

1 year post-doctoral research position

Artificial metalloenzymes for small molecule activation

Project: The activation of small molecules is integral to circular economy but present significant challenges for molecular catalysts. On the other hand, the complexity and instability of the natural enzymes that catalyze such transformations preclude their exploitation. We aim to prepare artificial metalloenzymes (AMEs) by incorporating transition metal complexes, that catalyze small molecule activation, into a robust small protein, that originates in an extremophile. The chosen protein facilitates electron transfer to/from the complex within and can withstand high temperature and many mutations without detriment to its structure. Therefore, we plan to explore mutations in the environment of the active site to study the effects of the second coordination sphere to understand and improve the enzyme (Figure 1).

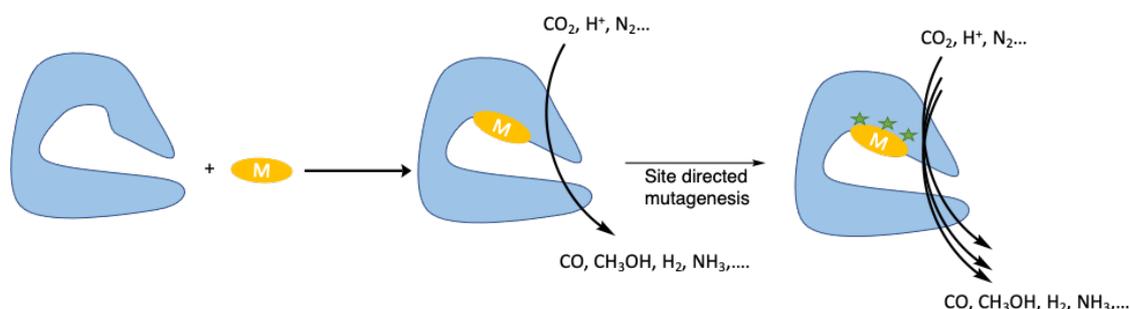


Figure 1 : Graphical representation of the preparation of an AME and its catalysis of the activation of different small molecules that improves upon sited directed mutagenesis (★).

The project tackles the pressing issue of sustainable economy and the planned AMEs are unique in terms of the construct and the reaction target. Implementing this interdisciplinary project requires a combination of techniques ranging from organic chemistry, coordination chemistry, electrochemistry, catalysis, and biotechnology.

Workplace: The chosen candidate will work with Dr. Wadih Ghattas in the team of Prof. Jean-Pierre Mahy located in the Laboratory of Bioorganic and Bioinorganic Chemistry of the “Institut de Chimie Moléculaire et des Matériaux d’Orsay” located in the Paris Saclay University, Orsay campus <https://www.icmmo.u-psud.fr/en/teams/lcbb/>. The project is in collaboration with Prof. Corinna Hess (Technical University of Munich) and funded short trips to Munich are to be expected <https://www.department.ch.tum.de/bioinorganic/home/>.

Application: candidates must hold a PhD and be trained in organic and inorganic synthesis, bio/catalysis, and electrochemistry. Knowledge of protein purification methods is desirable. To apply, send ASAP your CV, a short motivation letter and the names of two references to wadih.ghattas@universite-paris-saclay.fr