Funded PhD Research Opportunity

Research Studentship in Energy Efficient Water Distribution Systems

The Dept of Civil, Structural & Environmental Engineering, Trinity College Dublin invites applications for a research position leading to a PhD, part funded under the ERDF INTERREG Ireland-Wales programme 2014-2020. The Department is collaborating with the Trinity Business School and Bangor University Wales in this research.

The project is entitled Distributing our Water Resources: Utilising Integrated, Smart & low-Carbon Energy (Dŵr Uisce). The aim of the Dŵr Uisce project is to improve the long-term sustainability of water supply, treatment and end-use in Ireland and Wales through:

- The development of a number of new innovative technology platforms
- Undertaking economic and environmental impact assessments
- Developing policy and best practice guidelines to facilitate the implementation of integrated low-carbon and smart energy solutions for the water sector.

The management of large scale water distribution networks is particularly challenging due to their complexity and due to the high level of interconnectivity among the system components such as tanks, pipes, pumps, valves etc. Also, the presence of strong nonlinearities, random disturbances, conflicting and diverse performance criteria, stringent operational constraints, as well as social factors and legislative requirements make the energy optimization of water networks especially challenging. In addition, consumers’ behaviour has a considerable impact on the operation of the network and its uncertain nature leads to the formulation of a stochastic multivariable constrained network control problem.

As part of Dŵr Uisce (www.dwr-uisce.eu), this PhD research project will comprise the development and assessment of smart network control methodologies for energy efficiency gains in the water industry. The successful candidate will:

- Carry out background research in the fields of pipe network control and optimisation, the water-energy nexus, water supply & treatment.
- Develop and apply model predictive control techniques to the optimisation of energy consumption in water networks.
- Develop and assess energy saving strategies such as hydropower energy recovery and distributed micro-pumped storage.

Applicants with good honours degrees in Civil Engineering, Mechanical Engineering or a related discipline will be considered. Strong skills in scientific computing, applied mathematics and programming in one or more major programming tools such as C/C++/Matlab are preferred. A strong background in control and modelling of hydraulic systems is desirable. Candidates are asked to send a cover letter, CV and the names of two referees, at least one of whom should be an academic, to the address below. Funding for this position comprises €20,000 per annum for a period of 4 years. Closing date for applications is 1st July 2017. Position commencing 1st September 2017. Informal enquiries to basub@tcd.ie or amcnabol@tcd.ie;

Further information available at: https://www.tcd.ie/civileng/research/environment/water/water-energy-nexus/index.php

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