LABORATOIRE D'ELECTROCHIMIE MOLECULAIRE
Université Paris Diderot
UMR CNRS 7591, Paris, France

Funded PhD position

Title

Assembly and multi-scale electrochemical interrogation of integrated enzymatic systems, organized on nanometer-sized viral particles.

Keywords *biomolecular electrochemistry, viral nanotechnology, enzymatic catalysis, AFM-SECM microscopy.*

Project Summary

This project aims at assembling integrated enzymatic systems, comprising redox enzymes and mediators, on nanometer-sized viral nanoparticles, and to probe their catalytic response by a *multi-scale electrochemical approach*. An innovative immunological technology, based on the use of single domain antibodies (nanobodies), will allow us to position the enzyme PQQ-GDH and the redox/enzymatic mediator ferrocene, on the surface of GFLV viral particles (30 nm in diameter) with an unprecedented degree of spatial control. Studying the activity of the resulting catalytic viral particles, at the ensemble scale by cyclic voltammetry, but also at the single viral particle scale by AFM-SECM microscopy, will allow us to gain fundamental understanding on how the positional control of enzymes and mediators on nanoscaffolds can enhance bioelectrocatalysis.

This interdisciplinary project will be conducted in collaboration with two international research groups specialized in viral nanotechnology:

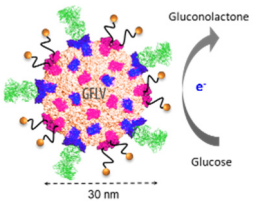
- Thierry Michon, INRA, Laboratoire biologie du fruit et pathologie – virologie, Univ. Bordeaux, France.
- Christophe Ritzenthaler, CNRS, Institut de Biologie moléculaire des plantes, Univ. Strasbourg, France.

Funding

French Ministry of Research Grant. Doctoral School ED 388 - Chimie physique et Chimie Analytique de Paris Centre (http://www.ed388.upmc.fr/).
Starting date: September /October 2019. ***Duration:*** 3 years.
Gross salary: Approx. 1800 € per month

Host Laboratory http://www.lemp7.cnrs.fr/

Laboratory of Molecular Electrochemistry (LEM) University Paris Diderot / UMR CNRS 7591, Bât. Lavoisier 15, rue Jean-Antoine de Baïf, 75013 Paris, France ().
Group: ***BIONANO*** **- « Biomacromolecular systems. Electron transport at the nanoscale. »**
Leader: Christophe Demaille



Candidate Profile

We are seeking for a PhD candidate having a Master degree in physical chemistry, biology, nanosciences or biophysics.
The candidate should show strong affinity for lab work and be rigorous and organized.
A plus: *Past experiences in nano(bio) electrochemistry, local probe microscopies (AFM,..)*

Candidacy

Interested candidates should send a Curriculum Vitae and a motivation letter via email to
Christophe Demaille demaille@univ-paris-diderot.fr - Tel : +33(0)157278797