RSC | Advancing the Chemical Sciences

The Newsletter of the Royal Society of Chemistry Water Science Forum

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Alan Tetlow Bursary

In memory of Alan Tetlow the Water Science Forum bursary will help post graduate students or young professional water scientists during the first 10 years of their career.

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Your newsletter by e-mail

Many members tell us they receive more of their mail electronically, so to get your newsletter through your in box please go to the members section of the RSC website (https://

members.rsc.org/UpdateDetails.asp) and ensure there is a valid e-mail address and you allow mail from the RSC. If every member received the newsletter by e-mail WSF would save ~£750 in postage and distribution costs allowing more resources for the conference and seminar programme. For more information contact Kevin Prior at rsc@cookprior.co.uk

The Alan Tetlow Memorial Bursary Awards

WSF is proud to announce the award of four Alan Tetlow Awards.

Christine Rogers, a Daphne Jackson Trust Fellowship recipient , received an Alan Tetlow Bursary in December 2008, to help cover her bench fees (i.e. her sampling and analytical consumable costs). Christine is coming back to water science after a career break. She had been awarded a Daphne Jackson Trust Fellowship at Leeds University for retraining. Her proposed research project related to the bioremediation of contaminated groundwater.

Sharon Velasquez Orta, a third year PhD student carrying out research into the use of microbial fuel cell technology for wastewater treatment at Newcastle University, attended the IWA World Water Congress and Exhibition in Vienna. Her paper on the role of flavins, Shewanella's endogenous electron shuttles, in microbial fuel cells was well received and she was able to meet and talk with fellow researchers and obtain valuable feedback on her project.

Silvia Batchelli,

Silvia Batchelli, a PhD student carrying out research on aquatic colloids and metal interactions at the Environmental Research Institute in Thurso, attended the American Society of Limnology and Oceanography Aquatic Science Meeting in Nice. Her research is current focusing on the interactions between trace metals and estuarine colloids in the presence of humic substances. As well as benefiting from the conference in general, Silvia was able to take part in a session on chemical speciation of metals in waters where she obtained valuable feedback on her work.

Daniel VandenBurg who is is doing his PhD at the University of Bath and is working on the mechanism and products formed from the sonochemical decomposition of phthalates in water. He has been invited to give a talk on his research at the 238th American Chemical Society Fall Meeting in Washington. His bursary was awarded a to assist with travel costs.

The awards are granted each year to assist early career water chemists or returners either in attending conferences or meetings or support relevant water science projects. Applicants have to be members of the RSC and each application is assessed by the WSF Committee to ensure that the area of research or career development contains a goodly proportion of water chemistry and has an identifiable practical application. The process is administered wholly by the Forum. All that we ask is that the recipient be a member of the Royal Society of Chemistry, and preferably a member of Water Science Forum..

If you would like to apply for the Alan Tetlow Memorial Bursary, please contact any of the people below giving using the form available on the WSF bursaries web page (http://www.rsc.org/Membership/Networking/InterestGroups/WaterScience/bursaries.asp) including a copy of your CV and a paragraph setting out how you would want to use the Bursary.

Contacts: Claire.Stacey@toucansurf.com, or martyn.jones@uuplc.co.uk,

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Water Science

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Special points of interest:

- **Research Needs on Water Sustainability and Climate Change at IUPAC 2009 Glasgow**
- **Alan Tetlow Memorial Bursary**
- **WSF Subscriptions 2010 –2013**
- **WSF Governance**

WE ARE ON THE WEB WWW.RSC.ORG/MEMBERSHIP/NETWORKING/INTERESTGROUPS/WATERSCIENCE/INDEX.ASP

"promoting the professional and scientific interests of members to safeguard the public interest in the application of chemistry in water-related industries."

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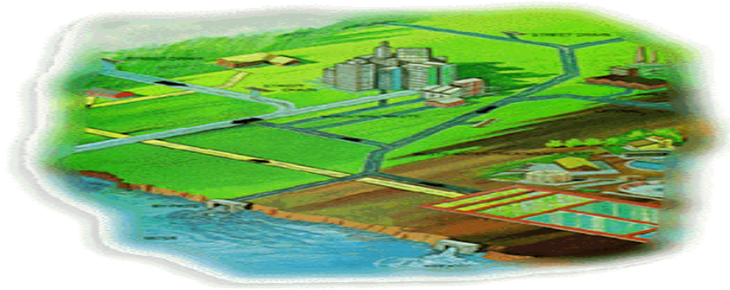
A IUPAC 2009 – Water Sustainability Symposium

By Richard Allan

In August this year the RSC hosted the IUPAC congress in Glasgow. This enabled the RSC to highlight the need for chemical science to play its part in sustainable water and to further promote this in the context of the recently published RSC priority road map. The RSC published its report on Water Sustainability in 2007. This report highlighted the role of chemical sciences in ensuring that water resources are managed and maintained in a sustainable way.



The symposium on water sustainability looked at a range of issue which touched upon global water resource management; monitoring the impact of climate change; Innovations in chemical science that will protect drinking water sources; and social justice issues. As the event unfolded it became clear that climate change and population increases will have a significant impact on water availability and quality, with time and that chemical science has a major role to play in all aspects of water management from purifying and treating to capturing and transporting water to point of use.

Climate Change

Dr Philippe Quevauviller presented his key note presentation on the impact of climate change and the links to the European Water Framework Directive. He highlighted the positive impact of the directive on promoting good catchment management, better steward ship of our water resources and the need for robust water quality monitoring. Dr Ulrich Borchers opened up the session on monitoring the effects of climate change by presenting a paper on work that he conducted in Ireland, which focused principally on the variation of metals concentrations.

Social Justice

Professor Adrian McDonald went on to highlight some of the key considerations around social justice and the right to the availability of good quality drinking water. He touched upon aspects of supplies in Africa as well as some of the impacts of water management in the United Kingdom. Professor Tony Allan touched upon some of the social challenges that will impact on water sustainability. He made the point that unless consumers and policy makers recognise that there is a threat to water then they will not act any differently.

As the event proceeded it was highlighted that water resource issues could only be addressed by scientists, engineers and policy makers working together to identify the optimum sustainable solution.

Subscriptions

Much of the Forum's income comes from surpluses derived from our successful seminars and conferences. Unfortunately, in the current financial climate, this income can no longer be relied upon with recent events only just breaking even or even making a slight loss.

Another vitally important source of income, albeit relatively small, is from our Members' annual subscriptions. When the then Water Chemistry Forum was first founded in 1985, the annual group membership subscription was set at £2. This was increased to £5 at the beginning of 1998, following consultation with members, as there was a risk of the Forum going into deficit. We do not seek to turn this into a regular cycle but if the current situation continues, history will repeat itself and Forum may well go into deficit by the end of 2010.

The Committee has, therefore, has been looking into ways of reversing this trend as part of the annual financial planning review. The preferred option is to increase the membership subscription to £10, with effect from 1 January 2010. This will not only maximise benefits for the Forum in the short term but also links in with the RSC intention for all inclusive membership in 2011, when the annual subscription rate for RSC will be increased whilst allowing membership of up to three Interest Groups at no additional cost.

The Committee regrets having to take this decision and apologises to Members for this additional financial burden at this difficult time, but we hope that you understand the reasons for doing so.

Subscriptions 2010—2013

2010 £10

2011 all inclusive fee*

2012 all inclusive fee

2013 all inclusive fee

* up to 3 interest groups included in RSC membership, each addition interest groups £10 each

Needs for Research on Water Sustainability and Climate Change by Ph. Quevauviller

According to IPPC and Water Framework Directive (WFD) expert groups (see references), climate change impacts might have consequences on current water management systems linked to EU water policies. For example, climatic variables might have a direct influence on the achievement of WFD environmental objectives (good status of all waters) by 2015. In this respect, baseline scenarios should consider future trends, including those caused by climate change, which could jeopardise the good status objective achievement if no WFD climate-proof measures are taken. This type of assessment requires that research related to climate change and water be undertaken to improve understanding and modelling of climate changes related to the hydrological cycles at scales that are relevant to decision making (possibly linked to policy).

At present, scientific information about water-related impacts of climate change is not sufficient, especially with respect to water quality, aquatic ecosystems and groundwater, including their socio-economic dimensions. Research into climate change impacts on the water cycle and its extreme will help improving the understanding and assessment of key drivers and their interactions, in order to better manage and mitigate risks and uncertainties. Arising questions concern scientific outcomes that are sufficiently mature to be taken aboard policy development and which are key research topics which need to be addressed at European level.

Examples of EC-funded projects addressing the above issues are WATCH (about global change on the hydrocycle – www.eu-watch.org), HIGHNOON (impacts on glacier retreat and monsoon in India – www.eu-highnoon.org) and ACQWA (impacts on water quality and quantity – www.acqwa.ch). Further projects on climate change impacts on water and security have been recently selected, which will focus on Southern Europe and neighbouring countries. A project cluster is under development, which will enable to build up synergies and a research critical mass on this topic.

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References

Bates, B.C., Kundzewicz, Z.W., Wu, S. and Palutikof, J.P., Eds., 2008. Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 210 pp.

Wilby, R., 2008. River basin management in a changing climate – Guiding principles to assist adaptation. Strategic Steering Group on Climate Change and Water, WFD Common Implementation Strategy

Australia's response to climate change sees rapid growth of seawater desalination and indirect potable recycling

By Stuart Khan and Rita Henderson, UNSW Water Research Centre, University of New South Wales, Sydney, Australia.

Due to both rapid population growth and recent droughts, most large cities in Australia entered the 21st century with an urgent requirement for new urban water resources. The historical response in Australia has been to increase storage capacity by building new dams on relatively untapped rivers. However, increased awareness of environmental and economic costs, coupled with the long-term inadequacy of many future dams, has caused governments to reconsider such construction plans. With strong demand management policies already in place in most large cities, Australian State Governments have been left with few options for the increasingly urgent replenishment of drinking water supplies. Consequently, many States have initiated planning and construction of major water supply projects involving indirect potable water recycling (IPR) and/or seawater desalination.

Indirect potable water recycling

During the last two decades, a number of planned IPR schemes proposed in Australia have not eventuated due to strident community opposition, notably in South East Queensland with Toowoomba (2005 – 2006) being the most recent example. However, by 2007 it had become clear that a number of Australia's largest cities would need to adopt varying approaches to water recycling in order to make full use of available water supplies and consequently Australia became the first country to develop national guidelines for IPR with the release of Phase 2 of the Australian Guidelines for Water Recycling (AGWR) – 'Augmentation of Drinking Water Supplies' in 2008. Major schemes have since been planned or developed in Queensland and Western Australia. For example, the Western Corridor Recycled Water Project (WCRWP), initiated in 2007, takes the vast majority of municipal effluent produced in South East Queensland (Figure 1) and treats it by reverse osmosis (RO) and advanced oxidation (UV/H_2O_2) at three new advanced water treatment plants (AWTPs) located at Bundamba, Luggage Point and Gibson Island. Currently, much of the advanced-treated water is used to supply cooling water to Swanbank and Tarong coal-fired power stations but when the storage levels in Lake Wivenhoe drop below 40% of capacity, the remaining water will be used to recharge Brisbane's main drinking water reservoir, Lake Wivenhoe.

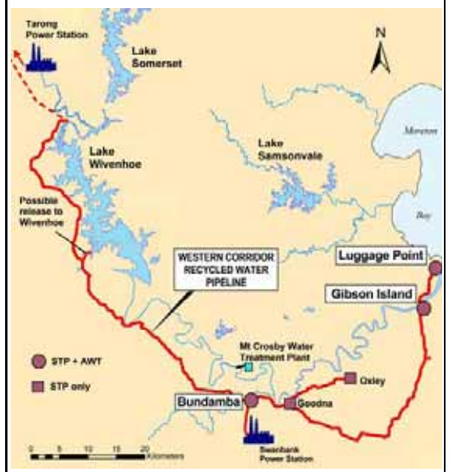

Figure 1 The Western Corridor Recycled Water Project (Gardner & Dennien, 2007).

Seawater Desalination

Perth was the first Australian city to have its drinking water partly supplied by desalinated seawater. A 45 GL/year plant was constructed to supply Perth and began operation in 2006 and plans for a second plant to supply Perth with a further 45 GL/year desalinated water by 2011 have been announced. A 45 GL/year plant at Tugan (QLD Gold Coast) began operation in December 2008 and now supplies water to the South East Queensland Water Grid. A 90 GL/year seawater desalination plant to supply Sydney with drinking water is currently under construction and expected to be operational before the end of 2009. The South Australian Government has announced plans to construct a 50 GL/year seawater desalination plant (expandable to 100 GL/year) at Port Stanvac to supply Adelaide with drinking water by December 2010. The Victorian State Government is currently planning what will be Australia's largest seawater desalination plant for the near future, to supply Melbourne

Figure 2&3 Rhodamine dye tests undertaken at the Perth Seawater Desalination Plant (Water Corporation, 2006).

with 150 GL/year of drinking water by the end of 2011. These plants will generally provide 15 – 25 % of their respective population's drinking water needs. A common concern with such desalination schemes is the management of the treated discharge to achieve minimal ecological disruption when released. Figure 2 demonstrates the dosing of fluorescent rhodamine dye to verify that plume dispersion at Perth Seawater Desalination plant would not negatively impact local marine habitat and fauna.

Refs: Gardner, T. and Dennien, B. (2007) Why has SEQ decided to drink purified recycled water? In: Water Reuse and Recycling (Eds, Khan, S. J., Stuetz, R. M. and Anderson, J. M.) UNSW Publishing, Sydney.

Water Corporation (2006) Photographs taken by the West Australian Newspaper and provided courtesy of Water Corporation, Perth, WA. Perth.

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WSF Governance

WSF has completed the integration into the RSC's change structure — a process started in 2003. This means WSF will relinquish its own charitable body status and operate under the umbrella of the RSC's charity status.

This will not affect the way WSF operates on day to day basis but this change will reinforce WSF's place within the RSC as a fully constituted interest group

" water resource issues can only be addressed by scientists, engineers and policy makers working together , "
Professor Tony Allan

If you would like to learn more about sustainable water and how the chemical sciences can aid progression in the field, contact

Dr. Elizabeth Milson (milsone@rsc.org)