

## **Deep learning in 3D localization microscopy: a comparison between convolutional neural networks and maximum-likelihood estimation**

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The large amount of data produced in localization microscopy requires fast and precise algorithms for data analysis. Real time data processing represents the ideal case for every real world application. In recent time many fast algorithms have been developed, based for instance on maximum likelihood estimators.

Deep learning offers a wide range of tools for data processing. Convolutional neural networks (CNN) have been adapted to a broad set of image recognition and classification tasks. They have also gained increasing popularity in the field of microscopy, where they are used to perform time consuming tasks with presumably no tradeoffs.

In this talk I will compare the performances of a convolutional neural network and maximum likelihood estimation for the 3D localization of fluorescent beads and molecules.