

AMSIC Newsletter

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Issue # 6, September 2018

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AMSIC Newsletter

Submissions

Please send news, announcements and other contributions for the newsletter to the Editor, Dr. Sidy Ba:

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Your contribution shall be included in the next issue of the newsletter.

Editorial notes



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*Director of Publications &
Newsletter Editor for AMSIC*

Welcome to the African Membrane Society Newsletter!

Since its inception in 2014, the African Membrane Society has been in the forefront of leadership, advocacy, and education for the development of all facets of membrane technologies and processes in Africa. The members across the continent and around the world are contributing to the advancement of the science and engineering of membranes. They are committed to democratize the science and engineering of membranes in Africa. That's why our members are always looking for more students to work on this exciting and promising field of broad application potential whether for cleaner water and air production, medical application for blood filtration or else.

One of the main objectives of AMSIC is to teach and train a critical mass of students to be scientifically and technologically capable of harnessing the potential of membranes in the sustainable industrial development of Africa. To this end, AMSIC is calling for partnership and collaboration between its members and between its members and external experts in the field of membranes from various horizons (academia, industries, public organizations, etc.)

To ensure that membranes in Africa are not just about esoteric knowledge between experts in academia, AMSIC urges its members to focus their work in meeting the needs of the populations across the continent through sound practical projects.

Enjoy reading AMSIC Newsletters and please do not hesitate to send us your comments and suggestions. AMSIC team of experts will gladly get back to you.

AMS activities and news

New Board Member:



AMSIC is proud to inform that **Dr Samuel S.O. Coker** joined its Board in May 2018 for the position of **Director of Industry-Academy relations**.

He will work in tandem with Dr Alexander Anim-Mensah - Chemical Engineer- who occupies a similar function. Sam is currently a consultant to several medical device companies that are developing technologies to improve the life of patients that require blood transfusions due to medical emergencies. Earlier in his career he was a visiting assistant Professor of Medicine in Research at the University of Southern California, School of Medicine department of Physiology and Biophysics. He also held senior positions in companies such as Pall Corporation Medical group (17 years) and Haemonetics, the Blood Management Company. Sam has extensive experience in developing technologies and products critical to the healthcare, pharmaceutical and water purification industries. Sam's unique expertise will bring unmatched value to the African Membrane Society given his motivation to educate members about the role of filtration in patient protection and blood transfusion.

Francofilt Congress 2019 (Tunisia):

AMSIC Vice President Pr Raja Ben Amar (Raja) will host and co-organize the 2nd edition of FRANCOFILT, an international congress on filtration/separation sciences, in partnership with the "Institut de la Filtration et des Techniques Séparatives (IFTS)", the University of Bordeaux (France) and the University of Blida (Algeria). FRANCOFILT will occur in Hammamet, Tunisia, and will last three days during the September 20-25th period in 2019.

Announcements

South African Women in Science Awards 2018



Our colleague and friend **Dr Soraya MALINGA**, Senior Lecturer and Researcher at the University of Johannesburg and member of AMSIC, has been awarded the **2nd runner-up of South Africa Prestigious Women in Science Award** - an event hosted by the Department of Science and Technology (DST) in South Africa since 2003. This award recognizes the achievements of women scientists; it encourages and rewards the next generation of young women who are starting their careers in the field of scientific research. In fact, Dr Soraya was showcased in the last issue#5 of AMSIC newsletter to refer to for those who want to learn more about her accomplishments.

Warm congratulations to Soraya for this important recognition signaling that a bright future lies ahead of you, and please keep being a role model for the new generation of female scientists who are looking after you!



The « **Unité de Développement des Equipements solaires, Centre de Développement des Energies renouvelables** » organizes from the 10th to the 16th of October 2019, **The Internat; The International Conference on Sustainable Water Treatment Technologies and Environment** in Tipaza, Algeria aims to attract high quality science presentations and keynote talks from national and internationally renowned scientists and researchers working in Water treatment area and related fields. This event will also facilitate close cooperation and intellectual exchange with a large number of experts from the academia, leading R&D&I institutions, industry and government agencies. It provides a platform for researchers, scientists, and decision maker to discuss the current challenges, opportunities and future directions in the development of sustainable energy systems especially in Algeria and MENA region.

The conference will include oral communications and poster sessions specialized in the following topics, but are not limited to:

A. Fresh water management

- Water availability, demand and consumption,
- Renewable Energy and water resource management trends,
- Climate change impacts on water resources,
- Supply networks, Leakage and Water losses.

B. Desalination

- Membrane processes (Reverse osmosis, Electro-Dialysis, ...)
- Thermal processes (MED, MSF, VC...)
- Desalination hybrid systems
- Renewable energies in desalination,
- New materials in water desalination field,
- Pre-treatment and post-treatment processes
- Brine/concentrate disposal and waste management

C. Wastewater treatment and reuse

- New trends in conventional processes (treatment quality, energy, financial expenditure, ...)
- Sustainable processes (advanced oxidation processes, Nanotechnologies, SODIS, ...)
- Wastewater treatment powered by renewable energies (green electricity, biogas, cogeneration, microbial fuel cells, ...)
- Decentralized wastewater treatment plants (MBR, SBR, low cost technologies, ...)
- Wastewater reuse (Management, Policies, Regulation, standards, ...)

D. Financial, Economic and environmental aspects

- Environmental issues of water treatment processes
- Water pollution and Environmental impact assessment
- Techno-economic studies,
- Monitoring, water quality, Safety and security issues.

For more information visit the website: <http://udes.cder.dz/sustwater2019/index.html>

Young researcher



Abaynesh Yihdego Gebreyohannes (Dr. Eng)

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Dr **Abaynesh Yihdego Gebreyohannes** was born and raised in Addis Ababa, Ethiopia. She obtained a European Joint Doctorate in membrane Engineering under the program of Erasmus Mundus Doctorate in Membrane Engineering (EUDIME) in Feb 2015. Currently, she is a postdoctoral fellow at KU Leuven, subsequent to a two-year postdoctoral activity at the Institute on Membrane Technology (ITM-CNR), Italy with main duties and responsibilities including; writing project proposals, advising and supervising MSc and Phd student projects, conducting researches and communicating the outputs through publications and workshops, etc. She also has a vast experience in organizing a bimonthly group seminars and organization of exams for 500+ students each year at KU Leuven.

She completed her **Bachelor in Chemical Engineering from Bahir Dar University, Bahir Dar, Ethiopia**. Later on, she served my alma mater as assistant lecturer for two years. Meanwhile, she got the privilege to pursue her **Master in Environmental Sanitation at Gent University, Belgium**. During her master's she worked on the development of electric field assisted ultrafiltration to control fouling due to charged colloidal suspensions. The thesis, carried out, under the supervision of Prof. Van Der Meer at PaInt, was innovative; as such it received a prize from the Flanders Water Technology Network, Belgium (TNAV) for the best membrane related thesis of the year 2010, selected among 11 masters theses in throughout Belgium.

After completing her Master degree with great distinction, she was **selected for 1st Edition of European Doctorate in Membrane Engineering (EUDIME)**. Inspired by her experience during her master studies, her PhD thesis was focused on understanding membrane fouling mechanism and use of smart membrane modifications to intensify downstream processing of industrial effluents.

In her PhD project, she **worked on the development of integrated membrane process for the valorization of wastewater** aiming at recovery of high added value co-products, purified water and other valuable resources within the logic of zero liquid discharge. As such, she tested membranes ranging from microporous to dense, from pressure driven to osmotically driven membrane processes. She gave special emphasis to develop novel approaches for in-situ degradation of major foulants and reducing total processable volumes. The work comprised, development of magnetic stimulus-responsive reversible enzyme immobilization techniques on the surface of membrane using ferric based bionanocomposites. Hence, she prepared novel magnetic responsive mixed matrix membranes and magnetic responsive bionanocomposites as a platform to tailor the formation of dynamic layer of immobilized enzyme on membrane surface. Use of magnetic guidance helped to physically immobilize enzyme on membrane, facilitate recovery and the recycling of enzymes. It also facilitated easy separation of the membrane from the immobilized enzyme, which subsequently facilitated membrane cleaning without affecting the enzyme activity. The work was the first of its kind in the field of membrane processing and biocatalytic membrane reactor development with broad application in addition to *in situ* foulant degradation.

By undertaking both long and short term accelerated aging studies, she also identified a best chemical cleaning condition for a magnetic responsive smart membrane. This can periodically complement the removal of foulants trapped inside membrane pore that may not be reached by the *in situ* enzymatic foulant degradation. In addition to membrane fouling control, most industrial operations release huge volume of wastewater within short period of time. She investigated and optimized forward osmosis process as a potential membrane contactor process that can be used to reduce the total processable volume while recovering and concentrating biophenolic compounds. Ultimately, an efficient integrated membrane process based on assessment of the above mentioned novel and traditional membrane processes was developed.

This research has recently received EFCE-EMS Joint Excellence Award in Membrane Engineering 2018, Valencia, Spain during Euromembrane2018. https://efce.info/efce_media/-p-3740-EGOTEC-23eee0a1b1af001711964ecf654244e1.pdf

These research activities were carried out at three different universities: University of Calabria/ITM-CNR under the supervision of Dr. Giorno and Dr. Curcio, KU Lueven under the supervision of Prof. Vankelecom and University of Paul Sabatier, Toulouse III under the supervision of Prof. Aimar. Working at the three universities, which have specialized in diverse fields, gave her the great opportunity to learn multidisciplinary approaches on membrane preparation, characterization, modification and operation.

It is in her firm belief that participating in a multidisciplinary and multicultural European PhD program and postdoctoral activities that requires a number of flexibility and adjustments has enriched her with an immense capability in team work and fostered her ability to collaborate with multidisciplinary-multinational researchers. This was a great input to both her personal and professional strength that helped her to be more flexible and open towards other people and their ideas which is a prerequisite for an effective team work player.

In the future, using the strong background she acquired together with her experience in the area of process intensification using advanced technologies, she is hoping to highly and inimitably motivated to be actively involved in the introduction of Membrane Technology in an African perspective for sustainable development.

List of Significant publications by Dr Gebreyohannes

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FLAT MEMBRANES TESTING BENCH FOR WATER FILTRATION AND DESALINATION

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Algeria, as other southern Mediterranean countries, suffers from the water shortage that will worsen in the coming years. To deal with this problem, the Algerian government has launched a huge desalination program to build 13 desalination plants in several regions of northern Algeria and even in the south for the treatment of brackish water. Reverse osmosis membrane technology currently dominates the industry of desalination and brackish water treatment in Algeria and in all world countries [1,2].

Our research team "Distillation et dessalement des eaux saumâtres et de mer, (DDESM)", develops new sustainable desalination and distillation processes through innovative membrane systems and the integration of green energies sources for drinking water production. Our research areas include membrane synthesis, test and characterization using several organic materials, use of photovoltaic and thermal energies and developing new prototypes for distillation and desalination of seawater, brackish and polluted water.

The flat membranes test prototype is realized at the UDES -Bousmail research unit, this system is composed of high-pressure pump and a cell to test flat membranes developed at our laboratory using different organic materials. The used cell is a circular stainless-steel system which can be used to test flat membranes on small water volumes for ultrafiltration (UF), microfiltration (MF), nanofiltration (NF) and reverse osmosis (RO) technologies, to compare directly and precisely the performance parameters of these membranes.

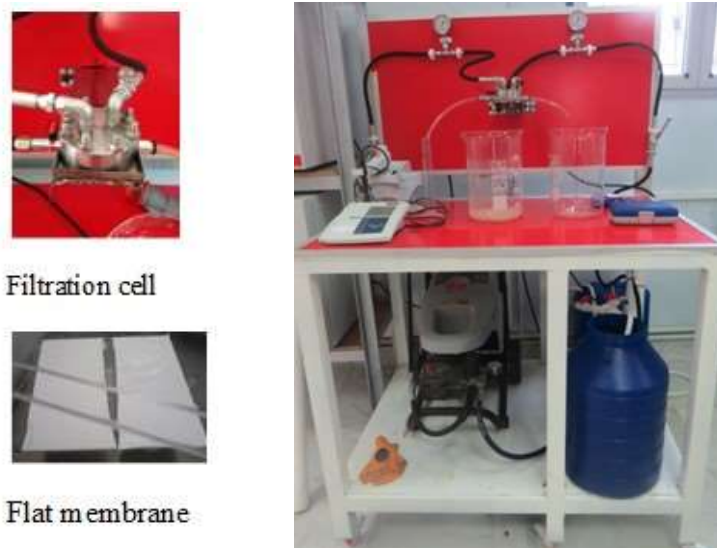


Figure.1. Flat membranes testing Bench for water filtration and desalination (DDESM /UDES 2018).

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**Report for the 2nd African Membrane Society
International Congress (AMSIC-2) 2018**



hosted by

**The University of South Africa College of Science, Engineering and Technology
Florida, South Africa**

On

29 July – 1 August 2018

**“Inventing a better future filled with knowledge sharing,
economic growth and prosperity in Africa using membrane
and filtration technologies”**

*UNISA
Science Campus
Florida Park*

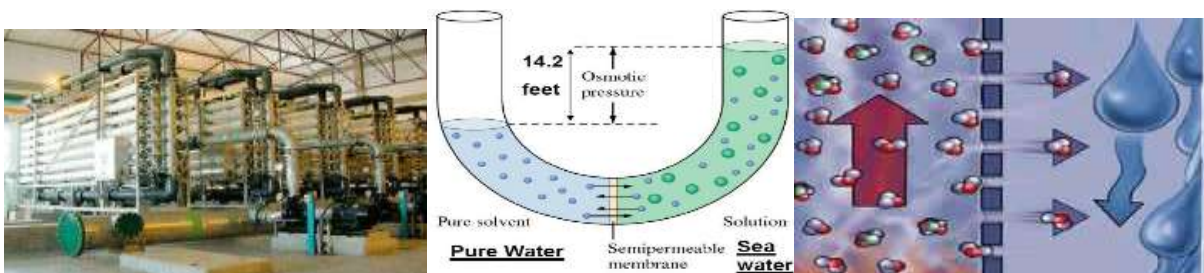
*Edward Nxumalo
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The 2nd African Membrane Society International Congress (AMSIC-2) was hosted by The University of South Africa (UNISA), College of Science, Engineering and Technology Florida, South Africa on 29 July – 1 August 2018 at UNISA. The congress was officially opened by Professor Thenjiwe Meyiwa, Vice-Principal: Research, Postgraduate Studies, Innovation and Commercialisation. This International Congress captured key technological advances in fields heavily dependent on membrane filtration systems such as water, air quality, biomedical sciences, microelectronics, biopharmaceuticals, chemical manufacturing, energy mining, oil, gas and power generation.

From an educational perspective, this meeting reviewed new synthetic routes for membranes and novel processes for the formation of filtering materials. It reflected on new approaches of merging academic and industrial research together without compromising the quest for basic scientific advances. Stumbling blocks to optimal performance of new membrane technologies and their mitigation strategies were also addressed on the basis of the chemistry of membrane materials.

From a socio-economic viewpoint, AMSIC-2 determined how filtration technologies can tackle more effectively practical challenges associated with better access to clean water, improved air quality, the processing of industrial and biopharmaceutical fluids in the African context. This was addressed by adopting environmentally friendly practices, and improved healthcare and patient protection.

The theme of the conference was therefore dubbed “*inventing a better future filled with knowledge sharing, economic growth and prosperity in Africa using membrane and filtration technologies*”.



2. Attendance

The AMSIC-2 hosted by the Nanotechnology and Water Sustainability Research Unit (NanoWS), College of Science, Engineering and Technology at UNISA was a 4-day full conference attended by approximately 150 delegates from over 17 different countries located in various parts of the world. Countries that participated included South Africa, Algeria, Saudi Arabia, Tunisia, Niger, Kuwait, Czech Republic, United States of America, Germany, Belgium, France, Italy, Australia, China, Singapore, Malaysia, Iran and the United Kingdom.



Figure 1 A section of AMSIC-2 conference delegates



Amongst the delegates that were in attendance, were 4 plenary speakers, 6 keynote speakers and 3 invited speakers; whom all have expert knowledge and experience in the field of membrane science, technology and processing.

2.1. Plenary and keynote speakers

The plenary speakers included:

- Professor Glenn Lipscomb, from the University of Toledo in the USA, gave the opening lecture and educated the audience about a field in membrane technology that is often paid less attention to, which is spacers for spiral wound modules,
- Professor Jas Pas Badyal from Durham University, in the UK, who gave a plenary talk on scalable smart surfaces for water harvesting and purification,
- Professor Jianxin Li from Tianjin Polytechnic University in China, who gave an insightful talk on recent developments in membranes for water treatment and industrial separation,
- Dr. Mihail Barboiu from “Institut Européen des Membranes, Université de Montpellier” who delivered a talk on Rubbery organic frameworks-molecular control of CO₂ capture with elastomeric membranes and
- Professor Rong Wang, from Nanyang Technological University (NTU) in Singapore gave the closing plenary lecture based on the development of novel membranes for desalination and water reuse.

Keynote speakers included the following:

- Professor Raja Ben Amar (from University of Sfax in Tunisia),
- Professor Mamadou Diallo Professor (from California Institute of Technology and AquaNano in USA),
- Dr Abdoulaye (Ablo) Doucouré (from Hollingsworth & Vose in the USA),
- Professor Woei-Jye Lau (from Universiti Teknologi Malaysia, in Malaysia),
- Professor Lingam Pillay (from Stellenbosch University, in South Africa) and
- Professor Mathias Ulbricht (from Universität Duisburg-Essen, in Germany).

The 3 invited speakers at the conference were

- Professor Chris Buckley (from the University of KwaZulu Natal, South Africa),
- Professor André Deratani (from the University of Montpellier, in France) and
- Dr Richard Moutloali (from the University of Johannesburg, South Africa).



Figure 2 Plenary and keynote speakers from L to R: Prof YuZhong Zhang, Prof Jas Pal Badyal, Prof Jianxin Li, NanoWS director Dr L. De Kock, CSET dean Prof Bhekie Mamba, African Membrane Society president Dr Abdoulaye Doucouré, Prof Rong Wang, Prof Mamadou Diallo, Prof Glenn Lipscomb, Prof Mathias Ulbricht, and Prof Lingam Pillay - at Moyo Zoo lake.

2.2. AMSIC-2 South African delegates

There were over 80 delegates from South Africa, representing various academic institutions (including UNISA, University of Johannesburg, Stellenbosch University, Tshwane University of Technology, University of KwaZulu Natal and University of the Witwatersrand and University of Western Cape), research centres (such CSIR and Mintek) and industries (Rand Water, Sasol, Anton Paar, Air Products SA, SAFIC and Ion Exchange).

Universities	Research Centres	Industry
University of South Africa	CSIR	Rand Water
University of Johannesburg	Mintek	Sasol
Stellenbosch University		Anton Paar
Tshwane University of Technology		Air Products SA
University of KwaZulu Natala		SAFIC
University of Western Cape		Ion Exchange
University of the Witwatersrand		

3. In overall, the conference covered in its entirety, the membrane synthesis and application work that is undertaken world-wide through the representation of delegates that attended and came from all parts of the world. Conference Assistants' Report

To facilitate the activities of the conference and ensure that the technicalities and the program were run smoothly, a team of assistants consisting of about 15 students, 2 postdoctoral fellows and 2 staff members from NanoWS research unit, was put together. Each assistant was placed in a group where specific tasks were assigned to each group. These tasks ranged from pre-conference activities, to assisting during the conference and post-conference activities. These activities generally consisted of preparing the conference venues, giving technical assistance to presenters and session chairs, making delegates feel welcome and comfortable throughout the conference and assisting delegates to swiftly transition between sessions without losing much time or getting lost.

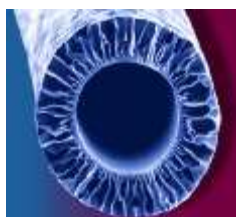
Specific chores began on the 28th of August 2018 with the postdoctoral fellows and staff members had to meet and greet the plenary and keynote speakers and introduce them to shuttle drivers who were tasked with taking them to their hotels. On Sunday, the 29th of August different groups of the team packed conference bags, set up the registration table, tested microphones and projectors in all conference venues. Another group put up poster stands, posters and directional signs all around the UNISA campus to ensure that delegates could find their way to the conference venues throughout the conference.

The activities or chores for subsequent conference days (30th of July to the 4th of August) included:

- (i) Uploading talks in the laptops and assisting speakers with using the pointer,
- (ii) Circulation of microphones in each session (a minimum of two students had to be present per session),
- (iii) accompanying delegates to the lunch/exhibition venue and,
- (iv) driving of plenary/keynote speakers/ some delegates to their respective hotel should a need arise.

This team of assistants were working hand-in-hand with the conference secretariat, Ms Thereza Botha, who remained at the registration table at all times, to ensure that delegates were getting all the information that they needed, at all times, with regards to conference activities. The NanoWS research administrator, Ms Gcinaphi Shabalala, and project secretary, Ms Kamogelo Musi assisted with designing, typing and printing of directional signs. The marketing office personnel assisted with the procurement and installation of conference banners.

We wish to thank for the following students, postdocs and staff members for the assistance that they provided during the conference: Dr Adolph Muleja, Dr Machawe Motsa, Dr Usisipho Feleni, Dr Ntuthuko Hlongwa, Brian Chabalala, Sithembela Zikalala, Rapelang Patala, Ellen Kwenda, Charmaine Tshangana, Sebatso Maifadi, Diseko Boikanyo, Seadimo Mojaki, Mookgo Mofokeng, Kgaugelo "Smiley" Mabape, Terrance Malatjie, William Moloto, Pfano Tsindane and Nozipho Gumbi.



4. Exhibition and sponsorship

Leading international manufacturers, suppliers and service providers presented their latest products and services in the extensive exhibition and demonstration area. The conference was graced by an exhibition from various companies who showcased their offerings in the Exhibition Hall.

- Yantairfilters Inc. (Yantair) representatives were showcasing the great work they are doing in the field of air filtration. Yantair is a US subsidiary of Yantair Co. Ltd in China. The company holds the leading position in the Chinese domestic air filter industry.
- Anton Paar who were displaying their latest material characterization technologies. They were also offering advice to delegates who were having challenges with equipment that had been supplied by Anton Paar.
- Aerfil demonstrated recent state-of-the-art air filtration systems.
- Science week: various department at UNISA showcased their courses, products and research activities at the Exhibition Hall.

Each of the exhibitors was allocated a stand in the Old Call centre and link area to maximise their exposure to the conference delegates.

AMSIC-2 had various sponsors including UNISA College Research Committee, NanoWS Research Unit. Others sponsors included Anton Paar, Institut Européen des Membranes, ANATECH, European Membrane Society, Ion Exchange Satic, Air Products and Mercedes Benz.





Figure 3 Participants at coffee-break, from L to R: Andrea Carletto, Dr Rachida Chemini, Prof Jas Pal Badyal, Dr Ludovic Dumée, Dr Abdoulaye Doucouré, Prof Raja Ben Amar

5. Technical & Social Programme and Workshops

Topics that were covered at AMSIC-2 include the following:

Ultrafiltration, Nanofiltration, Reverse Osmosis	Pressure Retarded Osmosis, Forward Osmosis and Mixed Matrix Membranes	Composites, Nanocomposites, Nanomaterials for Filtration
Fabrication and Modification of Ceramic, Ceramic-Polymeric and Hollow Fibre Membranes	Membrane Fouling and Mechanisms, Hybrid Membrane Filtration Systems	Pervaporation and Vapor Separation
Catalytic Membranes and Membrane Reactors/Bioreactors	Membranes for Biofuel Applications and Sustainability	Biomedical and Bio-separations Gas Separation Processes and Air Filtration
Advanced Pre-Filtration and Depth Filter Materials	Internet of Filtration Systems and Smart Materials	Socio-Economic and Environmental Issues Crucial in Membrane Technologies
Membranes for Sensing and Electrochemical Applications	Modeling/Theoretical Tools for Membrane Formation and Transport Phenomena	

Training Workshops

Two workshops were conducted during the conference:

5.1. Introduction to Air Filters

Date: 31 July 2018

Venue: GJ 301, UNISA Science Campus, Florida Park, Johannesburg

This was a half day workshop conducted by Dr Vijayakumar from Aerfil discussing the latest developments in the manufacture of air filters. Participants were introduced to the need for air filtration and opportunities in air filtration technology owing to the high levels of air pollution worldwide. The instructor described how the removal of airborne pollutants could be optimized and influenced by the type of selected filter materials (wetlaid paper, microfiber glass or airlaid polymer fiberweb) and their porous structure. The facilitator also demonstrated air filter design strategies to enable easy cleaning and longevity of the filtration products.

The workshop was attended by approximately 15 conference participants comprising of both students and researchers. Participants were given smart compass keyholders and pens for participating in the workshop. Catering for the participants was covered by the conference catering since the workshop was run in conjunction with the conference.

5.2. Membrane Technology for Water, Environment and Energy Applications

Date: 3-4 August 2018

Venue: GJ 301, UNISA Science Campus, Florida Park, Johannesburg

This was a 2-day specialized training workshop facilitated by Dr Lau Woei Jye and his colleagues – Dr Hasrinah Hasbullah and Dr Goh Pei Sean for postgraduate students and staff who attended the AMSIC-2 conference. The facilitators were from the Advanced Membrane Technology Research Centre (AMTEC) of Universiti Teknologi Malaysia; one of the top research centres in the world focusing on the development of membrane process for various applications. The workshop addressed key aspects of membrane formation and testing methods, explored the design and properties of standard filtration modules, and covered several membrane-based applications including water and wastewater treatment, gas separation, and fuel cell membrane technologies. Dr Lau is the appointed member for African Membrane Society (AMS) and the only member from Asia. It is always the aim of our society to have more collaboration with the scientists from Asian countries. The workshop preparations were done by the AMSIC-2 organizing committee. UTM instructors were visiting Africa for the first time and expressed strong interest to return to the continent and engage in educational and research collaborations with their peers.



Figure 4 Group of participants and facilitators in the Membrane Technology for Water, Environment and Energy Applications workshop

The technical expertise of the researchers was of great benefit to the African researchers, particularly postgraduate students who are working on similar field. The UNISA Science Campus supported the 2-day event by offering the training venue with necessary facilities to Dr Lau and his team. The training materials and meals provided during the workshop were sponsored by the Islamic Development Bank and Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia. Approximately 35 postgraduate students and staff members attended the workshop and were issued with certificates of attendance and gifts after completing the training.

Social programme

The opening ceremony and dinner were successful, and this was a great opportunity to socialise with the delegates. Some of the pictures are included below.



Figure 5 Prof Bhekhe B. Mamba (podium) and guests at Moyo Restaurant Zoo Lake

6. Impact of the Conference

- Various researchers spoke on various topics benefiting various workers in the field of membrane science and technology.
- Training workshops were rich in content and were offered by experts. All attendants were awarded certificates of attendance.
- Top academic scholars visited UNISA
- An excellent opportunity for showcasing our campus and infrastructure
- An excellent Networking opportunity for new collaborations and partnerships.
- Students had an opportunity to meet and interact with top academics in the field of membrane technologies
- Delegates had an opportunity to join the AMS and new South African Membrane Society
- Delegates interacted with exhibitors and expositors, government and industry.
- Science week celebration held at the same venue and time creating a great opportunity to showcase UNISA offerings to world experts.
- Opportunity to publish papers in the Journal of Membrane Science and Research.
- Conference impact was discussed in an article published on the UNISA website
- Conference progress and the role played by UNISA was widely covered on social media platforms including Facebook and twitter
- Lively AMSIC-2 opening by traditional poets showcasing South Africa rich educational history; enjoyable excursions and memorable culinary experiences in a way to commemorate the 145th anniversary of UNISA.

7. African Membrane Society (AMSIC) involvement

- In spite of a limited physical presence 5 Board members (president, vice president and 3 directors) and 6 members attended the congress (Malaysia, Niger, South Africa and Tunisia)
- Invited plenary and keynote speakers and presented during the keynotes
- invited industrial and academic sponsors
- Liaised with workshop instructors and contributed to the training sessions
- Sponsored prizes for the AMSIC-2 poster session
- Created AMSIC-2 webpage working in tandem with Executive Committee
- Managed EasyChair platform for paper/abstract collection
- Directs paper submission steps through Journal Membrane Science & Research
- Responsible for AMSIC-2 proceeding publication.

8. Challenges

- Few African Membrane Society members
- Workshop needed more delegates
- Some payments not made on time
- Not many exhibitors and expositors attended the tradeshow.
- Post gala (next day) morning session started too early.
- No advertising about AMSIC-3 (hosts and location not known yet).

9. Conference Awards

A panel of judges consisting of senior researchers was selected from among the delegates to assess oral and poster presentations for student presenters. Awards were given to three students in each category; best, runner up and second runner up. Each winner was awarded with a certificate and a monetary award as detailed in Table 1 for the awards were as follows.

Table 1 Monetary awards given to winner students

Position	Poster presentation	Oral presentation
1.	Ms Khona Maziya	Ms Nozipho Gumbi
2.	Ms Sarre Kadia Nzaba	Ms Mr Kate Kothlao
3.	Mr Francois Mathee	Christopher Chukwuati



Figure 6 The six Award Winners in the oral and poster presentations holding certificates (from L to R: C. Chukwuati, S.K. Nzaba, K. Kothlao, F. Mathee, K. Maziya, and N. Gumbi) with the CSET Dean, judges, AMSIC-2 conference chair and African Membrane Society president.

10. Conclusion

The conference was a resounding success.

Various positive feedback messages from delegates have been received.

Next hosts of amsic-3 will be announced in the next few months.



Figure 7 AMSIC-2 participants (main auditorium) during the Opening Ceremony.

11. Acknowledgements

We would like to thank the following:

All committees of AMSIC-2

CSET Executive DEAN of CSET, Prof BB Mamba

VP, Prof Thenjiwe Meyiwa

AMS Board

Technoscene

Sponsors and Exhibitors

NanoWS Research Unit and its Director, Dr de Kock

UNISA's Marketing & Communication Department

Administrative team

Guest speakers

All delegates

Photographer and videographer

Moyo Zoo Lake

Roodepoort Theatre

Our partner's corner

G. Glenn Lipscomb
Professor and Chair
The University of Toledo
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Impressions of the Second African Membrane Society International Congress

The Second African Membrane Society International Congress (AMSIC-2) was held July 29 – August 1, 2018 in Johannesburg, South Africa. The meeting, hosted by the University of South Africa (UNISA) on their Science Campus in Florida, follows the successful first meeting in Tunisia in 2016 and hopefully will be a recurring event for the global membrane community.

As chair of AMSIC-2, Professor Edward Nxumalo assembled an outstanding team in the Executive Organizing and Scientific Committees that made the meeting an exciting success. The meeting also would not have been possible without the support of Professor Mandla Makhanya, UNISA Principal and Vice-Chancellor, in obtaining access to the facilities on the Science Campus and the support of Professor Bhekie Mamba, Executive Dean of UNISA's College of Science, Engineering, and Technology, in securing sponsorship from a diverse group of industry, government, and academic sources.

The African Membrane Society board also invited some of the plenary/keynote speakers and helped organize the training sessions by Dr R. Vijayakumar (AERFIL, USA) for an introductory workshop on air filtration, and by Professor Woei-Jye Lau with two other faculty members (Universiti Teknologi Malaysia) for a two-day course on membrane technologies and their applications.

The trip was my first to the African continent - one that was an amazing technical and cultural experience. The Plenary Speakers provided insights into the state of the art in membrane science and engineering from around the world. Professor Rong Wang (Nanyang Technological University, Singapore) explored the diverse approaches her group has pioneered in developing novel membranes for desalination and water reuse. Water treatment also was focus of two other speakers: Professor Jianxin Li (Tianjin Polytechnic University, China) who described his impressive research program in membrane technology and Professor Jas Pal Badyal who discussed his remarkable new materials for water harvesting and described efforts to bring water treatment technology to developing areas of the world. The use of membranes for water treatment is expected to grow as the world's population increases and greenhouse gas emissions potentially lead to climate changes that affect rainfall. The Plenary Talks were rounded out by a presentation from Professor Mihail Barboiu (Institut Européen des Membranes, France) on the development of intriguing rubbery organic framework membranes for carbon dioxide capture.

The theme of water treatment carried over into the oral presentations. I found several presentations of great interest. Mr. Christopher Chukwuati (University of Johannesburg, South Africa) reported on unique PES/GO/PEI/Ag nanocomposite membranes for heavy dye and metal removal from water while Ms. Nozipho Gumbi (University of South Africa, South Africa) reported the development of novel macrovoid free PES/SPSf/MWCNT ultrafiltration membranes with enhanced antifouling and mechanical properties. Both graduate students were recognized for their outstanding presentations – Ms. Gumbi received the first-place prize

while Mr. Chukwuati received the third-place prize. Professor Lingam Pillay's (University of Stellenbosch, South Africa) presentation on his group's efforts to provide membrane systems for developing economies also was well received. His commitment to help enable access to clean water throughout Africa was applauded by the audience.

I found the student poster session to be the most rewarding portion of the meeting. As a poster judge, I talked with each presenter about their work. The quality of the students' research was impressive and made decisions about the top presentations difficult. Congratulations are richly due for the winners: 1st - Khona Maziya (University of Johannesburg), 2nd - Myra Sarre Nazaba (UNISA), and 3rd - Francois Matthee, (University of the Western Cape).

The meeting organizers provided ample opportunity to explore South African culture. Attendees had opportunities to sightsee in Johannesburg and Soweto, visit the Apartheid Museum, visit Maropeng, and tour the Sterkfontein Caves. I visited Maropeng and the Sterkfontein Caves and found being in the Cradle of Humankind a moving experience. It also was memorable to visit South Africa shortly after the celebration of Nelson Mandela's 100th birthday. The conference banquet at the Moyo Restaurant adjacent to the Zoo Lake provided the perfect conclusion to the meeting as attendees dined and danced to the music of the UNISA Jazz Band.

I believe AMSIC-2 left strong impressions on attendees. The quality of the membrane research in Africa is manifestly evident. While the work of Professor Ronald Sanderson firmly established South Africa as a center of innovation, the research reported at AMSIC-2 indicates the activity has grown and expanded. The commitment of UNISA to this area through formation of the Nanotechnology and Water Sustainability Research Unit will further enhance the influence of Africa in the membrane community. It also is evident that strong ties have been developed between Africa and myriad international partners. Such collaboration will benefit all in the creation and commercialization of membrane technology.

The African and North American Membrane Societies have an opportunity to strengthen their collaboration. Mutual attendance at each society's meeting is the first step. Discussions between the leadership of both societies would help identify other opportunities. Options include: 1) special sessions at society meetings, 2) conduct of mutual workshops, and 3) pursuit of funding for technical exchanges between researchers. By working together, we will be in a better position to address the challenges that exist in providing food, energy, and water for people around the world.

PES/GO/PEI/Ag: Polyethersulfone/ Graphene Oxide/ Polyetherimide/Silver

PES/SPSF/MWCNT: Polyethersulfone / Sulfonated Polysulfone/ Multiwall Carbon Nanotubes