

## MASTER 2 RESEARCH INTERNSHIP

# Probing the mechanics of early marine embryos : *from measurements to models*

### Laboratories:

Developmental Biology Laboratory of Villefranche-sur-Mer (LBDV)  
Sorbonne Université - Institut de la Mer UMR7009  
181 chemin du Lazaret, 06230 Villefranche-sur-Mer

Center for Interdisciplinary Research in Biology (CIRB)  
Collège de France - CNRS UMR 7241  
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### Supervision:

Dr. Alex McDougall - Ascidian BioCell Group  
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Dr. Hervé Turlier - Multiscale Physics of Morphogenesis  
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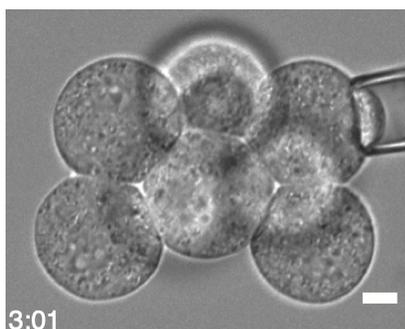
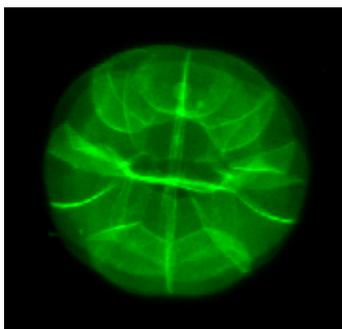
Paid internship: YES

PhD thesis after internship: YES

**Expected profile:** The candidate should be trained in **biophysics** or **soft-condensed matter**, and should be willing to work at the interface of **experimental** and **computational** biology. She/he should have good computational skills (**Python**) and interest for deep learning techniques.

**Project:** The project aims at creating a spatio-temporal map of cellular forces in the early embryos of two marine species: ascidian (*Phallusia mammillata*) and jellyfish (*Clytia hemisphaerica*).

The student will use the micropipette aspiration technique to measure the cortical tension and mechanical properties of cells during the first stages of embryo development. She/He will be trained and perform experiments in the team of A. McDougall. She/He will perform extensive confocal light-imaging of early embryo development and will use computational tools developed in the team of H. Turlier for automatized analysis of cells forces. Depending on their interests, she/he will also have the opportunity to develop their own image analysis tools, based on deep learning techniques, and will be able to directly use the results of experiments in 3D simulations of embryo development.



### Working environment:

The student will be working mainly in the team of A. McDougall in Villefranche-sur-Mer and will be co-supervised by H. Turlier, with whom several in-person meetings will be organized either in Paris or Villefranche. Experimental work will be assisted by experienced researchers from the group of A. McDougall. A notebook computer will be provided to the student, that will also have access to powerful computing resources located in H. Turlier's team.