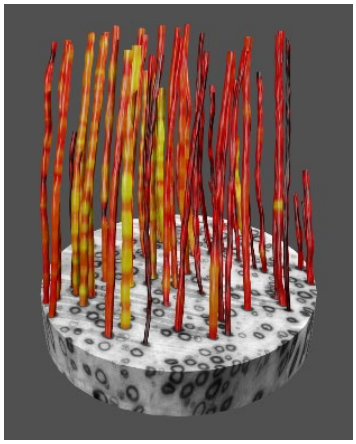
Online Workshop *30th Sept. – 1st Oct. 2020*

Machine Learning for Segmentation of 3D Structures



This online workshop is hosted by the Centre for Quantification of Imaging Data from MAX IV (QIM) and focuses on segmentation of 3D structures in microscopy images using machine learning.

You will learn how to apply state-of-the art machine learning tools to segment your own data. We will focus on the trade-off between annotation effort and segmentation quality, with an emphasis on "good enough" in reasonable time.

The first day of the workshop is a webinar-style presentation of how to apply machine learning tools to various segmentation tasks, followed by a practical session where you will apply the tools to example datasets. The second day of the workshop will be in small groups, where each participant begins segmenting their own data.

Sign up no later than September 11th, 2020 at https://www.conferencemanager.dk/workshop-ml-for-segmentation-of-3d-structures. For more information, you can contact the QIM team at info@qim.dk

30th September Talks and hands-on session with example datasets

10.00	Welcome and introduction to QIM, the Centre for Quantification of Imaging Data from Max IV. Anders B. Dahl, *Head of QIM*.
	Machine learning for segmentation of 3D structures. **Silas N. Ørting**, *Postdoc at QIM, University of Copenhagen.*
	Insegt tool: Learning a dictionary of images patches to detect repetitive structures. • Fibre tracking (X-ray micro-CT), **Monica J. Emerson**, *Postdoc at QIM, Technical University of Denmark*. • Bee eyes detection (X-ray micro-CT), **Hans Martin Kjær**, *Assistant Professor, Technical University of Denmark.*
	U-net: Neural Network architecture designed for image segmentation. • Sperm detection (TEM), **William Laprade**, *Research Assistant at QIM, University of Copenhagen.* • Pancreas Cell Segmentation (TEM), **Chenhao Wang**, *Research Assistant at QIM, University of Copenhagen.* • *RootPainter* : Interactive segmentation using U-Net, **Abraham George Smith**, *PhD Student, University of Copenhagen.*
12.00	Break
13.00	Hands-on session with Insegt and U-net applied to the example data sets presented in the morning session.
15.00	Summary and discussions, **Behnaz Pirzamanbein**, *Postdoc at QIM, Technical University of Denmark*

1st October Analysis of your own data	
10.00	• Presentation of participants data and segmentation problem in small groups + discussion of best tool and approach for solving segmentation problem. • Start work on segmentation problem.
12.00	Break
13.00	Continuation of analysis and discussion about possible collaborations.
15.00	Wrap up

Practical details:

1. The hands-on sessions will be carried out in break-out rooms with the supervision of the QIM team.
2. For participating in day 2, it will be required to submit a one-page presentation about a user case. This presentation will be used to group participants according to their need for analysis (more information about the submission will be sent via email after the sign-up deadline).
3. *Software requisites*: A google account to enter the Google Colab work environment.