

**MASTER DE CHIMIE DE PARIS CENTRE - M2S2****Proposition de stage 2018-2019****Internship Proposal 2018-2019****Spécialité(s) / Specialty(ies) :**

- Chimie Analytique, Physique, et Théorique / *Analytical, Physical and Theoretical Chemistry* :
- Chimie Moléculaire / *Molecular Chemistry* :
- Matériaux / *Materials*:
- Ingénierie Chimique / *Chemical Engineering*:

**Laboratoire d'accueil / Host Institution**Intitulés / *Name* : Institut Parisien de Chimie Moléculaire (IPCM), UMR 8232Adresse / *Address* : Sorbonne Université, 4 place Jussieu, ParisDirecteur / *Director (legal representative)* : Louis FENSTERBANKTél / *Tel* : 01 44 27 38 47

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**Equipe d'accueil / Hosting Team** : Chimie des PolymèresAdresse / *Address* : (à partir de décembre 2015) SU, tour 43-53, 4<sup>ème</sup> étage, 4 place Jussieu, ParisResponsable équipe / *Team leader* : Laurent BOUTEILLERSite Web / *Web site*: <http://www.ipcm.fr/article581.html>Responsable du stage (encadrant) / *Direct Supervisor* : Lydia Sosa VargasFonction / *Position* : Chargé de RechercheTél / *Tel* : 01 44 27 55 85

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Période de stage / *Internship period* : janvier-juin ou juillet 2019***'Smart' building blocks for surface-functionalization, Synthesis and STM analysis*****1. Projet / Project**

Numerous strategies have been developed in the field of surface-confined supramolecular self-assembly to create ordered 2D arrays leading to novel applications in molecular electronics, photonics and nano-mechanical devices.<sup>1, 2</sup> Within our group, we are working on molecular building blocks based on phthalocyanine and porphyrin derivatives. These building blocks are designed to form highly ordered surface-confined supramolecular self-assemblies at sp<sup>2</sup>-hybridized carbon-based substrates such as HOPG and graphene and that can bring a functionality or modify the intrinsic properties of the 2D materials (graphenoid surfaces). The molecular design of these novel target molecules has been targeted to investigate the effects and phenomena that occur upon small changes in the molecular structure. Scanning-tunnelling microscopy (STM) will be used to study the effects of the molecular structure in the 2D-self assemblies on graphenoid surfaces.

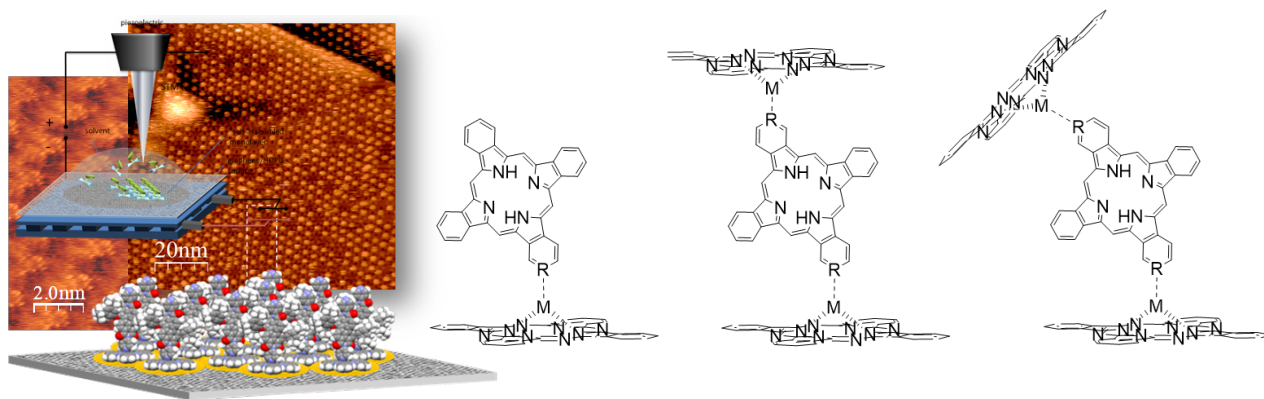
**2. Techniques ou méthodes utilisées / Specific techniques or methods**

The project will involve the synthesis of the 'smart' molecular building blocks; therefore, good practical laboratory skills will be required. The materials will be fully characterised using basic characterisation

\* 5 mois à partir du 26 janvier 2018 / *5 months not earlier than January, 26th 2019.*

\*\* Fin du premier semestre M2S1: 19/01/2018 ; Soutenances des stages M2S2, 1ere session du 29/6-3/7/2018 / End of the 1st semester M2S1: 19/01/2018. Master Defense (1st session of M2S2) from 29/06 to 3/07/2018.

techniques such as NMR, UV-Visible, IR spectroscopy and mass spectrometry. Finally, the trainee will learn to study the self-assembling properties of the target molecules by Scanning Tunnelling Microscopy (STM) at the solid-liquid interface, no prior experience in this technique is required.



**Figure 1.** Proposed target compounds and scanning tunnelling microscopy analysis of self-assembled monolayers.

### 3. Références / References

1. A. Ciesielski, C.-A. Palma, M. Bonini, P. Samori, *Adv. Mater.*, **2010**, 22, 3506-3520; J. V. Barth, G. Constantini, K. Kern, *Nature*, **2005**, 437, 671-679.
2. L. Sosa-Vargas, E. Kim, A.-J. Attias, *Mater. Horiz.* **2017**, 4, 570-583.