



## Post-Doctoral Position in therapeutic agents evaluation on lymphoma cells with a high frequency based analysis technique

### Context

The measurement of biological signatures actually requires marker-based techniques. Cellular functions are usually determined with various methods such as flow cytometry or imaging, which involve cellular labeling with fluorescent molecules and do not give access to all cellular behaviors. The development of analyzing tools, exhibiting rapidity, precision and compatibility with very small volumes of biological samples, without preliminary manipulation or labeling, constitutes a huge challenge.

### Post-doctoral tasks

Within this context, the MH2F team of LAAS-CNRS in close partnership with team 9 of CRCT is developing a new physical analysis technique, which could exhibit such abilities. It is based on the exploitation of microwave dielectric spectroscopy [1]. The technique has been previously developed and validated for cells quantification and viability [2-3]. The core of the project is now to evaluate the effectiveness of therapeutic agents on lymphoma cells. Despite the efficiency of current treatments, some lymphomas are indeed still incurable because of the aggressiveness or the stage of the disease but also according to the patient. Being able to in vitro evaluate the efficiency of chemicals on patient cells presents therefore a pertinent interest toward personalized therapies.

The candidate will consequently have in charge first to adapt the actual microwave test setup with a controlled bio-environment. He/she shall then conduct high frequency experiments on B lymphoma cells with different therapeutic agents, in parallel to traditional analyzing techniques, such as flow cytometry or label-based optical imaging. Investigations shall be conducted both on cell lines and then on patients cells.

### Profile

The candidate shall speak English or French, and have good communication skills.

He/she shall possess a background in the fields of

- physics, electrical engineering (electromagnetics preferably but not mandatory), with interests in cellular biology, bioengineering and micro-nanotechnologies,
- or cell biology with interests in new analytical instrumentations.

Demonstrated interests in multidisciplinary research will be a plus. High experimental skills are also required.

**Duration** 2 years

**Starting date** Nov. 1st, 2015, at the latest

**Localization** LAAS-CNRS lab, in the MH2F team, and CRCT lab, in the J.J. Fournié team, in Toulouse, France.

**Contacts** CV and motivation letter shall be sent to both contacts.

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### References:

- [1]. K. Grenier, D. Dubuc, P-E. Poleni, M. Kumemura, H. Toshiyoshi, T. Fujii, H. Fujita, 'Integrated Broadband Microwave and Microfluidic Sensor dedicated to Bioengineering', IEEE Trans. on Microwave Theory and Techniques, Vol. 57, n°12, Dec. 2009, pp. 3246-3253
- [2]. K. Grenier, D. Dubuc, T. Chen, F. Artis, T. Chrétiennot, M. Poupot, J-J. Fournié, 'Recent Advances in Microwave-based Dielectric Spectroscopy at the Cellular Level for Cancer Investigations', invited paper in the Biomedical Applications of RF/Micro. Tech. Special Issue of IEEE T-MTT, Vol. 61, Issue 5, Part 2, 2013, pp. 2023-2030
- [3]. F. Artis, T. Chen, T. Chrétiennot, J-J. Fournié, M. Poupot, D. Dubuc, K. Grenier 'Microwaving biological cells - Intracellular analysis with microwave dielectric spectroscopy', IEEE Microwave Magazine, pp. 87-96, May 2015