STudent REseArch Mobility Programme (STREAM)
Project proposal

Host University:
Université Paris-Sud

Field (drop-down list):
Natural sciences, mathematics and statistics
alejandra.resendiz@campusfrance.org
Specified field, subject:
Physics

Research project title:
Nano-structured porous materials

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Fev	Mar	Apr	May	Jun	Jul	Aug
☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☐	☐

Possible duration in months:

1	2	3	4	5	6	7	8	9	10	11	12
☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐

Alternatively, exact starting and end date: from date to date

Suitable for students in: ☒ Bachelor level ☒ Master level

Prerequisites:
Good background in Physical Sciences including soft-matter, X-ray scattering. Interested in developing new nanomaterials**.**

Restrictions:

Description (maximum 2,000 characters):

Project will be devoted to structural studies of self-assembled systems using Small Angle X-ray Scattering (SAXS and SANS). For many systems, the building blocks are nano-objects such as micelles or nanoparticles. Objective is to understand and predict how such nano-objects can organize themselves spontaneously into ordered phases. In a scattering experiment, such ordered phases give diffraction signals that are called Bragg peaks. Analysis of such signals requires adapting standard methods of crystallography to the nanoscale, as the relevant length scale is much larger than the atomic scale.

The purpose will be to develop new nano-structured materials using the so-called 'bottom-up' approach. These materials are often derived from soft matter systems, which bring them the self-assembly properties. By adding an inorganic component to soft matter systems, true solid materials are obtained. Their nanostructure is very interesting because it offers new physical properties compared to a macroscopic material. New optical, electronic,

magnetic or transport properties are in view. For example, for mesoporous materials, the control of the architecture of the porosity allows to optimize transport properties. Main goal is to control the nanostructure during the synthesis of such materials. For this, time-resolved scattering experiments allow to follow in real time the formation of the materials and to elucidate the mechanisms involved.

During the project, X-ray scattering experiments will be done at the Laboratoire de Physique des Solides about porous materials currently studied in the group: magnetic mesoporous materials and hierarchical porous materials using freezing (collaboration with Saint-Gobain research).

Faculty and/or Department:
UFR de Sciences, Département de Physique
http://www.sciences.u-psud.fr

Contact person, including position:
Séverine Fogel, Head of International Relations

Contact email:
severine.fogel@u-psud.fr

Deadline for nomination to reach host university:
2 months before the starting date

Notification of admission given by the end of:
Within 3 weeks

Additional information: