Membrane Society of Australasia

Membrane Society of Australasia NEWSLETTER

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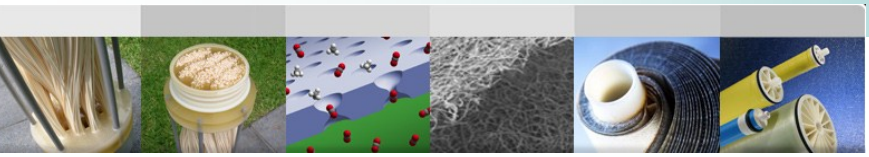

Inside this issue

FROM THE PRESIDENT

Dr Aaron Thornton
MSA President

Welcome to the first issue of our MSA Newsletter for 2016. We have had a great start to the year with reports on our active members working on membranes for Antarctica, disaster recovery in Nepal, new product line from Evoqua and a MSA-sponsored workshop on desalination. Our members are also encouraged to apply for travel awards for the great line up of international membrane events, participate in our 2016 mentorship program and apply for sponsorship of membrane-related activities. On behalf of the board, we wish you a "prosporous" year.

Natural disaster recovery in Nepal

As part of UNSW's Natural Disaster Recovery Initiative, A/Prof Pierre Le-Clech has recently visited Nepal to initiate his project on the development of guidelines for greater resilience of low-cost water filtration units. In addition to visits and discussions to many stakeholders in the Kathmandu region, a new water filtration unit was donated and installed in a small village affected by the recent earthquake.

Welcome ceremony on arrival in the Milanchowk village before the installation of the water filtration systems.

This study is conducted in collaboration with Skyjuice Foundation (http://www.skyjuice.com.au/), a non-for-profit organisation which designs, builds and installs low-cost water filtration units based on membrane technologies. Over recent years, researchers at UNSW have been working with Skyjuice to study and develop more advanced water treatment processes and to better understand the fate and long-term performances of the units installed in the field. Although Skyjuice technology has been developed for easy set up and operation, a number of systems is expected to be underused. It is therefore critical to assess and report the reasons (whether technological, social or political) responsible for this phenomenon. The recent earthquake in Nepal has also heavily tested the resilience of the installed filtration units in that region. However, there is, so far, no report on the role played by those systems in the direct aftermath and since the disaster.

This project aims to develop a set of practical guidelines and recommendations for the setup and long-term operation of low-cost water filtration units for developing countries and disaster zones. This will be developed in the form of an app. Although Nepal is crippled by intermittent power and safe water supply, the large majority of the population owns a recent smartphone, which would become the support of this new tool.

For more details about this project, and how you can help, please contact Pierre on p.le-clech@unsw.edu.au

UPCOMING EVENTS

- **EMN Meeting on Membranes (Dubai, UAE)**

The paramount EMN Meeting on Membranes, April 05-08, 2016 will bring an opportunity for leading academic scientists, researchers and decision makers in the field of Membranes to get their latest discoveries acknowledged on the global arena. Visit http://emnmeeting.org/membranes/ for more details.

- **Membrane Technologies for Water Treatment in Urban Centers and Small Communities**

The international meeting in Sfax (Tunisia) from May 3 to 5, 2016 will focus on key advances in academic and industrial research targeting membrane technologies for water treatment. The African Membrane Society will organize two days of research sessions and training to discuss membrane filtration in developing countries (May 3rd and 4th). The third and final day will be devoted to visiting a water desalination plant followed by the closing ceremony. (Website: http://www.sam-ptf.com/sfax.html)

- **International Scientific Conference PERMEA 2016**

The Membrane Science and Technology Conference of Visegrád Countries, PERMEA, is going to take place together with MELPRO 2016 Membrane and Electromembrane Processes Conference organized by the Czech Membrane Platform on May 15-19, 2016 in Prague, Czech Republic. Visit: http://www.permea2016.cz/ for more details.

Small scale potable water recycling for the Antarctic

Australian Antarctic Division (AAD) is aiming to improve the quality of wastewater discharge from its Antarctic bases, as well as to reduce its energy use for the production of drinking water. A membrane bioreactor (MBR) has just been installed at Davis Station and an Advanced Water Treatment Plant (AWTP) capable of producing drinking quality water from the MBR effluent will be taken to Davis Station next summer. Davis Station has approximately 120 people over the summer and 20 people over winter.

The AWTP consists of the following unit processes: ozone, ceramic microfiltration, biologically active carbon (BAC), reverse osmosis (RO), ultraviolet disinfection, calcite contactor and chlorination. AAD constructed the AWTP and Victoria University, the University of Melbourne, RMIT University, Veolia, AECOM, Curtin University, Coliban Water, TasWater and the Australian Water Recycling Centre of Excellence worked with AAD to design and demonstrate the reliability and robustness of the AWTP. The AWTP was operated at Selfs Point Wastewater Treatment Plant, Hobart for 12 months.

Advanced water treatment plant: *bottom left* – ozone and ceramic membranes; *bottom right* – BAC and RO; *top right* – UV, calcite contactor and chlorination; *top left* – laboratory and chemical storage.

Key design and operational issues for the AWTP were:

- it should require little operator involvement as operators change every 12 months and are required to undertake other duties at Davis Station,
- the quality of wastewater be suitable for discharge to the pristine Antarctic ocean,
- while there is no decision yet about reuse of the water for drinking – the required water quality should achieve the higher log removal values required for small communities and be verified on-line,
- chemicals of concern be effectively removed in the product water and in discharges to the environment,
- low imported chemical use be achieved as space on the annual supply ship to the Antarctic is limited, and
- it should reduce the energy of drinking water production.

Ceramic microfiltration membranes were chosen because of their robustness and ability to work with an ozone residual in the feed to reduce membrane fouling, and because they do not suffer from fibre breakages that compromise membrane integrity. Control of fouling was achieved via backwashing and chemically enhanced backwashes. No build-up of TMP was observed during the trials.

Containerised AWTP at Selfs Point Wastewater Treatment Plant, Hobart. Centre: Michael Packer (AAD) surrounded by visitors from Water Research Australia (L-R: Mike Chapman (GHD), Steve Capewell (Water Corporation), Peter Brass (Water Research Australia), David Halliwell (Water Research Australia – now Deakin University)

Operation of the RO membranes incorporated a pressure decay test to achieve on-line verification of 2 log removal for protozoa, and the RO system was operated with a recycle feed to achieve the set overall recovery of 70%.

A 69% reduction in energy use for water production at Davis is predicted. Potable water is currently obtained from desalination of a cold, hypersaline tarn. Chemicals of concern were shown to be effectively removed by the AWTP in both the product water and effluent discharge. Imported chemical use was acceptable for operation at the Antarctic.

The AWTP is continuing to be operated by AAD at Selfs Point prior to its shipment to Davis Station next summer. Once at Davis Station it will be demonstrated for a further 12 months before a decision is made regarding recycling of the product water for drinking. Reports from the project can be found at: http://www.australianwaterrecycling.com.au/research-publications.html (Robust water recycling for remote areas).

The project has attracted interest from China and India, and preliminary discussions for access to the technology and outcomes are taking place.

For more information, contact: Stephen Gray, Victoria University, stephen.gray@vu.edu.au

Membrane industry highlight

New double-ended submerged ultrafiltration system from Evoqua Water Technologies

In February 2016, Evoqua Water Technologies has introduced a new ultrafiltration system in its Memcor® product line– called Memcor® CSII Ultrafiltration System. This system features innovative double-ended filtration delivering backwash aeration energy reduction of 20 percent. This new product line enables customers to design submerged membrane systems at the lowest cost of ownership. It is expected that CSII will help municipalities allow lower-cost capacity expansion, or reduce footprint by up to 30 percent. The advantages of the double-ended filtration was recently presented on February 3 during the Membrane Technology Conference in San Antonio, Texas, USA.

For more details about the product, visit http://www.evoqua.com/en/brands/Memcor/Pages/default.aspx.

Evoqua Water Technologies is the global leader in helping municipalities and industrial customers protect and improve the world's most fundamental natural resource: water. Evoqua is an MSA corporate member.

MSA-sponsored workshop: Membrane distillation and related technologies for desalination and water reuse

The one-day workshop on 'Membrane distillation and related technologies for desalination and water reuse' was successfully held on January 15, 2016 at the Faculty of Engineering and Information Technology Building of the University of Technology Sydney (UTS). Several top-notch professors and researchers graced the event as speakers coming from Italy, Singapore, Saudi Arabia and Australia. Around 50 people from academe and industry attended the event organised by UTS, Membrane Society of Australasia, University of Wollongong in collaboration with the National Centre for Excellence in Desalination, Australia, University of New South Wales and Victoria University. UTS through the Distinguished Visiting Scholar scheme and the Centre for Technology in Water and Wastewater, MSA and UoW Strategic Water Infrastructure Laboratory were the main sponsors of the event. The workshop was co-chaired by Dr Leonard Tijing (UTS) and A/Prof Ho Kyong Shon (UTS).

The aim of the workshop was to provide a platform for discussion and scientific exchanges for current and new MD-based technologies, and to explore innovative approaches to further advance the MD process and related technologies for a wide range of commercial opportunities.

The workshop was officially opened by UTS Deputy Vice-Chancellor Glenn Wightwick and followed by MSA President, Dr Aaron Thornton. Two prominent professors in membrane science and engineering, Prof. Enrico Drioli from ITM-CNR, University of Calabria (Italy) and MSA Patron Prof. Tony Fane from Singapore Membrane Technology Centre, Nanyang Technological University (Singapore), gave very interesting and informative keynote presentations. Prof Drioli presented about the progresses in MD for industrial applications, with particular emphasis on the new mining industry, produced water, brine treatment and resource recovery. He shared his vision and direction of the MD-based technologies. Prof Fane provided an update of the current MD, FO and PRO activities at SMTC. He shared their works on new membranes for MD and FO, and the performance of the combined FO/MD anaerobic bioreactor. He also highlighted the challenges still being faced in membrane development and fouling control.

Other invited speakers include Mr Neil Palmer (NCEDA), Prof Wendell Ela (Murdoch University), Prof Saravanamuthu Vigneswaran (UTS), Prof Vicki Chen (UNSW), Prof Mikel Duke (VU), Dr Lijo Francis (KAUST), Prof Long Nghiem (UoW), A/Prof Ho Kyong Shon (UTS), and Dr Leonard Tijing (UTS). Mr Palmer talked about the NCEDA activities and the plan for a Future Water Cooperative Research Centre with a ten year term. Prof Ela presented their results and experience of an autonomous solar MD desalination unit they installed in the USA. Prof Vigneswaran spoke about their group's work on seawater organic fouling behaviour in DCMD desalination and the efficiency of MD in removing fluoride and pesticides in groundwater. Prof Chen described some strategies on enhancing the performance of submerged MD using novel configurations, feed pre-treatment, air backwash and repetitive membrane cleaning. Prof Duke presented MD opportunities in several industrial applications in mining, power generation, dairy and municipal wastewater treatment. He indicated the importance of appropriate implementation of pre-treatment and membrane cleaning strategies. Dr Francis introduced some new MD module designs that they are currently studying at the Water Desalination and Reuse Centre in KAUST. Prof Nghiem talked about innovative hybrid systems for treating highly saline solutions and for

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JOIN MSA NOW!

The Membrane Society of Australasia envisions:

- to be the nexus of membrane science and technology activity in the Australasia region;
- to promote collaborative engagements across the community to disseminate membrane technology to end users, and;
- to capture current research and industry involvement and highlight future trends.

REGULAR MSA ACTIVITIES

- Newsletter publication
- Mentoring
- Travel awards
- Funding support
- ECR symposium
- IMSTEC hosting

MSA MEMBER BENEFITS

Members of MSA receive discounts on registration for all MSA meetings, workshops and other activities sponsored by MSA.

Being involved as a member also entitles you to a free electronic newsletter "MSA E-News" which not only keeps you up to date of the membrane activities in Australasia, it also gives members space to present their highlights.

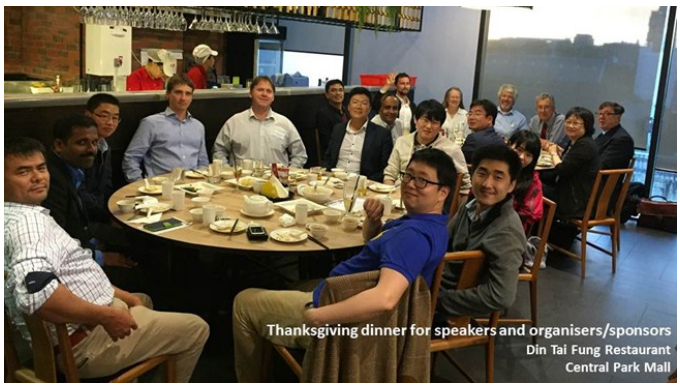
Also the latest events, awards and other opportunities will be broadcast via MSA E-News.

If you wish to join, visit https://www.membrane-australasia.org/join-msa-now/ and follow the online submission process.

MD Workshop … continued from page 3

resource recovery. A/Prof Shon and Dr Tijing reported their current works on membrane fabrication by electrospinning and phase inversion techniques towards superhydrophobic and omniphobic membranes for MD application.

The workshop was free for all attendees who were all MSA members with tea breaks and lunches provided. Ample time was set for networking and discussions among attendees and speakers. Before the afternoon session, participants were given a laboratory tour of the Environmental Engineering Laboratories at UTS showing the different MD test and membrane fabrication set-ups, and other experimental systems instruments, and facilities. The workshop ended with a panel discussion on the direction and vision for MD and related processes and potential research opportunities. Prof Long Nghiem officially closed the workshop. After the workshop, the invited speakers, some guests and organisers enjoyed a sumptuous Taiwanese cuisine dinner together with full of discussions. The organisers wish to thank all sponsors, speakers, student volunteers and participants for making the workshop a success. (*Contributed by: Leonard Tijing and Hokyong Shon*)


Thanksgiving dinner for speakers and organisers/sponsors
Din Tai Fung Restaurant
Central Park Mall

MSA is once again hosting the International Membrane Science and Technology Conference (IMSTEC), which will be held on December 5-8, 2016 in Adelaide, Australia. Submit your abstract now!

www.membrane-australasia.org

5-8 December 2016
Adelaide Convention Centre

9th IMSTEC 2016

INTERNATIONAL MEMBRANE SCIENCE AND TECHNOLOGY CONFERENCE

Plenary speakers


Prof. Menachem ELIMELECH


Prof. Benny FREEMAN


Prof. Sandra KENTISH


Prof. Xiao-Lin WANG

PROPOSED SESSIONS AND CHAIRS

Gas separations - Matthew Hill, Aaron Thornton
Pervaporation vapour separation and membrane distillation - Mikel Duke
Membrane development and characterisation - Keith Andes, Matthias Wessling
Advances in MF and UF membranes - Hip Le, Andrew Groth
Advances in NF and RO membranes - Sheng Dai, Mike Dixon
Novel materials and surface modifications - Suzana Periera Nunes, Amanda Ellis
Engineered osmosis - Huanting Wang, Ho Kyong Shon
Electrically enhanced membrane operations - Namita Choudhury, Linda Zou
Membrane Bioreactors - Piere Le Clech, Sophie Latherme
Membrane fouling - Tony Fane, Emile Cornelissen, Sophie Latherme
Water and waste water treatment - Dharma Dharmabalan, Mark Newland
Wine, food and dairy application - Mike Duke, Milena Ginic-Markovic, Sandra Kentish
Application in mining industry and agriculture - Ho Kyong Shon, Neil Palmer, Stephen Gray

Abstract Submission Open	9 September 2015
Registration Open	9 September 2015
Abstract Submission Close	5 July 2016
Early Bird Registration Close	15 August 2016
Notification to Authors	23 August 2016
Authors Registration Required by	30 August 2016
Full Program Released	15 September 2016

2016 International Forward Osmosis Summit (IFOS)

Forward Osmosis and Pressure Retarded Osmosis: Prospects and Challenges

2 (Fri) – 4 (Sun) Dec 2016

CALL FOR PAPERS

The organizing committee is pleased to invite you to IFOS 2016. We strongly encourage people working in the field of FO/PRO science and technology to not only join the summit but also submit an abstract electronically and share your knowledge and skills with all other participants. (Visit: http://www.ifosummit.org/)

Topics

- FO/PRO membrane
- FO/PRO based membrane hybrid systems
- Draw solution for FO/PRO
- Fouling of FO/PRO
- Operating parameters for FO/PRO
- Applications for FO/PRO

Important Dates

- Submission deadline: 30 May 2016
- Notification of acceptance: 30 September 2016
- IFOS Summit: 2 (Fri) – 4 (Sun) Dec 2016
- After this summit, you can also attend the 9th International Membrane Science and Technology Conference (IMSTEC) to be held from 4-9 December (http://www.membrane-australasia.org/imstec/)

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Please contact the editors if you wish to contribute any article to future editions or send message to newsletter@membrane-australasia.org.