Materials Science

Degree conferred
Scientiarum doctor in scientia materiarum / Doctor of Philosophy in Materials Science (PhD)

Commencement of studies
An application for admission may be submitted at any time.

Regulation
http://studies.unifr.ch/go/QHF-l (French and German only)

Application procedure
Candidates with Swiss qualifications
http://studies.unifr.ch/go/QHFI
Candidates with foreign qualifications
http://studies.unifr.ch/go/CRu5v

Fribourg profile
The Adolphe Merkle Institute (AMI) currently employs around 50 PhD students who work in the five AMI research groups. The working language at the AMI is English and the PhD work comprises a personal research 3-4 year project within one of the research groups. The mentoring staff at AMI is devoted to instilling the doctoral candidates with the desire to perpetuate a tradition of high scientific quality. The state-of-the-art facilities provide students with the potential to acquire a whole range of valuable knowledge and skills over the course of their studies. The quality of the research equipment constitutes one of the major assets of the program, as the trainees will be given the chance to master a high number of experimental techniques. The combination of interdisciplinary, outstanding infrastructures and educational commitment defines the attractiveness of AMI, making it one of the best places to study soft nanomaterials at the postgraduate level. The institute strives to be a leader in this area and hosts both academic setting, enabling the unification of two different scientific backgrounds in order to exploit the catalytic power of enzymes, to create novel nanosystems and to develop materials with unprecedented new functions. Three lines of research illustrate our strategy:

1) Enzyme-catalyzed controlled/living radical polymerization (ATRPases);
2) Protein cages and polymersomes as nanoreactors;
3) Polymer-protein hybrid materials with the capability to self-report damage.

For more information: http://ami.swiss/research/macromolecular-chemistry

Polymer Chemistry and Materials
Motivated by the desire to create novel (nano)materials that exhibit currently unavailable properties and enable new applications, the primary research focus of the Polymer Chemistry and Materials group led by Prof. Christoph Weder is the design, synthesis, and investigation of structureproperty relationships of novel functional polymers. Many projects are inspired by Nature’s materials, and/or utilize bio-based building blocks, such as cellulose nanocrystals. Interests and activities are interdisciplinary and range from the synthesis of new monomers and polymers, to advanced polymer processing, to the in-depth investigation and technological exploitation of materials with unusual but desirable properties.

For more information: http://ami.swiss/research/polymer-chemistry-materials

Soft Matter Physics
How does the assembly of materials on the 10 nm to 1 μm length scale determine its function? This question motivates most of the projects of the soft-matter physics group. Currently the two main
topics encompass energy and optical materials. In the energy materials field, we investigate structure-function interplay in organic and perovskite based solar cells and in lithium-ion batteries. Optical materials include plasmonic metals that are structure with the help of polymer self-assembly and bioinspired photonic bandgap materials. The latter is part of the strong focus on bioinspiration focus of the soft matter physics group that also includes surface properties of (nano-) structured materials such as wetting and adhesion, and mechanical properties (e.g. nacre).

For more information: http://ami.swiss/research/soft-matter-physics

Interdisciplinary collaborations between our researchers are the basis for the successful and efficient execution of complex research projects that transcend the boundaries of traditional scientific disciplines.

Open PhD positions will be advertised on the AMI web-page. Unsolicited applications that are not targeting an advertised position will not necessarily receive a response.

Organisation des études
Structure of studies
No ECTS credits can be earned.

Doctoral school

Admission
In order to be admitted to a doctorate the candidate must have been awarded an academic Bachelor's and Master's degree or an equivalent qualification by a university recognised by the University of Fribourg.

Before applying for a doctorate the candidate should contact a professor who would be willing to supervise the thesis work.

There is no general right to be admitted to a doctorate.

The respective conditions of admission for each doctoral study programme are reserved.

Contact
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Switzerland
http://ami.swiss

Portail doc/postdoc
http://www.unifr.ch/phd

http://studies.unifr.ch/endoctorate/sci/softmaterials