Detail Improvement with Fusion Concepts on Multiview Imaging Datasets

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Selective plane illumination microscopy (SPIM) can provide improved, nearly isotropic resolution compared to widefield and confocal microscopy. This is possible due to multiple views through the sample in different angles. Depending on the view angle, it enables to collect complementing information with different resolutions. Providing proper registration, it is the task of an image fusion algorithm to combine only the useful information contained in all views into one single data set. As numerous specialized approaches in other modalities have shown satisfactory results, we provide a comparison among the most popular ones. Using well established deconvolution methods together with the appropriate image formation model, we propose an alternative approach and show that it produces improved results.

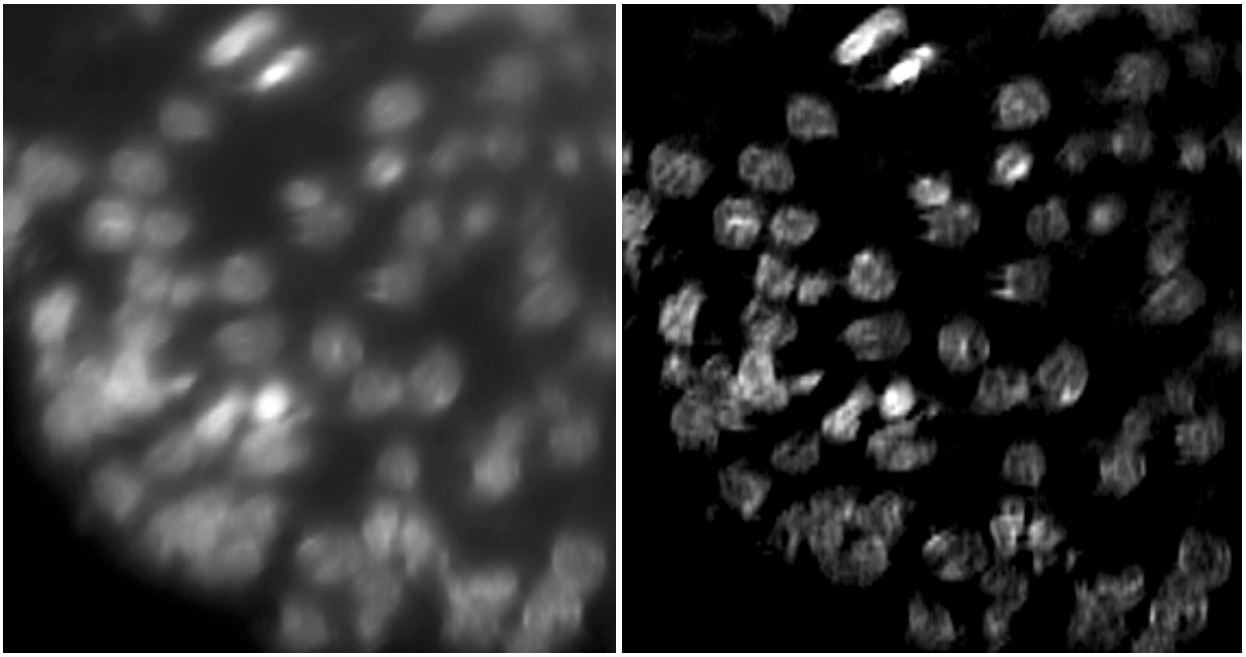

Figure: Islet cells of rat, fused section using 4 views 0-45-90-135° (Objective: Zeiss Plan Apo 63x/0.95, Zeiss SPIM test setup). Left: Gauss-Variance weighted fusing. Right: Deconvolution based fusing.