LABORATOIRE D'ELECTROCHIMIE MOLECULAIRE

CNRS – Univ. Paris Diderot UMR 7591, Paris France

Post-doctoral Fellowship

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ANR *Project* : eVIRZYM

Electrochemical Functional Imaging of Multi-Component Enzymatic Systems Organized on Virus Nano-Scaffolds

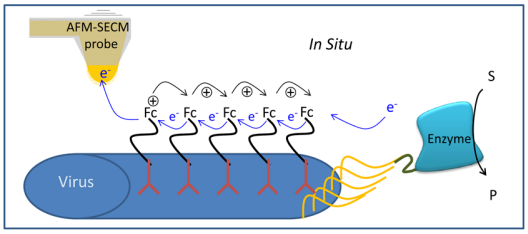
Keywords: Electrochemical Atomic Force Microscopy, Functional Nanosystems, Virus Nanocarriers

Salary : 2100 € / month (net income) ***Duration*** : 1 year (renewable)
Starting date : From January 2015
Host Laboratory : Laboratoire d'Electrochimie Moléculaire LEM – Paris Diderot University, 15 rue J.A. Antoine de Baïf, 75013 Paris, France – http://www.lemp7.cnrs.fr
eVIRZYM project : Coordinator Dr. Christophe Demaille (LEM) - *Research Team* **:** Biomacromolecular systems. Electron transport at the nanoscale.

The scientific goal of the ANR eVIRZYM project is to generate new insights into the way spatial organization modulates the efficiency of scaffolded multi-component redox/enzymatic systems. To achieve this goal, experimental nanoscale systems are to be designed and their functional behavior interrogated.

We propose an original strategy for designing such systems, which consists in coupling enzymes and redox macromolecules of interest with a compatible highly ordered protein scaffold: Virus particles. Following this bio-inspired "bottom up" viral nano-technology approach, pioneered by the biologist partner of the project (INRA, Bordeaux),[1] two types of nanosystems will be designed, namely a redox nano-transducer and a two enzymes catalytic cascade.

Another particularly advanced aspect of this interdisciplinary project is that, by making use of atomic force electrochemical microscopy (AFM-SECM), in a "molecule-touching mode" developed by the electrochemist partner of this project,[2] we intend to probe the redox and catalytic activities of the newly designed systems at the individual nanosystem (i.e. virus particle) scale.



1. Cardinale, D.; Carette, N.; Michon, T. Virus Scaffolds as Enzyme Nano-Carriers. *Trends in Biotechnol.* **2012**, *30*, 369-376.
2. Huang, K.; Anne, A.; Bahri, M. A.; Demaille, C. Probing Individual Redox PEGylated Gold Nanoparticles by Electrochemical-Atomic Force Microscopy. *ACS Nano* **2013**, *7*, 4151-4163.

Candidates profile :
The candidate must hold a doctoral degree in chemistry, physics, biology or biophysics, and should have some experience in nanoscience and local probe microscopies (AFM,…), preferably applied to the imaging of bio-objects. An experience in electrochemistry would be appreciated but is not mandatory.

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