

**MASTER DE CHIMIE DE PARIS CENTRE - M2S2**  
**Proposition de stage 2019-2020**  
**Internship Proposal 2019-2020**

**Parcours type(s) / Specialty(ies) :**

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

**Laboratoire d'accueil / Host Institution**

Intitulés / *Name* : Institut Parisien de Chimie Moléculaire (IPCM), UMR 8232  
Adresse / *Address* : Sorbonne Université, 4 place Jussieu, Paris  
Directeur / *Director (legal representative)* : Louis FENSTERBANK  
Tél / *Tel* : 01 44 27 38 47  
E-mail : louis.fensterbank@upmc.fr

**Equipe d'accueil / Hosting Team : Equipe Chimie des Polymères**

Adresse / *Address* : Barre 43-53, 4<sup>ème</sup> étage, 4 place Jussieu, Paris  
Responsable équipe / *Team leader* : Laurent BOUTEILLER  
Site Web / *Web site* : [@Polymers\\_SU](http://www.ipcm.fr)  
Responsable du stage (encadrant) / *Direct Supervisor* : Lydia SOSA VARGAS  
Fonction / *Position* : *Chargée de Recherche*  
Tél / *Tel* : 01 44 27 55 85  
E-mail : lydia.sosa-vargas@sorbonne-universite.fr

Période de stage / *Internship period* \* : janvier-juin ou juillet 2021

**'Smart' building blocks for surface-functionalization, Synthesis and STM analysis**

**1. Description du projet / Description of the 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.

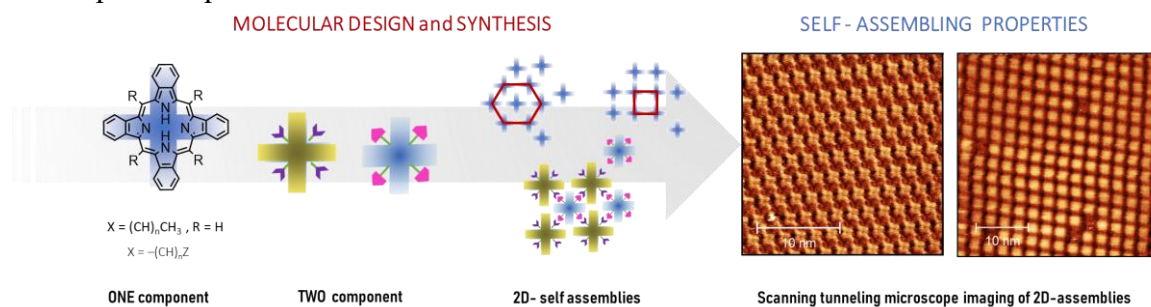
**2. Techniques ou méthodes utilisées / Specific techniques or methods**

The project will involve the synthesis of the 'smart' molecular building blocks; therefore, good/strong skills in organic chemistry (synthesis, purification) will be required. The materials will be fully

\* min. 5 mois à partir du 13 janv 2020 / *min. 5 months not earlier than January, 13th 2020.*

Fin de stage au plus tard le 15/07/2020 ou le 30/09/2020 (dates de validation de diplôme). / *End of internship at the latest July 15, 2020 or Sept. 30, 2020 (dates of graduation).*

characterised using basic characterisation 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.



### 3. Références / References

1. D. P. Goronzy, M. Ebrahimi, F. Rosei, Arramel, Y. Fang, S. De Feyter, S. L. Tait, C. Wang, P. H. Beton, A. T. S. Wee, P. S. Weiss, and D. F. Perepichka  
*ACS Nano* **2018** 12 (8), 7445-7481
2. L. Sosa-Vargas, E. Kim, A.-J. Attias, *Mater. Horiz.* **2017**,4, 570-583.