

Microfluidic devices for the development of advance therapy medicinal products using acoustofluidic interactions

Microfluidics / Acoustofluidic interaction / Instrumentation / Lab on a chip / BioMicrodevice

Host institution: Univ. Bourgogne Franche Comté

Laboratory: FEMTO-ST Institute, MN2S Dept, Besançon, FRANCE

Starting date: November 2018

Duration: 36 months

Salary: 1400€ net/month

Positioning of the project

The treatment of chronic inflammatory diseases and cancer is on the cusp of a revolution related to the recent advances in biotechnology. Classical treatments by chemical drugs have shown their limits but some new drugs obtained from the patient itself are starting to emerge. These advanced therapy medicinal products (ATMPs) have an exceptional application potential, but require to rethink the production process of these drugs from living materials. Their manufacture requires implementing complex technology in a controlled environment. This work is part of the MIMEDI project (Microtechnology for advanced therapy medicinal products) which involves 10 partners (6 companies, 3 academic partners and a transfer agency).

The aim of this thesis is to develop new microfluidic devices based on acoustofluidic interactions (acoustophoresis) which allows manipulating fluids and particles. These devices will be used to enhance interactions between cells and sort them. The first step of the study will be dedicated to design, including simulation of the device. The second step will concern fabrication (including clean room processes) and experimental validation. At the end, the device will be tested with biologists to validate efficiency in the production of transgenes for new cell therapy and medicinal products.

This thesis will be hosted at the BioMicroDevice Group, Micro-Nano Sciences and Systems (MN2S) Department of the Femto-St institute (www.femto-st.fr) in collaboration with biologist from other MIMEDI project partners.

Candidate profile

The candidate will benefit from the skills and experience of our laboratory in the field of microtechnology, acoustic devices, microfluidic, instrumentation and biochemistry and will operate in the clean-room facilities of FEMTO-ST. She/he will be involved in the design (FEM simulations), microfabrication of prototypes including the fluidic cell with acoustic transducer and in the experimental setup to control the microfluidic devices.

The candidate should be qualified in applied physics or engineering sciences and with a strong interest for interdisciplinary environment and experiments He/she should possess skills among MEMS, acoustics, instrumentation and multiphysics simulation. Some knowledge in biomedical field will be appreciated but is not necessary.

She/he is expected to be highly autonomous and innovative, to demonstrate ability to write, communicate in English and work in an interdisciplinary approach. French language is not required.

Application procedure

To apply, send an email before sept 30th 2018 with detailed CV, 2 references and motivation letter to: Jean-François Manceau (jfmanceau@femto-st.fr) and Franck Chollet (franck.chollet@femto-st.fr) (<https://scholar.google.com/citations?user=44MuafQAAAAJ> and <http://members.femto-st.fr/chollet/>)

Links

<http://projects.femto-st.fr/mimedi/>

<http://teams.femto-st.fr/BioMicroDevices/>

<http://teams.femto-st.fr/BioMicroDevices/en/acoustophoresis>

