PhD student position in Digital Manufacturing of Sensors for Smart Wearables

The MEMS and Printed Microsystems group led by Dr. Danick Briand from the Soft Transducers Laboratory at the EPFL (Swiss Federal Institute of Technology) has an opening for a PhD student in the fields of printed electronics and smart wearables.

Requirements
- M.Sc. in Materials Engineering, Mechanical Engineering, Micro-engineering, Electrical Engineering, Physics, or related field.
- Strong experimental skills and interest in printing technologies
- Ability to collaborate closely with colleagues in a multicultural setting.
- Fluent in English. French is a plus.

Objectives and description
Recently 3D-printing has made strong progress and is applied to the fabrication of various structural elements. One of the key challenges for the full exploitation of the potential of the technology is to integrate in the process chain the printing of functional layers. Implementation of sensing components by printing during their fabrication would make the 3D-printed objects smarter. The project D-SENSE aims at digitally manufacture sensors in 3D-printed wearables. The project focuses on wearables for human and robots for which customization and sensing will be highly beneficial. We will demonstrate smart free form 3D printed wearables including temperature, strain, force/pressure and motions sensors. The wearable will be 3D-printed following the shape of the host human or robotic part.

The project aims to solve one key challenge of integration of sensors into products: Enabling the integration of functional sensing layers into the fabrication process of 3D-printed objects. The objective is to digitally print functional and structural inks to form smart 3D-printed sensing wearables. The approach will be based on the use as structural materials of 3D-printed cellulose-based composite elastomers, biocompatible and breathable, with tunable mechanical and chemical properties. Digital printing of metallic and composite electrical conductors to realize embedded resistive, capacitive and triboelectric transducers will be investigated. Materials and processes will be also developed to include antenna and discrete electronic components to provide the sensors with electronics and communication.

Context
This project is funded in the framework of the Swiss program of the Strategic Focus Area (SFA) Advanced Manufacturing and will be performed in collaboration with research groups from ETHZ, EMPA, CSEM, and CHUV. This research activity is carried out at the EPFL-EnviroMEMS group (Dr. D. Briand) leader in printed flexible electronics and sensors. The laboratory is located in the Neuchatel campus of the EPFL, with state of the art facilities for processing soft materials on large areas based on additive manufacturing digital printing.

The candidate must have strong electrical design skills, be adept at thinking at a system level, and enjoy building and testing working devices. The candidate must be highly motivated, independent, yet able to work closely and harmoniously with colleagues in this lab and partner labs.
**Contract details**

- Generally up to 4 years
- Start date: 4.2018
- Excellent facilities (state of the art printing facility)
- Work location is Neuchâtel, Switzerland.
- The main language used for technical discussions in the lab is English.

To apply for the position, please email a CV, cover letter, university transcript, and list of three references to danick.briand@epfl.ch. In addition, students must be admitted to the EDMI doctoral school at the EPFL.

Further information about our lab can be found at [http://lmts.epfl.ch/EnviroMEMS](http://lmts.epfl.ch/EnviroMEMS)