Fluorescence Microscopy Digital Deconvolution Comparison

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Available at: https://works.bepress.com/gmcnamara/57/
Reducing Image Degradation through Deconvolution

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Deconvolution

*Deconvolution* is an image processing technique to improve the contrast and resolution of images acquired with a microscope.

Reduces image degradation from:

- Noise
- Scatter
- Glare
- Blur

Source: biop.efpl.ch

Source: molecularexpressions.com
Testing Deconvolution Algorithms

Convolved Image       Original Image

Test data is from http://bigwww.epfl.ch/algorithms/deconvolutionlab/
‘bars’ http://bigwww.epfl.ch/deconvolution/?p=bars
Testing Deconvolution Algorithms
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The Best Deconvolution Algorithms in ImageJ

- DeconvolutionLab
  - Richardson-Lucy
  - Regularized Inverse Filtering

- Iterative Deconvolve 3D
- CUDA GPU based Deconvolution

mitoYFP T-cells from David Rushworth, Cooper Lab
Standalone Deconvolution Software

OMX
DeltaVision

AutoQuant X3

SVI Huygens

mitoYFP T-cells from David Rushworth, Cooper Lab
Visualizing Cells in 3D

Rendering of YFP-mitochondria (may have been done) in Bitplane Imaris