QUARTERLY NEWSLETTER
MAY 2022 ISSUE

BUILDING A MEMBRANE COMMUNITY IN AUSTRALASIA

MEMBRANE EVENTS, NEWS AND RESEARCH HIGHLIGHTS

Table of Content

About MSA

The Society aims to represent and promote the activities in membrane science and technology both in the research and industrial sectors.

Our Vision

- 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.

Our Mission

The MSA is to represent Membrane Science and Technology in Australasia realising that this will be aligned with societal needs.

This will be achieved by:

- providing an open forum for transferring and sharing technologies as well as capabilities within the members, industries and high education organisations;
- supporting multidisciplinary networking events;
- providing leadership and mentorship in membrane science for the Australasian membrane community;
- promoting opportunities for young members; and
- and enabling wider understanding of the membrane technologies for public interest.

A Farewell Message From Prof. Ho Kyong Shon

Dear MSA members,

I wish to step down from my 6-year board position and do not wish to go for a re-election. I would also like to step down from the role of my MSA President after three and a half rewarding years since July 2018. It has been a period of substantial change and extensive opportunities at MSA that has continued to evolve our dedicated and meaningful initiatives. I am so proud of the board and members to improve the MSA's value proposition, grow our membership, support industry involvement, and advance our communication and social media presence. In particular, the MSA webinar has been fantastic for me to regularly and consistently engage with our members and non-members during this pandemic.

It has been my great privilege to work with our numerous volunteers from different universities and I would like to pay special thanks to the Board Directors over the years. They really collaborate our MSA value, spirit and commitment strategies with their considerable time and effort to make sure that MSA is functioning to the world-class society and standards. In particular, I thank the two Vice Presidents that I have worked with: Dr Geoffrey Johnston-Hall and Dr Stefan Smith. They have brought an organisational culture and spirit that are dedicated, transparent, open and supportive.

I am sure that despite COVID-19, MSA will be continuing to move ahead as a leading membrane society in the world.

I look forward to seeing you in an MSA event very soon.

Best regards,

Ho Kyong Shon

MSA President (2018 – 2021)

Prof. Ho Kyong Shon
MSA President (2018-2021)
Professor in School of Civil and Environmental Engineering
Deputy Director of Centre for Technology in Water and Wastewater
Faculty of Engineering and IT
UNIVERSITY OF TECHNOLOGY SYDNEY
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Message from the New President

Dear MSA members,

After serving as a MSA board member for more than 5 years since 2016, it is my great privilege to be elected as the MSA president. I would like to take this opportunity to thank the four past MSA presidents, Prof. Mikel Duke, Dr. Aaron Thornton, Prof. Amanda Ellis and Prof. Ho Kyong Shon for their great leaderships and contributions to MSA, making MSA an international-leading regional membrane society. This is a tremendous achievement, in particular, considering the small size of the membrane community in Australia and New Zealand.

As a small society, MSA is facing a few challenges. Our membrane researchers have been conducting world-class research, demonstrated by high impact publications and strong recognition by global membrane community. Like other research fields in Australia and New Zealand, technology translation of membrane research is below the world average, due to the lack of government support and incomplete value chain of membrane technologies. To maximise the impact, MSA needs to find a way to engage with the upstream membrane manufacturers and downstream end-users, not only nationally but also internationally. Covid-19 has changed everyone's life in many ways, in particular, how people engage with each other. The challenge to MSA is what is the best way to serve our members. One of the key legacies of MSA is bringing people together by organising conferences, symposiums, workshops. Many people are now reluctant to travel. Although MSA did a great job in organising webinars over the last two years, what more can MSA do to ensure MSA members are strongly interconnected?

Although there are no easy solutions to these challenges and some new challenges may emerge in future, I am very confident that the new MSA board will do our best, as a team, to serve MSA communities and explore all opportunities to keep MSA growing.

Regards,
Xiwang

Prof. Xiwang Zhang

Endowed Dow Chair in Sust Eng Innov,
Director of UQ Dow Centre,
ARC Future Fellow
School of Chemical Engineering
THE UNIVERSITY OF QUEENSLAND
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https://chemeng.uq.edu.au/profile/4639/xiwang-zhang

Dr. Federico Volpin
https://www.linkedin.com/in/federico-volpin/

Dr David Wang
https://www.linkedin.com/in/david-wang-68738225/

Farewell to Secretary Federico and Newsletter Editor David Wang

Current MSA secretary Federico Volpin is relocating to Denmark to take up a position with Alfa Laval Membrane Business. We thank Federico for his excellent contribution to MSA and wish Federico all the best.

We would also like to thank David for his immense contribution to the MSA newsletter over the years. The new MSA newsletter taskforce will continue to bring everyone the latest news and events. Stay tuned!

Welcoming Our New Secretaries

Hearty welcome to Dr. Soo Leong and Dr. Nawshad Akther, MSA's new secretaries. We know you will do great!

Dr. Soo Leong
https://www.linkedin.com/in/soo-leong-17870140/

Dr. Nawshad Akther
https://www.linkedin.com/in/nawshadakther/
https://twitter.com/nawshad_akther

Dr. Soo Leong is a Hub Manager of the ARC Research Hub for Energy-Efficient Separation (ARC-EESep) at the Department of Chemical and Biological Engineering, Monash University, Australia. She obtained her PhD from Monash University in developing a novel material for the photocatalytic membrane process. Prior to joining Monash University, she worked in an academic position for 10 years. Currently she manages and oversees all aspects of the administrative operations of ARC-EESep.

Dr. Nawshad Akther is currently a Postdoctoral Research Engineer at the School of Civil and Environmental Engineering, University of Technology Sydney (UTS). Dr. Akther received her PhD in Environmental Engineering from UTS. Her research focuses on the development of materials and advanced membranes for various applications, including desalination, resource recovery and water treatment. She is known for her work on the synthesis of nanocomposite membranes modified with graphene oxide and derivatives for forward osmosis. She has won over 10 awards over the past 2 years for her research, including the Membrane Society of Australasia (MSA) Best Student Award (2021), MSA Best Short Talk Award (2020), UTS 3MT (2020), UTS Research Excellence Commendation Award (2019) and UTS Collaboration Experience Award (2019).

MSA Board of Directors

MSA is currently managed by a rotating Board of Directors. In accordance with the MSA Constitution, current Directors are automatically nominated for re-election unless written notice is given to the contrary.

Prof. Xiwang Zhang
President/
International Engagement

Prof. Xiwang Zhang is the Endowed Dow Chair in Sustainable Engineering Innovation and the Director of UQ Dow Centre at UQ. Before he moved to UQ, he was a Professor in the Department of Chemical Engineering at Monash University, the Founding Director of ARC Research Hub for Energy-efficient Separation, and the Deputy Director of Monash Centre for Membrane Innovation. His research focuses on membrane and advanced oxidation technologies for energy-efficient separation, water and wastewater treatment, resource recovery, green chemical synthesis and renewable energy generation. He was the recipient of the prestigious ARC ARF Fellowship, Future Fellowship and Monash Larkins Fellowship.

Dr. Zongli Xie
Vice President

Dr. Zongli Xie, the current Vice President of MSA, is a Research Group Leader and Principal Research Scientist at CSIRO Manufacturing, Australia. She has extensive research experience in collaboration with industries on advanced membrane materials/technologies and catalysis for energy and environment. She has authored/co-authored over 130 journal publications (>5400 citations and h-index of 37), 5 patents, 4 invited book chapters, and over 30 confidential commercial technical reports. Dr Xie also serves as an Adjunct Professor in Victoria University, a board member of Monash Centre for Membrane Innovation, Associate editor of Separation Science and Technology, and the editorial board member of Membranes and Results in Engineering.

Dr. Leonard Tijing
Treasurer

Dr. Leonard Tijing is currently a senior lecturer at the School of Civil and Environmental Engineering, University of Technology Sydney. He is a core member of the Centre for Technology in Water and Wastewater. His research encompasses membrane development and process optimisation for desalination and water purification. He has published >115 articles and has been cited >6,880 times so far. Dr Tijing has been part of the board of directors of the Membrane Society of Australasia (MSA) since 2018. He has served various roles in the society such as newsletter editor, and travel/workshop coordinator. He is currently the MSA executive treasurer.

Dr. Soo Leong
Secretary

Dr. Soo Leong is a Hub Manager of the ARC Research Hub for Energy-Efficient Separation (ARC-EESep) at the Department of Chemical and Biological Engineering, Monash University, Australia. She obtained her PhD from Monash University in developing a novel material for the photocatalytic membrane process. Prior to joining Monash University, she worked in an academic position for 10 years. Currently she manages and oversees all aspects of the administrative operations of ARC-EESep. Moreover, she is holding the position as Secretary at Membrane Society of Australasia (MSA). She built the new website and is maintaining the website for the World Association of Membrane Societies (WA-MS).

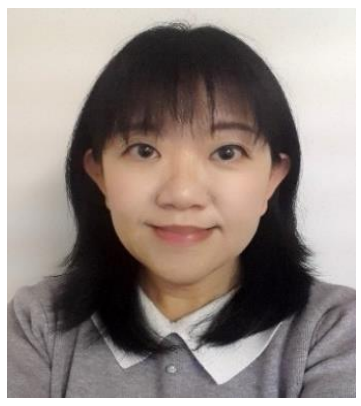
MSA Board of Directors

Dr. Nawshad Akther
Secretary

Dr. Nawshad Akther is currently a Postdoctoral Research Engineer at the School of Civil and Environmental Engineering, University of Technology Sydney (UTS). Dr. Akther received her PhD in Environmental Engineering from UTS. Her research focuses on the development of materials and advanced membranes for various applications, including desalination, resource recovery and water treatment. She is known for her work on the synthesis of nanocomposite membranes modified with graphene oxide and derivatives for forward osmosis. She won over 10 awards over the past 2 years for her research, including the Membrane Society of Australasia (MSA) Best Student Award (2021), MSA Best Short Talk Award (2020), UTS 3MT (2020), UTS Research Excellence Commendation Award (2019) and UTS Collaboration Experience Award (2019).

Dr Amir Razmjou
Newsletter Coordinator

Dr Amir Razmjou is a tenured lecturer at Edith Cowan University (ECU) and Editorial board member of the Journal of Desalination. He has supervised more than 20 HDR students, and has held leadership roles in several industrial projects. He has over 10 years of expertise in surface nanoengineering and membrane technologies with more than 150 high-impact refereed journals (>5800 citations and an h-index of 38 and h10 of 89, April 2022). Dr Razmjou's current research focuses on direct lithium extraction, ion selective membranes, sensors and machine learning for material discovery.



Dr Filicia Wicaksana
Website/ Events Coordinator

Dr Filicia Wicaksana is a Senior Lecturer at the Department of Chemical and Materials Engineering, the University of Auckland, New Zealand. Dr Filicia Wicaksana has more than 20 years research experience in membrane technology. Her current research areas include membrane processes for water/wastewater treatment, desalination, and dairy applications; membrane fouling; non-invasive techniques for fouling monitoring and hydrodynamics studies in membrane filtration systems.

Dr. Andrea Merenda
Membership Coordinator

Dr. Andrea Merenda (PhD from Deakin University, 2019), holds a MSc in Chemical and Sustainable Engineering from the Polytechnic of Turin (Italy) and a MSc in Chemistry and Chemical Engineering from the Ecole Nationale Supérieure de Chimie de Montpellier (France). Prior to joining the Surfaces, Materials and Catalysis group at RMIT University in March 2021 he worked as Associate Research Fellow at Deakin University. He specialises in the design and synthesis of functional nanomaterials and stimuli-responsive surfaces, with a focus on heterogeneous catalysis and membrane catalytic reactors applied to green chemistry, CO_2 conversion and water remediation. He has published 36 research papers (since 2016, h-index: 13) and a book chapter. Dr. Merenda is also a Board Director of the Membrane Society of Australasia, member of the Early Career Editorial Board of the Journal of Water Process Engineering (JWPE) and member of the American Chemical Society.

MSA Board of Directors

Dr Gayathri Naidu
Awards Coordinator

Dr Gayathri Naidu is a Senior Lecturer, Australian Research Council DECRA Fellow and Johnson & Johnson Fellow at the University of Technology Sydney. Gayathri's core research is dedicated towards fabricating nanomaterials and membranes to drive the global water industry towards sustainable water reuse and valuable resource recovery – critical rare earth elements, lithium, rubidium. As part of the MSA board of directors, Gayathri aspires to use this platform to expand MSA activities, reach out to a wider community, recognise young membrane technologist through MSA awards and advocate for more gender equity measures.

Prof. Faisal Hai
International Engagement/ Communication Coordinator

Professor Faisal Hai is the director of the Strategic Water Infrastructure Lab (SWIL) and the coordinator of the 'Environmental Engineering and Water Resources Powerhouse' of the University of Wollongong, Australia. A recognised authority in advanced wastewater treatment and reuse, Prof Hai has forged strong collaborations with industry and internationally leading researchers, which have led to collaborative grants and/or high calibre publications. He is an Editor of 'Water Science and Technology' (IWA, UK) and 'Journal of Water and Environment Technology' (Japan Society on Water Environment) and a member of the editorial board of a number of Elsevier journals. He is the lead editor of the book 'Membrane Biological Reactors', which has been one of the bestsellers from IWA publishing, UK.

Dr Mark Mullett
Industry Engagement

Dr Mark Mullett (MSc, BSc Hon, CChem, FRACI) is the Process Consultant for Industrial Water at Veolia ANZ. Mark has over 25 years' experience in hydrometallurgy, wastewater treatment, innovation, and process engineering. His specific area of expertise is the application of membrane processes to treat complex water sources within the mining sector. Prior to working for Veolia, Mark worked for 1 year as the Principal of M2M Environmental Engineering, 9 years at Hatch, 2 years with BHP Technology Centre, 12 years with Alcoa World Alumina's Technology Delivery Group and 10 years at CSIRO. Mark has over 30 publications and a patent.

Dr. Geoffrey Johnston-Hall
Industry Engagement

Dr. Geoffrey Johnston-Hall is the research and development manager at DuPont. He has over 12 years of experience in key leadership roles and is a technology expert for filtration technology (MF, UF, MBR), polymer processing, extrusion, adhesives, washing and drying systems, environmental control and filtration processes (including fouling and chemical cleaning). Before joining DuPont, he worked at Evoqua Water Technologies as the principal scientist/membrane R&D manager for 6 years, and at Siemens for 5 years.

8th Early Career Researcher Symposium Highlights

The 8th MSA Early Career Researcher Membrane Symposium, endorsed by the Membrane Society of Australasia (MSA), was held in November last year. The MSA ECR Symposium is Australia's most renowned symposium for membrane scientists and engineers in the early stages of their careers. It has a strong track-record of success and typically brings together young delegates from Australasia and from the rest of the world in a unique, exciting event. The symposium aims to provide a vibrant platform for young researchers to present and share research ideas and network with peers.

Given the COVID restrictions and the worldwide pandemic, the symposium was held online only and was hosted by the Monash ARC Hub for Energy-Efficient Separation. Two inspiring keynote presentations were given by Dr. Jingwei Hou and Dr. Gayathri Naidu. The symposium program featured specific sessions for ECRs and PhD students to present and showcase their research work, whereas an interactive networking session was also organised in the second half of the symposium.

Organising committee:

Dr Andrea Merenda, chair, RMIT University
Dr Ashley Ansari, program coordinator, Uni. of Wollongong
Dr Nawshad Akther, website coordinator, UTS Sydney
Dr Xing Wu, abstract coordinator, CSIRO
Dr Rijia Lin, review coordinator, Uni. of Queensland
Dr Rujing Hou, sponsorship coordinator, Monash Uni.
Dr Yuan Kang, media coordinator, Monash Uni.
Dr Seungju Kim, award coordinator, Uni. of Melbourne

Dr Jingwei Hou
ARC DECRA fellow and ARC Future Fellow
University of Queensland

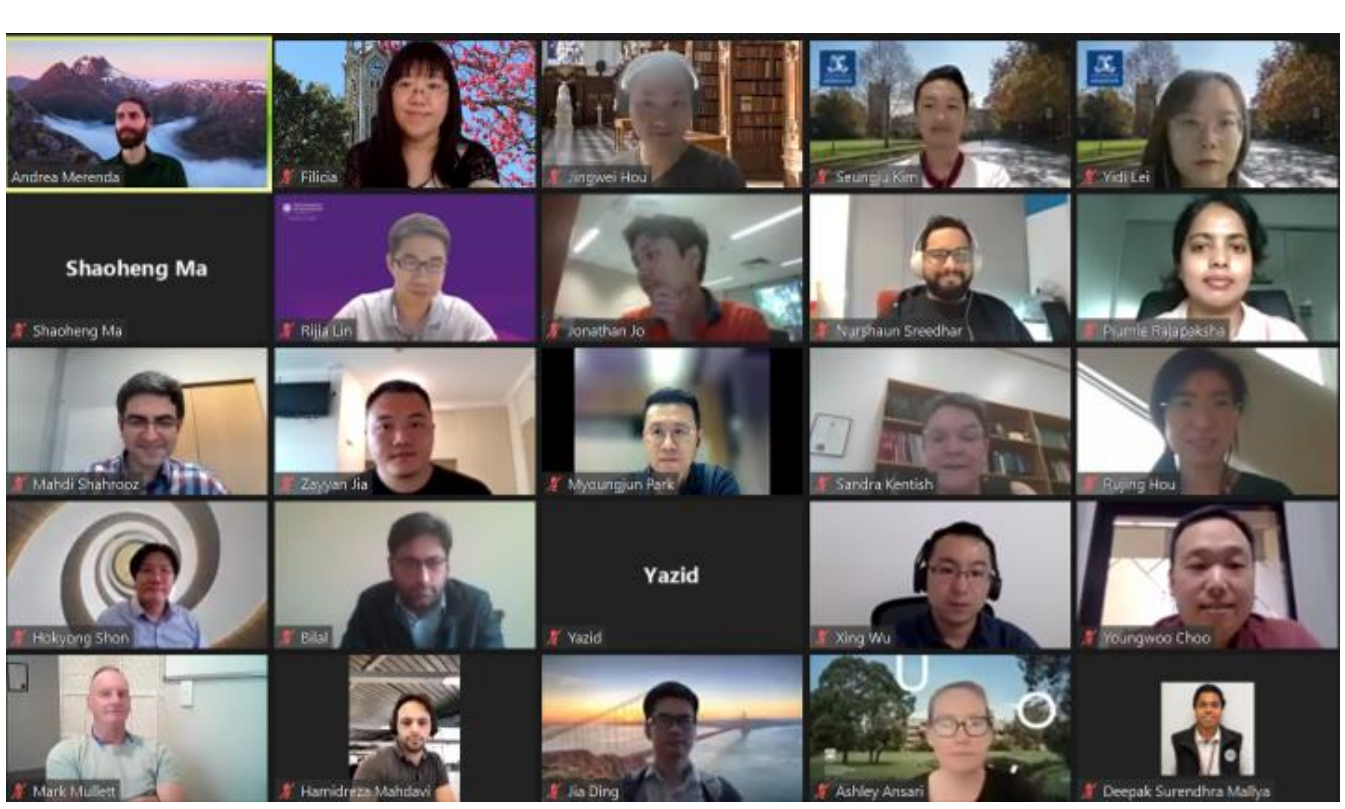
Keynote presentation

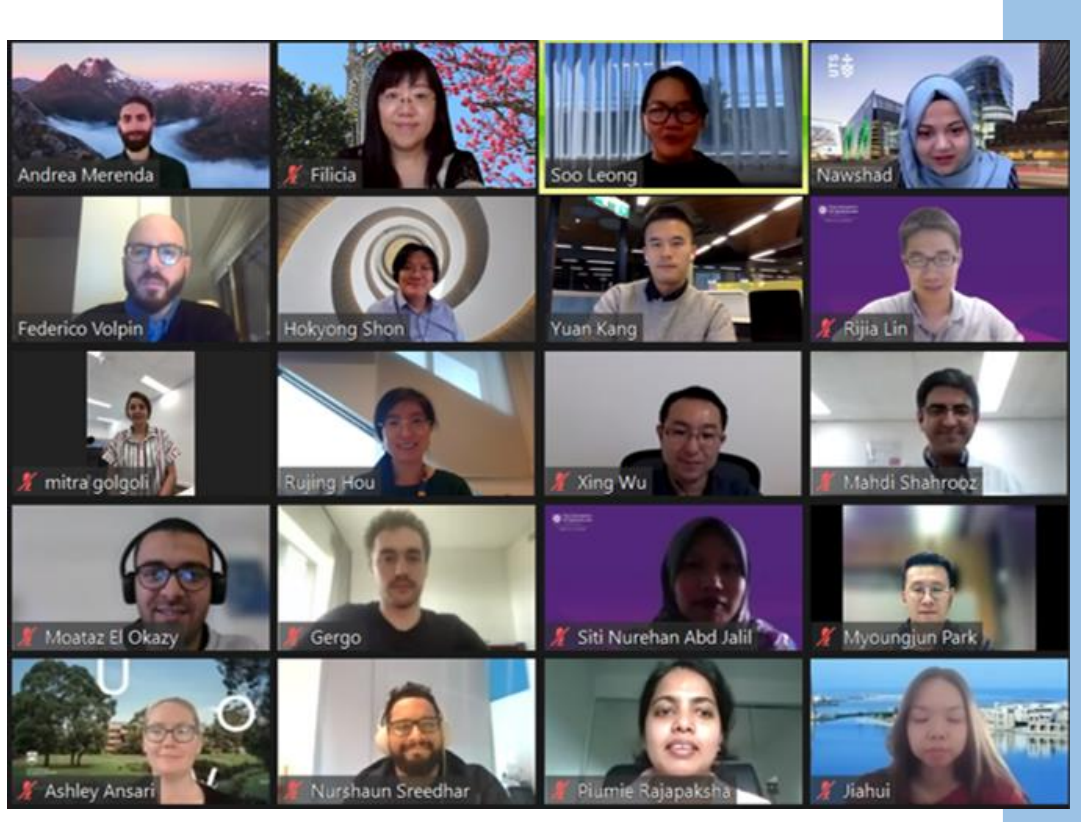
An ECR's perspective on membrane engineering – how new opportunities emerge from the interface of interdisciplinary researches.

Dr Gayathri Naidu
Senior Lecturer and ARC DECRA Fellow
University of Technology Sydney

Keynote presentation

Application of membrane and nanomaterials for brine treatment and resource recovery.



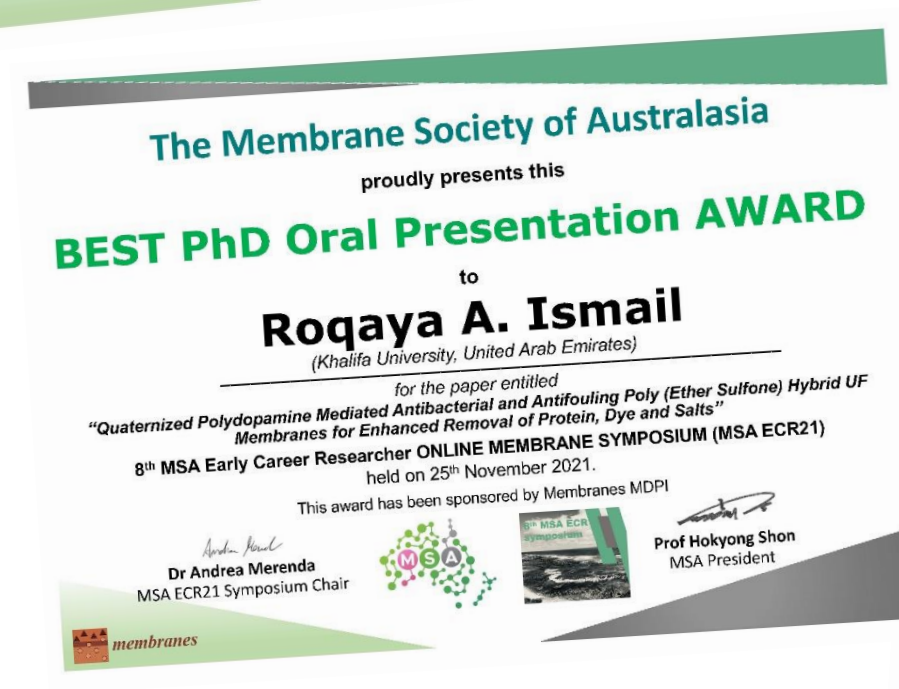


8th Early Career Researcher Symposium Highlights

Awards for the best oral presentations at the 8th MSA ECR symposium were given to one ECR and four PhD students. Congratulations to the winners!

- **Dr Gergo Ignacz** (King Abdullah University of Science and Technology)
  "Why Is Rejection So Hard To Predict?"
- **Ehsan Ghasemiestahbanati** (Monash University)
  "Charge Carrier Molecular Sieve (CCMS) Membranes for Vanadium Redox Flow Batteries"
- **Piumie Rajapaksha** (RMIT University)
  "Nanofunctionalised Graphene Oxide Hybridised Cross-linked Polyvinyl Alcohol Electrospun Membranes for Removing Waterborne Pathogens and Chemical Contaminants from Synthetic Wastewater"
- **Roqaya A. Ismail** (Khalifa University)
  "Quaternized Polydopamine Mediated Antibacterial and Antifouling Poly(Ether Sulfone) Hybrid UF Membranes for Enhanced Removal of Protein, Dye and Salts"
- **Yu Jie Lim** (Nanyang Technological University)
  "Unraveling the role of support membrane chemistry and pore properties on the formation of thin film composite polyamide membranes"



ARC Research Hub Success

Australian Government
Australian Research Council

Industrial Transformation Research Hubs: ARC Research Hub for Nutrients in a Circular Economy (2021-2024)

Prof. Ho Kyong Shon
Director of ARC NiCE Hub
Professor in School of Civil and Environmental Engineering
Faculty of Engineering and IT
University of Technology Sydney
PO Box 123 Broadway NSW 2007
Australia

ARC NiCE hub Node leaders

Sydney Node: Ho Kyong Shon, Jason Prior, Jeff Powell, Sherub Phuntsho

Brisbane Node: Stefano Freguia, Cara Beal, Bernadette McCabe

Australian membrane researchers recently were successful with the application for Australian Research Council Industry Transformation Research Hub for Nutrients in a Circular Economy (NiCE), which involves 14 Australian, Korean, and Swiss universities/institutes and 12 industry partners. The NiCE was announced as successful last year under the ARC Linkage Projects scheme, and $2 million was funded for four years.

The NiCE Hub will bring together the water and agriculture industries, along with manufacturing industries, regulators, councils and citizens to demonstrate a value chain for a circular economy of nutrients based on urine.

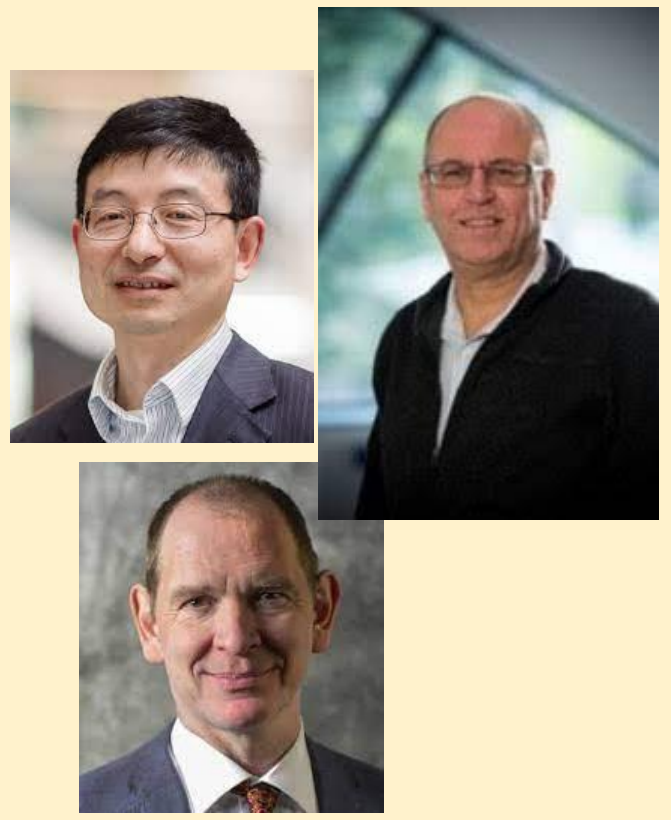
Urban utilities are in need to design resilient wastewater infrastructure to tackle the pressures of urban intensification, waterways pollution and climate change. This Hub aims to transform the wastewater industry with an unprecedented, city-scale circular economy of nutrients based on urine separation and processing at building level, to produce safe and effective liquid fertilisers. By engaging with stakeholders across the value chain, this Hub expects to bring two urine processing technologies to commercial readiness, and to produce new regulations and business models for the circular economy. This will add resilience to the wastewater and urban farming industries, and will create market opportunities for new Australian technologies.

To learn more about how your organization can get involved and participate in the ARC NiCE Hub, please contact Hub Director:
Prof. Ho Kyong Shon, hokyong.shon-1@uts.edu.au

ARC 2021/2022 Funding Success

The ARC funding outcome was released for 2021 and 2022 funding commencement. A number of membrane separation and materials researchers have done very well to secure Discovery Projects, ARC Future Fellowships, Australian Laureate Fellowship, and a Discovery Early Career Researcher Award. MSA would like to say many congratulations to you and your colleagues on being awarded a 2021/2022 ARC Grants. That is a great achievement for the membrane community. A compiled snapshot list of membrane separation related projects is provided in this newsletter and their results can also be found at the ARC outcome website here in this link.

Discovery Project - DP210101758; funding commencing year: 2021
Huanting Wang; Mark Banaszak Holl; George Simon
Crystal engineering of membranes for chiral separation
This project addresses the urgent challenge of chiral separation in the manufacturing of pharmaceuticals and agrochemicals by creating a new class of membranes produced by engineering functionalised porous framework crystals. This project expects to generate new knowledge regarding how membrane chemistry and architecture can be used to achieve highly selective, fast chiral molecule transport. The expected outcomes of the project include new membrane compositions, design principles, fabrication techniques, and proof-of-concept production of scalable, high-performance composite membranes. This project should produce significant economic and environmental benefits in the development of advanced membranes, pharmaceuticals, and agrochemicals.



Monash University

Discovery Project - DP210102155; funding commencing year: 2021
David Huang
Predicting concentration-gradient-driven liquid transport in 2D membranes
This project aims to achieve a predictive understanding of liquid transport through two-dimensional (2D) membranes driven by concentration gradients by using a combination of novel theory and computation. Membranes made from 2D nanomaterials hold great promise for many applications from desalination to power generation to chemical sensing, but the concentration-gradient-driven transport processes that underlie these applications are not well understood. The expected outcome of this project is an unprecedented quantitative understanding of the parameters that control these transport processes. This will enable predictive optimisation of 2D membranes, which will reduce the time and cost of membrane development for diverse applications.

The University of Adelaide

ARC 2021/2022 Funding Success

University of Technology Sydney

Discovery Project - DP210101361; funding commencing year: 2021
Ho Kyong Shon; Dong Han Seo; Sherub Phuntsho; Hideto Matsuyama; Enrico Drioli
Novel inkjet-printed organic solvent nanofiltration membranes
The pharmaceutical industry is one of fastest growing industries in Australia. Manufacturing pharmaceutical products requires the use of hazardous and expensive organic solvents, which are toxic for the environment and expensive to recover due to the energy intensive thermal process required. This project aims to discover and manufacture a novel, low-cost, chemically robust nanomaterial-based membrane using an industry scalable inkjet printing process. The membrane will be resistant to organic solvents while efficiently recovering valuable and hazardous organic solvents with minimum environmental footprint. It will effectively provide for the future growth of the Australian pharmaceutical industry while also having global applications.

University of Tasmania

Discovery Project - DP210101466; funding commencing year: 2021
Michael Breadmore; Spas Kolev
Polymer inclusion membranes for electrokinetic sampling and separation
This proposal aims to understand the chemical and physical properties governing the transport of ions into and within advanced extracting polymeric materials, known as polymer inclusion membranes, under the influence of an applied voltage. These membranes are dry-to-touch and represent a new and potentially powerful analytical platform for environmental, medical and industry sample preparation. By understanding the transport mechanism, new membranes will be developed, capable of purifying and concentrating diverse targets chemicals from liquid and solid samples. These processes can take place during sample transportation to a centralised laboratory thus simplifying and streamlining analysis upon arrival to decrease drastically its costs.

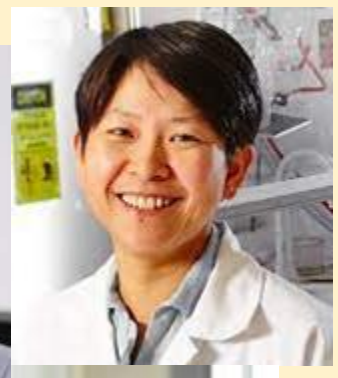
ARC 2021/2022 Funding Success

Discovery Project - DP210100901; funding commencing year: 2021
Matthew Hill; Timothy Scott; Huacheng Zhang; Benny Freeman
MOF-polymer 3D composites for liquid organic hydrogen carrier utilization
This project aims to address the hydrogen transportation challenge by utilising liquid organic hydrogen carriers rather than other techniques involving high pressures or cryogenic temperatures that need complex infrastructure. This project expects to generate knowledge in the hydrogen economy area using the novel approach of simplifying the separation of the liquid carriers before and after their release of hydrogen. Expected outcomes of this project include largely enhanced hydrogen transportation efficiency by recently discovered new materials. This should provide significant benefits such as a huge economic opportunity for Australia, both for domestic low cost clean energy, and for export to Asia in the hydrogen economy.

Monash University

Discovery Project - DP210100838; funding commencing year: 2021
Tong Lin; Hao Shao; Gregory Rutledge; George Chase
High Temperature, Piezoelectric Polymer Membranes
This project aims to acquire new knowledge about the preparation of flexible polymer membranes that can convert mechanical energy into electricity ("piezoelectric" conversion) stably at high temperature (e.g. 200-500 °C). This will solve the current problem where only inorganic ceramic materials can be used for high-temperature piezoelectric conversion. The expected outcomes include a new approach to prepare polymer membranes capable of high-temperature piezoelectric conversion using an electrostatic spinning technology. The new breakthrough materials will not only enhance performance and reliability at high temperature, but also offer novel applications in diverse fields such as "smart" protective clothing for firefighters.

Deakin University


Swinburne University of Technology


The University of Queensland

The University of New South Wales

ARC 2021/2022 Funding Success

Discovery Project - DP220100603; funding commencing year: 2022
Tianyi Ma; Baohua Jia; Han Lin
Monolithic solar thermal photocatalytic membrane for hydrogen production
This ambitious project aims to develop a new concept of monolithic membranes composed of photocatalysts embedded in highly efficient solar thermal graphene. Such a membrane will be first of its kind and is able to utilise full solar spectrum for scalable seawater desalination and direct splitting to produce hydrogen without the need to concentrate sunlight. Expected outcomes include chemically and structurally tailored membranes and 2D floating prototypes for real life hydrogen production, and in-depth understanding of working mechanism to facilitate up-scaled renewable hydrogen generation. Significant benefits in minimising fossil fuel consumption, increasing energy security, and expanding competitive clean energy industry are promised.

Discovery Project - DP220102203; funding commencing year: 2022
Xiwang Zhang; Benny Freeman
Carbon Molecular Sieve Membranes for Organic Solvent Separation
Directly addressing the pressing challenge of organic solvent separation faced by numerous industries, the project aims to develop molecular sieve membranes with outstanding selectivity and solvent tolerance by constructing zeolite-carbon mixed matrix membrane via incorporating zeolite nanosheets into carbon materials. The project expects to generate advanced knowledge of nanosheet synthesis, membrane fabrication and selective molecule transport. The membranes developed in the project have great potentials for improving the production capacity and sustainability of Australian industries, e.g., pharmaceutical manufacturing, bioethanol production and petroleum refining, providing significant economic and environmental benefits to Australia.

Discovery Project - DP220103294; funding commencing year: 2022
Chuan Zhao; Yibing Li
Anion exchange membrane water electrolysis for clean hydrogen production
Low-cost and robust water electrolysis technology is a cornerstone towards the success of the hydrogen economy. This project aims to develop next generation anion exchange membrane water electrolyser technologies for low-cost and high-efficiency clean hydrogen production and renewable energy storage. Novel non-precious transition metal-based catalysts with high intrinsic activity, large surface area and super-hydrophilic surfaces will be developed, and their mechanism and stability within membrane electrode assemblies understood by using operando spectroscopy, electrochemistry and 3D X-ray imaging characterisations. An efficient anion exchange membrane water electrolyser prototype made entirely of non-precious materials is to be devised.

ARC 2021/2022 Funding Success

Discovery Early Career Researcher Award (DECRA)
- DE220101043; funding commencing year: 2022
Masoumeh Zargar
Peculiar membrane structures for removing microplastics from water

Microplastic pollution can inflict irreparable damage to human health and the environment. This project aims to develop functional membrane structures specifically designed to remove microplastics from aquatic and wastewater treatment systems. The approach will utilise advanced techniques in material science, separation science and fluid mechanics. The expected outcomes include advanced membranes with high separation efficiency for microplastics filtration. This will have significant benefits, including the efficient removal of microplastics from water sources securing cleaner potable, irrigation and recycled water, and contributing to a safer, healthier environment for all Australians.

Edith Cowan University

Discovery Early Career Researcher Award (DECRA)
- DE220100427; funding commencing year: 2022
Xingya Li
Engineered multifunctional membranes for aqueous organic redox flow battery

This project aims to develop multifunctional membranes with high ion conductivity and selectivity and high energy density to address the key challenges in the development of aqueous organic redox flow battery for renewable energy storage. The project will develop novel methodologies for precisely tuning and functionalising microporous materials to achieve cost-effective and scalable fabrication of membranes with multi-functions, thus improving the energy efficiency and retaining the cycling capacity of redox flow batteries. The advancement of multifunctional membranes will enhance the efficiency of storage of intermittent and fluctuating renewable resources, thereby contributing to the reduction of carbon footprint in Australia.

Monash University

ARC 2021/2022 Funding Success

The University of Melbourne

Discovery Early Career Researcher Award (DECRA)
- DE220100135; funding commencing year: 2022
Seungju Kim
Superhydrophobic thermally rearranged membranes for low-energy separation

This project aims to develop thermally rearranged membranes with superhydrophobicity using novel polymer chemistry and nanofibre morphology. Both water flowrate in membrane distillation and gas flowrate in carbon dioxide stripping from solvents will be increased by minimising the water vapor condensation between the nanofibers; resolving shortcomings in current energy-intensive filtration systems. This project will provide significant benefits to Australian communities by advancing cost-effective and energy-efficient potable water production and carbon dioxide separation processes for sustainable development. The advanced materials developed can be manufactured locally and will enhance our national capability in modern manufacturing.

Queensland University of Technology

Discovery Early Career Researcher Award (DECRA)
- DE220101354; funding commencing year: 2022
Jiaye Ye
Novel ion exchange membrane for high performance vanadium flow battery

This project aims to design and synthesis novel ion exchange membrane with tailored ion selectivity and high proton conductivity for vanadium redox flow battery (VRFB). VRFB is a promising energy storage technology for large scale storing renewable energy due to its advantage of decoupled capacity and power, long lifetime. Currently, VRFB suffers from fast capacity decay and cyclic instability because of severe vanadium ion permeability of commercial membrane. The expected research outcomes in this project include stable, high ion selectivity membranes made of cost-effective aromatic polymer and robust nanofillers, enabling high performance VRFB. This will place Australia in the forefront of clean energy storage technologies.

ARC 2021/2022 Funding Success

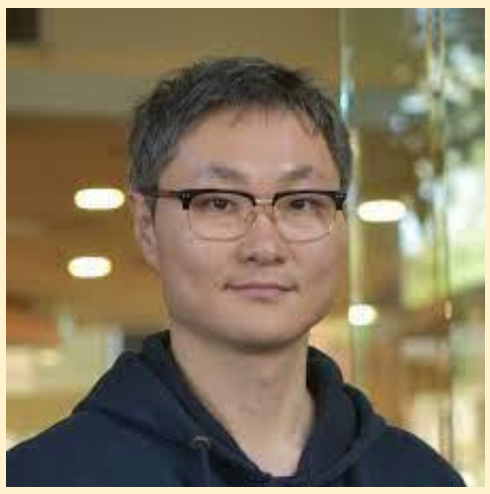
ARC Future Fellowships
- FT210100593; funding commencing year: 2021
Xiwang Zhang
Epitaxial stacking of nanoporous nanosheets for next-generation membranes

The project aims to develop high-precision selective membranes which are urgently needed in Australian key industries for solute-solute separation by constructing vertically-aligned and chemically-tailorable nanochannels using two-dimensional porous nanosheets as building blocks. The project expects to generate advanced knowledge in the areas of nanosheet synthesis and functionalisation, membrane design and fabrication, selective transport of solutes and applications. The membranes developed in the project should make existing separation processes more effective and sustainable and advance emerging applications in pharmaceutical, dairy and mining industries, providing significant economic and environmental benefits to Australia.

Monash University

ARC Future Fellowship
- FT210100589; funding commencing year: 2021
Jingwei Hou
Metal Halide Perovskite Metal-organic Framework Crystal-Glass Composites

This project aims to investigate the highly stable and efficient semiconductive composite materials, recently discovered by my group, consisting of metal halide perovskite embedded in metal-organic framework glass. An integrated experimental and computational approach will be used to study the structures and interfacial bonding mechanisms that govern the highly sought-after properties for the composites. Expected outcomes are a new generation of environmentally safe perovskite devices for energy, environmental and health applications, e.g. lighting, displays, X-ray sensing, photocatalysis and photovoltaics. This project will position Australia at the forefront of semiconducting device research and create commercial opportunities.



The University of Queensland

ARC 2021/2022 Funding Success

Monash University

Linkage Project
- LP200301320; funding commencing year: 2021
Xiwang Zhang; Huanting Wang; Yinlong Zhu; Arash Zamyadi; Stephen Wee
Sustainable Hydrogen Production from Used Water
The project aims to address the pressing challenge of water scarcity in hydrogen production by developing an innovative approach of using used water as the feed for water electrolysis. The project will result in an in-depth understanding of the impacts of water impurities in used water on the performance and durability of water electrolysers, and develop guidelines for the design of highly durable water electrolysers and the operation and upgrade of existing wastewater treatment plants. The project will advance the practical applications of water electrolysis for scalable and sustainable hydrogen production and help Australia secure a leading position in the global emerging hydrogen economy.

The University of Melbourne

Linkage Project
- LP210100244; funding commencing year: 2021
Spas Kolev; Louis de Klerk
Rare Earth Metal Separation by Polymer Inclusion Membranes
The project aims to develop a novel hydrometallurgical method for the separation of the rare earth metals dysprosium and terbium from mixed rare earth metal solutions using polymer inclusion membranes with a crosslinked or non-crosslinked polymer backbone. These metals are crucial for the manufacturing of advanced technology products. The membrane-based method is expected to offer significant advantages over the currently used solvent extraction methods by eliminating the use of solvents and conducting the separation as a continuous process where the extraction and back-extraction steps take place simultaneously. These advantages are expected to make the separation process more cost-effective and drastically reduce its environmental impact.

MSA Travel Support

MSA Travel Award (PhD/ECR)

In order to assist MSA members (students and early career researchers (ECRs)) attend MSA affiliated symposiums and conferences, MSA will sponsor travel awards to support their conference registration costs or to partially cover their conference expenses. Subject to the approval of the MSA executives, MSA executive will directly pay the registration costs of the award recipients to the organising committee. The award winners will be announced during the conference closing ceremony and published in our newsletter post-conference.

(ECRs here are defined as those researchers within 5 years post-PhD graduation)

Eligibility

- Must be a current member (HDR student or ECR) of the MSA.
- Must have their abstract accepted and be the presenting author of an oral or poster presentation at the conference.
- Must not have previously won a travel grant from MSA during the calendar year.

Selection Criteria

Applicants will be selected by a panel of judges according to their track record relative to opportunity, the quality of abstract and significance of research, justification of eligibility and the need for financial assistance.

Travel Funding use – What the MSA grant support program is for?

This travel award is provided specifically for the sponsorship of the above mentioned conference registration or conference expenses.

Dr Gayathri Naidu
Travel Award Coordinator
Senior Lecturer/ARC DECRA Fellow
University of Technology Sydney
E: gayathri.danasamy@uts.edu.au

How to apply?

Call for application will be made through the general MSA email list. Please stay in touch with the MSA to receive all the relevant updates for these Travel Awards. The application form must be submitted via email to the MSA Travel Funding Committee (funding@membrane-australasia.org) with the subject line: "**[conference name] travel award application**" at the announced deadline. The outcome of the application will be announced within 6 weeks after the deadline.

Conditions

To qualify for this travel funding program, the awardee has to meet the following terms and conditions:
Reporting – write a short article as a contribution to the MSA Newsletter, highlighting relevant points of interest to MSA members (can be about the conference or other member-related topics);
Acknowledgment – the MSA (including the logo) must be acknowledged for providing financial support in the presentation materials.

Contact us

If you would like further information on the MSA travel funding program, contact Travel funding program coordinator:
Dr Gayathri Naidu (funding@membrane-australasia.org or gayathri.danasamy@uts.edu.au)

Launch of Open Membrane Database

Open Membrane Database (OMD) is an open-access, crowd-sourced resource with the performance and properties of 661 reverse osmosis (RO) membranes. The interactive charts and search functions allow easy data exploration and comparison of membrane performance, physicochemical properties and synthesis conditions.

Researchers are encouraged to contribute to the database by uploading their latest membrane performance results. Note that only data published in peer-reviewed journals, patents, or commercial product datasheets is allowed on the database to provide quality control.

Currently, the OMD only contains RO membranes. The goal is to later incorporate other membrane-based separations technologies such as nanofiltration (NF), forward osmosis (FO), and ion-exchange (IX).

For further information, please visit the Open Membrane Database website:

https://openmembranedatabase.org/

Founders

Dr. Rhea Verbeke

Dr. Timothée Stassin

Professors

Prof. Ivo Vankelecom

Prof. Chuyang Y. Tang

Prof. Guy Ramon

Prof. Menachem Elimelech

Founding Members

Ines Nulens

Dr. Douglas Davenport

Dr. Zhe Yang

Adi Ben Zvi

Naama Segev

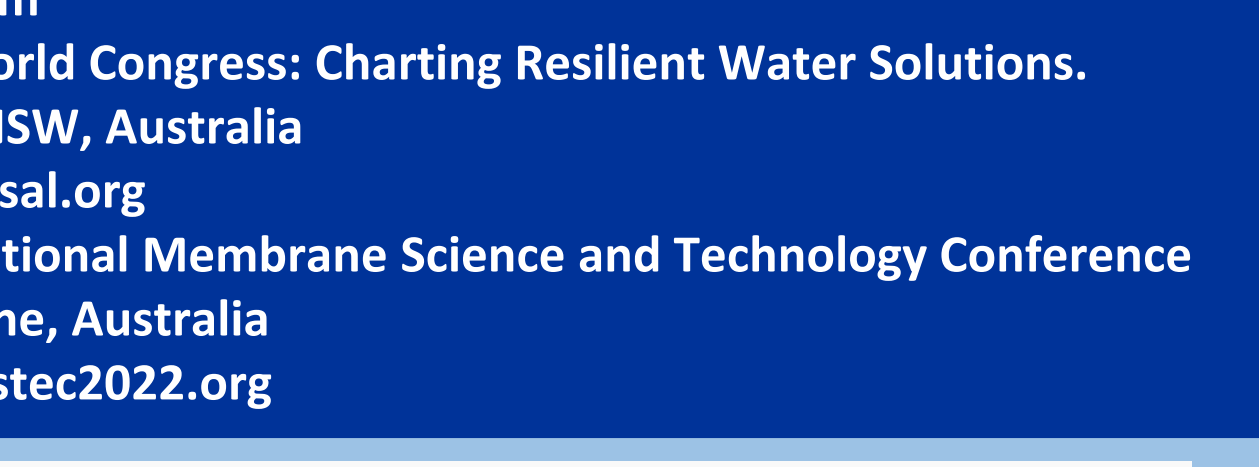
Cody Ritt

Ryan DuChanois

Membrane Society of Australasia

https://www.membrane-australasia.org/

CURRENT EVENTS	2022	ABSTRACT SUBMISSION
Nanofiltration 2022 Reutlingen, Germany nanofiltration2022.iamt.kit.edu/26.php.	27 – 30 June	NOW
International Conference on Inorganic Membranes ICIM 16 Taipei, Taiwan www.icim2020.org	28 – 30 June	31 Dec 2021
The 13th Conference of the Aseanian Membrane Society Nanyang Technological University, Singapore www.ams13.org	04 – 06 July	15 Apr 2022
Gordon Research Conference - Membranes: Materials and Processes New London, NH, USA www.grc.org	30 – 31 July	1 May 2022
15th International Conference on Membrane Science and Technology 2022 Virtual Mst2022.com	10 – 11 Aug	30 Jun 2022
IWA World Water Congress & Exhibition 2022 Copenhagen, Denmark www.worldwatercongress.org	11 – 15 Sep	17 Jan 2022
13th World Filtration Congress San Diego, CA, USA wfc13.com	05 – 09 Oct	29 Apr 2022
IDA 2022 World Congress: Charting Resilient Water Solutions. Sydney NSW, Australia wc.idadesal.org	09 – 13 Oct	30 Jun 2022
11th International Membrane Science and Technology Conference Melbourne, Australia www.imstec2022.org	04 – 08 Dec	15 May 2022



MSA Newsletter Taskforce

Every quarter, MSA Newsletter publishes important pieces of news, events and research highlights related to membranes and membrane technologies. You are encouraged to get in touch with the Newsletter Editor, Amir Razmjou, to contribute a piece of news-worthy article or two from an area of your work, research or group. To facilitate this process, we have formed a team of Newsletter Taskforce based on Board nominations and their relevance to membrane field. Please welcome them to the MSA family during news gathering time by offering your kind assistance. Should you wish to nominate someone for the Taskforce, please get in touch with the Newsletter Editor.

Taskforce members

Dr. Amir Razmjou, *Newsletter Editor* (amirr@unsw.edu.au)

Dr Amir Razmjou is a tenured lecturer at Edith Cowan University (ECU) and Editorial board member of the Journal of Desalination. He has supervised more than 20 HDR students, has held leadership roles in several industrial projects. He has over 10 years of expertise in surface nanoengineering and membrane technologies with more than 150 high-impact refereed journals (>5800 citations and an h-index of 38 and h10 of 89, April 2022). Dr Razmjou's current research focuses on direct lithium extraction, ion selective membranes, sensors and machine learning for material discovery.

Dr. Milton Chai, *Associate Editor* (milton.chai@uq.edu.au)

Milton Chai received his PhD in Chemical Engineering from the University of New South Wales in 2019. He then pursued further research as a postdoctoral researcher at the UNESCO Centre for Membrane Science and Technology, UNSW and later the University of Queensland in the area of MOFs and biocatalysis. His main research interests include ion-selective membranes for critical minerals recovery, biocatalytic reactors for CO_2 conversion, and membranes for bioseparation.

Ms. Weonjung Sohn, *Assistant Editor*
(Weonjung.Sohn@student.uts.edu.au)

Weonjung Sohn is currently a 1st year PhD student at University of Technology Sydney under Prof. Hokyong Shon's supervision. Her main research interests include biological nitrification process in membrane bioreactors, and reverse osmosis technology for nutrients recovery in a circular economy from blackwater such as urine.

Mr. Vedant A. Joshi, *Assistant Editor*
(che18va.joshi@stumarj.ictmumbai.edu.in)

Vedant A. Joshi is currently a 4th year student pursuing Integrated M.Tech. in Chemical Engineering with Specialization in Petroleum and Petrochemical Technology from Institute of Chemical Technology Mumbai MarJ. His research interest lies in the domain of Enhanced Oil Recovery, Aromatic Extraction and Process Modelling and Simulation.