

Open position: Postdoctoral fellow, Duration: 2 years, Starting date: Spring 2021

Subject: Biomechanics and mechanobiology of the lymphatic system

Funding agency: ANR (Agence Nationale de la Recherche), MechLymph project

**Advisor:** Dr. Badr Kaoui, CNRS Associate Scientist, Biomechanics and Bioengineering Laboratory, Université de Technologie de Compiègne, 60200 Compiègne, France / badr.kaoui@.utc.fr

**Context of the project** The lymphatic system consists of a network of thin lymphatic vessels, and of lymph nodes, that run throughout the body in a tree-like structure with tiny roots that drain the lymph fluid from all around the body towards the right lymphatic duct and the thoracic duct in order to administrate it back into the bloodstream. The lymphatic system has not been extensively studied, in contrast to the cardiovascular system even though both are closely related and complementary. The lymphatic system has recently appeared to have a crucial role in eliminating cancer cells beside its main task of returning back fluid from the interstitial spaces to the blood circulation, and to be a vital part of the immune system. There are still multiple crucial open questions regarding the function of the lymphatic system. This project aims to study *in silico* the biomechanics and the mechanobiology of the lymphatic system.

**Postdoc description:** The recruited postdoc is expected to pursue our quest to gain further insight into the biomechanics and the mechanobiology of the lymphatic system. The postdoc is expected to handle an in-house numerical library, the used numerical methods (LBM, IBM, and FEM), the physics, the biochemistry and the mechanics of the studied system. The postdoc will implement new features and will improve the performance of existing and newly implemented algorithms, and will learn and implement state-of-the-art techniques of fluid-structure interaction. The postdoc will use fully three-dimensional computer simulations to study the correlation between the lymphatic vessel wall biochemically induced contraction and the opening-closing of the lymphatic valves, and its consequences on controlling the lymph fluid pumping mechanism.

**International collaboration:** Close collaboration and strong interaction are planned with the group of Dr. Lance Munn of Massachussetts General Hospital at Boston (USA).

**Qualifications:** PhD in science or engineering with strong background in scientific computing, high performance computing and fluid/solid mechanics.

**Application documents:** Curriculum vitae, motivation letter, statement of research, and at least two recommendation letters.