

POSTDOC POSITION

Fluid-structure interactions in active channel networks

**Mechanical and Engineering Institute of Marseille (IMI)
Marseille, FRANCE**

Target start date: September 2022

CONTACT

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Context. Liquid transport in channel networks is a key element in many biological systems. It enables the transport of functional fluids and the actuation of soft membranes. Research inspired by biological systems has led to many technological advances in fields such as soft microfluidics and soft robotics. One significant difference between the technological applications emerging from these fields and their bioinspiration has always been the nature of their actuation. Large microfluidic networks often rely on external pressure controllers and numerous serial valves to function. In contrast, in biological tissues and vascular networks, locally distributed feedback-based deformations are at the core of the control of fluid flows.

The main goal of the proposed research is to develop model experiments and theoretical models that explain and predict how large deformations can emerge from feedback-based transport in channel networks (Fig. 1).

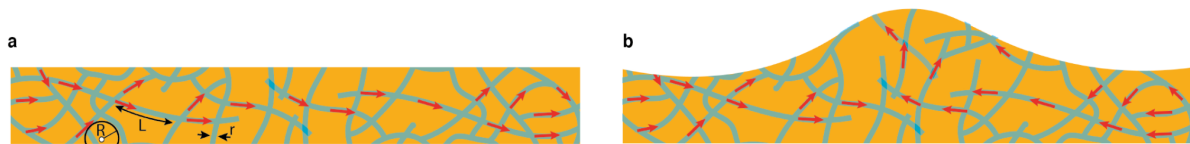


Fig. 1: (ab) illustration of self-deformation triggered through active fluid transport. The shape of the channel networks and the (re)orientation of the local flow are critical parameters to study such deformation dynamics.

Profile. Candidates with either Physics or Engineering backgrounds and interested in the general area of soft/compliant mechanics, biomechanics or fluid mechanics are welcome to apply. The following areas of experimental expertise are particularly welcomed: rapid prototyping, micro-fabrication, material science and mechanical testing. Skills in scale analysis, theory, and proficiency in finite element analysis are a plus.

Environment. IUSTI and IRPHE are laboratories of CNRS and Aix Marseille University located in Marseille, France. They are part of the Mechanical and Engineering Institute (IMI), one of the leading French Institutes in fluid and solid mechanics with opportunities for strong interactions with local and international collaborations.

Application procedure. Applicants are welcome to directly contact Martin Brandenbourger and Joel Marthelot with a detailed CV before June 10th 2022.