

## International Partners

The students attend a 3 month-long working stay in cooperation with our international partners:

Prof. Lanson, Grenoble, Switzerland  
Prof. Worden, Liverpool, UK  
Prof. Tombácz, Szeged, Hungary  
Prof. Cordier, Lille, France  
Prof. Tanaka, Sendai, Japan  
Prof. Öhlander, Luleå, Sweden  
Prof. MacLaren, Lincoln, New Zealand  
Dr. Virolle, Paris, France  
Prof. Abate, Tucuman, Argentina  
Prof. Kostka, Tallahassee, Florida, USA  
Prof. Roden, Madison, Wisconsin, USA  
Prof. Rull, Valladolid, Spain

Further guest speakers are invited to our study program.

Supported by: **DFG** Deutsche  
Forschungsgemeinschaft



## Contact

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## Website

<http://www.gk-alteration.uni-jena.de>

## Cooperating Institutes

**Institute of Microbiology**  
Faculty of Biology and Pharmacy  
Neugasse 25, 07743 Jena, Germany

**Institute of Geosciences**  
Faculty of Chemistry and Earth Sciences  
Burgweg 11, 07749 Jena, Germany

**Institute of Ecology**  
Faculty of Biology and Pharmacy  
Dornburger Str. 159, 07743 Jena, Germany

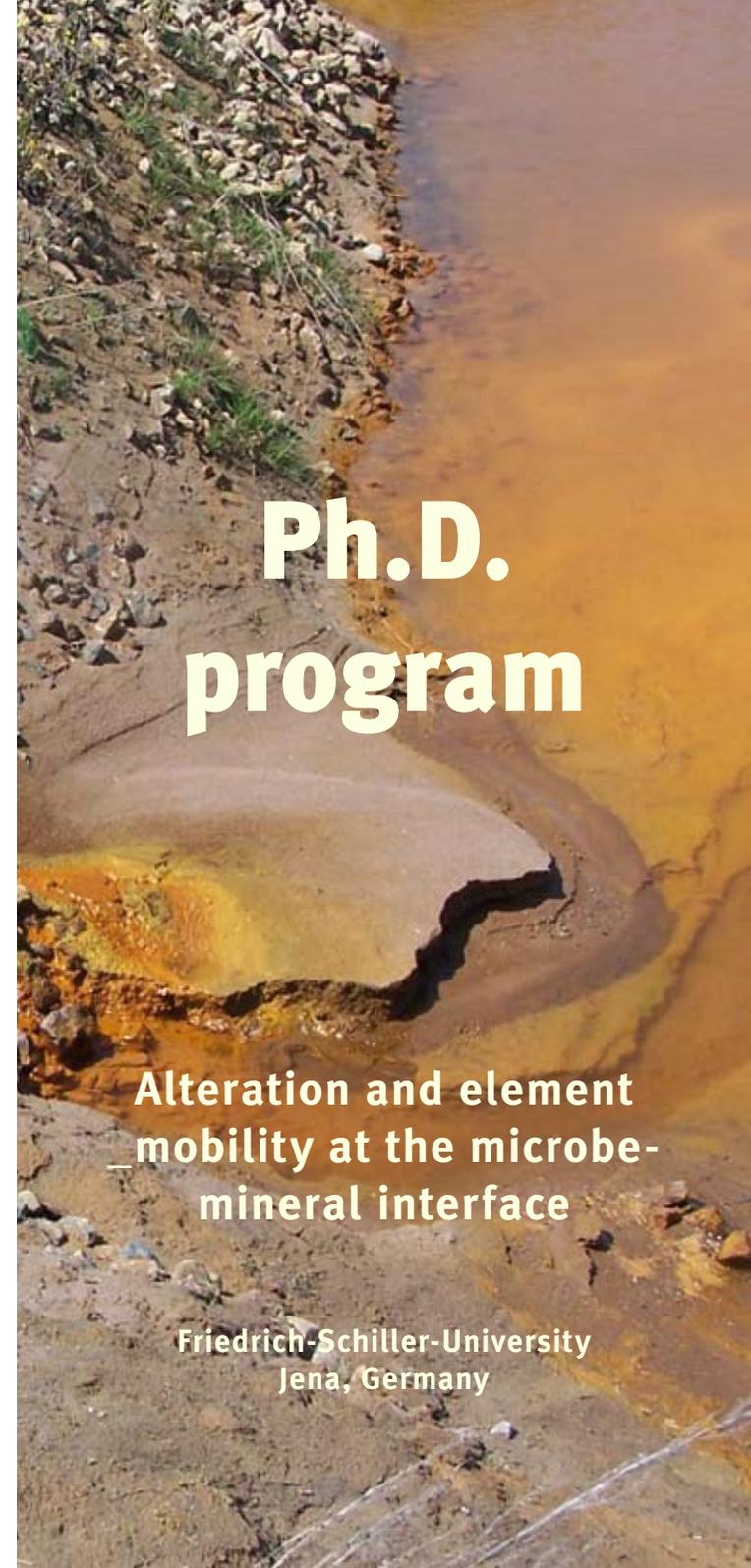
**Institute of Physical Chemistry**  
Faculty of Chemistry and Earth Sciences  
Helmholtzweg 4, 07743 Jena, Germany

**Max Planck Institute for Biogeochemistry**  
Biogeochemistry  
Hans-Knöll-Str. 10, 07745 Jena, Germany

# Ph.D. program

## Alteration and element mobility at the microbe- mineral interface

Friedrich-Schiller-University  
Jena, Germany



# Alteration and element mobility at the microbe-mineral interface

## Concept

Recent findings in deep surface microbiology, biocorrosion, acid mine drainage, and microbially-induced mineral transformations have challenged the conventional concept of the exclusiveness or predominance of abiotic reactions in Geosciences. The potential of microorganisms to alter pH, Eh and chemical properties and thus allowing transformation of metal-containing minerals led to new interest in the importance of microbes in geological processes. Metals cannot be degraded, but transformations through sorption or complexation with mineral surfaces, and/or changes in the valence state affect not only the mobility but also the bioavailability of these compounds. Microorganisms can alter the reactivity and mobility of metal-containing minerals both directly and indirectly. However, we have only a marginal understanding of these microbially-mediated transfer reactions at the hydro-litho interface in porous media like soils or sediments. The innovative research training group on “Alteration and element mobility at the microbe-mineral interface” aims to achieve a fundamental, mechanistic understanding of



the coupling between microbial metabolism, chemical and physical reactions at mineral surfaces, and metal transport. It is centered in an excellent environment in the Geosciences with close relation to microbial ecology. Due to this improved, multidisciplinary understanding of the biogeochemical functioning of the subsurface environment, both bioremediation strategies and accurate modeling approaches can be developed that will allow prediction of metal mobility in the future.

## Study program

The study program with a 3 months mandatory stay at an international laboratory aims at training graduates to excellence in the interdisciplinary fields of (hydro)geochemistry, chemistry and microbiology. The educational upgrading given by the incorporated soft skill training seminars and a virtual desk project in addition to the thorough understanding of natural sciences will improve the future scientific career and project acquisition in the industry. Compatibility of the program with child care is facilitated by the good tradition of East German facilities for child care. Integration of excellent students with a bachelor degree during a one year qualification program is another strongly enforced career development plan aiming at minimizing study time and at the same time ensuring top level graduates. Three years of Ph.D. are strictly enforced with interdisciplinary education including early presentation and discussion of data at international conferences. The Ph.D. thesis will be cumulative, and will support the student in taking early responsibility for publication of data.

