

COSMETOSCIENCES PROGRAMME – ARD 2020

(Open to young scientists)

Research Field: [Analytical chemistry in cosmetic and pharmaceutical sciences](#)
(Chromatography and Raman spectroscopy)

CONTEXT

Region Centre-Val de Loire (France) actively supports research projects connecting academia with industry through the ARD 2020 program. For instance COSMETOSCIENCES is a scheme enabling gathering of researchers from the university and local cosmetic industrial partners to address current needs in novel technology and/or expertise.

Numerous companies are specialised in development of new processes for preparation of skin products for topical application hence involving diffusion of Active Cosmetic ingredients (ACI) or Active Pharmaceutical Ingredient (API) through the layers of the epidermis. Biological evaluation remains a crucial step with scientific evidence of suitable penetration of the active molecules and innocuousness of products toward the skin barrier function.

In that context, the University of Tours (EA 6295 NMNS, faculty of pharmacy) is currently exploring combination of analytical protocols based on chromatography techniques (HPLC, GC) and Raman imaging as tools for *in vitro* detection and tracking of ACI/API penetration in the skin but also to investigate and elucidate molecular dynamics occurring in the *stratum corneum* after topical applications of different type of formulations.

SCIENTIFIC RESEARCH CONTEXT

Raman Confocal Imaging (RCI) enables label free chemical characterization of biological samples at tissue and subcellular levels. Beyond proven capabilities for discrimination of different tissue/cell types, the notion of RCI opens perspectives to monitor and elucidate molecular dynamics induced following exposure to an exogenous agent. Applied to the skin industry, Raman spectroscopy is a most suited analytical tool for the detection and tracking of ACI or API delivering information about their penetration through the *Stratum corneum* but also their diffusion rate in the underlying layers of the skin.

Chromatography techniques remains gold standards when it comes to quantifying specific molecules. HPLC and GC are particularly interesting to study penetration kinetics of ACI or API through biological epithelium (reconstructed skin, human skin) or synthetic (polymeric membranes). Those techniques provide assessment of the overall permeability of the system studied to particular active molecules or formulations.

In that context, the EA6295 NMNS (Faculty of Pharmacy, Tours, France) has established a dynamic project involving industrial partners to promote and support development of analytical protocols combining RCI and chromatography techniques for *in vitro* and *ex vivo* biological evaluation of new formulations process.



MISSION OF THE RESEARCH SCIENTIST

The scientist will be in charge of the analytical aspect of the project including skin samples preparation, data collection and data analysis. The main mission is to set up comparative studies to investigate *a*) kinetics of penetrations of active molecules in different skin models (human, reconstructed skin, synthetic skin) and *b*) Understanding the link between physicochemical characteristic of the formulations and diffusion of active molecules in skin models.

The candidate will join a dynamic ongoing project with participation of other students and postdoctoral fellows. Therefore, it is expected its contribution to be focused on the optimization of the protocols for improved repeatability and reproducibility in results collected. As example, most of *in vitro* penetration studies are performed in Franz diffusion cells requiring standardization (Volume of samples in donor compartment, nature of the receptor fluid, etc...). For HPLC analysis, depending on the type of formulation tested and the skin model used the column and/or mobile phase need to be adjusted. Similarly, methodology for Raman imaging can be subjected to a number of optimizations from wavelength of the laser source, selection of objective, substrates used for samples deposition, etc.... The candidate will take part in the different experimental aspects to strengthen in house competences.

Young scientists are really welcome on this project. Although Raman spectroscopy holds a strong position in the project, candidate with competences in chromatography or other relevant techniques are strongly encourage to apply.

ESSENTIAL SKILLS AND EXPERIENCE

- Significant track records in the field of analytical sciences applied to cosmetic / pharmaceutical sciences:
 - previous experience in skin analysis (human and/or reconstructed models);
 - or previous experience in penetration studies;
 - or demonstrated expertise for applications of Raman spectroscopy to tissue and/or subcellular imaging;
 - or demonstrated expertise in chromatography techniques (HPLC, GC);
- Experience and motivation for team work and ability to establish fruitful scientific exchanges with researchers, students and actors of different technical and scientific cultures;
- Research experience in the field of study, able to innovate and interact with diverse stakeholders including industry;
- Proven ability to participate to the whole research chain from the definition of the experimental set-up, preparation of samples, data collection, data analysis and communication of results to both academic and non-academic audiences;
- Strong organisational and time management skills with ability to prioritize work, manage time effectively and deliver results on time;
- Excellent written and verbal communication skills, including abilities to make clear and concise presentations but also to participate to fast publication of latest results.

CONDITIONS OF EMPLOYMENT

The position is based in **Tours, France**

Duration of the contract: **15 months**

cosmetosciences.org



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Gross monthly Salary: **2600€**

The research scientist will be provided with the necessary means of work (laboratory facilities, office, telephone, internet, access to databases, computer tools, etc ...) inside the EA 6295 Nanomedicines and Nanoprobes research unit based in Tours.

The scientific working languages are French and English.

CONDITIONS OF APPLICATION

Application to be sent to Franck Bonnier (franck.bonnier@univ-tours.fr) – CV + motivation letter

Applications will be reviewed as they come in.

The position is expected to be filled before June 2019.

