Project Title: Hunting for microbial life in the Atacama Desert

Supervisor: Dr. Anna Hakobyan, Prof. Claudia Knief
Institute/group: INRES - Molecular Biology of the Rhizosphere
Webpage: https://sfb1211.uni-koeln.de/, https://www.boden.uni-bonn.de/rhizosphaere-1/de

Requirements: Bachelor in Biology, knowledge of common molecular biology techniques (preparation of buffers, DNA extraction, PCR, agarose gel) and culturing are of an advantage, independent and team working skills, good communication skills in English.

Skills to be learned (max 50 words): The student will learn about microbial life in the Atacama Desert. Methodologically, she/he will do microbial DNA extraction from desert soils, PCR for amplicon sequencing (16S rRNA gene, fungal ITS1 region) and qPCR. Further, aerobic cultivation, H_2 and O_2 microsensor measurement methods can be done. It also includes data analysis.

Project Description (max. 150 words): The Atacama Desert represents an extreme environment for microorganisms, caused by the strong limitation of water. In our project, we study the distribution, activity and adaptation of microorganisms in the hyperarid Atacama Desert within the framework of the research consortium CRC1211. Our work shows that signatures of microbial life exist ubiquitously in diverse habitats of the Atacama Desert, even at the driest locations. At present, we want to find out which portion of the microbial life is still viable there or whether microorganisms are rather dormant or already dead in different habitats. In addition, we will start to explore whether fog enables microbial activity at low rates. Finally, we intend to find out whether selected isolated bacteria from the desert can overcome drought conditions by profiting from metabolic water.

Support concept (max. 75 words): The successful candidate will become part of our Atacama team. The student will be trained by members of this team to obtain microbiological background knowledge about the project and the methodological skills mentioned above. As part of the AG Knief group she/he is invited to attend group seminars, which provide broader insight into different research activities. We in turn expect a valuable contribution by the student to our Atacama Desert research project.