

# Safir

## Users Guide

### SAFIR

Safir is a tool specially developed for denoising fluorescence microscopy image sequences. It is based on well-established and published scientific methods and thus highly accepted in the scientific community. Since it is not changing the quantitative nature of the data it is an ideal pre-processing step for further image analysis like deconvolution, tracking, etc. Especially in low-light scenario Safir can tremendously improve the results of those methods which are in general very prone to noise.

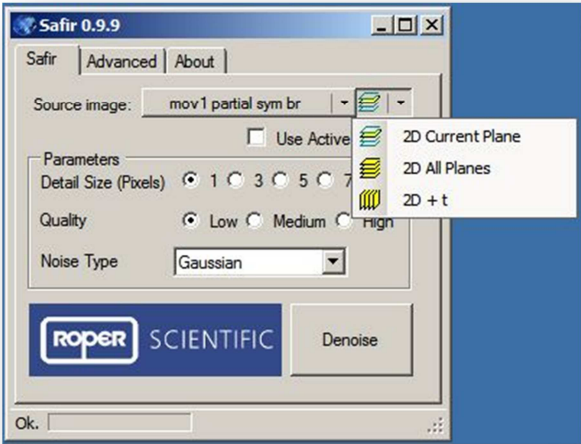
Safir is based on ND-SAFIR, software from INRIA. If you use this method for publication work, please cite the following paper.

**J. Boulanger, C. Kervrann, P. Bouthemy, P. Elbau, J.-B. Sibarita, J. Salamero Patch-based non-local functional for denoising fluorescence microscopy image sequences In Transactions on Medical Imaging, 29(2):442-454, 2010**

A copy of this paper can be found here:

[http://www.irisa.fr/vista/Papers/2009\\_TMI\\_Boulanger.pdf](http://www.irisa.fr/vista/Papers/2009_TMI_Boulanger.pdf)

SOURCE IMAGE



Main interface of Safir

Selects name of the image to denoise. Images are taken from open images in MetaMorph workspace. Safir works with single plane images, or multi-plane images which are treated differently depending on the denoise mode.

DENOISE MODE

2D Current Plane	Denoise current plane of stack in 2D mode.
2D All Planes	Denoise each plane in stack independently in 2D mode.
2D + t / 3D	Interprets the stack as time laps, denoise taking into account temporal information.

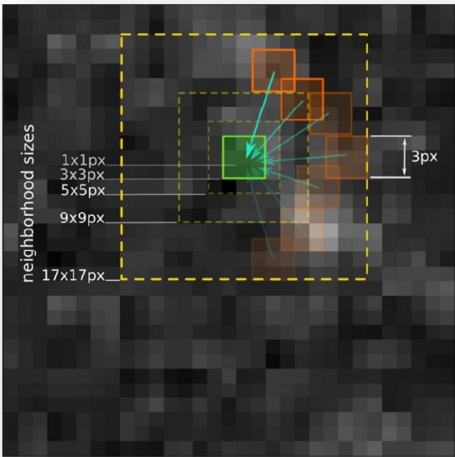


Illustration of Detail Size. Bigger detail size uses bigger patch sizes to average image details, which might result in slightly blurred result images in case of mismatched parameter.

PARAMETERS

Detail Size	Corresponds to the average size of structures present in the image to denoise.
Quality	Adjusts number of iterations, depending on noise-level in image. Images with low S/N ratio give better results with Quality High.
Noise Type	<i>Gaussian</i> : Scenarios with low S/N ratio <i>Poisson</i> : Good S/N ratio.

ADVANCED

Parameters	Default parameters used on startup and for automated denoising with MetaMorph journals.
Multiply Coefficient	Virtual Gain Parameter to be used in low signal scenarios. Images are denoised in float precision; intensity gets multiplied by "Multiply Coefficient" before rounding to entire values. May help gaining gray levels.
Mixing Coefficient	Amount of source image to be mixed with denoised image. Can be used if denoised image appears too artificial.