



## **Message from Chairman**

Last year was another successful one for the section. The technical meeting held immediately following the “Hydraulic Specialists Meeting” in the School of Engineering, Cardiff University on “Managing Flooding and Water Quality in the Urban Environment” was very well attended. Thanks are due to Catherine Wilson (Cardiff University) and Ian Guymer (Warwick University) for organising this event. The Young Persons Papers Competition was also a huge success. The results are provided below and thanks are due again to the sponsors for their generous donations.

This year’s AGM will be held at Keble College Oxford on the 29<sup>th</sup> of September 2008 - prior to FLOODrisk 2008. In addition to the AGM, the day will include the final of our Young Persons Papers Competition, and a half-day meeting on “Flow gauging”, organised by Caroline McGahey (HR Wallingford Ltd). I hope you can find time to come along and support both of these events.

This addition of Newsflash UK includes a technical briefing on “Infomatics in Hydraulics” provided by Zoran Kapelan and Dragan Savic (Centre for Water Systems, University of Exeter). It is our intention to make the technical briefing a regular of Newsflash UK and I would welcome suggestions for future topics.

Finally a list of our current committee members is provided at the end of this edition. I am very grateful to them for their continued hard work and support. Please feel free to contact any committee member with your views on the organisation and management of the UK section. We are particularly keen to receive suggestions for meeting topics.

Garry Pender  
IAHR UK Section, Chair

12 June 2008

## **Report from 2007 AGM**

In September 2007 the UK Section of the IAHR organised a half-day meeting on Managing Flooding and Water Quality in the Urban Environment at the School of Engineering, Cardiff University. Four excellent talks were given by Ali Cotton (WRc), Elliot Gill (Halcrow), Barry Hankin (JBA Consulting) and Adrian Saul (University of Sheffield), which encompassed a range of different aspects of this subject, including integrated urban drainage, urban flood modelling and water quality modelling. The final of our Young Persons Paper Competition, also took place and was won by Fang Yenn Teo of Cardiff University for his paper on modelling mangroves under tsunami wave conditions. Over sixty-five people were in attendance and comprised a good mix of people from industrial and academic communities.

Catherine Wilson  
Meeting Organiser

2 June 2008

## UK Section AGM Monday 29<sup>th</sup> September 2008



KEBLE COLLEGE  
UNIVERSITY OF OXFORD

The UK Section of the IAHR is organising a half-day meeting on “Flow Gauging”. A programme for the technical session is provided below and will be preceded by the final of the UK Section’s Young Persons Papers Competition. If you wish to register for the meeting please follow the link below.

- |          |   |
|----------|---|
| 12 noon  | Registration  |
| 12.30 pm | Lunch   |
| 1.00 pm  | Presentations from finalists in UK Section Young Persons Papers Competition |
| 1.50 pm  | Presentation of prizes  |
| 2:00 pm  | IAHR UK Section AGM   |
| 2.10 pm  | Technical meeting   |

### Flow Gauging

- |         |  |
|---------|--|
| 2.10 pm | Prof Koji Shiono, University of Loughborough<br>New approaches to estimating flood flows via videography and 2D & 3D modelling |
| 2.45 pm | John Davies, United Utilities<br>A water company’s approach to regulatory flow monitoring                                      |
| 3.25 pm | Mark Thomas, Flow Check Ltd<br>Flow surveys  |
| 4:00 pm | Eric Gaume<br>Reducing uncertainties in estimating peak discharges after major flood events                                    |
| 4.35 pm | Close  |

**Attendance at the half-day technical meeting is free to students, £40 for IAHR members and £50 for non-members. If you wish to attend the above event please register on line now at [www.iahr.net/UKSection/](http://www.iahr.net/UKSection/).**



## IAHR British Section Papers Competition

The IAHR British Section is pleased to announce its Young Persons Paper Competition 2008. The competition affords young engineers and scientists the opportunity to share knowledge and experience within the hydraulics research community.

Authors are invited to submit a short paper (max 15 pages) describing a piece of research or design they have undertaken that required a novel application of hydraulic principles. The paper may have been written for another purpose, such as, a project report or conference paper. The paper should include a description of the problem solved; its context within engineering and scientific endeavour; the hydraulic principles applied; and, the element of novelty in their application.

The competition is open to scientists and engineers working in any sector: academic, commercial or government. Submissions will be split into two categories, research and design innovation. All candidates must be less than 30. **Deadline for submission is 4<sup>th</sup> August 2008.**

The prizes will be awarded to the papers demonstrating progress in hydraulic research and novelty in the application of hydraulic principles to design. The judging panel will be nominated by the IAHR UK Section Committee.

Based on the written submission the top two entries in each category will be required to give a brief presentation of their paper at the UK Section AGM at Keble College Oxford (see: <http://www.floodrisk2008.net/venue.htm>) on the 29<sup>th</sup> of September 2008 - one day prior to FLOODrisk 2008. The oral presentations will determine first and second place in each category.

To enter please submit your paper to Caroline Mc Gahey at [c.mcgahay@hrwallingford.co.uk](mailto:c.mcgahay@hrwallingford.co.uk).

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## **Technical briefing Informatics in Hydraulics**

Zoran Kapelan and Dragan Savic  
*Centre for Water Systems, University of Exeter, UK*

Hydroinformatics is a branch of Informatics which concentrates on the application of information and communications technologies in addressing water related problems. It has its origins in the field of computational hydraulics established by M.B. Abbott in the late 1960s / early 1970s.

The numerical simulation of water flows and related processes in both rural and urban systems remains one of its mainstream areas. Initially, the emphasis was on the development of detailed, physically-based, 1D/2D/3D hydraulic and hydrological models for both the rural ([www.wallingfordsoftware.com](http://www.wallingfordsoftware.com), [www.dhigroup.com](http://www.dhigroup.com), [delftsoftware.wldelft.nl](http://delftsoftware.wldelft.nl)) and the urban environment ([www.mwhsoft.com](http://www.mwhsoft.com), [www.haestad.com](http://www.haestad.com)). Later on, as the hardware and software technology was developing, more emphasis was put on (re)writing the software in the object-oriented context and the development of sophisticated Graphical User Interfaces. This typically involved Geographical Information Systems to represent and analyse spatial data. Recently, the emphasis seems to be shifting towards integrated modelling (Fu et al. 2008), web-based applications and the provision of intelligent decision support tools. Development of decision support tools includes the use of various automated techniques for the selection of best solutions based on a set of criteria. This includes different optimisation techniques (e.g. Genetic Algorithm embedded in the GANetXL software <http://www.centres.ex.ac.uk/cws/technology/76-ganetxl>) and/or various multi-criteria decision analyses methods.

In addition to computational hydraulics, the hydroinformatics community has a strong interest in the use of techniques originating in the artificial intelligence field, such as artificial neural networks, support vector machines, genetic programming, cellular automata, fuzzy logic, various Bayesian models and many others. These techniques are usually used to perform data mining for knowledge discovery or for developing data-driven models. Typical applications include: (a) building a mathematical model from observed data where it is not possible or is too difficult to develop a physically-based model (Berardi et al. 2008); (b) extracting rules from data (Bessler et al. 2003); (c) generating emulators (or meta-models) of complex physical or numerical models with the idea of significantly improving computational efficiency whilst preserving their prediction accuracy (Khu and Liu, 2007); (d) development of off- and on-line models for detecting and/or diagnosing system faults (e.g. detection of pipe bursts – see [www.neptune.ac.uk](http://www.neptune.ac.uk)) and (e) many other problem specific applications.

In addition to the above general techniques, new data-mining techniques are constantly being developed. An example of such a technique is the Evolutionary Polynomial Regression (EPR) methodology and software (<http://www.hydroinformatics.it/prod02.htm>) developed jointly by the Technical University of Bari and the Centre for Water Systems at University of Exeter (<http://www.centres.ex.ac.uk/cws>). EPR is a smart regression tool that automatically detects the best model structure and related parameters from observed data. Unlike black box methods (e.g. neural networks) it generates fully transparent mathematical models that could be subjected to engineering judgement. The methodology was recently used to develop pipe deterioration models in the UK for both water and wastewater systems.

The hydroinformatics community has its own specialised journal (Journal of Hydroinformatics at <http://www.iwaponline.com/jh>) and meets regularly every two years at specialised series of conferences. The next, 8<sup>th</sup> international conference will be held in Concepcion, Chile in January 2009 (<http://www.heic2009.org/8hic>). See you there!

#### References

1. 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*, 10(2), 113-126.
2. Bessler, F.T., Savic, D.A. and Walters, G.A. (2003), "Water Reservoir Control with Data Mining", *ASCE Journal of Water Resources Planning and Management*, 129(1), 26-34.
3. Fu, G., Butler, D. & Khu, S-T., (2008), "Multiple objective optimal control of integrated urban wastewater systems", *Environmental Modelling and Software*, 23, 225-234.
4. Khu, S.-T. and Liu, Y. (2007), "Evolutionary computation-based meta-models in hydro-environmental modelling: A survey, Invited Paper", Workshop on Advances in Hydroinformatics, Niagara Falls, Canada.

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