



Dr Adil Dhalla, Chairman of the Steering Committee, SG-MEM, Singapore's National Membrane Consortium

A cornerstone in Singapore's water industry

With a globally recognised research and development ecosystem in Singapore's water industry that is rapidly expanding to translational activities, it is no surprise that the country is formalising its water value chain.

Although Singapore is already known as a global hydrohub, according to Dr Adil Dhalla, Chair of the Steering Committee for Singapore's National Membrane Consortium (SG-MEM), it is only the beginning.

Membranes have always been a cornerstone of water treatment and purification, and they are fast becoming an intrinsic part of process technology, not just for the water industry, but others, such as the energy and petrochemical industries.

Seeing the opportunities for membrane-based systems, with various companies either specialising in or needing certain membranes, Singapore's National Research Foundation (NRF) came up with the idea of SG-MEM, a consortium created with the sole purpose of bringing all related institutions and industries into one ecosystem. Dr Dhalla and Professor Gary Amy (National University of Singapore),

who chairs the Technical Management Committee, were asked to set up and lead the consortium.

DR DHALLA

A cheerful, unassuming man with a razor-sharp intellect and clear vision for SG-MEM, Dr Dhalla was first tasked with setting up a translational facility for Separation Technologies in 2015. This was the genesis for what has developed into the Separation Technologies Applied Research and Translation (START) Centre, which he and his team have built up since its launch in 2016, and which he leads as its Managing Director.

"I had been in General Electric for 15 years and had been heading GE's water research centre by the time I decided it was time to make my next career move – which I had originally thought would be within GE.

"Around that time, one of the things I was

excited to hear from PUB and Singapore's Economic Development Board (EDB) was that they were very interested in taking some of the early-stage water-related inventions in Singapore and bring them to full scale products and processes. Given the significant platform of innovation in the area of membranes and separations, it was a great opportunity to create new technologies with benefits to communities in Singapore and beyond," he explained.

"At the time, we were in a situation where Singapore was known for its inventions, but we also increasingly wanted to be known for our products and processes, not merely discovered, but also developed here in Singapore.

"A laboratory discovery is typically in a very early stage of technological readiness. The proof of concept might be there, but in order to bring this to a full scale product is a

huge undertaking and and with with unique challenges, which are undertaken in the START Centre.”

SG-MEM

The first step on the way to translation is a thorough techno-commercial analysis. While it is possible to scale the technology up, commercially it still has to be viable two years in the future when the product is ready to hit the market.

“Singapore is privileged to be home to two of the best sets of membrane research faculties and facilities at NUS and NTU. The team at NUS is made up of a number of professors who have come together under the auspices of the Membrane Science and Technology Consortium (MSCT), led by Professor Amy,” he said.

“At NTU, we have the Singapore Membrane Technology Centre (SMTc), led by Professor Wang Rong. SMTc is part of Nanyang Environment and Water Research Institute (NEWRI), ranked among the world’s leading institutes in its field.”

Coupled with the START Centre and the Environmental and Water Technology Centre of Innovation (EWTCoI) at Ngee

Ann Polytechnic, led by Ms Tham Li Phin, these four centres together constitute Singapore’s institutional Research and Innovation ecosystem for membranes.

“NRF wanted to set up SG-MEM as an umbrella organisation to foster a vibrant academic and industrial ecosystem in the field of membranes,” Dr Dhalla continued.

Dr Dhalla and Professor Amy’s vision for industrial membership of SG-MEM was broad-ranging, from chemical manufacturers whose products went into membrane fabrication, to the end users of membrane technologies. This vision is reflected in the current membership, which is 23 and growing, with members including large companies, global multinational corporations, small and medium enterprises (SMEs), and even start-ups.





Photos 1-3: Testing and scaling up products in the START Centre laboratory, a crucial step in de-risking new technologies

BENEFITS

“Oftentimes, we have found that companies become members of many consortiums and organisations and I think there’s a kind of fatigue involved,” Joanne Sim, programme manager, SG-MEM, explained.

“The differentiating factor of SG-MEM is that we have the presence of two translational centres within our ecosystem that are able to translate cutting-edge technology in the lab to actual real world applications. This is an immense boon provided to our industry partners who benefit from the upscaling facility and this largely reduces the cost and risk of bringing new and promising technologies to market.”

“Larger companies generally have the resources to de-risk their own technologies, although they are always looking for new innovations, but start-ups and SMEs, which are typically much more resource-limited, would really benefit from having not only a wide selection of new inventions, but also translational facilities to help them take new products to commercialisation,” Dr Dhalla added.

“Novel technologies and processes are the lifeline of start-up companies, and one of SG-

MEM’s mandates is to foster a more vibrant start-up culture in Singapore. I would love to see one of the start-ups we are privileged to partner with growing to take pride-of-place in the membrane ecosystem.”

Members of the consortium, apart from gaining much-needed exposure and access to new business opportunities, get to link up with the entire ecosystem, and even get access to some of the world’s leading researchers in the field of membranes.

“We are an end-to-end one-stop hub because SG-MEM incorporates all of Singapore’s world-class membrane expertise and facilities. Being a member gives them preferential access to these, as well as the valuable business and collaborative connections to the key players across all domains,” added Sim.

“These are the benefits, and I think because of them, in such a short time, we managed to get quite a number of companies – and we’re just getting started.”

THE FUTURE

Though Singapore is already known and respected for its water solutions and as a global hydrohub, for Dr Dhalla, stopping to rest on successes is not an option, and he is

always planning his next step to maintain and expand expertise in Singapore.

“We are known for our inventions in the area of membranes, separation and water, so our next step is to have some of the world’s best products and processes in the field coming from Singapore, and that is our most important goal, irrespective of whether they are commercialised through start-ups or SMEs or even larger companies. I just want the world to see the best invented, developed and commercialised products are from Singapore,” said Dr Dhalla.

“I am confident this will lead to products actually made and coming out of Singapore, and this will help the ecosystem not only in terms of economic benefits, but also a workforce constantly upgrading its skills and efficiencies, and novel technologies providing solutions to Singapore and the world. Moreover, my dream is that there will be an increasingly number of products and processes where someone using it anywhere in the world will say ‘this was discovered, designed and developed in Singapore.’” [WWA](#)

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