



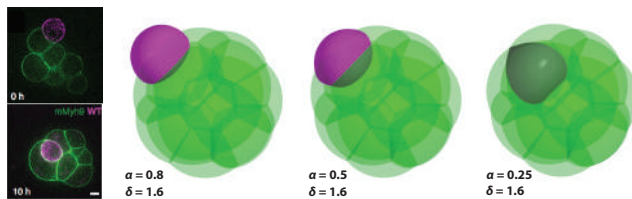
Post-doc position available

Multicellular dynamics: towards a virtual embryo

Position:

A post-doc position is available in the **new team *Multiscale Physics of Morphogenesis***, headed by **Hervé Turlier** (www.virtual-embryo.com). Funded initially for 24 months, the position can be extended to 36 months after evaluation. The work will combine **physical & computational modeling to build a novel simulation framework for multicellular dynamics in 3 dimensions**.

The mechanics of cells is generally dominated by the contribution of its actomyosin cortex, a thin viscoelastic layer which lies at the cell's surface. The active stress developed by molecular motors within the layer is sufficient to drive its non-linear deformation in cell polarization¹, cell division² or in the morphogenesis of early embryos³. The work will combine recent active-viscous models for the actomyosin cortex with a new numerical framework for describing the geometry & topology of multicellular systems in 3 dimensions³. The resulting computational tool will form a general-



Internalization of a cell in a mouse embryo, experiments & simulations.

purpose framework to simulate the dynamics of multicellular systems, and in particular early embryos. Several biological problems may be studied in collaboration with experimental biologists, such as the development of early mammalian embryos³ or the nature & properties of contractile surface waves⁴.

1. Bun P. et al., Mechanical Checkpoint For Persistent Cell Polarization in Adhesion-naive Fibroblasts. *Biophysical Journal* **107** (2014).
2. Turlier H. et al., Furrow Constriction in Animal Cell Cytokinesis. *Biophysical Journal* **106** (2014).
3. Maître J-L., Turlier H. et al., Asymmetric division of contractile domains couples cell position and specification. *Nature* **536** (2016).
4. Maître et al., Pulsatile cell-autonomous contractility drives compaction in the mouse embryo. *Nat. Cell Biol.* **17** (2015).

Skills:

The candidate should prove **excellent research records** in **theoretical physics, mechanical engineering or computational science/applied mathematics**, and should already have **strong programming skills** (C++). Experience in differential geometry will be valuable, as well as past collaborative work with experimental biologists. The candidate will furthermore be expected to take part in the scientific life of the lab, to present his research at interdisciplinary & international conferences & to participate to outreach activities from the Foundation Bettencourt-Schueller.

Location:

Located in the heart of the Latin Quarter in Paris, Collège de France is one of the oldest Research University in France, with internationally renowned Professors & research laboratories. The Center for Interdisciplinary Research in Biology (CIRB) is a novel & interdisciplinary CNRS/INSERM structure (UMR 7241 / U1050) regrouping 21 teams focused on biological problems from various perspectives: cell & developmental biology, neuroscience, mathematical biology and biophysics.

Interested candidates should contact herve.turlier@college-de-france.fr