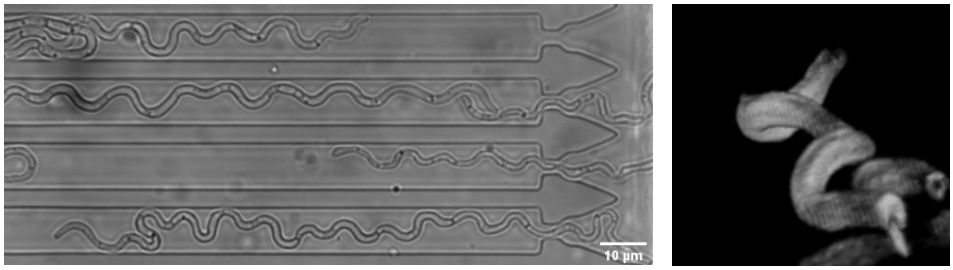
INTERNSHIP PROPOSAL

Laboratory name: **Physico-Chimie Curie**
CNRS identification code: **UMR168**
Internship director'surname: **Catherine VILLARD**
e-mail: **catherine.villard@curie.fr** Phone number: 06 25 78 42 01
Internship location: **Institut Pierre-Gilles de Gennes pour la microfluidique, 6 rue Jean Calvin, 75005 Paris**
Thesis possibility after internship: YES
Funding: Not yet (Possible ANR project)

Moving forward and curvy: a biophysical approach of the growth of *C. albicans*

Summary
Many organisms, from plant roots to nematodes move forward or grow is an oscillatory manner, forming sinusoids or helix.
We have recently dissected this phenomenon in the filamentous form of the human opportunistic pathogen yeast *Candida albicans* (E. Couttenier PhD thesis, https://hal.archives-ouvertes.fr/tel-03113033). We have in particular revealed that the confinement provided by two surfaces spaced by less than the filament (or hypha) diameter was a triggering condition for sinusoidal growth. In addition, more distant surfaces lead to helical growth while straight growth is observed in non-confined situations. Finally, let us note that a switch from straight to oscillatory growth can occur after the hypha hits an obstacle, or when entering in a confined space.
All these results were obtained from the development of dedicated physical microenvironments using microfluidic technologies. This project is developed in collaboration with Institut Pasteur, with the aim of better understanding the pathogenicity of *C. albicans*.



Sinusoidal and helical growth in PDMS chips

At this stage of the project, our purpose is to find the mechanism governing hyphal responses to their physical environments. From on-going discussions with theorists, one appealing hypothesis is emerging, based on the coupling between the polarity complex governing hyphal tip pathfinding (the Spitzenkörper) and cytoskeleton components.
The aim of the proposed internship is to provide new insights into this hypothesis thanks to new experiments and eventually modeling.

Methodological content: microfabrication in the leading French Institute for microfluidics (IPGG), cell culture, imaging and image analysis, interaction with theorists.
This internship is by essence fully interdisciplinary.