

## SUPER – Stuttgart University Program for Experiencing Research Project Information

### Institute's Information

Name of Institute Research Facility for Subsurface Remediation (VEGAS), University of Stuttgart

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### Duration of Project/Number of Students

June/July x

June/July/August x

Number of Students 1

**Name of Project** Monitored Bioaugmentation, Bioelectrochemical Remediation and Electro-Nano-Bioremediation

**Beneficial Skills & Knowledge** Experience in experimental/practical work as well as data evaluation

### Description of Work

We investigate the combination of three technologies in the field of in-situ subsurface remediation: microbial remediation, remediation by nano-scale zero-valent iron, and both in combination with electrochemical enhancements. Aerobic chloroethene biodegradation is a novel concept for removing contaminants from the subsurface environment for improving groundwater quality. The combination of this process with enhanced electro-kinetic distribution by operating electrodes installed in the soil is a novel approach (monitored bioaugmentation). Bioelectrochemical systems can be utilized to generate electricity and their potential and their operating mode must be investigated (bioelectrochemical remediation). Finally, nano-scale zero-valent iron is a very effective reducing agent for hydrocarbons and has been used for subsurface remediation. However, the effect of an electric field via electrodes on the efficiency is a promising research topic. The goal of this internship is to operate the running medium-scale experiments ( $V = 0.4 \text{ m}^3$ ,  $0.15 \text{ m}^3$  and  $3 \text{ m}^3$ ) together with our team, consisting of a PhD student and our technician. This includes monitoring of the experiment, taking liquid samples, performing analyses in the lab (groundwater parameters and contaminant concentrations), calibrating sensors, gas chromatographs and other technical equipment, and evaluating and visualizing data.

