DIAMOND
Deconvolution of Augmented Images in Multi-dimensional Optical Microscopy
ANR projet 2009 - 2012 - http://www-syscom.univ-mlv.fr/ANRDIAMOND/

Objectives

Exhaustive study of two new optical fluorescence 3D techniques: diffraction tomographic miscroscopy and temporal confocal MACROscopy.

3D+t MACROscopy
- Modeling + acquisition
- PSF analysis / Image processing
- Deconvolution
- Results assessement

Tomographic microscopy
- Biological samples + acquisition
- PSF analysis / Image processing
- Deconvolution
- Results assessement
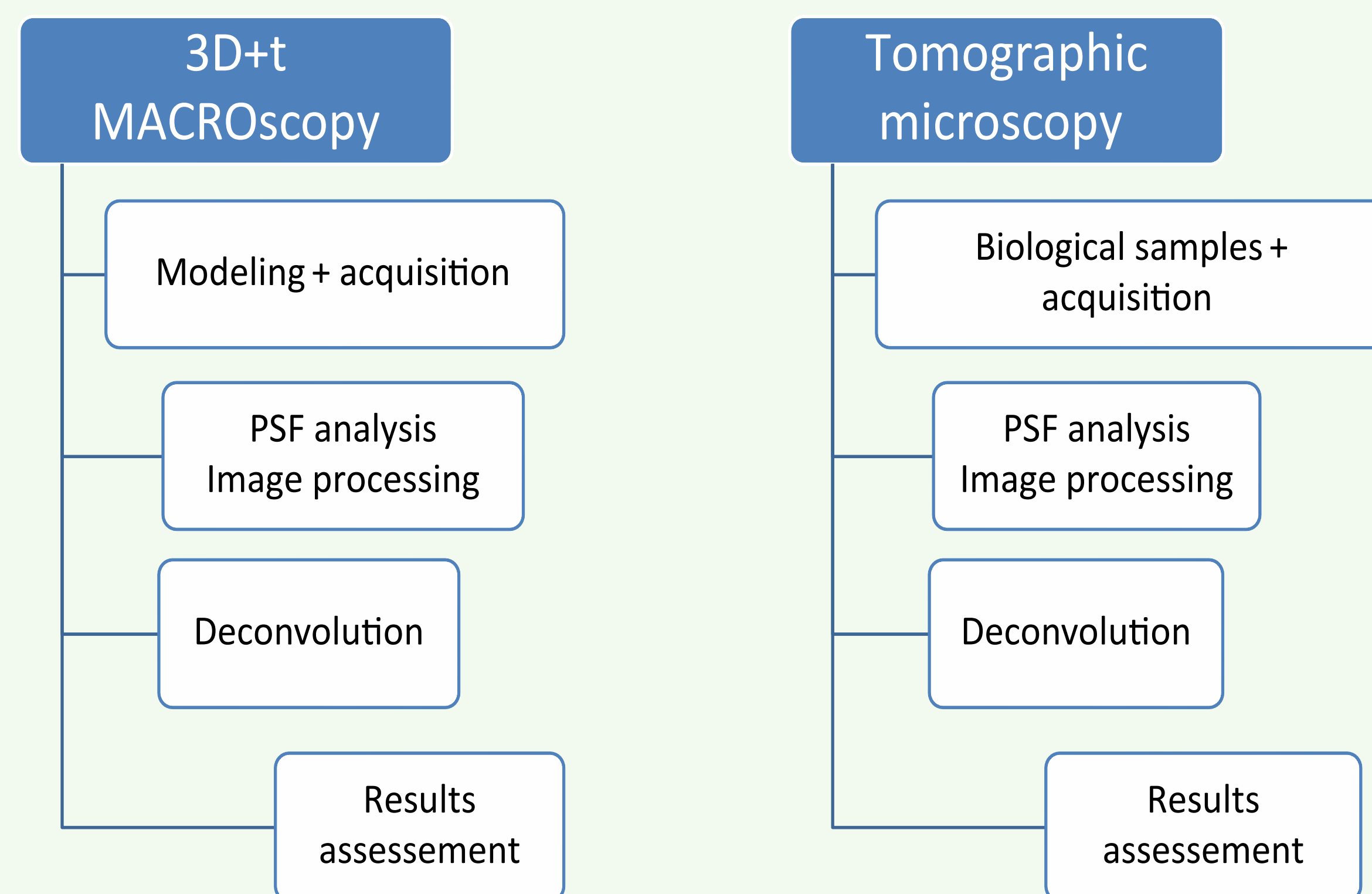
Perspectives

- Fast algorithms design
- Efficient implementations
- Estimation and deconvolution using spatially-variant PSF

Results

- PSF modelling, noise and bleaching rate estimation for MACROscopy
- Confocal MACROscopy image restoration with a Poisson-Gauss fidelity term
- Estimation of the fluorescence microscope PSF from the refractive index map obtained by diffraction tomography
- Blind restoration of confocal microscopy images with spatially-variant PSF
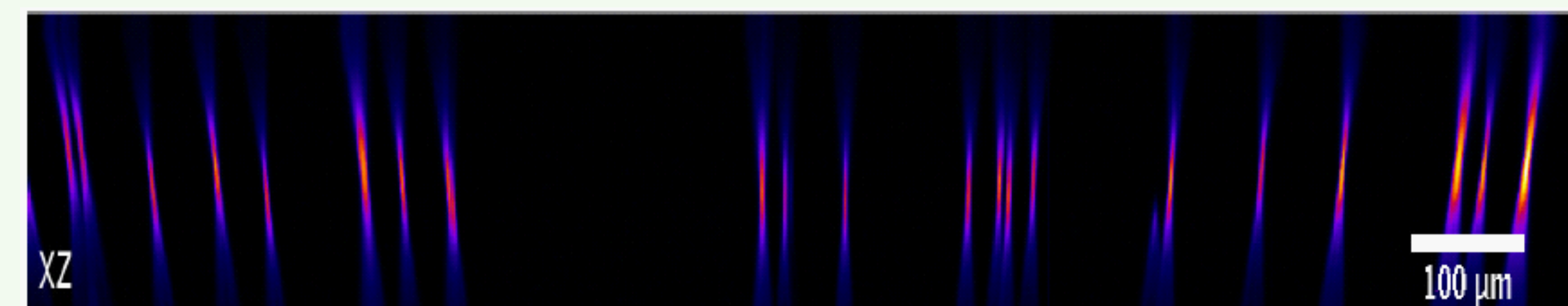
PSF modelisation in MACROscopy
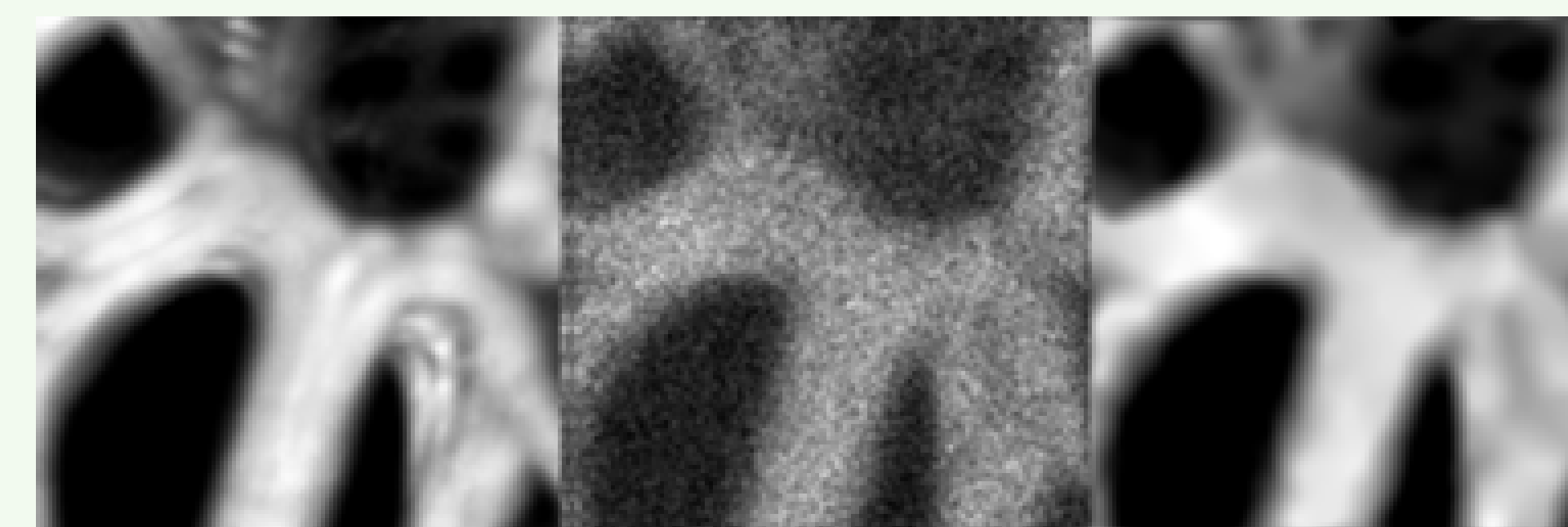
Original image *Observed image* *Restored image*

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