeling workflow the will enable you to create the necessary training data for deep learned segmentation.
- introduce you to the idea behind the BiolImage.io Model Zoo and why you will benefit from this initiative in the future.

Please note that **the tutorial will in large parts be hands-on and interactive**. There will be a lot of time to play with all presented tools. While we will bring data you can use, we also encourage you to work on your own data. Hence, bring you most noisy images, bring some data you'd like to segment!

If you are a developer, this tutorial will additionally offer (in parallel sessions):

- an introduction to the libraries we created to enable Fiji to run pretrained neural networks.
- a guided tour through the process of creating your own Fiji plug-ins that can run trained networks.
- an interactive lecture on how our libraries can also be used to train neural networks directly from within Fiji.
- an introduction to the new BiolImage.io Model-Zoo format and how we support it in Fiji.

Information about the tutors

- *Deborah Schmidt* is a Research Software Engineer in the Jug Lab at the Center for Systems Biology and the Max-Planck Institute for Molecular Cell Biology and Genetics in Dresden. She is a core contributor to the Fiji/ImageJ ecosystem and has, among many other contributions, significantly contributed to integrating deep learning solutions into Fiji.
- *Tom Burke* is an experience Software Engineer who recently joined the Labs of Florian Jug and Pavel Tomancak at the Center for Systems Biology and the Max-Planck Institute for Molecular Cell Biology and Genetics in Dresden. His contributions aim at building bridges between the Java and Python worlds that currently dominate the field of BioImage Analysis.
- *Florian Jug* is leading a research group at the Center for Systems Biology Dresden and the Fondazione Human Technopole in Milan. His research agenda combines computer vision, machine learning, and bioimage informatics. Next to methods research, the lab has a strong focus to bring the most useful methods to biologists in ways that are supporting their research.

