



Post-doctoral position

Magnetically actuated metamaterials for biotechnology applications

The CEA/INAC SPINTEC and SyMMES labs offer an 18 months post-doctoral position on the development of magnetically actuated metamaterials prototypes for biotechnology applications. This work is part of the ABIOMATER European FET project, with the general goal of developing bio-inspired metamaterials [1]. This project aims at the creation of a new class of magnetically actuated soft metamaterials, as a basis for novel micro and macro-mechanical devices. This is achieved by the understanding of the fundamental physical principles of these materials, and the production of prototypes which will demonstrate the breadth of technological potential therein.

Based on the results already obtained since the beginning of the project on the fabrication and properties of soft **Magneto-Elastic Membranes (MEM)** with micrometer-sized magnets embedded in PDMS, the candidate will conduct the following studies:

- Study of **Bioreactor Systems**, consisting in vibrating MEM-based single-layer or 3D systems in which cells will be incorporated: test for their ability to modify cell growing, to maintain cell viability, and study of the cells growth under static or dynamic stress induced by the MEM actuation;
- Fabrication and study of **MEM-based Micro-Lens** with the goal of achieving tunable optical properties, using an externally applied magnetic field to tune the shape of the stretched membrane;
- Fabrication of **MEM Muscle Analogue**, by the design of membranes with magnetically controlled anisotropic contraction, such devices forming the basis for sphincters and valves. A second phase of the experiments will focus on the dynamic regime, appropriate for muscle constructs.

The successful candidate will show motivation for a multidisciplinary experimental work in a multi-partners project, with a strong capacity for autonomy. Required qualification is a multi-disciplinary PhD degree in nanoscience and nanotechnology, including knowledge in physic, chemistry and biology, or relevant experience in these fields. Experience with clean-room fabrication would also an asset.

Applicants should send a CV, a letter of motivation, a brief description of scientific achievements including publications, and contact information for two references.

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[1] <http://blogs.exeter.ac.uk/abiomater/>