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Industrial PhD scholarship in Life cycle analysis and risk analysis of alternative drinking water technologies

Deadline for application: September 15th 2008

Are you interested in a research career and in developing new technologies to provide the public with safe drinking water in a sustainable way? Then here is an opportunity to do a PhD in an internationally recognized research environment supported by the largest water supplier in Denmark.

Scientific focus of the announced PhD position
The main goal of the project is to establish a scientifically based platform to support decisions regarding emerging alternative water management technologies. This will be achieved by 1) improving tools to make life cycle analysis (LCA) of the use of alternative technologies and resources; 2) evaluating selected new technologies and resources by life cycle analysis (including e.g. resources, energy and chemical consumption, accumulation of dangerous residual chemicals and microorganisms, emissions of pollutants and working environment); 3) conducting quantitative risk analysis of integrated system solutions for selected cases, e.g. application of integrated water management in a quarter of the city including rainwater harvesting, direct recycling of greywater and infiltration via engineered wetland for groundwater storage and recovery.

Workplan and methods: The project will initially explore and establish approaches of applying available life cycle analysis for integrated managed water system. This will initially be used for 1-2 large, centralised systems e.g. treatment facilities for harvested rainwater or facilities for handling greywater for reuse. In phase 2 these analysis will be applied to more complex, decentralised and integrated systems with a mixture of resources, treatment technologies, and dual pipe systems for collection and distribution of different water quality for different uses. This phase will be based on 1-2 (possibly theoretical) cases in Copenhagen. In phase 3 the cases will be evaluated based on quantitative risk assessment - with certain focus on microbial aspects. An increasing shorter distance in space and time between dirty and contaminated water and high quality and safe drinking water are strongly increasing the consequences in case of failures in the system, but may also lead to a low but continuous risk for the consumers. The goals of such risk analysis are e.g. to estimate the risks of each technology, to estimate the effect on public health, and to estimate the health risk for the individual consumer. In a phase 4 multi-criteria evaluation based decision support tools will be considered to assist the selection and combination of elements for constructing of the most sustainable and safe solution.

Wider context of the project
The PhD scholarship is part of a larger research project titled 'Integrated management of water and wastewater in Copenhagen' which is established between Københavns Energi A/S (KE) and DTU Environment (www.env.dtu.dk).

The water supply (KE) for Copenhagen is currently facing increasing problems in getting access to sufficient water resources. These problems include groundwater contamination; problems to obtain new groundwater abstraction licenses outside the municipality of Copenhagen; and limitations set by The European Water Framework Directive (WFD). All these aspects are increasing the pressure on the exploration of alternative technologies and resources, such as the use of rainwater, reuse of e.g. greywater or desalination of seawater. Thus waste water may turn into a resource and this raises a demand for integrated water management. The scientific basis for making decisions on technologies in this area is rather limited – information on the sustainability of these new technologies and evaluation and comparisons of risks for public health and the environment by implementing these new technologies is lacking. As an example energy consuming technologies such as membrane filtration of reuse water next to the consumer may be more environmentally friendly than simple treatment of distantly abstracted groundwater requiring long transport.

Candidate requirements
At the date of appointment candidates must hold an MSc degree in engineering sciences, natural sciences and/or mathematics, preferably with a specialization in one of the following fields: environmental engineering, LCA. Experience from consulting companies is also seen as a qualification.

Terms of employment
The successful candidate will be employed at and enrolled as a PhD stipend at DTU, within the framework of the Urban Water Technology research developing programme (www.urbanwatertech.dk) and under the supervision of Associate professor Hans-Jørgen Albrechtsen (DTU Environment) and Product Manager MSc. Jens Andersen (KE). Information about the general requirements for enrolment and the general planning of the PhD education at DTU may be found at:
www.env.dtu.dk/English/Education/PhD%20Programme.aspx
Further information on Industrial PhD scholarships can be found at the homepage of Forsknings- og Innovationsstyrelsen: http://fi.dk/site/forside/lovstof/vejledning-for-erhvervsphd-ordningen

The salary and further terms of employment (3 years) are consistent with the general terms for PhD stipends at DTU and are consistent with the current rules for PhD stipends. Annual salary starts at 40,000 EUR before tax, including pension/holiday pay.
For any further information, please contact: Associate professor Hans-Jørgen Albrechtsen
(hja@env.dtu.dk).

How to apply
Applicants must submit an application containing (1) a cover letter explaining their motivation to apply, their qualifications relevant for the research project and when they are able to start, (2) a curriculum vitae providing relevant academic, employment and personal details, (3) authorized academic transcripts, (4) contact details for at least two reference persons that we may contact for further inquires and (5) documentation of English language competence.
Candidates will be evaluated based on their research potential and commitment and selected candidates will be invited for an interview.
Please send your application in English or Danish by e-mail as an attached pdf-file to
hja@env.dtu.dk
All interested candidates irrespective of age, gender, race, religion or ethnic background are encouraged to apply. The scholarship is open to both Danish and international applicants.
The starting date is negotiable but a quick start is preferred.

The position will remain open until the position is filled on September 15th 2008.

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