

- **Title:** Development of dielectric elastomeric materials for cardiac assistance
- **Duration:** 12 months
- **Salary:** ~ 2990 €/month (gross)
- **Scientific theme (disciplinary field):** Materials chemistry
- **Host laboratory:** Laboratoire de Physicochimie des Polymères et des Interfaces (LPPI) – Université de Cergy-Pontoise (France)
- **Background:** Thesis in polymer materials.
- **Skills:** General knowledge of polymer synthesis methods and their mechanical and electrical characterization.

LPPI (Laboratory of Physicochemistry of Polymer and Interfaces) from University of Cergy Pontoise wants to recruit a postdoctoral fellow for one year starting from January 2019.

- **Subject**

Electroactive polymers (EAPs) are materials capable of changing shape or volume under the action of electrical stimulation. They therefore have a strong development potential in the field of actuators, precursors of artificial muscles. Among these materials, dielectric elastomers (DEs) are the subject of much research given their high deformation capacity and their high breakdown voltage for producing lightweight actuators with good energy efficiency. The study of their electromechanical properties shows that, for optimal performance, these materials must have high dielectric permittivity and stretching rate, and low dielectric losses and viscoelastic damping.

LAI (Laboratory of Integrated Actuators) of the Ecole Polytechnique Fédérale de Lausanne wishes to use this technology to create an implantable cardiac assist device. However, the specific energy densities of the existing materials are insufficient. In this context, LPPI is seeking to develop new dielectric elastomeric materials. For this purpose the candidate will synthesize new elastomers and / or produce original formulations, then characterize their mechanical properties (stress-strain, viscoelasticity, etc.) and electrical properties (dielectric constant, breakdown voltage, etc.) so as to obtain material meeting a list of specifications. Some of these characterizations can be done at LAI and the adequacy of the envisaged solutions with biocompatibility and integration constraints in the human body will also have to be considered.

- **Candidate profile**

Doctor in chemistry with a polymer specialty.

**Main skills**

General knowledge of synthesis methods and characterization of polymer materials, in particular the techniques of mechanical (DMA, traction ...) and electrical (resistivity, breakdown voltage ...) analysis. Experience in the field of dielectric elastomeric materials in general and / or on silicone-based materials would be a plus.

**Additional skills**

Synthetic, good oral and written communication skills in French and English.

- **Contact person to candidate and/or to have informations:**

Dr. Philippe Banet  
Laboratoire de Physicochimie des Polymères et des Interfaces  
[philippe.banet@u-cergy.fr](mailto:philippe.banet@u-cergy.fr)