NEWRI UPDATE 2016

- ISSUE 7 -

Stay Connected with NEWRI – Your Global Research & Technology Partner

In this issue:

Prof Ng meeting and welcoming some new students on 4 January 2016 during a New Year gathering at NEWRI

A word from the Prof...

Dear Colleagues and Friends of NEWRI,

Year 2015 has been a busy time for NEWRI with many significant events that have speckled the calendar year. Our collaborative reach grows wider as we welcome more industry partners interested in knowing what we have to offer and partnering with us. It has been a stretch since our last update but I assure 2016 promises even more.

NEWRI continues the journey towards further innovation and drive towards enterprise. Recent developments with Chongqing as well as Korea, signified by the events of the Dadukou District People's Government of Chongqing, Chongqing Longda Technology Co. Ltd and NEWRI, 3 party Memorandum of Understanding (MoU) Sino-Singapore Environment Protection Projects signing (Jan 2016), the NTU-Hyundai Urban System Centre launch (Jan 2016), and the Chongqing Longda / STSE / NEWRI MoU signing (Nov 2015), the collaboration agreement with Sinomach-GME, and the recent NEWRI-R3C proposal for the construction of a WTE facility amongst others, indicate our collaborative direction clearly.

The economic growth in the region has come with environmental management requirements. Rapid urbanization and industrialization generate huge requirements for water supply and waste water treatment as well as the utilization of renewable energy. NEWRI and its partners bring real solutions to these concerns.

As we continue to encourage innovation, foster entrepreneurship and facilitate the commercialisation of research, NEWRI's spinoffs (ie. MINT, WOT (Water Optics Technology), Aquaporin Asia, ANAESYS and NE4Technology) expand our innovation cluster. Earlier in 2015, NEWRI conducted a series of presentations, workshops and roadshows to inform the industry of NEWRI and its spin off activities.

2015 has also seen colleagues increase their career profiles. Highlights and congratulations are in order for Prof Liu Ai Qun, School of Electrical & Electronic Engineering being elected OSA Fellow in 2015 and Dr K. B. S. N. Jinadasa**,** Dept. of Civil Engineering (University of Peradeniya) recently awarded the President's Award for Scientific Publications for highly rated scientific research published in the year 2013. In a similar vein, I wish to also welcome our new colleagues to the NEWRI family - Dr Babu Narayanswamy, as Operations Director of our Innovation Cluster, and Dr Adil Minoo Dhalla as Director of ST-IC .

Lastly, this year will also see NEWRI once again at the SIWW 2016 in a bigger booth and we do hope you will join us on the road to innovation and enterprise.

Prof Ng Wun Jern
Executive Director, NEWRI
NEWRIUpdate

On 18 November 2015, NTU/NEWRI, Chongqing Longda Technology (owned by the Chongqing Hualong Group) and STSE Engineering Services met and signed a memorandum of understanding. More on page 2

19 Jan 2016, saw the official launch of the NTU-Hyundai Urban System Centre hosted by the College of Engineering and the NEWRI Ecosystem. More on page 3

NANYANG TECHNOLOGICAL UNIVERSITY

Nanyang Environment & Water Research Institute

NEWRI ECOSYSTEM
Your Global Research & Technology Partner

www.ntu.edu.sg/NEWRI

INDUSTRY UPDATES

From Left to Right:
Dr Shi Lei (NEWRI), Mr Yeong Wai Cheong (NEWRI), Associate Prof Tan Soon Keat (NEWRI), Mr Simon Lek (STSE Engineering Services), Mr Ong Tze Haung (EDB), Mr Azam Khan (IFC), Mr Soon Fook Soon (STSE Engineering Services), Prof Ng Wun Jern (NEWRI), Ms Li Chunyan (Chongqing Hualong Group), Mr Dai Jiayi (Chongqing Hualong Group), Mr Zhao Yu (Chongqing Longda Technology), Dr Meng Gang (Chongqing Longda Technology), Prof Liu Yu (NEWRI), Asst Prof Zhou Yan (NEWRI), Dr Jiang Xie (NEWRI)


Prof Ng receiving Ms Li Chunyan (President of Chongqing Hualong Group) and entourage.


Prof Ng sharing a moment with Mr Soon Fook Soon and Mr Yeong Wai Cheong.

NTU/NEWRI, Chongqing Longda Technology (owned by the Chongqing Hualong Group) and STSE Engineering Services met and signed a memorandum of understanding to mark the first step towards collaboration. (18 November 2015)


Audience anticipating the MoU signing.


Prof Ng presenting a token of appreciation to Ms Li Chunyan.

"Chongqing, with the fastest GDP growth among all the provinces and autonomous regions/cities in China, saw mushrooming growth of industrial enterprises in the region...."

In our continuous efforts to reach out to the industry with our innovation and gaining additional collaboration, NEWRI actively seeks industry players to establish joint work in the environmental and water domain.

The signing between NEWRI, Chongqing Longda Technologies and STSE Engineering Services, as well as the signed collaboration agreement with Sinomach-GME (a Fortune 500 company responsible for more than 10% of all water infrastructure built in China) would take NEWRI into the exciting developments in Chongqing and the whole of China's Western region.

On 8 January 2016, Dadukou District People's Government of Chongqing, Chongqing Longda Technology Co. Ltd and NEWRI, NTU jointly signed the 3 party Memorandum of Understanding (MoU) Sino-Singapore Environment Protection Projects. The collaboration aspects include education, research, technology development, investment schemes as well as urban development. Chongqing Longda Technology agreed to lead the organisation of construction and development resources from Singapore, and bridge the resources to related Dadukou district departments. (http://cq.cqnews.net/html/2016-01/08/content_36165833.htm)

(*Continued on next page*)


Dadukou District People's Government of Chongqing, Chongqing Longda Technology Co. Ltd and NEWRI, NTU jointly signed the 3 party Memorandum of Understanding (MoU) Sino-Singapore Environment Protection Projects.

A significant milestone in R&D efforts in Singapore was made when NTU and Hyundai Engineering & Construction signed an agreement to jointly undertake research projects in the area of civil & environmental engineering, and to address issues faced by densely developed urban centres. The NTU-Hyundai Urban System Centre marks a significant beginning for NTU and Hyundai, as this is the first research centre between NTU and a major Korean construction company in Singapore, focusing on urban solutions. (http://www.channelnewsasia.com/news/singapore/new-research-centre/2438280.html, see right)

Earlier in 2015, a renewed MoU was signed between NTU-NEWRI and Technisehe Universität Darmstadt (TUDa) for 2015 – 2018, which set out joint activities for enhanced cooperation, promotion of early career researchers, and setting up a multilateral thematic network on "Clean Water China and Southeast Asia".

The recent announcement of construction of a Waste to Energy (WTE) facility, a product of the partnership with National Environment Agency (NEA) with collaborating partner JFE Engineering Corporation and NEWRI-R3C, is expected to spawn many cross collaboration research activities between NEWRI and external parties with the aim of translating research into commercial applications. This puts NEWRI in a very strong position to leverage on the facility backbone and compete for external funding to support research activities.

A renewed MoU was signed with NTU-NEWRI and Technisehe Universität Darmstadt (TUDa) for 2015 – 2018, which agrees in joint activities for enhanced cooperation, promotion of early career researchers, and setting up multilateral thematic network of "Clean Water China and Southeast Asia" (29 June 2015)

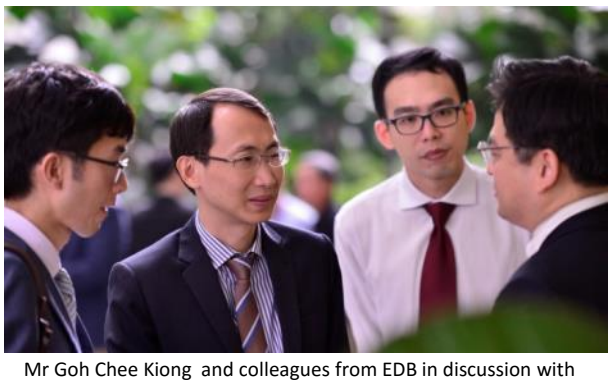
From left to right: Prof Tay Beng Kang, (Assoc. Dean (Research), College of Engineering), Prof Ng Wun Jern (Executive Director, NEWRI), Prof Chen Tsuhan (Dean, College of Engineering), Prof Freddy Boey (Provost NTU), Mr Goh Chee Kiong (Executive Director, Cleantech EDB), Dr Lee Seok Hong (CTO, R&D Div, Hyundai Engineering & Construction), Mr Choi Won Ho (MD, Hyundai Singapore), Dr Lee Hong Sung (Dep GM, R&D Planning Group, Hyundai Engineering & Construction), Prof Tan Soon Keat (Dep. Executive Director, NEWRI)

Dr Lee Seok Hong (CTO, Hyundai E&C) presenting Provost NTU Prof Freddy Boey with a memento to commemorate this event

Provost NTU Prof Boey being interviewed by Channel News Asia

Prof Ng Wun Jern (Exec Director, NEWRI) shares a moment before the ceremony with Dr Lee Seok Hong (CTO, R&C Div, Hyundai E&C) and Mr Choi Won Ho (MD, Hyundai Singapore)

From Left: Dr Lee Seok Hong (CTO, R&C Div, Hyundai E&C), Mr Choi Won Ho (MD, Hyundai Singapore), Marc Petry (PI, Hyundai E&C), Prof Chen Tsuhan (Dean, College of Engineering)



Mr Goh Chee Kiong and colleagues from EDB in discussion with Dr Lee Hong Sung (Hyundai E&C)

The NTU-Hyundai Urban System Centre is launched by Provost NTU Prof Freddy Boey, Mr Goh Chee Kiong (EDB) and Dr Lee Seok Hong (Hyundai E&C)

Mr Goh Chee Kiong (EDB) with his welcome address

PARTNERSHIPS / NEW RESEARCH

"In today's increasingly competitive market, we have to be even more vigilant, more innovative, and more enterprising to appeal and be able to partner the industry."
Prof Ng Wun Jern

NEWRI's direction in its next phase of development is to go beyond being just a R&D institution but to actively bring its research outputs to the industry.

Anaesys and NE4Techology are two spinoffs which are examples of NEWRI's pursuit of value beyond research. These companies were established to bring biologics and non- biologics solutions to the market.

NEWRI keeps its members current with regular professional seminars and workshops. An example would be Dr Eric Lee's seminar "From Concept to Commercialization" in March 2015, where Dr Lee recounted the journey of two companies that developed their technology from the idea stage into commercial processes and products. In the same month, "Develop Innovation Thinking to Align Research with IP mindset" presented by Dr Lim Jui, showed how our researchers can align research with IP mindset by developing innovation thinking.

Prof Ng articulating NEWRI's directions at a New Year gathering (4 Jan 2016)

AEBC IPs road show (2 July 2015)

Dr Eric Lee Seminar - From Concept to Commercialization – Two Case Studies (4 March 2015)

"Develop Innovation Thinking to Align Research with IP mindset" 31 March 2015 (@NEWRI) - Dr Lim Jui seminar

THE STRAITS TIMES, THURSDAY, 11 JUNE 2015, PAGE B2

NTU scientists use yeast to take waste out of waste oil

By SAMANTHA BOH

LOCAL scientists are harnessing oil-guzzling yeast to help get rid of waste oil, transforming it into an edible money spinner in the process.

Their method could help cut costs in the food and beverage industry – a sector notorious for wastage. It also provides a cheaper source of carotenoids, the substance which makes carrots orange, and a common food additive used in anything from butter to canned fruit, worth over a billion dollars worldwide.

"In the past, it was cheaper to throw the oil away than to convert it into something else," said Professor William Chen of Nanyang Technological University's (NTU) School of Chemical and Biomedical Engineering, who led the research.

"But now, we've found a more cost-effective way to do so."

He and his team studied a specific type of yeast called *Rhodosporidium toruloides*, which loves to eat the fatty acids in waste oil – oil that has been used, say for cooking, and in the process contaminated by impurities.

The scientists have now engineered the yeast strains to secrete carotenoids naturally.

Prof Chen believes that the new method – which involves simply adding the yeast to the oil – could be used by restaurants which could then sell the carotenoids, which are in high demand, with a global market value of US$1.2 billion (S$1.6 billion) in 2010, according to global research group BCC Research.

Carotenoids are costly to produce now, because they have to be extracted and purified. Industry players are keen to get hold of the new technology, and two overseas companies, including a food and beverage giant, are in discussions with the NTU team.

The next step, said Prof Chen, is to engage industry players, to help them adapt their processes.

Mr Matthew Tan, chief risk and technology officer of abalone producer Oceanus Group, feels the method is promising as it is environmentally friendly. His firm uses bacteria to treat waste water at its processing plants in China, but has not found a similar method for waste oil, which must be treated with harmful chemicals.

He said companies would like to move away from the use of substances such as chloroform and methanol to treat waste oil, because they are harmful to the ozone layer. Noting that climate change has led to a dip in marine harvests, he added: "We on the production side are seeing the drastic changes...We need to move towards greener processes."

✉ samboh@sph.com.sg

Professor William Chen on the headlines.
(11 June 2015)

LIANHE ZAOBAO, 9 MAY 2015, PAGE 13

接近有效期食品还能吃吗?

南大构建微生物DNA数据库 未来或可识别食品安全度

建立食物微生物脱氧核糖核酸排序的数据库后，人们可能利用智能包装设计，看到食物中的有害微生物含量，增加对食品安全的信心。

杨潇 报道
yangyang@sph.com.sg

食品包装上的有效期快到时，不少人都会对里头食物是否仍能安全食用产生疑问。建立食物微生物脱氧核糖核酸排序的数据库后，人们可能利用智能包装设计，看到食物中的有害微生物含量，增加对食品安全的信心。

南洋理工大学从今年开始，把新一代排序（Next Generation Sequencing）科技运用于食品方面，借此研究影响食物品质和安全的微生物。

南大食品科技教育署长陈维宁教授受访时说，微生物本必全都有害，食物中也包含了有益微生物。研究人员从食物内抽取出这些微生物后，使用脱氧核糖核酸（DNA）排序技术，了解它们的习性和抗病规律加以研究，找到对付有害微生物的方法，或加强有益微生物的功能，增加食品产量和质量。

新一代排序并非新技术，本地研究人员在这之前已广泛运用在空气和水微生物的研究范畴。

目前，南大研究人员率先针对本地渔场养殖的食用鱼进行研究，他们抽取病鱼体内的有害细菌，找出导致鱼死亡的罪魁祸首。

陈维宁指出，这次选择食品安全作为新的研究领域，是希望研究人员在进行微生物新一代排序作业后，能创立一个全球化数据库，把食物内可找到的各类病毒、细菌和霉菌资料输入其中，供国内外研究人员参考。

食品供应链高度全球化，南大各座教授霍根（Jorden Schlundt）强调，要确保食品安全就得从源头抓起。

他指出，人类基因组排序的研究工作早在2001年就开始进行，如今这类科技已非常普及，成本大幅度下降，有利于展开新研究，研究效果也更快更精确。他说："我们分析食物微生物的脱氧核糖核酸排序，就好像研究人员收集的指纹。如果把它们全部集中在同一个数据库，一旦有'罪犯'出现，就能通过核对指纹，把这些害群之马揪出来。"陈维宁认为，无论是对政府或人民，食品安全都是一个很重要的课题。这个数据库对人们的日常生活也会很有帮助。

他说："一般消费者看到食品包装纸近有效日期时，都不肯定食物到底安不安全。我们可以通过智能包装设计，把感应器和有害微生物识别系统安置在包装材料里，让供应商或消费者看到食物细菌是否超标。这是我们所预见的一种直接应用方式，目的就是要让消费者更有信心。"

南大昨天举办了食物安全和生产研讨会，吸引了近百名国内外专家参与。

NTU reaches LHZB – Using DNA sequencing for Food Safety.
(9 May 2015)

The NEWRI welcomes a steady stream of visitors from numerous organisations. Many come to determine opportunities for collaboration.

VISITS (EXTERNAL)

MIT (India) of visit
(25 November 2015)

Dean Bhalkikar, Mr Sanjay Desmukh, Prof Ng Wun Jern, Prof Jagdish, Dr Arpita Saxena, Dr Maszenan bin Abdul Majid

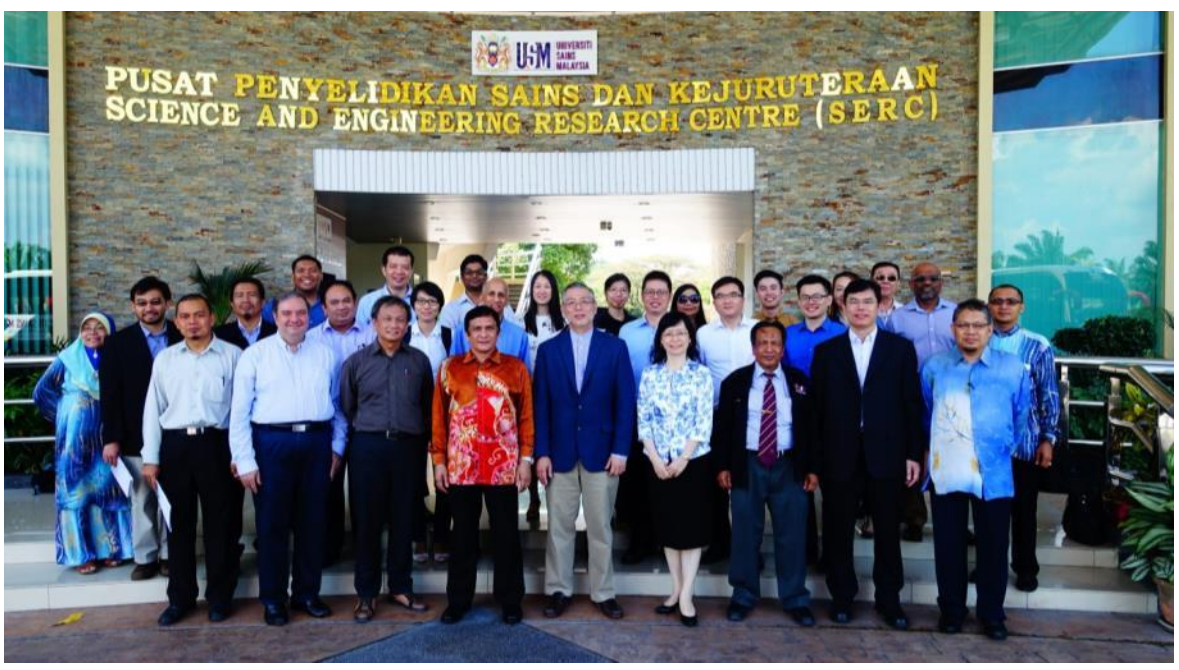
Homeland Visit
(10 April 2015)

Research Council of Norway visit
(30 April 2015)

Mr Arvid Hallén, Mr Egil Rensvik, Mrs Kristin Danielsen, Dr Sigurd Falch, Mr Kjell Roang, Prof Ng Wun Jern

Prince of Songkla University, Thailand visit (29 May 2015)

Asst.Prof.Dr. Piyarat Boonsawang, Asst. PRof. Dr. Apichat Upaichit, Assoc. Prof. Dr Maszenan bin Abdul Majid , Dr. Aran H-Kittikun (Hanpongkittikun), Prof Ng Wun Jern Assoc.Prof.Dr. Benjamas Cheirsilp, Dr. Wiriya Duangsuwan, Dr. Uschara Thammarat, Dr. Wassana Suyatha



NEWRI's visit to Universiti Sains Malaysia (USM) – 10 Dec 2015

NTU Singapore, through NEWRI, is keen on establishing research collaborations on water and other research related to water and the environment with Universiti Sains Malaysia (USM). Dr Zainal Arifin, director of the USM Engineering Campus, said such collaborations are also in accordance with the desire to turn USM into one of the renowned universities in the world come 2025. NEWRI director, Prof Ng Wun Jern was pleased with the hospitality and presentation during their visit to USM, and Dr Maszenan Abdul Majid, NEWRI senior research fellow, said water safety, membrane and using waste or discarded materials to produce energy were areas in which NTU and USM could cooperate.

SEMINARS, WORKSHOPS AND TRAINING

NEWRI constantly seeks to enhance staff knowledge and experiences. Regular in-house workshops and seminars by fellow researchers allow knowledge to diffuse throughout the organisation. These are some events in 2015.

1.	Developments and Directions for Water in USA
2.	Compact wastewater treatment by the use of moving bed Biofilm Reactors
3.	Sulfur cycle-based biotechnology for hybrid water resource cycle in coastal areas
4.	Energy and water infrastructure projects in Brazil: challenges for Environmental Hydraulics
5.	Conjugated Oligoelectrolyes for Biochemical applications
6.	Innovating in Wastewater Treatment
7.	Analysis on mixing and straining along-channel of the Estuaries
8.	From concept to commercialization – Two case-studies
9.	Chemical sensors – the most versatile tools of modern chemical analysis
10.	Cyanobacterial bloom in a eutrophic lake and its environment impact
11.	Experiences in developing risk analysis tools for oil spills in the gulf of Finland – How to create learning system?
12.	Develop innovation thinking to align research with IP mindset
13.	Microbial dark matters in anaerobic digestion processes
14.	Arctic research initiatives of the US Navy's Office of Naval
15.	Research global & water wave interactions with ice floes
16.	Fouling of UF and RO Membrane in pilot and Full-scale desalination treatment units
17.	Recent advances in Organic solvent nanofiltration
18.	Cellulose nanocrystal – A promising sustainable nanomaterial for Environmental Applications
19.	Compartmentalization in submerged membrane bioreactors & Queen's University & Canadian water treatment research
20.	Aerobic degradation processes in active landfill cells
21.	Membrane's technology and integrated water treatment


Water Technology Talk / NEWRI-PhD Scholarship workshop


"Innovating in Wastewater Treatment" - presented by Prof Mark Loodsdretch


"Micro Pollutant Removal from Used Water" – presented by Dr Arjen (11 June 2015)


NEWRI Researchers and Senior PhD Seminar Series - presented by He Chao (NEWRI-R3C), Goh Kunli (NEWRI-SMTC) and Dr Le Song Ha (NEWRI DHI-NTU) respectively (9 June 2015)

(Left)
NEWRI Researchers and Senior PhD Seminar Series - presented by Dr Song Jie (NEWRI – DHI-NTU), Ms Jaslyn Lee (NEWRI-AEBC), Mr Low Jiun Hui (NEWRI-SMTC) respectively


"Membrane Technology and Integrated Water Treatment" - presented by Prof Dr Ludo Diels, University of Antwerp, VITO, Belgium (9 June 2015)


NEWRI Best sharing workshop and best research workshop (25 May 2015) jointly coordinated by Dr Victor Sim and Dr Shi Lei

AWARDS / ACCOLADES / ACHIEVEMENTS

Our congratulations to the following for their achievements.

Prof Liu Ai Qun was recently elected as OSA Fellow in 2015. Last year, Prof Liu was also presented the Royal Chemistry Society (RCS) Fellow (2014) and SPIE Fellow (2013). We congratulate Prof Liu on his appointment.

Prof Liu, a professor at School of Electrical & Electronic Engineering, College of Engineering is active with his research work and is recently been involved with Acoustophoretic Microfluidic Systems, Nano-Opto-Fluidic System (NOFS) and Optofluidic System for Virus Manipulation and Biotioxin detection.

Dr. Shameen Jinadasa (former NEWRI-LIEN Fellow) from the University of Peradeniya, Sri Lanka, received the President's Award for Scientific Publications for the second consecutive year for the outstanding research performance selected accordingly to highly rated research publications. H.E.

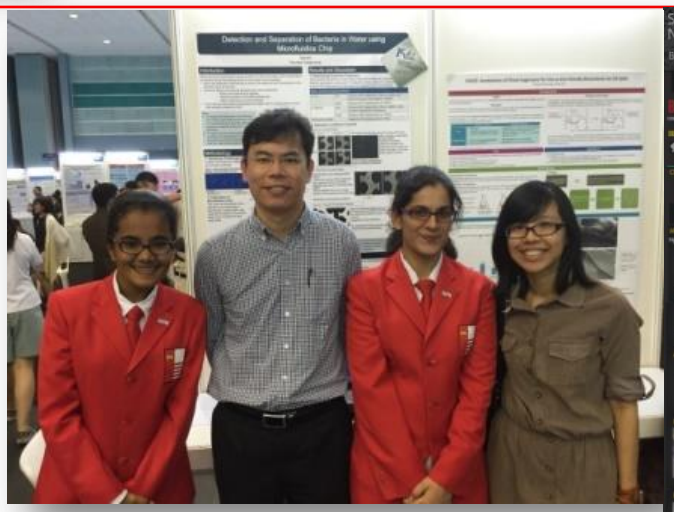
The President of Sri Lanka graced the awards ceremony which was held on 18th November 2015 in Colombo. He was awarded NTU-NEWRI LIEN Fellowship in 2010 and President's Awards, based on his collaborative research work with Prof Ng Wun Jern and NEWRI staff members. Dr. Shameen Jinadasa is currently a Senior Lecturer of Department of Civil Engineering, University of Peradeniya , Sri Lanka .

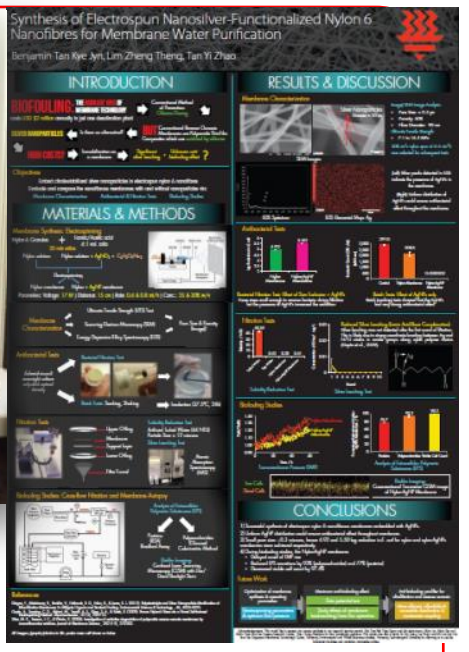
The first time in 49 years the award was given to a doctoral dissertation beyond north America since 1966. Dr Victor Sim, former NEWRI-SMTC PhD student & currently NEWRI's Scientist (Alumni), won AWWA ACE15.

SMTC PhD student, Lee Jian Yuan, received NAMS Student Fellowship Award and also won runner up poster award during Advanced Membrane Technology VI: Water, Energy and New Frontiers in Siracusa, Sicily, Italy

NEWRI trained **JC Students** received awards at the Singapore Science and Engineering Fair 2015

From the NEWRI-HCI collaboration, one of the teams did very well in the Singapore Science and Engineering Fair (SSEF) 2015. Not only did they win gold but they were the only water related team to be representing Singapore in the US for the International Science and Engineering Fair (ISEF) out of hundreds of entries nationwide. They had self electro-spun the nanofibers membrane with nano silver particles in HCI's own lab and then proceed to conduct biofouling studies in NEWRI-SMTC lab. After which, they won a 2nd award in the environmental engineering category and a special award was given by Sigma Xi for the Intel Science and Engineering Fair in US. These were also the highest awards by the Singapore representatives in the year.





From the NEWRI-NJC collaboration, NJC Students received merit award (top 5% of 600 projects) in Singapore Science and Engineering Fair 2015

Top left: Zhou Qingji, Dr Song Xiaoxiao, Assoc Prof Robert Tiong Lee Kong, Lim Kok Hin, Dr Chinagarn Kunacheva, Shankar Acharya Kamarajugedda, Dr Chen Huimei
Front Left: Liao Yuan, Tien Miao, Isabelle Wong Yuet Mun, Li Tian, Qi Saren

And it's not all work and no play at NEWRI!
Big congratulations to the combined team of NEWRI and CEE which emerged champions winning the Lam Khin Yong Shield in the NTU Badminton Champion finals 2015 beating LKCMed by an impressive 4:2, despite busy schedules, family affairs and physical conditions.

Isabelle Wong Yuet Mun (NEWRI)

Shankar Acharya Kamarajugedda (CEE)

Li Tian (NEWRI)

VIEWPOINTS / FEATURES

Viewpoints by Professor Hu Xiao

Several key innovations at NEWRI are propelled by fundamental knowledge in chemistry and materials science. Cross-disciplinary collaboration efforts have catalysed and accelerated the generation of intellectual property in a number of areas including nano-catalysts, high performance and functional membranes, stimuli responsive regenerable draw solutes, oil-water separation nano-filters and drinking water disinfection materials and devices. The field of environmental chemistry and materials is undoubtedly a bedrock for future technological breakthrough and is therefore of strategic importance. Environment Chemistry and Materials Group (ECMG) is envisioned to escalate its role by adopting an open, inclusive and forward-looking mindset. Through working with sister centres, a growing ECMG will be better positioned to explore innovative ideas for pollutant removal and resource recovery. The team strives to create value by developing new concepts and disruptive technologies even as we add value to the on-going efforts in waste management, water treatment, membranes technology and contaminant monitoring and remediation. The team will relentlessly seek cross-boundary synergy in order to tacking tough environmental challenges and perennial problems.

Spotlight on Dr Victor Sim

Dr Victor Sim, our former NEWRI student is doing us proud! He is proficient in US EPA Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), Disinfection By-Products (DBPs) Control and Process Trade-offs. He graduated from Nanyang Technological University (NTU) with a PhD under Professor Anthony Fane with the support of the National Research Foundation Environment and Water Technology (NRF-EWT) scholarship. His PhD work on the development of novel monitors for early detection of fouling in reverse-osmosis systems has won numerous awards and accolades including the World Future Foundation (WFF) PhD prize and American Water Works Association (AWWA) Academic Achievement Award for the best doctoral dissertation in his research field.

He is the first author of 9 publications, 2 book chapters and holds 3 patents. A two time recipient of the IDA Channabasappa Memorial Scholarship (2010-2012) and the recipient of the Young Leader award for his presentation at the World Congress 2011, he looks forward to contribute back strongly to IDA.

Dr Victor Sim is currently a Process Engineer at CH2M Singapore and affiliated with Nanyang Environment & Water Research Institute (NEWRI) - Singapore Membrane Technology Center (SMTC) as a scientist. He is CH2M Singapore's process lead for design considerations and process options for drinking water works and is now supporting the construction of Singapore's 3rd seawater desalination plant.

Yogyakarta Special Province, Indonesia

Water protection and distribution at the Gunungkidul regency karst area, Yogyakarta Special Province, Indonesia, is challenging. Karst geology is largely of porous limestone. Rainwater quickly drains into underground rivers with minimal soil infiltration.

During the dry season, wells and dolines (shallow depressions) dry up. Gunungkidul villagers will then have to purchase water or wait for government truck deliveries. The mountainous terrain makes access of piped supply costly.

With the Lien Environmental Fellowship (LEF) Programme, NEWRIComm and the Yogyakarta Institute of Technology (ITY; previously Yogyakarta School of Environmental Engineering) designed and installed a bank filtration well at Nangsri Doline, Candirejo, Gunungkidul. The team was led by Mr Agus Suyanto, a forestry lecturer at the ITY, who started studying the Gunungkidul area in 2007.

The well, which was built by the villagers themselves, is complemented by a water purification system comprising membrane filtration and UV disinfection. The facilities were handed over in May 2013 to the local youth village committee. Since then, at least 650 residents from two villages living around Nangsri Doline have been able to enjoy clean water.

The project team is expanding the project to Kepek Village, Saptosari, also in Gunungkidul. Like many dolines in the regency, Winong Doline in Saptosari is heavily polluted as it is also used for sanitation purposes. About 90% of 282 dolines in Gunungkidul is in critical condition due to siltation and pollution attributable to activities such as limestone mining, animal husbandry, and community hygiene.

Kepek Village water is not naturally green.

Community meets like this are very important!

The Kepek Village community is aware of the need to protect their water source. On their own, they have been working on reforesting the locality. They have also made a sand filter system to treat the doline water, but the results have been unsatisfactory. With support from the locals, ITY and NEWRI have decided to map the ecosystem of Winong Doline catchment, in order to plan for an appropriate management strategy for the Doline.

Villagers read about the "Save Telaga" (Doline) campaign

The community at Saptosari actively participates in the outreach activities-- the "Save Telaga" (Doline) campaign. Some of the education programmes were funded by the local government, and several schools in the area have requested to extend the programme to their institutions

Help from the government. Yay!

Recently, two additional units of bank filtration wells have been installed at Nangsri Doline by the local government. As part of their clean water facility development plan for Gunungkidul, they have also de-silted the doline, built a rubble wall on the banks, and fenced the circumference. Candirejo was proposed and selected to be the pilot site as data was available from the studies done through the project, allowing continuity of development.

Mr Agus Suyanto with the team of experts from ITY and Universitas Gadjah Mada, Yogyakarta (UGM) is mapping the hydrology, ecology, and socio-economic factors of the catchment. The study is expected to complete in September 2015. A management proposal for Winong Doline shall then be drafted.

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Till the next update - best wishes,

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