

# Improving Volume Reconstruction from Large Electron Microscopy Data

*Stephan Saalfeld HHMI's Janelia Research Campus, USA*

Connectivity analysis from Electron Microscopy images requires both efficient automation and manual proofreading. Current state-of-the-art automatic image analysis methods have high demands on data quality to deliver satisfying results within reasonable time.

We have developed methods to explicitly model and compensate for various artifacts that otherwise complicate automatic analysis. This includes joint distortion correction of multiple independent camera arrays, montaging sections from large sets of overlapping image tiles, elastic serial section alignment, local and global approaches to compensate intensity variation within and across sections, and an image based method for accurate local section thickness estimation and ordering.

Thanks to generic programming based on ImgLib2, our solutions transfer well to other applications, e.g. stitching Confocal image stacks or video processing.

All methods are available as plugins and protocols for the TrakEM2 software included in the ImageJ distribution Fiji. We are currently spending efforts to bring the best available methods to scale with a strong focus on making them accessible to the scientific community as Open Source Software. I will demonstrate the status of our joint efforts and outline perspectives.