UNIVERSITY OF EXETER
Centre for Water Systems
1998 10 YEARS 2008

CWS Newsletter

Volume 1, Issue 11

A decade of Engineering Excellence!

The **Centre for Water Systems** is celebrating its tenth anniversary. To mark the occasion and celebrate the achievements of this leading research centre, around 80 people from industry and academia travelled to the University for an evening celebration on Tuesday 24 June.

Professor Dragan Savic, founding co-director of the Centre for Water Systems said: "It all started with two permanent members of staff in 1998 and now we are an internationally recognised centre of excellence in urban water research with over 30 researchers and funding from UK and EU sources that has risen over the ten years from about £100k to £1m per year.

Much of our work is carried out jointly with industry, to ensure that research results are put to good use as soon as possible. For example, our tools have been used recently by consultants to help water companies assess investment needs for the latest price review 2009 (PR09) by the water regulator OFWAT. The event was not only an occasion to celebrate the past successes, but also to reiterate our commitment to keep our future research grounded in real world practice."

Guests attended from across the south west region, with representatives from the Met Office, South West Water and Halcrow, among others.

10th Anniversary Celebrations

Some travelled from as far away as Australia to attend the event. The evening provided an opportunity for the Centre to build on links with industry and other universities, which will stand it in good stead for the next ten years.

New Grant Awarded

Dr Zoran Kapelan and Professor Dragan Savic were recently awarded an EPSRC grant for a research project entitled "A Risk-Based Design of Water Distribution Systems under Uncertainty". The total value of the grant is £180K over two years. The aim of the project is to develop a novel, optimisation based methodology for the risk based design / rehabilitation of real-life WDS systems under both hydraulic and mechanical uncertainty. The project brings mathematical techniques for statistical sampling and evolutionary optimisation together with an engineering knowledge of the design of water distribution systems. The project is supported by SEAMS, United Utilities Water Ltd and Harbin Institute of Technology. Contact:

Dr Zoran Kapelan (z.kapelan@exeter.ac.uk)

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Special points of interest:

- Working with HR Wallingford
- Partners in Europe, the Middle East and China
- BHS National Symposium 2008
- MSc in Urban Water Systems

UK Collaboration

Strategic Partnership with HR Wallingford Ltd

We are pleased to announce a Knowledge Transfer Partnership (KTP) with HR Wallingford which has resulted in DTI / EPSRC funding over the next three years. The project will focus on developing a decision support tool to plan for flood defence interventions at many strategic locations, while taking predicted changes in climate and alterations to existing defences into account, thereby improving the assessment of flood risk management options.

Flood risk management is highly complex with a large number of options to consider (with associated differences in costs and performance). In addition, the identification of management options is extremely time-consuming and riddled with uncertainties. This project will develop tools to enable the team to make effective and efficient use of flood simulation and management models to overcome problems associated with optimal options determinations, taking cost and benefits, and the quality of solutions into account.

The project will be led by Dr Soon-Thiam Khu, Dr Zoran Kapelan and Professor Dragan Savic at the Centre for Water Systems, and by Ben Gouldby and Paul Sayers at HR Wallingford. A project associate, Michelle Woodward, has been appointed and started working at HR Wallingford in August 2008.

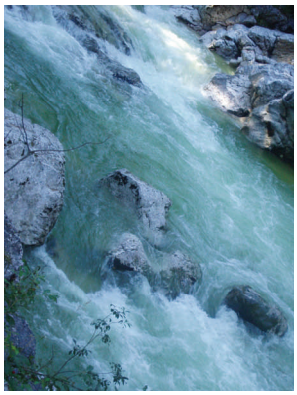
"This partnership has the potential to set new standards in the area of flood risk assessment"

This partnership will directly improve HR Wallingford's ability to provide its services in both the public and private sectors. The proposed research project will impact the techniques and tools used in providing consultancy initially to the flood management sector, but later across all business sectors.

The partnership has the potential to set new standards in the area of flood risk assessment and such gains will help place HR Wallingford at the cutting-edge of their industry and help protect its future growth.
For more information, please contact Dr Khu at s.t.khu@exeter.ac.uk

This KTP is a great example of how research expertise can be applied and developed in a practical context. If you would like to know how this concept could be applied to your work, please contact us: cws@exeter.ac.uk.

Consultancy



Dr Zoran Kapelan is currently working on a project with Kiwa Water Research (KWR) in the Netherlands. The project aims to develop the methodology and software for identifying water travel times in distribution systems. These times are identified by adding NaCl to the drinking water (within the Water Act limits) and then measuring the electric conductivity at different locations within the network. This information is then used to calibrate the associated water quality model of the analysed network. This project is in collaboration with Ms Mirjam Blokker from the KWR.

Contact: Dr Zoran Kapelan (z.kapelan@exeter.ac.uk).

CWS researchers are involved in the development of an addition to the water resources simulation software, Aquator, developed by Oxford Scientific Software Ltd (OSS), to optimise the use of water resources in reservoir systems for United Utilities. The Genetic Algorithm (GA) software developed by CWS will be used to optimise a single control curve on any Aquator model. The results of a preliminary study clearly showed the potential financial savings using this form of optimisation with Aquator by increasing the volume supplied from a reservoir. The work is carried out by OSS, with CWS providing the GA functionality as a subcontractor to OSS. For further details please contact Professor Dragan Savic (d.savic@exeter.ac.uk).

Overseas partnerships

Some of the latest activities with our overseas and European partners:

Spain

Professor David Butler was invited in June to the EXPO 2008 event in Zaragossa, Spain (the biggest water festival on earth!). He spoke at the 'Water Tribune' Water and Cities thematic week on the performance of an ultra-low flush toilet.

China

Professor Dragan Savic was inaugurated as a "Guest Professor" at Harbin Institute of Technology in China this July. He now has a PhD student at HIT whom he will be supervising over the next 4-5 years.

South Africa

In August, Dr Zoran Kapelan and Professor Dragan Savic attended the 10th Water Distribution Systems Analysis (WDSA) conference in Kruger Park, South Africa http://www.uj.ac.za/wdsa2008. They presented a total of 11 papers between the two of them, including the papers from the on-going EPSRC Neptune project.

The conference was officially opened by Adv. Masotho Petlane, deputy-chair of Rand Water's Board. This was followed by the conference keynote address "Quo Vadis Water Distribution System Analysis", delivered by Professor Dragan Savic. The evening was concluded by an open-air meet-and-greet function with an African theme.

Professor Dragan Savic is inaugurated as 'Guest Professor' at Harbin Institute of Technology

Sweden

In August, Professor David Butler gave an invited keynote address on "Towards the sustainable City? Principles and Practice", in the one-day Sustainable City workshop at the 2008 World Water Week in Stockholm.

Pakistan

Dr Fayyaz Ali Memon, organised a two day regional workshop on urban water demand management from 27 to 28 August 2008 in Pakistan under the DelPHE project supported by the British Council and DFID. The workshop was aimed at capacity building in developing countries for sustainable water management. The event was inaugurated by the Vice Chancellor of Sindh University Pakistan, who thanked the project funders and congratulated Exeter University for bringing together urban water demand management experts to discuss current thinking to the benefit of developing countries like Pakistan. Under the DelPHE project, the CWS team is also helping to set up three demonstration pilot scale sites for greywater recycling in Pakistan.

A workshop on urban water demand management in Pakistan, organised by Fayyaz Ali Memon

Italy

Dr Zoran Kapelan visited Professor Orazio Giustolisi and his research group at the Technical University of Bari and the Engineering Faculty of Taranto in September 2008. The visit was used to further strengthen the ongoing collaboration between the two research groups.

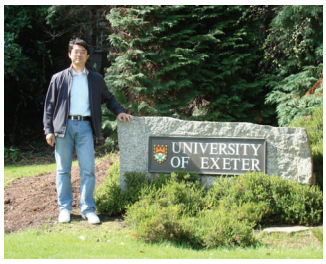
We are in the process of working with several European partners on the next FP7 call for proposals (more to come on this in the next issue of the Newsletter).

Visitors to the Centre

Dr Samuel Odaii in Exeter talking about his work

In May we welcomed **Dr Samuel Odaii** as a visitor and speaker. Sammy is Head of the Water Resorces and Sanitation Programme at the Kwame Nkrumah University of Science and Technogy in Kumasi, Ghana. KNUST is a centre of excellence in Africa for teaching in Science and Technology for development.

Jeremy Gabe of Landcare Research, New Zealand was a visitor in June. Landcare Research is New Zealand's leading provider of solutions and advice for sustainable development and the management of land-based natural resources.



Dr Niu Zhi-guang , from Tianjin, visiting the University

Dr Niu Zhi-guang, associate professor of Tianjin University of Tianjin China, visited the Centre for Water Systems July to September 2008. During his stay in Exeter, Dr Niu had discussions about research into water supply systems and about methods of teaching.

British Hydrological Society National Symposium

The BHS Symposium gala dinner

The 10th British Hydrological Society National Symposium was held at Exeter University from 15-17 September 2008. 150 academics and practitioners from across the UK and overseas attended for three days of discussion on topical issues of hydrology, to present their latest research and debate new hypotheses and technologies. (See http://www.hydrology.org.uk/ for some of the presentations).

Keynote lectures were delivered by Professor Wang Hao (IWHR, China), Dr Brian Golding (Met Office, UK) and Mr Ian Barker (Environment Agency, UK). Keynote speaker Professor Vijay Singh was prevented from attending by the Hurricane Ike.

One afternoon was set aside for site visits and delegates visited Boscastle, Venford Reservoir and treatment works or the Met Office and the Environment Agency's Regional forecasting room.

This successful 3-day event was enjoyed and valued by all.

For more information, please see the BHS website or contact Dr Soon-Thiam Khu (s.t.khu@exeter.ac.uk) or Dr Zoran Kapelan (z.kapelan@exeter.ac.uk).

Delegates at Boscastle

Recent publications

Giustolisi, O., Savic, D.A. and Kapelan, Z., (2008), Pressure-driven Demand and Leakage Simulation for Water Distribution Networks, *ASCE Journal of Hydraulic Engineering*, 134(5), 626-635.

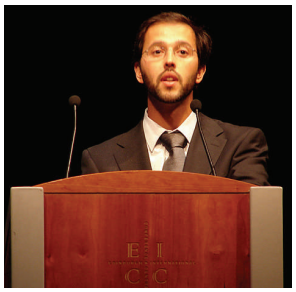
Berardi, L., Kapelan, Z., Giustolisi, O. and Savic D.A. (2008) Development of Pipe Deterioration Models for Water Distribution Systems using EPR, *Journal of Hydroinformatics*, Vol. 10, No. 2, pp. 113-126

Dawson, R.J., Speight, L., Hall, J.W., Djordjevic, S., Savic, D.A., Leadro, J. (2008) Attribution of flood risk in urban areas, J. *Hydroinformatics*, 10(4):75-288.

Makropoulos, C.K., Natsis, K., Liu, S., Mittas, K. and Butler, D. Decision support for sustainable option selection in integrated urban water management (2008). *Environmental Modelling and Software,* 23, 12, 1448-1460.

Fewtrell, L., Butler, D., Memon, F.A., Ashley, R. and Saul, A. (2008). An overview of UK-based HIA research on water management and flooding. In *Health Impact Assessment for Sustainable Water Management*, Fewtrell, L. and Kay, D. (Eds.), IWA Publishing London, pp 29-43, ISBN: 9781843391333.

Jonkergouw, P. M. R., Khu, S. T., Kapelan, Z. and Savic. D. (2008). Water quality model calibration under unknown demands. *ASCE J. Water Res. Plng & Mgt.* doi:10.1061/(ASCE)0733-9496(2008)134:4(326)



PhD student Jorge Leandro speaking at the IWA conference in September

Congratulations!

PhD student **Jorge Leandro** was shortlisted for a prestigious international prize – *The Poul Harremoës Award for Best Urban Drainage Paper by a Young Author*. This award is given for the presentation of novel and provocative ideas relating to developments in urban drainage.

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Mark Morley, was awarded a PhD from the University of Exeter in August 2008. He is now working as a post-doctoral researcher in the Centre for Water Systems.

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Congratulations to **David Butler** on winning the 2008 IWA Prize for Research Excellence in Support of Sustainable Urban Water Management for co-authoring the paper: Ashley R M., Blackwood D., Butler D., Jowitt P., Davies J., Smith H., Gilmour D. & Oltean-Dumbrava C. Making asset investment decisions for wastewater systems that include sustainability. *ASCE Journal of Environmental Planning and Management,* 134, 3, 200-209, 2008.

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Dr Darko Joksimovic, post-doctoral researcher in the Centre for Water Systems, took up a post in the Faculty of Civil Engineering, Ryerson University in Toronto in September 2008.

Professor David Butler

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Please contact us to find out more about any of the topics in this newsletter

Diary

Informatics Research Institute Seminars

Harrison Building room 209, Exeter University

at 2 pm

4 November : *Evidential Reasoning in Water Distribution System Operations*

Josef Bicik (University of Exeter)

11 November: *Linking AHP and Social Choice Methods in Group Decision-Making*

Bojan Srdjevic (University of Novi Sad, Serbia)

18 November: *The Anglian Water Alliance – Modelling Experiences from AMP4 and future challenges for AMP5*

James Lau (Black & Veatch)

25 November: *Tearfund's Impact on MDG 7*

Frank Greaves (Programme Development Adviser for Water & Sanitation at Tearfund)

2 December: Huanhuan Chen (University of Birmingham)

Topic to be finalised

MSc in Urban Water Systems

"Water is Life: Sanitation is Dignity" (Water Services Strategic Framework, South Africa)

The MSc in Urban Water Systems is offered by the Centre for Water Systems at the University of Exeter and is the only course of its type in the UK. It draws on the experience and cutting-edge research capability of the Centre staff together with external lecturers from leading companies and government agencies, ensuring delivery of a theoretically sound, yet practically relevant course.

This programme will train you in the essentials of urban water supply and urban drainage technology together with the hydroinformatic tools for simulating their performance, all in a context that encourages a wide integrated systems approach to their implementation.

Topical issues covered include:

Water losses and leakage, Water efficiency, Climate change, Sustainability, Asset management, Whole-life costing, Urban flooding, Integrated modelling, Risk and uncertainty.

For full programme details and information about how to apply visit: www.exeter.ac.uk/cws/msc

Attendance: one day a week for up to 60 weeks over two years.

The individual Research Project can be undertaken at your place of work with a University supervisor.

A Postgraduate Diploma and Certificate can be studied over a shorter period. Full-time study is also available.

Contact:

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