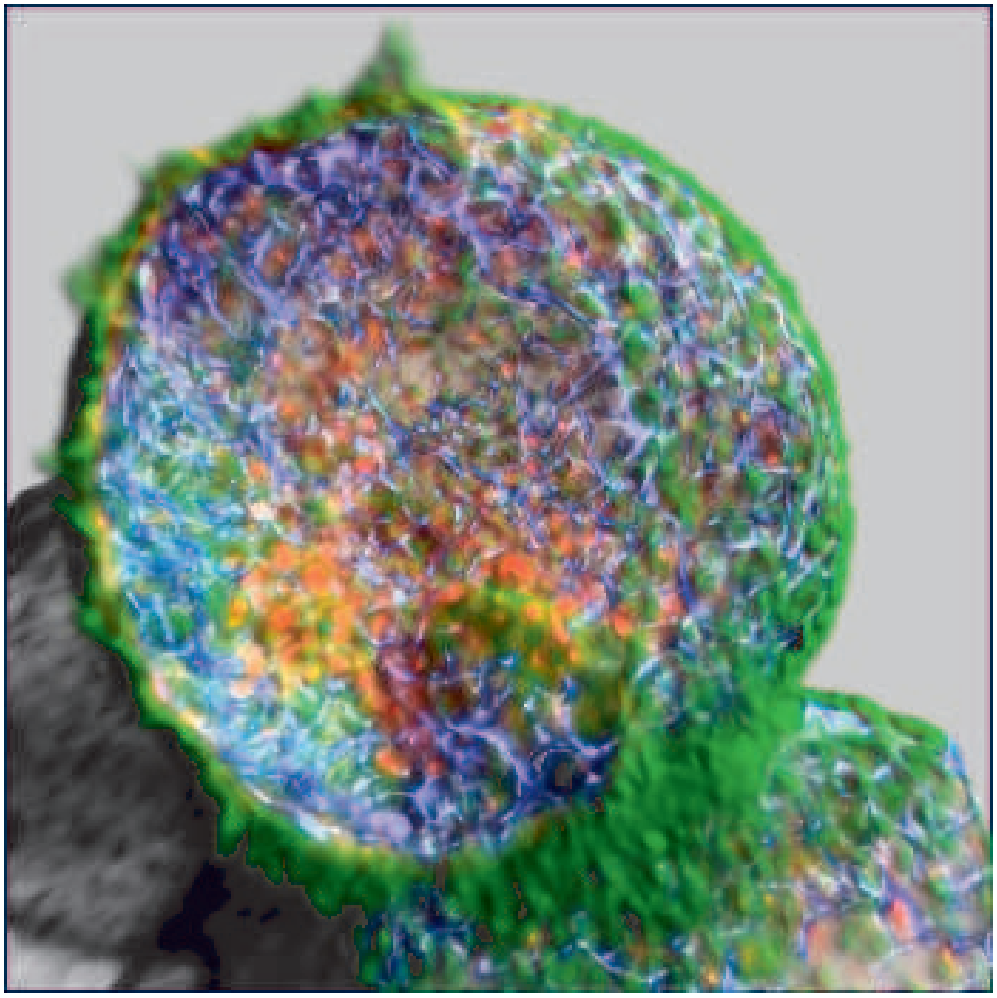
Huygens Essential



High quality deconvolution

Confocal ✲ Widefield ✲ Multi photon ✲ Nipkow disk

PSF distiller ✲ SFP volume visualization

From 2D to multi channel 3D-time images

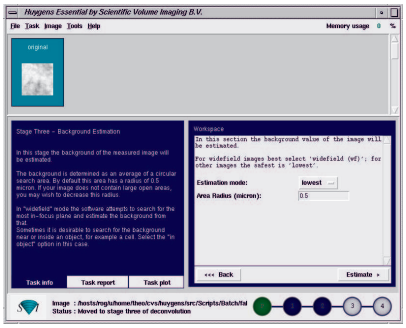
IBM AIX ✲ Mac OS X ✲ SGI Irix ✲ Linux ✲ Windows

Scientific Volume Imaging b.v.
www.svi.nl

Startling clarity with Huygens Essential deconvolution

Huygens Essential makes high quality deconvolution available for everyone by combining state of the art deconvolution algorithms with a remarkable ease of use. Huygens Essential improves resolution and contrast in your microscopic images dramatically while effectively removing haze and noise. In this way structures and details become visible which would otherwise remain hidden.

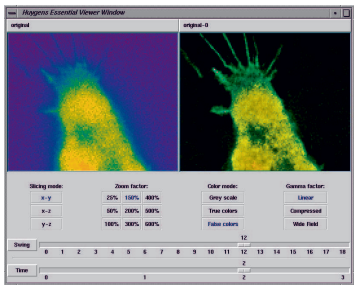
The wizard-style user interface guides you step by step through the deconvolution process.



In the preprocessing stage the intelligent parameter checker scrutinizes the microscopic parameters. It marks suspicious optical conditions and warns you of undersampling conditions. In the next stages you can use the automatic cropping tool, inspect the image histogram to spot clipping or saturation and inspect the image background.

At the last stage you launch the iterative deconvolution run. During this stage spherical aberration is also corrected, as well as bleaching in the case of widefield images or time series. You can then launch the Twin Slicer by clicking on a thumbnail image to compare the deconvolution result with the recorded image. Alternatively, you can open multiple volume rendering windows to compare results.

You're in charge: whenever you are not fully satisfied with the result you can stop iterations and rerun with, for instance, a different background setting. Each run results in a different thumbnail image to keep track of your work.

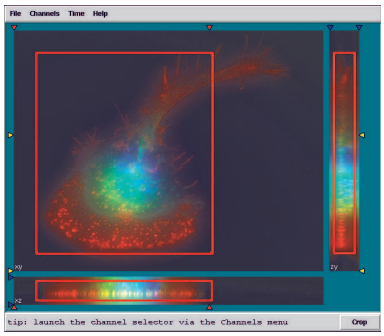


The Twin Slicer enables you to compare corresponding slices or time frames from the original and deconvolved image. You can simultaneously zoom and pan the images while selecting various contrast and colour modes. You can swing through space or time and compare individual voxel values.

Multi channel images are handled by deconvolving the channels sequentially. When all channels are done you can select the best result on each channel to compose the final result.

Time series Huygens Essential is able to deconvolve time series of 3D or 2D images, automatically correcting for bleaching and varying backgrounds.

The Intelligent 4D cropping tool allows you to trim images along four dimensions and to delete uninteresting channels. In that way you deploy your computer's processing power to only the interesting parts of the image.



Still, situations occur where your system's memory is not sufficiently large to allow deconvolution of an image as a whole. In these cases the image is split into bricks. The bricks are deconvolved one by one; the results seamlessly stitched together again.

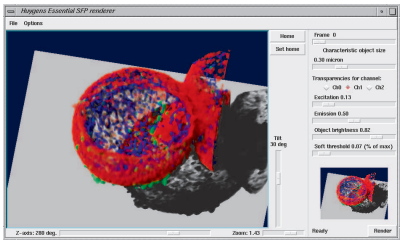
Multiple platforms. Huygens Essential runs on PCs with Linux, Windows 98, NT, 2000, XP and on Apple Mac OS X. When you find that your data have outgrown these platforms you can run a 64bit multiprocessor version of Huygens Essential on systems from SGI or IBM.

Image I/O file formats. Huygens Essential is able to deal with images in a variety of formats:

- Read/write ICS (Image Cytometry Standard), Nikon-ICS, Leica style TIFF series, Biorad 'pic', and Imaris classic images
- Read Zeiss 'Lsm5', Metamorph 'stk', 'MRC', Olympus 'Fluoview', DeltaVision 'IMSubs'
- Read/write a single or numbered series TIFF images into/from 3D volume image
- 4D support: ICS, TIFF series, Biorad, numbered 'stk'

Volume Rendering based on the Simulated Fluorescence Process algorithm (SFP).

- Depth cue rich physically realistic algorithm
- Interactive manipulation of viewpoint, transparencies and zooming
- 4D support & animation



A free demo copy of Huygens Essential can be downloaded from our website http://www.svi.nl.

Cover illustration and bottom right image: isolated Rat Hepatocyte couplet recorded at the Department of Anatomy, University of Basel, Switzerland (head: Prof. Lukas Landmann) as deconvolved with Huygens and visualized with the spectral SFP volume rendering algorithm. Cropper illustration: macrophage fluorescently stained for tubulin (yellow/green), actin (red) and the nucleus (DAPI, blue). Recorded by Dr. James Evans, Whitehead Institute, MIT, Boston MA, USA, using widefield microscopy. Slicer illustration shows 3D-time series of a similar macropahge, also recorded by Dr. James Evans. Central image pair: original (top) and deconvolved (bottom) widefield image: Rhodamine phalloidin labelled SW480 cell derived from a colorectal adenocarcinoma. Prepared by Dr. P. Roux and G. Gaddea, recorded by Dr. Pierre Travo, Centre de Recherches de Biochemie Macromoleculaire, Montpellier, France.

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