

## Scientist position

### *Spectroscopic tools for on-line monitoring of mammalian cells processes*

#### **Context**

Physiological state and properties of cells still remain difficult to on-line monitor during whole bioprocesses. Most of the information is obtained from delayed off-line measurements. However, the real time quantification of cell physiological state is essential to better understand cell metabolism and to implement control strategies allowing to reach high performance processes. On-line dielectric spectroscopy is now used in various bioprocesses for the determination of cell concentration. However, it often requires additional off-line techniques to access biological significant variables. In this context, the French National Agency for Research (ANR) has founded the SPECTRE project (Spectroscopies pour l'Evaluation et le Contrôle en Temps réel de l'Etat Physiologique de cellules biologiques). The aim of this project is to study the coupling of two technologies, the spatially resolved optical spectroscopy (SRS) and the dielectric spectroscopy, for on-line determination of cell physiological variables such as biovolume, cell size, membrane capacitance, intracellular conductivity, ... during bioprocesses using various biological cell (yeasts, animal cells, ...). In parallel, some off-line analyses (using microscopy, cytometry, florescence, image analysis, ...) will be performed to initially calibrate on-line data. Several French and Mexican research teams involved in Biochemical Engineering, and a society specialist in SRS domain and in data analysis techniques, will collaborate.

#### **LRGP project**

The Biochemical Engineering Group, which is included in the Laboratory of Reactions and Chemical Engineering (LRGP) in Nancy, is active since twenty-five years in the field of animal cell culture processes. In the SPECTRE project, it will perform various cultures of mammalian cells, in suspension or attached on microcarriers, inside bioreactors implemented with sterilisable sensors (pH, temperature, dissolved O<sub>2</sub>, dissolved CO<sub>2</sub>, NIR, SRS). Off-line methods will be used to calibrate and validate on-line measurements. To improve knowledge of cell behaviour throughout the whole cell culture and ensure a pertinent monitoring of the process, a software tool will be developed to reconcile the data set.

#### **Applicant**

The candidate should have a Master or a PhD degree in Biochemical Engineering, and any experiences in animal cell culture will be appreciate. He should know basic methods for cells or medium analysis. He will be interested by the development of new sensors and software for on-line data processing. The candidate will be highly motivated, handy, able to work independently. He should have very good interpersonal skills to interact within the team and with the project partners. He should demonstrate critical thinking and initiative and have good communication skill in oral and written English.

#### **Other details**

Workplace: Laboratory of Reactions and Process Engineering, LRGP-UMR CNRS 7274  
Université de Lorraine, ENSAIA, 2 Avenue de la forêt de Haye,  
54500 Vandœuvre-lès-Nancy, France.

Date and duration: The position will be open from February 2013 for 18 months.

Contact: Send CV, motivation letter, publications and coordinates of three references to:

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