

## Towards a mechanistic understanding of the microbiological and geochemical dynamics of sand filtration

Department: Earth Sciences

Research group: Geochemistry

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### Project description

In the Netherlands, drinking water is produced by purifying ground- or surface water using either slow or rapid sand filtration. Sand filtration is an important step in cleaning drinking water and a proven technology for the removal of macro and micro pollutants from the source waters, such as iron, manganese, methane and nitrogen compounds. The quality of the sand filters and pollutant removal efficiency depend on a range of operational parameters (e.g. chemistry of the inlet water, flow rate and regular cleaning procedures), but also microbiological and geochemical processes occurring in the filters. To date, especially the geochemical and microbiological processes occurring in the sand filters are not well understood, which again can lead to operational challenges such as filter dysfunction, clogging and reduced filter efficiency.

The student will contribute with data collection and experimental research to increase the understanding of the microbial and geochemical processes that occur and interact in sand filters in order to optimize drinking water production.

The student will contribute to fieldwork at Dutch water treatment plants (DWTPs) and perform chemical analyses of solid sand samples and porewater collected from sand filters. The work will involve a range of chemical spectrophotometric analyses (e.g. ICP-MS, ICP-OES, X-ray spectroscopy) and ion and gas chromatography and data processing. This work is part of a collaborative project with the Department of Microbiology at Radboud University in Nijmegen.

The balance between fieldwork, laboratory work and office work (on campus and at home) will depend on the Covid-19 situation. The Bright Minds student will have frequent (at least weekly) contact with the supervisors, either in person or through teams.

### Job requirements

The student should have basic skills in chemical work in the laboratory.