2019-2020

Internship proposal (Master or final project engineering school) at LMGP Lab.

Identification of the molecular bases of natural adhesive proteins.

Abstract

In our daily lives, all conventional man-made adhesives are petrochemical products, which are toxic for the body and show limited efficiency in wet conditions, major drawbacks for biomaterials. In this project, we aim at producing adhesives effective in air and/or in wet conditions inspired by natural glues of some arthropods. This approach using simplified mimics of biological adhesives will facilitate better understanding of systems from which they are derived and could find applications in medicine as well as in biotechnology and industry.

Project description

Adhesive proteins of some arthropods have been identified. For these animals, the adhesion mechanism seems to be related to protein self-assembly on the surface but the mechanism as well as the molecular basis of this process remain to be elucidated. The adhesive proteins show particular sequences with repetitive architectures. The goal of this internship is to identify the primary structure elements important for the assembly of the proteins and their adsorption on materials. To achieve this goal, the different steps of the project will be the following:

- Peptides will be designed according to the sequences of the various repeated motives of the natural adhesive proteins, and will be purchased.
- Then, the adsorption properties of the peptides on different kind of material surfaces will be investigated using surface plasmon resonnance.

Adsorption studies with protein mimicking natural ones will also be considered.

Location

The internship will take place in the Interface Material and Biological Matter (IMBM) team of the Material and Physical Engineering Laboratory (LMGP) at Grenoble (http://www.lmgp.grenoble-inp.EN/).
This project is in collaboration with the laboratory ERRMECe, MecUp team, of the Cergy-Pontoise University (http://www.u-cergy.fr/errmece/).

Profile & requested skills

We look for a student with a strong knowledge in biochemistry, biophysics and/or in material science. The student should be able to work in a team, have good writing skills (report, presentation…) and good knowledge of at least one of the languages used in the lab: French, English.
The internship should start in January or February 2020 for a duration of 6 months.

Subject could be continued with a PhD thesis: No

Allowance: ≈ 550 € per month.

Contact

Send a *C.V.* and a cover letter to Marianne Weidenhaupt: marianne.weidenhaupt@grenoble-inp.fr; Charlotte Vendrely: charlotte.vendrely@grenoble-inp.fr.