AALBORG UNIVERSITY

Technical University of Denmark DTU

PhD scholarships in Urban Water Technology

Applications are invited for PhD fellowships in urban water technology as announced below. The scholarships are announced under the Urban Water Technology research school (www.urbanwatertech.dk), which was recently established by the Technical University of Denmark (DTU) and Aalborg University (AAU) in collaboration with external industrial and research partners. The fellowships are funded jointly by the host university, the collaborating industry/research institute and the Danish Ministry for Science, Technology and Development.

	Project title	Host university	Collaborator
1.	Advanced treatment of urban stormwater runoff	AAU, DBCEE	PH-Consult
2.	Data based process models for rainfall-runoff in combined sewer systems	DTU, IMM	Waste Water Control
3.	Framework for real time control of integrated urban wastewater systems	DTU, E&R	Krüger
4.	Microbiological risk assessment of urban water: development of methods for detection and analysis of pathogens	DTU, E&R	Statens Serum Institut
5.	Monitoring of drinking water systems	DTU, E&R	Krüger
6.	Optimisation of filter operation	DTU, E&R	Grontmij | Carl Bro
7.	The connection between retention time and water quality in water distribution networks	DTU, E&R	Odense Water Ltd
8.	Transport models for water distribution systems	DTU, E&R	7-Technologies

Details about the projects may be found on the following pages. For further information about the individual projects, please contact the directly involved supervisors (these are listed under the individual project descriptions).

Note that only six scholarships are available at this time, and thus only six of the above research projects can be initiated. The scholarships will be awarded according to the applicant's research potential and commitment.

Applicants must submit an application containing (1) a cover letter explaining their motivation to apply, their qualifications for the specific research project(s) they apply for and when they are able to start, (2) a curriculum vitae providing relevant academic, employment and personal details, (3) authorised documents of university degrees, (4) contact details for at least two reference persons that we may contact for further inquires, and (5) documentation of English language competence.

Applicants may express interest in more than one project. In that case an order of preference should be indicated.

At the date of appointment candidates must hold a MSc degree in a discipline relevant for the research project. All interested candidates irrespective of age, gender, race, religion or ethnic background are encouraged to apply. The scholarships are open to both Danish and international applicants.

A committee appointed by the board of the research school will evaluate the applications and selected applicants will be invited for an interview. The final selection of the successful candidates will be made by the board upon recommendation by the committee. The successful candidates are requested to apply for academic approval and enrolment as a PhD student at the relevant university, which involves working out a more detailed project description in collaboration with the involved supervisors.

The salary and further terms of employment (3 years) are consistent with the general terms for PhD students at DTU and AAU. Information about the general requirements for enrolment and the general planning of the scholarship studies may be found at DTU's and AAU's websites. Annual salary starts at 40,000 EUR before tax, including pension/holiday pay. Funding is available for an immediate start but the starting date for most fellowships is negotiable.

Please send your application in English or Danish by e-mail as an attached pdf-file to the Director of the Urban Water Technology research school, Prof. Erik Arvin at urbanwatertech@er.dtu.dk.

Application deadline is 25th April 2007 at 12:00. Applications received after this date will not be considered.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 1: Advanced treatment of urban stormwater runoff

Background

Phosphorus, heavy metals and organic micropollutants associated with stormwater runoff from urban catchments are in general critical for the quality of local surface waters like lakes and streams. A wet pond with a permanent water table is a relatively simple, however, not always sufficient facility for reducing such pollutant loads. The overall objective of the Ph.D. project is to develop and to assess the efficiency of additional technologies that can improve the treatment performance of such wet ponds.

Project

The Ph.D. project will be associated with the EC supported LIFE-Treasure project (www.life-treasure.dk) carried out in Denmark during the period October 2006 – September 2009. This EC project aims at implementing and demonstrating advanced treatment of urban stormwater runoff in three wet detention ponds located in Silkeborg, Århus and Odense, respectively. These ponds will be combined with varying types of advanced technologies for addition of chemicals improving floc formation and with units for filtration and adsorption for removal of soluble pollutants and pollutants associated with small particles and colloids. Literature information on the efficiency of these units exists and both bench and pilot scale studies are being performed. On this background, the main activities of the Ph.D. project will focus on intensive monitoring of several central parameters related to the governing treatment processes in the three treatment facilities and associated assessment of the treatment performance. In this respect development and use of models for simulation of the pond performance is central. These main activities can be formulated with focus on:

- Kinetics of filtration and adsorption processes for colloidal and soluble substances that occur in low concentrations
- Application of this understanding for design and operation of advanced treatment facilities for urban stormwater runoff combined with wet ponds
- Model development for the simulation of treatment of stormwater associated pollutants in wet ponds equipped with technologies for addition of chemicals or units for filtration and adsorption
- Assessment of different scenarios for design and operation of wet pond facilities for advanced treatment of stormwater and road runoff

Candidate requirements

The position requires a M.Sc. degree or equivalent grade within the area of Environmental Engineering Science and Technology. Furthermore, the applicant must document qualifications in terms of relevant experimental work and computer modeling. Related to the project, the candidate must after 2-3 months be able to communicate in Danish with the participating municipal staff members and read technical notes in Danish.

Contacts

This PhD scholarship is a joint project between PH-Consult and Aalborg University (AAU), Section of Environmental Engineering, within the framework of the Urban Water Technology research school. The PhD student will be enrolled at AAU. General conditions are explained at

www.urbanwatertech.dk, and further information about this project may be obtained by contacting the involved supervisors:

Supervisor:	Prof. T. Hvitved-Jacobsen, Section for Environmental Engineering, AAU, http://www.bio.aau.dk/en/environmental_eng/, e-mail: thj@bio.aau.dk, ph: +45 9635 8489.
Co-supervisor:	Associate Prof. J. Vollertsen, Section for Environmental Engineering, AAU, http://www.bio.aau.dk/en/environmental_eng/, e-mail: jv@bio.aau.dk, ph: +45 9635 8504.
Company supervisor:	Director J.J. Linde, PH-Consult, www.phc.dk, e-mail: jl@phc.dk, ph: +45 3996 2200.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 2: Data based process models for rainfall-runoff in combined sewer systems

Background

The European Water Framework Directive calls for an increased focus on reduction of discharges (overflows) from combined sewer systems into receiving waters. The classical technical solution is construction of large detention ponds, and modern approaches to on-line control are increasingly suggested to optimize the utilization of the available storage. Models play an important role in planning the systems. However, conventional catchment oriented runoff models taking observations from a single, or few rain gauges as input have difficulties with simulating the overflow volumes and pollution loads from individual overflow structures realistically, because they neglect the heterogeneous spatial distribution of the heavy rainfalls that give rise to combined sewer overflows. Furthermore the existing methods are mostly linear and non-stochastic. An alternative - or supplementing strategy is to establish non-linear stochastic models based on on-line observations obtained in the sewer systems. The parameters of the models can be estimated either by off-line procedures, or by adaptive estimation techniques. Such models will improve the estimation of overflows, and they may be coupled with traditional models when on-line data is not available. This strategy becomes increasingly attractive as monitoring data becomes more readily available, but there is currently a considerable need for developing methods and tools for interpreting and utilizing the obtained data.

Project

The aim of the project is to develop cost-effective data-based process models that can utilize on-line data obtained from pumps, level and flow gauges and water quality sensors placed in sewer systems to estimate combined sewer overflow volumes and pollution loads. Emphasis will be on distinguishing seasonal processes (e.g. groundwater infiltration) and recurrent processes (e.g. wastewater from households) from the highly stochastic, non-linear and dynamic rainfall-runoff processes based on state-of-the art statistical methods and grey box modeling principles. The expected result is a suite of methods for estimation of robust non-linear process models from on-line data that can be used either alone or in combination with catchment based runoff models. Two Danish municipalities (Hillerød and Helsingør) and Waste Water Control Aps will make several years of on-line data and preliminary models available. The developed methods will be applied for both design and control purposes and will be tested in practice as part of the project.

Candidate requirements

The candidate is expected to hold a MSc degree in engineering sciences, preferably with a specialization within one/several of the following fields: mathematical modeling and statistics, time series analysis, hydrological modeling, environmental engineering, and urban water/wastewater management. Experience with handling and analysis of large amounts of data is an advantage. The candidate should have an excellent academic track record and a wish to work with innovation at the interface between science and practice.

Contacts

This PhD scholarship is a joint project between Waste Water Control and the Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General

conditions are explained at www.urbanwatertech.dk, and further information about this project may be obtained by contacting the involved supervisors:

Supervisor:	Prof. Henrik Madsen, Informatics and Mathematical Modelling, DTU, www.imm.dtu.dk, e-mail: hm@imm.dtu.dk, ph: +45 4525 3408.
Co-supervisor:	Associate Prof. Peter Steen Mikkelsen, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: psm@er.dtu.dk, ph: +45 4525 1605.
Company supervisor:	Director, Dr. Marinus Nielsen, Waste Water Control Aps, www.wwcontrol.dk, e-mail: mkn@wwcontrol.dk, ph: +45 4585 5147.
Municipal contact persons:	Hillerød municipality: Heidi Taylor, e-mail: heta@hillerod.dk Helsingør municipality: Dines Erik Thornberg, e-mail: det59@helsingor.dk

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 3: Framework for real time control of integrated urban wastewater systems

Background

Over the past twenty years there has been an increased interest in exploiting the potential for integrated real time control (RTC) of urban wastewater systems. This increased interest has been fuelled by demands of the European Water Framework Directive, effects of climate change, higher service demands and increased public awareness, and it has been accompanied by favourable developments in terms of cost, availability and reliability of senor, communication and information technologies. Current developments in the water industry call for a scientifically based generalised framework for estimation and evaluation of integrated RTC strategies of urban wastewater systems. This will minimize the number and effect of overflows and maximise the efficiency of wastewater treatment plants.

Project

The aim of the project is to establish a generalised framework for identification, implementation and evaluation of methods for optimised real time operation and control of urban drainage systems. Focus should be on "model predictive control" strategies exploiting a combination of real time models and measurements. Measurements here encompass any real time observations including precipitation observations, hydraulic variables such as levels and flows, pollutant concentrations and operational parameters such as pump and sluice-gate data.

Focus should be on statistically based approaches to data assimilation, such as stochastic state space modelling and stochastic adaptive control in combination with causal relationships known from classical rainfall-runoff, urban drainage and sewer sciences. Uncertainty in state estimates, prediction and optimisation should be considered within the framework. Data considered could include level and flow data, operational pump and sluice gate data, component concentrations, rain gauge, radar and others.

Candidate Requirements

The candidate is expected to have a background in engineering sciences (MSc), with a focus on at least one of the following fields: urban water management, mathematical statistics and systems analysis. The candidate is expected to have an excellent academic track record and to have a demonstrated ability to work both independently and within scientific research and innovation teams. The candidate should have experience with modelling and simulation tools, mathematical data analysis tools and some software programming. The candidate is expected to be fluent in English, spoken and written.

Planning and Context

The project should commence as soon as possible within the possibilities of the Urban Water Technology Research School - UWT. The researcher should take advantage of the information exchange and qualified criticism that working within a water and data focused research team can give. Appropriate use should be made of the WaterAspects and Krüger RTC frameworks. The candidate will work closely with Krüger's software innovation team exchanging advice on market, context and full scale implementation. Performance is evaluated against established and widely

accepted modelling tools such as for example Mike Urban (Mouse), InfoWorks, SWMM, SAMBA (built on WaterAspects) and WEST or equivalent WWTP description, but should methodologically not be limited to any specific modelling tools.

Contacts

This PhD scholarship is a joint project between Krüger and the Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor:	Associate Prof. Peter Steen Mikkelsen, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: psm@er.dtu.dk, ph: +45 4525 1605.
Co-supervisor:	Prof. Henrik Madsen, Informatics and Mathematical Modelling, DTU, www.imm.dtu.dk, e-mail: hm@imm.dtu.dk, ph: +45 4525 3408.
Company supervisor:	Dr. Morten Grum, Krüger, www.kruger.dk, e-mail: mg@kruger.dk, ph: +45 3957 2117.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 4: Microbiological risk assessment of urban water: development of methods for detection and analysis of pathogens

Background

In urban waters many bacteria and other micro-organisms occur, which can be unwanted, harmful or even pathogenic. In warm/hot domestic and industrial water systems especially the pathogenic water-bacteria *Legionella* is found very frequently. *Legionella* can cause a severe pneumonia – so called Legionnaires´ disease. However, not all *Legionella* types (species/serogroups/subgroups) are equally virulent, and recently some of the virulence mechanisms, genes and markers have been described. *Legionella* is an intracellular bacterium in amoeba, and their growth is influenced by the presence of other micro-organisms and physical/chemical factors in the environment. On other words the number of *Legionella*-cells in a system is not sufficient to assess the real risk – low number of highly virulent bacteria may provide a higher risk than high numbers of less virulent cells.

Detection and quantification of *Legionella* is traditionally based on a culture technique, which is a laborious, slow and costly analysis. Furthermore, the sensitivity of the method is influenced by presence of other micro-organisms in the samples. An obvious alternative is to use a real time quantitative polymerase chain reaction (RT QPCR) for detection and quantification of *Legionella* in water and biofilm samples from technical water systems.

Other micro-organisms in water may also cause a health risk to humans; therefore, for a more comprehensive risk assessment of water systems, it is necessary to include methods for rapid detection, quantification and characterisation of other waterborne bacteria, protozoans and vira.

Project

The main objective of the Ph.D.-project is to improve the risk assessment of microbial infections from urban waters, especially Legionnaires' disease. Focus will be on

- Direct detection of *Legionella* in water samples by implementation and optimization of a RT QPCR
- Optimisation and evaluation of different sample preparation methods/techniques for environmental samples, including biofilm, from urban water systems
- Identification and characterisation of specific virulence makers as well as of environmental conditions that influence growth and probably also expression of virulence. One of these aspects will be detection and characterisation of their natural host organisms - amoebae - in the technical water systems
- Risk assessment investigations of real-world technical water systems, and assessment of the effect of different technical interventions to reduce
- The risk assessment may also involve implementation and use of PCR and other molecular methods for detection of pathogens and virulence associated genes for other water associated pathogens

Equipment for experimental studies and other facilities for the Ph. D. student will be available at SSI and E&R/DTU.

Candidate requirements
The position requires a M.Sc. degree with A or equivalent grade and laboratory experiences within microbiology and molecular biology and with interest in the area of Environmental Engineering Science and Technology. The applicant must be able to work independently as well as in groups

Contacts
This PhD scholarship is a joint project between Statens Serum Institute and Institute of Environment & Resources (E&R), Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor: Associate Prof. Hans-Jørgen Albrechtsen, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: hja@er.dtu.dk, ph: +45 4525 1586.

Company supervisors: Prof. Karen A. Krogfelt (e-mail: kak@ssi.dk) and Senior scientist, Ph.D. Søren A. Uldum (e-mail: su@ssi.dk), www.ssi.dk, ph: +45 3268 3268.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 5: Monitoring drinking water systems

Background

In Denmark, the water supplies have generally benefited from a very high consumer confidence compared internationally. The consumer beliefs are related to the water supplies ability to provide good and safe drinking water. Any incident affecting the consumers perceived water quality will most certainly deteriorate their confidence. Lately the number of contamination incidents appears to be increasing; possibly as a result of better sampling procedures and/or higher sampling frequencies. Additionally, the media have to a larger extent paid interest in issues related to poor drinking water quality; which may explain the booming sales of bottled water. From environmental and national economic point view this is an unwelcome development.

Consequently, there is a growing need for improving the reliability of the systems that warrant good drinking water quality. Furthermore, the water supplies are met with demands for documenting that their drinking water quality constantly fulfils the guidelines.

Drinking water professionals has traditionally relied on historic data and static models as decision tools for their operation of drinking water system. However, the technological development has brought new and reasonably priced equipment to the market. This equipment may be applied to collect and process large quantities of quality data in real-time.

Scope of the project

The project purpose is to set methodologies for the processing and interpretation of large quantities of real time data collected from drinking water systems in order to improve decision-making. This includes combination and utilisation of information collected from various sources such as sensors, models, grab samples etc.

Special attention is paid to identify situations with potentially poor water quality caused by abnormal incidents (e.g. back suction of surface water). By applying sensors and models, different types of incidents may be recognised in real time by monitoring its specific “fingerprint”.

Candidate requirements

The position requires a M.Sc. degree or equivalent grade within the area of Environmental Engineering Science and Technology or relevant discipline. Preferably, you have skills or experience within one or more of the following topics: Environmental Science and Technology, Water supply engineering, Chemistry, Microbiology, Statistics, Programming, Mathematical Modelling.

Contacts

This PhD scholarship is a joint project between Krüger and the Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor: Prof. Erik Arvin, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: era@er.dtu.dk, ph: +45 4525 1472.

Company supervisor: Dr. Rasmus Boe-Hansen, Krüger, www.kruger.dk, e-mail: rab@kruger.dk, ph: +45 3957 2081.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 6: Optimisation of filter operation

Background

Filters for the treatment of groundwater and surface water have been used for more than 100 years in water works for removal of particulate material like microorganisms and for the removal of soluble contaminants such as iron, manganese, ammonium, methane, hydrogen sulphide and organic compounds. Despite this, filters are designed and operated mainly on the basis of rules of thumb and frequently, the effluent quality does not comply with today's stringent quality requirements from the EU, etc. There is a considerable need for the development of design criteria for particulate and soluble contaminants and for development of diagnosis tools for evaluating the state/quality of the filter operation.

Project

During the project, the PhD student will develop:

- Models of the removal of the soluble and particulate contaminants with a view toward optimising filter operation
- Develop diagnostic indicators for the operational state of filters
- Study the effect of operational variables, including backwashing which aims at restoring the full porosity of the filter medium.

Candidate requirements

The position requires a M.Sc. degree or equivalent grade in Environmental Engineering Science and Technology or other relevant discipline, preferably with knowledge of water treatment and specialised in hydraulics, chemical/microbiological analysis and/or modelling. While ability to work in Danish is not a requirement, the candidate will be expected to learn Danish as part of their study program.

Contacts

This PhD scholarship is a joint project between Grontmij/Carl Bro and Institute of Environment & Resources (E&R), Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor: Prof. Erik Arvin, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: era@er.dtu.dk, ph: +45 4525 1472.

Co-supervisor: Associate Prof. Philip Binning, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: pjb@er.dtu.dk, ph: +45 4525 2161.

Company supervisor: M.Sc. Michael Hansen, Grontmij | Carl Bro, www.carlbro.com/en, e-mail: mlh@carlbro.dk, ph: +45 8210 5170.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 7: The connection between residence time and water quality in water distribution networks

Background

The water consumption in Denmark and many other countries has decreased during the last decades. Today, it has stabilised at a level approximately 35% lower than in 1970, and this lower water consumption has resulted in decreased flow velocities and longer residence time in the distribution networks and storage tanks.

The increased residence time may influence the chemical and biological water quality as well as the taste due to various reasons *e.g.* biofilm formation supported by organic compounds diffusing out from the surface coatings in storage tanks and the pipe materials. Little is known of the biological control of this biofilm formation, but since small animals and protozoa have been found in storage tanks, dead ends and distribution pipes with low flow velocities, they are supposed to graze on the bacteria in the biofilm. Limited research has been conducted in this field and the significance of the presence of small animals and protozoans is unknown, *e.g.* in terms of influence on the survival of intruding pathogens or indicator organisms, which may be reduced, or supported e.g. as a host by the fauna.

Especially in non-disinfected drinking water without chemical control of the microbiological growth there is a strong need for establishment of insight in these processes, to form a quantitative basis for decisions during daily operation, design and renovation of the distribution network.

Project

The Ph.D. project will focus on one or more of the following areas:

- Effects on drinking water quality in the distribution network, in terms of odour, taste, chemical and biological quality as a result of the residence time, physical parameters and the design and choice of materials in the network
- Identification of measurable indicator parameters for monitoring the water quality
- The occurrence of protozoa and small animals (*e.g. Chydorides, Asellus aquaticus, Cyclops albidus* ect.) in the distribution network, and how their occurrence is related to flow velocity, residence time, and biofilm formation
- The effect of protozoa and small animals in the distribution network on the water quality, on the control on biofilm formation, and on the survival of the indicator organisms and pathogens *e.g.* as hosts or predators
- Means to reduce or eliminate the presence of small animals in the distribution network

Equipment for experimental studies and other facilities for the Ph. D. student will be available at E&R/DTU. Network modelling expertise will be available at OV. Staff for assistance in field testing and sampling will be available at OV.

Candidate requirements

The position requires a M.Sc. degree or equivalent grade within the area of Environmental Engineering Science and Technology and preferably be specialised within microbiological and/or chemical analysis.

Contacts

This PhD scholarship is a joint project between Odense Water Ltd (OV) and Institute of Environment & Resources (E&R), Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor: Associate Prof. Hans-Jørgen Albrechtsen, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: hja@er.dtu.dk, ph: +45 4525 1472.

Co-supervisor: Prof Erik Arvin, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: era@er.dtu.dk, ph: +45 4525 1586.

Company supervisor: Team leader Henrik Juul, Odense Water Ltd, http://www.ov.dk/?AreaID=2, e-mail: hj@ov.dk, ph: +45 4082 3610.

Announcement of PhD scholarship
Application deadline 25th April 2007, 12:00
See further details on www.urbanwatertech.dk

Project No. 8: Transport models for water distribution systems

Background

Models for water distribution systems are widely used for analysis of hydraulic variables, pressure and flow velocity, and predictions of water quality. Whereas hydraulic models are very well developed, water quality models can currently only simulate a few variables such as conservative compounds like chloride/salt and chlorine concentration. More complex phenomena like biological reactions and particle transport can not be modelled properly and there is therefore a considerable need for reseach in these areas.

Project

The project will develop numerical models of the transport of particles and sediments in water distribution systems. The models will be extensions of existing hydraulic simulation models designed for the operation of supply networks. The new model will track the position and development of vital water quality parameters including solid particles acting as hosts for bacteriological growth. Accurate deterministic models for this purpose require a suite of parameters that are not generally known, so the challenge is to find model formulations that have sufficient detail while being applicable for practical purposes. Hybrids between deterministic and stochastic models may be considered. The basic numerical scheme will be based on either a Euleran or Lagrangian formulation or a combination of these.

The project will also include some experimental work designed to provide data for motivating and testing model development. Experimental work will include case studies developed in association with 7 Technologies.

Candidate requirements

The position requires a M.Sc. degree or equivalent grade within the area of Environmental Engineering Science and Technology or relevant discipline. The transport and biological quality models will be embedded in the 7-Technologies AQUIS water network simulation software. The applicant must therefore have documented qualifications in computer modelling, hydraulics, numerical methods and programming experience (C++, C#). It is desirable that the applicant has experience or a demonstrated interest in doing experimental work.

Contacts

This PhD scholarship is a joint project between 7-Technologies and Institute of Environment & Resources (E&R), Technical University of Denmark (DTU), within the framework of the Urban Water Technology research school. General conditions are explained at www.urbanwatertech.dk. Further information about this project may be obtained by contacting the involved supervisors:

Supervisor: Prof. Erik Arvin, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: era@er.dtu.dk, ph: +45 4525 1472.

Co-supervisor: Associate Prof. Philip Binning, Institute of Environment & Resources, DTU, www.er.dtu.dk, e-mail: pjb@er.dtu.dk, ph: +45 4525 2161.

Company supervisor: Manager, System Design, Steffen K. Iversen, 7-Technologies, www.7T.dk, e-mail: steffen.iversen@7t.dk, ph: +45 45 900 700