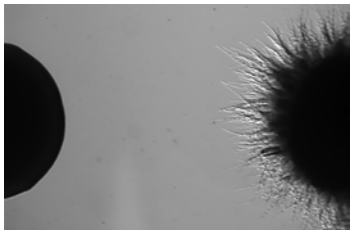
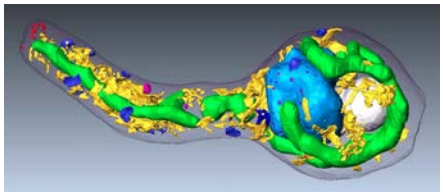
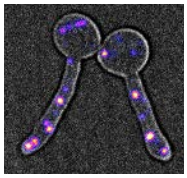
Super-resolution Dynamic Imaging of Intracellular Compartments in a Human Fungal Pathogen

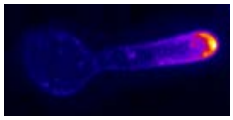
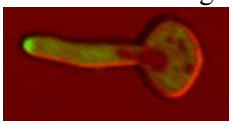
Super-Dynamic-I²Fun

Worldwide, fungal infections cause significant morbidity and mortality and *Candida* species are major etiological agents of such life-threatening infections. *Candida albicans,* a normally harmless commensal, is found on mucosal surfaces in most healthy individuals, yet it can cause superficial as well as life-threatening systemic infections. Its ability to switch from an ovoid to a filamentous form, in response to environmental cues, is critical for its pathogenicity. The apical zone of the filament is densely packed with multiple highly dynamic membrane compartments, including a cluster of secretory vesicles and Golgi cisternae. To understand the exquisite regulation of apical polarized growth, it will be critical to follow the movement of these compartments in 3D, with high spatial and temporal resolution. This PhD project will develop, optimize and apply super-resolution imaging approaches, in particular those taking advantage of fluorescent molecule blinking and their independent fluctuations in time, to study membrane traffic reorganization during filamentous growth in this medically relevant human fungal pathogen.

Candidates should have either a strong math/computational (convex/nonconvex sparse optimization in image processing, time series deconvolution, super-resolution) or a strong biological/microbiological (microscopy, mycology) background and be motivated to work in an interdisciplinary environment, with the possibility of short stays in life science biotechnology companies.

The recruited PhD student will follow different fluorescent protein fusions expressed in *C. albicans* live cells in super-resolved images obtained by reconstruction from wide-field acquisition. The entire acquisition pipeline will be optimized, from the experimental conditions to the reconstruction algorithm, for quantitative analysis of *C. albicans* hyphal subcellular structure and dynamics.

The supervisors have extensive experience in image processing and reconstruction (L. Blanc-Féraud; https://www-sop.inria.fr/members/Laure.Blanc_Feraud/) and fungal cell biology (R. Arkowitz; http://ibv.unice.fr/research-team/arkowitz/) and S. Schaub has developed a super-resolution microscope taking advantage of multiple-angle total internal reflection fluorescence (http://ibv.unice.fr/news/multi-angle-tirf-a-molecular-resolution-optical-microscope-developed-at-ibv/).

For program information see http://univ-cotedazur.fr/fr/recherche/boosturcareer#

Interested and motivated students please contact:

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