Prof. Fink leads the BioNanomaterials research group, is to apply biophysics knowledge towards materials science, and biophysics. Varying scientific backgrounds of its members, which include bio-based building blocks, such as cellulose nanocrystals, utilize bio-based building blocks, such as cellulose nanocrystals. Currently the two main strategies important areas: (1) Enzyme-catalyzed controlled/living radical polymerization (ATRPases); (2) Protein cages and polymersomes as nanoreactors; and (3) Polymer-protein hybrid materials with the capability to self-report damage.

For more information: http://ami.swiss/en/groups/bionanomaterials/

Biophysics
The overarching research goal in the Biophysics laboratory, led by Prof. Michael Mayer, is to apply biophysics knowledge towards improving human health. To this end, his group contributes to the molecular understanding of disease by developing sensitive, diagnostic assays and sensors, as well as characterizing individual protein molecules for applications in biomarker detection, routine protein analysis, and proteomics. Research is multidisciplinary and collaborative and many projects take inspiration from nature to develop biophysical assays, methods, and tools that enable molecular-scale interrogations with unprecedented information content, sensitivity, and speed.

For more information: http://ami.swiss/en/groups/biophysics/

Macromolecular Chemistry
The research carried out by AMI's Macromolecular Chemistry group, led by Prof. Nico Bruns, is motivated by a fascination for polymers and proteins. The rationale behind our work exploits the various functions of proteins, such as their ability to self-assemble into well-defined three dimensional structures and to act as catalysts, and merges them with polymer systems, which are relatively easy to synthesize and can be tailored to specific applications. Via this approach, some of the best aspects of two different domains of macromolecular chemistry are combined 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/en/groups/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.


Soft Matter Physics
How does the assembly of materials on the 10 nm to 1 nm 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).


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.

**Studies organisation**

**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 must 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**

Adolphe Merkle Institute  
Chemin des Verdiers 4  
1700 Fribourg  
Switzerland  
[http://ami.swiss](http://ami.swiss)

**Doc- Postdoc-portal**

[http://www.unifr.ch/phd](http://www.unifr.ch/phd)