The Newsletter of the Royal Society of Chemistry

Water Science Forum

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"Promoting the professional and scientific interests of members to safeguard the public interest in the application of chemical sciences in water-related industries."

In this issue:

Appreciation for Kevin's Outstanding WSF Contribution

WSF retiring chair Kevin Prior was delighted to be presented with a glass water jug and glasses, plus a certificate and RSC plate commemorating his excellent service to the Water Science Forum. We were also able to gift a copy of the minutes from the 6th November 1997 annual meeting when Kevin was initially elected to the committee! Due to Kevin's excellent leadership, financial prudence and planning he leaves WSF in a strong position with an engaging and ambitious 5 year plan. Thankfully Kevin's expertise and knowledge is not lost to WSF completely as he is willing to be a corresponding committee member for the foreseeable future. Dr Helen Keenan now takes the chair with Dr Simon Gillespie as vice chair. The Secretary added that it had been a great pleasure working with Kevin and wished him every success in his 'retirement' However his inspiring presence at the committee meetings will be sorely missed. ***- by Helen Keenan and Roger Wellings***

Kevin's presentation of a certificate of appreciation from RSC for all his efforts over the years

Kevin's gifts of appreciation and long service from WSF and RSC

Water Factoid—The total amount of water ever drunk by humans would cover the earth's oceans to a depth of less than 3mm.

The Pan Africa Network (PAN) Congress 2016 – Sustainable Water Resources for Africa

The 2016 PAN congress took place at the Nairobi University, Kenya over three days (30th November to 2nd December 2016) and included a range of international and African experts from academia and industry.

The themes for the sessions included:

- **Water and Health** – including sanitation, waterborne disease, pathogen detection, disinfection, disease prevention and disease treatment
- **Waste water management and treatment** – including water reuse in industrial, agricultural and domestic environments
- **Water quality and contamination** – including pollutant monitoring, removal of pollutants and analytical techniques
- **Water policy** – including the implementation and assessment of chemical science innovations for sustainable water

The Royal Society of Chemistry created the opportunity to engage with other scientists, exchange ideas and establish new collaborations and partnerships which enable the development of co-constructed research projects centred on water security and social justice. As ever the PAN Congress was well attended with over 100 delegates who included industry representatives, government representatives, academics and students. There was a great deal of discussion and debate on both water quality and quantity, particularly in the context of sustainable rural communities. There was a focus on low cost point of use treatment to remove heavy metal contamination, microbiology and some organic compounds. A great example of the new low cost technologies being developed through the advancement of chemical science includes the work by Prof T. Pradeep of the Indian Institute of Technology in Madras; who has developed novel nano-materials for the removal of arsenic and chromium. Examples like this application of nano-materials shows that the chemical science have a significant role to play in ensuring safe, clean drinking water is accessible to all. ***- by Richard Allan***

From L-R: Prof Graham Mills, University of Portsmouth, Dr Richard Allan, the James Hutton Institute and Prof Dominic Tildesley, the outgoing president of the RSC

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Meeting Report — What's New in the Analysis of Complex Environmental Matrices?

What's New in the analysis of complex environmental matrices was held at Burlington House, London (Royal Society of Chemistry headquarters) on Friday March 3rd. The meeting was organised by the Environmental Chemistry Group (Dr Roger Reeve), Water Science Forum and the Separation Science Group (Professor Graham Mills – WSF committee member) to describe and discuss recent developments in the analysis of various complex matrices highlighting different analytical (GC, LC, MS, NMR) approaches. It was attended by more than 70 delegates (split between industry, environmental agencies and academics including some students), including 10 speakers and there were 8 exhibitor stands. The day started with opening comments from Graham Mills (University of Portsmouth) who welcomed everyone to the meeting. There were 9 excellent talks with 5 of them having a water theme. Leon Barron (King's College London, UK) kicked off the morning session by describing the use of SPE and LC-HRMS for the screening of waste water and River Thames water looking at targeted vs untargeted analysis. Next up was Andrew Sweetman (Lancaster University, UK) who described their research group's use of passive samplers and how these devices could be used as a potential compliance tool within the EU Water Framework Directive. The next water themed talk was the keynote lecture given by Jaroslav Slobodnik (NORMAN Network). This talk focussed on the non-target screening of environmental pollutants in the context of risk assessment of European river basins and introduced the NORMAN network (http://www.norman-network.net/) and highlighted the EMPODAT database. Gavin Mills (Severn Trent Ltd., UK) kept the water theme going after lunch with a presentation on the advances in the determination of taste and odour compounds. The fifth water themed presentation was given by Dr Erika Castrignan and Luigi Lopardo (University of Bath, UK) (in Professor Barbara Kasprzyk-Hordern absence) and presented the group's work on exposure routes and risks from environmental endocrine disrupting chemicals in personal care products and profiling of chiral biomarkers. There were also excellent non-water talks given by Colin Creaser (Loughborough University, UK), Stuart Harrad (University of Birmingham, UK), Jacob de Boor (Vrije Universiteit Amsterdam, Netherlands) and Mark Perkins (Anatune, UK). The organisers would like to thank Agilent Technologies, Anatune Ltd., Hichrom Ltd., Imspex Diagnostics Ltd., Kinesis, Markes International and Thames Restek Ltd., for their sponsorship of the meeting. Financial support is also acknowledged from Environment Sustainably and Energy Division of the RSC. - ***by Gary Fones***

Graham Mills opening the day's proceedings

Dr Jaroslav Slobodnik - Norman Network

WSF Events

WSF plan to organise a number of events for 2017 and 2018.

Details will be updated onto the event website—http://www.rsc.org/Membership/Networking/InterestGroups/WaterScience/ForthcomingEvents.asp

Water Science Jokes

Why did the white, furry bear dissolve in water?

Because it was polar!

Where do bacteria go to resolve their disputes?

The settling chamber!

RSC Peninsula Section Evening Meeting—Mayflower WTW

An evening meeting was organised at Plymouth University on 13 February when Adrian Clark gave a brief talk on WSF activities before introducing Chris Rockey, Science & Water Quality Manager, South West Water, to give a presentation on "Mayflower Water Treatment Works: a pioneering journey into a new world of water purification". The new Mayflower WTW will serve 250,000 customers in Plymouth. It is currently under construction at Roborough Downand replaces Crownhill WTW which was built in the 1950s. Chris described the innovative technology which employs suspended ion exchange, in-line coagulation and ceramic microfiltration. Advantages include reduction in dissolved organic carbon and disinfection by-products, and an absolute barrier to Cryptosporidium. The process has been shown to produce drinking water of exceptional high quality and is less energy intensive and more robust than conventional treatments. It is also very compact and efficient, capable of automation, cheaper to operate, and environmentally sustainable. The process was designed and developed by PWN Technologies, a Dutch water technology company and this is the first time it has been adopted in the U.K. Much has been learned about implementing the process from the specific studies undertaken by Chris and his team and there are plans to undertake further research with introduction of ozone for membrane cleaning. The pilot plant used for the studies is now visiting other sites owned by SW Water for testing with a range of water sources. The new technology is seen as having potential to deal with changes observed in water quality over the last decade leading to increases in colour and TOC, plus taste and odour complaints, possibly as a result of climate change. Chris has offered to organise a site visit later in the year and details will be posted when available.

Thanks go to Sov Atkinson, Secretary of Peninsula Section for arranging the event. Our Committee are interested in similar networking opportunities with other regional groups. **- *by Adrian Clark***

In the News

Graphene-based Sieve Turns Seawater into Drinking Water—*BBC News*
University of Manchester research group have published progress on graphene oxide membranes for the use of desalination.

Ocean Chemistry Changes Triggered Earth's Greatest Extinction Event—*Chemistry World*
Chinese and US researchers found the mixing of sulphite and oxygen rich waters in the prehistoric Panthalassic Ocean contributed to the largest ever mass extinction.

The Most Bizarre Stuff Caught in a Berlin Sewage Plant, From Bullets to False Teeth—*Wired*
Ruhleben, the largest waste water plant in Germany display a varied collection of flushed items caught and salvaged from the works, from a rubber duck to false teeth! If any of our members have come across any oddities in water plants we would love to hear about them on our social media channels (Twitter @rsc_wsf, Linked In RSC - Water Science Forum).

New Solar-Powered Device Can Pull Water Straight from the Desert Air—*Science*
A zirconium metal organic framework has been engineered alongside a solar powered condenser with the ability to adsorb and harvest water from very low humidity air.

Edible Water: How Eating Little Balls of H_2O Could be the Answer to the World's Plastic Pollution—*Independent*
Seaweed based membrane balls have been developed as an environmentally friendly alternative to bottled water by innovators taking their inspiration from caviar.

3 Years After Ill-Fated Switch, Flint Mayor Recommends Using Detroit Water—*NPR (USA)*
Proposal for Flint to be supplied long term with their original water source as opposed to Flint River of which the switch to in 2014 initiated lead contamination issues.

Papers of Interest

Occurrence of Neonicotinoid Insecticides in Finished Drinking Water and Fate during Drinking Water Treatment—*ES&T*
http://pubs.acs.org/doi/abs/10.1021/acs.estlett.7b00081
Review of the Molluscicide Metaldehyde in the Environment—*Environmental Science: Water Research & Technology*
http://pubs.rsc.org/en/content/articlelanding/2017/ew/c7ew00039a#!divAbstract

Famous Water Quotes

"When you drink the water, remember the Spring. " -Chinese proverb

"In wine there is wisdom, in beer there is freedom, in water there is bacteria." -Benjamin Franklin

"For many of us, clean water is so plentiful and readily available that we rarely, if ever, pause to consider what life would be like without it." -Marcus Samuelsson

SABE—The Work of Standardisation Relating to Water and the Environment

The Strategic Advisory Body: Environment (SABE) had its regular bi-annual meeting to discuss environmental issues relating to standardisation and EU policy on the 30th March 2017. The SABE meeting was chaired by Richard Allan.

A broad range of topics were discussed which included environmental aspects relating to sustainable transport, energy, water and the circular economy. Of particular interest at the meeting was a presentation and discussion on the EU plastics strategy. The strategy recognises the important contribution plastics make to innovation and societal benefit. However it was noted that much more effort needs to be put into capturing and recycling of plastics to ensure the environment is better protected. The speaker from the commission highlighted that the production of new plastics is predicted to reach 1200 million tonnes by 2050 and at that time there will be more particles of nano-plastics in the sea than fish. More effort is going into capturing plastics and recycling as a secondary raw material in manufacturing. Innovation is driving the production of consumer goods from recycled plastics such as clothing, footwear and white goods. At the moment the recycling of plastics is low (at around 30%) but there is a drive to get this to over 50% by 2030 and aspirations to go much further. Plastics are seen as a valuable resource that should not be disposed of through landfill or incineration. The recycling and re-use of plastics supports the objectives of a circular economy and underpins sustainable practise, while protecting the natural environment. ***- by Richard Allan***

Water Science Forum bursaries

Please consider applying for our Water Science Forum Bursaries. Up to £2000 is available per applicant for both the Alan Tetlow and Water Science Bursary. They are open to all WSF members from any country and the money available can be used for a wide range of activities including conferences, research, lab visits and research projects across a range of topics including water quality.

Alan Tetlow Bursary—In memory of Alan Tetlow the Water Science Forum bursary will help post graduate students, young (under 35) or professional water scientists during the first 10 years of their career.

Water Science Bursary—supporting RSC members undertaking water science research at any stage of their career. In particular, applications are encouraged from members aiming to achieve Registered Science Technician (RSciTech) or Registered Scientist (RSci) status.

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Get Connected—WSF are on Social Media

Water Science Forum are now on Twitter and Linked In. Please join us and become a group member by following the links provided below. We welcome your involvement with posts and conversations on all water related topics.

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