

<b>Project title</b>	Hydrogeology and Hydrochemistry of Groundwater-Dominated Lakes: From Catchment to the Groundwater-Lake Interface
<b>Principal academic advisor</b>	Associate Professor Peter Engesgaard, Department of Geography and Geology, University of Copenhagen, <a href="mailto:pe@geo.ku.dk">pe@geo.ku.dk</a>
<b>Co-advisors</b>	Senior Researcher Bertel Nilsson, GEUS Senior Researcher Dieke Postma, GEUS
<b>Employment</b>	Department of Geography and Geology, Øster Voldgade 10, 1350 Copenhagen.
<b>Research school affiliation</b>	FIVA, PhD school of Science, University of Copenhagen

### Project description

Currently there is a gap in our knowledge of how to link hydrology, hydrogeology, and hydrogeochemical processes in lake catchments. This is particular true for groundwater-dominated lakes, where the water quality of a lake can be seen as an integrated response of catchment properties and processes; regional geology, groundwater flow paths, hydrogeochemical processes during transit from the catchment to the lake, and the attenuation processes in groundwater as it passes through the aquifer and lake sediments (buffer zones and lake bed). As a consequence, lake water ecology is closely linked to the land use/cover in the catchment feeding groundwater to the lake and on the complex interplay of subsurface properties and processes.

The main objectives of the PhD research are:

1. Quantifying groundwater-lake interactions at different scales using several tracers (e.g. stable isotopes, water, and temperature).
2. Understanding the geochemical processes controlling the solute fluxes and nutrient retention through the different compartments from the catchment to the groundwater-lake interface, e.g. through the application of flow and reactive transport models.
3. Understanding how land use and catchment characteristics affect lake water quality.

The specific envisioned tasks are:

1. Instrumentation of 1-2 lakes with e.g. offshore and onshore wells (in different compartments), geophysical imaging of geology, sampling of tracers and groundwater/lake water quality.
2. Use of numerical groundwater models for simulation flow and reactive transport at different scales (catchment, buffer zones, sediment-water interface).
3. Establishment of water and chemical budgets for lakes.
4. Modeling of the importance of changes in land use on lake restoration

We invite candidates from different scientific fields to apply: hydrology, hydrogeology, hydrogeochemistry, physical geography, engineering, or environmental sciences. Candidates should have a solid background in some of these fields as well as experience with field work and modeling. The PhD fellowship will be part of a large-scale project on lake restoration and is a joint collaboration with the Geological Survey of Denmark and Greenland. The PhD scholarship will also include collaboration with freshwater biologists. The starting date is expected to be July 1, 2011 or soon after.

Please follow the application guide line provided by the PhD school at the Faculty of Science ([http://www.science.ku.dk/phd/applying/application\\_guide/applying\\_for\\_an\\_advertised\\_scholarship](http://www.science.ku.dk/phd/applying/application_guide/applying_for_an_advertised_scholarship))

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### **Terms of employment**

The successful PhD candidate will be offered a full-time Ph.D. position for a period of three years, contingent on a satisfactory performance, with the specific intent that it results in a PhD degree and scientific publications. It is a prerequisite for the appointment as a PhD-fellow, that the person concerned can be registered as a PhD-fellow according to the Ministry of Science, Technology and Innovation Executive Order no 18 of 14. January 2008. Information about the PhD programs at the Faculty of Science can be found at <http://www.science.ku.dk/phd/>.

The salary depends on seniority, as agreed between the Ministry of Finance and the Danish Confederation of Professional Associations within the range of 23,000-30,000 DKK/month (approximately 3,100-4,000 Euro/month).

Place of employment and work will be the Department of Geography and Geology, Øster Voldgade 10, 1350 Copenhagen.

For further information contact Associate Professor Peter Engesgaard ([pe@geo.ku.dk](mailto:pe@geo.ku.dk)). The application should be sent as one single pdf file to [pe@geo.ku.dk](mailto:pe@geo.ku.dk) no later than June 10, 2011 at noon. Possible interviews are scheduled for June 20-21.