

## **Kolloquium:**

### **Biological and abiotic transformations of uranium in the environment: mechanism and isotopic fractionation**

**Date:** Monday, 02 November 2020, 16:15  
**Location:** **Institut für Geologie**, Baltzerstrasse 3, 3012 Bern,  
Studer Auditorium, 2.OG  
**Speaker:** **Prof. Rizlan Bernier-Latmani**  
**EPFL, Switzerland**

Uranium (U), present in the tetravalent form (relatively insoluble as U(IV)) in igneous rocks, undergoes oxidation and mobilization as part of weathering. As a result, oxidized uranium (hexavalent, U(VI)) is present in surface waters, particularly in areas with an underlying granitic bedrock. In anoxic soils and sediments, uranium can accumulate through reductive processes, forming natural hotspots. Looking through the sedimentary rock record, one can consider the accumulation of U as an indication of local anoxic conditions and the associated isotopic fractionation may reveal more detail about the depositional environment. Additionally, uranium can be a contaminant in the subsurface as a result of anthropogenic activities such as mining and processing of nuclear fuel. Arresting the transport of uranium in the subsurface by reducing uranium in contaminated environments, through harnessing microbial and chemical reductive mechanisms, has been proposed as an engineered remediation strategy.

A thorough understanding of the mechanism of U(VI) reduction and the attendant isotopic fractionation is necessary in order to interpret the geological record and to optimize U remediation strategies.

The talk will present recent development in laboratory-based investigations of the reduction of U(VI) by microorganisms as well as by minerals along with advances in constraining the associated isotopic fractionation. The work spans mechanistic understanding of microbial and abiotic U reduction as well as investigations of the stability of sediment-trapped tetravalent U. This presentation is intended as an overview of the exciting new findings in U biogeochemistry.