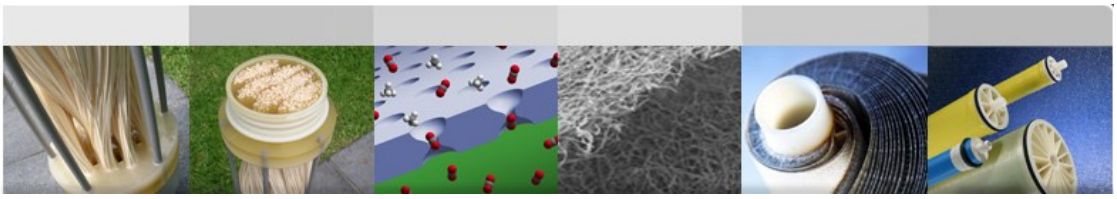
Membrane Society of Australasia



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Upcoming Events:

- MSA Workshop: Ceramic based membranes for gas separation applications, Brisbane 2nd July 2015
- AMS9 Taipei, Taiwan, 19th-21st July 2015
- 2nd International Conference on Desalination using Membrane Technology, Singapore, 26th - 29th July 2015
- 9th International Mesostructured Materials Symposium, Brisbane, 17th-20th August 2015
- Euromembrane, Aachen, Germany, 6th-10th Sep 2015
- CESE, Sydney 28th Sep-2nd Oct 2015
- International Desalination Workshop, Korea 18th-21st Nov 2015

Report on Advances in Forward Oz'mosis Workshop

The "Advances in forward osmosis (FO)" workshop was successfully conducted on the 18th June 2015 at UNSW Australia. The event was organised by UNSW/UNESCO Centre for Membrane Science and Technology (PhD Gaetan Blandin and A/Prof Pierre Le-Clech) and UTS/The Centre for Technology in Water and Wastewater (Dr Sherub Phuntsho and A/Prof HK Shon), in collaboration with the Membrane Society of Australasia (MSA) and the National Centre of Excellence in Desalination Australia (NCEDA). More than 50 delegates, from academia and industry, attended the workshop that featured an impressive mix of presentations given by upcoming and established Australian researchers.

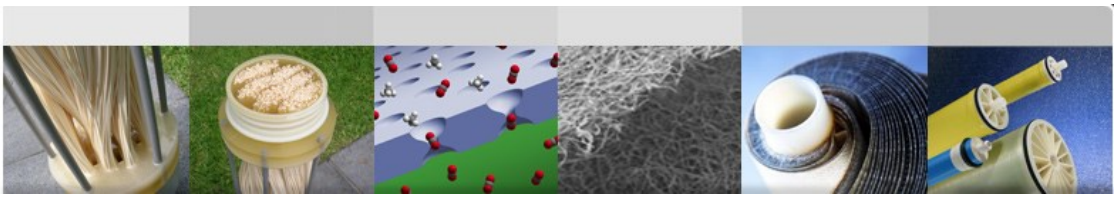
Opening statements to the workshop were given by Neil Palmer, CEO of the National Centre of Excellence in Desalination Australia (NCEDA) and A/Prof Pierre Le Clech (UNSW). In the morning session dedicated to FO applications, Gaetan Blandin (UNSW) and Dr Sherub Phuntsho (UTS) presented their work on NCEDA funded projects on assisted FO for energy savings in desalination and fertiliser drawn forward osmosis respectively. Both presentations pointed out the positive impact of hydraulic pressure to overcome flux and recovery limitations of FO. Wenhai Luo (University of Wollongong) described the concept of osmotic membrane bioreactor and pointed out the need for further work to limit reverse salt diffusion. Prof Jega Jegatheesan (RMIT) spoke about the interest of using FO to concentrate pre-treated sludge in desalination.

Guofei Sun, Project Manager of Aquaporin Asia (Singapore), presented their biomimetic membranes and insisted on the high potential of FO in industrial wastewater applications for concentration of high value products and zero liquid discharge. The morning session ended up with a presentation from Dr Ming Xie (Victoria University), who confirmed FO as a low fouling membrane process. During the lunch break, a visit of UNSW lab installation was the opportunity to discuss around FO setups and modules configurations.

The afternoon session started with two presentations from Monash University, highlighting the need for new developments on membrane and draw solute. Vincent Liu first presented his outstanding but still challenging work on graphene based membrane. Dr Kha Tu spoke then about his innovative approach which considers using thermo-responsive hydrogels as draw solution. Dr Shuaifei Zhao (CSIRO) gave an overview on properties to consider for draw solutions selection and challenges still to be overcome.

The audience then enjoyed the Prof Tony Fane's presentation, through Skype video conference, about current research on-going at Singapore Membrane Technology Centre. More than the amount and diversity of research dedicated to FO (Membrane development, draw solutions, FO processes, pressure retarded osmosis (PRO)), Tony shared his enthusiastic vision and positive confidence in FO/PRO future. UTS and UNSW researchers concluded the program with overviews of FO work currently on-going in their research centre including grapheme oxide FO membrane development, dynamic modelling for full scale FO processes, collaboration with international partners, AFO-NF project, optimisation of submerged reactors and novel approaches for irrigation.

For further information about this workshop and its outcomes, please contact: Gaetan Blandin (g.blandin@unsw.edu.au) or Pierre Le-Clech (p.le-clech@unsw.edu.au).



Report on MSA 2015 Annual General Meeting

Keynote presenter Ms Alison Couts (Executive Chair of NuSep), with Dr Aaron Thornton (CSIRO)

The AGM was hosted at the University of New South Wales on the 15th of May and chaired by Dr Aaron Thornton. The keynote presentation was delivered by Ms Alison Coutts, executive chairman of NuSep (ASX: NSP), that stimulated discussion around commercialisation of membranes in Australasia. A summary of the Annual Report was presented that included membership growth, new programs, new website, upcoming events and other MSA activities. The meeting concluded with vibrant discussion around the future opportunities for the MSA including technology factsheets, involvement in industry, international links, market research, funding and internships.

The MSA thanks the outgoing committee members for their tremendous contribution to the Society, including Pierre Le-Clech (UNSW), David Halliwell, (WQRA), Mark Mullet (Hatch), and Takahiro Fujioka (UoW). We are also fortunate to welcome new committee members including Pamela El Jbeily (IXOM), Malcolm Keen (Burkett), Kristina Konstas (CSIRO), and Hokyong Shon (UTS). Roles will be decided at the next board meeting. *<Arron Thornton, CSIRO>*

Ultrafiltration Membranes Treating Clarifier and Backwash Wastewater

IXOM has recently completed the design, fabrication, installation and commissioning of a 1ML/d ultrafiltration (UF) system at an existing Water Treatment Plant in Sydney NSW.

Prior to this upgrade, the process at the existing site involved discharging the clarifier underflow and filter backwash water to the Sydney Water sewer. In order to reduce trade waste costs, Ixom investigated the use of membranes to recover some of the waste discharged to the sewer and hence increase the overall plant recovery. Ixom trialled DOW outside-in PVDF UF membranes in 2013. The trial assessed the suitability of the DOW membrane format and configuration and enabled optimization of system design parameters. Throughout the three month trial, membranes performance was continuously analysed, operation setpoints were adjusted and different Clean-in-Place (CIP) regimes and chemicals were trialled.

The feed water quality to the UF system was particularly challenging with the total iron being as high as 10 mg/L and suspended solids up to 45 mg/L. A range of different Chemical-Enhanced-Backwash (CEB) regimes were trialled in the process of optimizing UF system recovery while achieving a CIP interval of two months. Upon completion of the trial, it was concluded that DOW UF membranes were suitable for the application, and with the right operating and cleaning protocols, the membranes can recover up to 85% of the waste, and hence provide savings of more than $1M annually in trade waste costs.

The full scale 1 ML/d UF system was built and factory tested at the Ixom manufacturing facility in Adelaide prior to commissioning at the client site. The UF system includes DOW IntegraPac™ IP-51 modules and pre-engineered skid, feed pump, backwash pump, pre-filtration, filtrate tank, CIP equipment & chemical dosing pumps for CEB.

The plant has been in operation for more than 6 months, operating within the design limits and with Ixom continuing to provide operation support in monitoring and enhancing performance. The UF system produces filtrate with total iron less than 0.5 mg/L. *<Pamela El Jbeily, IXOM>*

Innovators Corner

- Scientists create synthetic membranes that grow like living cells *<ScienceDaily, 22 June 2015>*
- Membranes with artificial free-volume for biofuel production *<Nature Communications 6, Article number 7529>*
- A carbon nanotube wall membrane for water treatment *<Nature Communications 6, Article number 7109>*

Editors: Kha Tu & Huanting Wang
Please contact the editor to contribute to future editions. Email: newsletter@membrane-australasia.org