



AMSIC Newsletter

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AMSIC Newsletter

Submissions

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

Sidy.Ba@USherbrooke.ca

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

Editorial notes

by

Abdoulaye Doucoure
President of AMSIC



AMSIC invites the world filtration community to Africa: Dakar, Senegal November 3-6th, 2020

The prevalence of socio-economic disparity across the globe has reached a level triggering intense debates among key stakeholders from the government and policy-making branches, research and higher education circles, and community advocacy groups. To complicate matters, fixing the uneven distribution of wealth must account for other pressing challenges reflected by weather instabilities and climate change, fast-expanding demographics in some regions, shrinking agricultural landscapes, or weaker ecological systems. For Africa, moving to an era of industrialization offers some attractive opportunities to most effectively support several vital and basic needs from its citizens – i.e. 1.2 billion inhabitants, with 45% of them living in urban centers. With a population expected to double by 2050 and a limited contribution to the global fossil fuel consumption, the continent will have to build its industrial infrastructure by finely balancing two strategies: a) advocating for more relaxed constraints related to CO₂ emissions control; b) promoting sustainable innovation and implementing environment-friendly technological solutions. The 3rd African Membrane Society Congress seeks to examine how filtration and energy experts can advance sustainable development agendas benefiting both urban centers and small isolated communities. Specifically, activities subsequently highlighted are the cornerstone of AMSIC strategy to encourage durable changes in synergy with local residents and respectful of the environment:

The International Water Association and AMSIC will join forces to host IWA Regional Membrane Technology Conference (7th ed.) to be held for the first time on the African continent. Multiple sessions will be scheduled reflecting the conference theme Membrane Technology for a Sustainable World. This news will be disseminated by IWA networks very soon.

Air Filtration & Quality: with 92% of the world population living in areas where World Health Organization air quality guidelines are not met, AMSIC intends to prioritize issues of air filtration, air quality in its technical programs and to treat nonwoven/fiber materials sciences as an integral component of the membrane science disciplines. Experts from the nonwoven community will prepare “air tutorials” during AMSIC-3. Other technical contributors will engage in a conference, educate and share data on nonwoven materials utilized for indoor air filtration and ambient air treatment.

Exposition and Technician workshop: there are numerous ways to create conditions favorable to build an industrial infrastructure, which for Africa, will help alleviate vital needs and close socio-economic gaps. Our network seeks to play an active role by supporting a commercial exposition bringing together local and international exhibitors from the filtration and energy industries. Another key project aims to create training certificates for technicians with a strong focus on hands-on competencies. Our goal is to start a couple of multi-national projects in Africa by 2021. AMSIC-3 plans to host a Question/Answer round table session on the final proposal and debate on the next steps.

AMS activities and news

AMSIC members attending a conference call with the World Association of Membrane Societies (WAMS), September 2019

On Sep 27, 2019, the world association of membrane societies (WA-MS) working group Education had its first meeting through skype. AMSIC was represented by myself (Abaynesh), Rachida and Ablo. The meeting was chaired by Prof. Bart Van der Bruggen (KU Leuven). There were about 15 people who joined this meeting representing AMSIC (Dr. Ablo, Dr. Abaynesh and Dr. Rachida), NAMS (Prof. Ranil Wickramasinghe), EMS (Prof. Drioli), Singapore, Belgium (Dr. Arnout D'Haese), Dutch (Prof. Antoine Kemperman and Prof. Yvonne van Delft) etc.

AMSIC presented its progress in this Membrane Education project. Thanks to its actively engaged members, we have been able to collect some interesting data by setting-up a survey (15 questions) disseminated to members from the five regions of Africa. Outcome of the survey is under review and will be presented in October. AMSIC stressed that many universities in Africa are faced with an overwhelming number of undergraduate students and teaching conditions are increasingly challenging. Moreover, there aren't enough professional high schools and associate-level programs training technicians. AMSIC members are actively seeking to start basic curricula targeting the training of professional technicians. These students should be able to build/assemble equipment, fix broken parts, and maintain machineries in public or private labs. 2/ Further, online teach courses need to be adopted due to the limited hosting capacity of the school infrastructure.

Priorities of this call were to introduce members and to define the overall objective of our working groups.

Success Teach stories such as Membrane courses by UTwente (Netherlands) and the European doctorate and master degree in membrane Engineering (EM3E and EUDIME) were mentioned.

The group acknowledged the existence of gaps in membrane education in all regions of the world including the US and Europe and the following strategies were suggested:

- Expand the number of doctorate schools focused on Membranes
- Expand the number of Master's program focused on Membranes
- Presentations in none-membrane related international conferences
- Approach universities (departments) to provide courses.
- Open Membrane Centers like the Middle East (KAUST, MEDREC)
- Teach membrane topics at every education level like China and India.
- Approach politicians.

For some countries/continents bottom up like provide course, slowly advertise and this may grow to higher levels.

Bright hopes:

In the 2019 Chemical Engineering annual meeting about 12% out of 1100 presentations had membrane in their title, and many others who used membrane as part of their overall process scheme. This shows evidence of the big role that membranes currently play and will play.

ACTION:

With this, WA-MS president Bart invited all to continue actively participating in providing the necessary information and to create a repository of training courses across the world, focusing on membrane science and technology (MSc level) at universities in countries represented by your society (title, size, programs where they are taught and summary). Share this information by 31 October.

The next meeting may take place around the second half of November; Ranil (NAMS) will take the initiative to set a date and time.

Abaynesh Yihdego Gebreyohannes (Dr. Eng)

Biological and Environmental Science and Engineering
King Abdullah University of Science and Technology

AMSIC SPOTLIGHTS

The congress is chaired by Courfia DIAWARA, professor of Chemistry and Rector of the *University Assane Seck of Ziguinchor* in *Sénégal*. In his role, Courfia oversees all assignments undertaken by AMSIC-3 Executive Committee, which includes several members of AMSIC network:

Mady CISSE, Food Science professor and AMSIC General Secretary and Study Director at *Ecole Supérieure Polytechnique de Dakar*;

Cheikhou KANE, professor of Chemical Engineering at *University Cheikh Anta DIOP of Dakar*.



Pr Courfia K. DIAWARA (center) with Pr Ali AOUABED (Left) and Pr Roger BEN AIM (Right) at the inaugural session of Francofilt-2 in TUNISIA (city of Hammamet), on Sept. 23, 2019

The country of Senegal, located on the West coast of Africa, will host the African Membrane Society 3rd international congress in its capital city, Dakar from November 3rd to 6th, 2019



Pr Courfia K. DIAWARA (center) with Pr Ali AOUABED (Left) and Pr Roger BEN AIM (Right) at the inaugural ceremony of Francofilt-2 in TUNISIA (Hammamet), on Sept. 23, 2019



Prof Raja R. BEN AMAR , Vice-President of AMSIC was interviewed on November 7th by ICARDA, an international research organization that seeks to improve livelihood in dry areas <https://www.icarda.org/about-us>

This YouTube video (in French):

<https://www.youtube.com/watch?v=AkEOI0XwgP4&feature=youtu.be>

shows Raja discussing:

- Economic and geographic water scarcity in Africa;
- Membrane and filtration technologies for desalination and the supply of agricultural water;
- Growing industry-academe partnerships on the continent;
- Presentation of the African Membranes Societies, its activities (AMSIC-1, 2, 3 etc.) and key partners.

CONGRATULATIONS TO RAJA FOR HER COMMITMENT TO PROMOTE MEMBRANE & FILTRATION TECHNOLOGIES IN AFRICA, ACROSS THE GLOBE AND FOR HER DEDICATION TO AMSIC!

Prof. Raja R. BEN AMAR is Head of Department of Chemistry (Laboratory of Materials Science & Environment), University of Sfax, Tunisia,

"Wastewater management improvement in the unamid headquarter in central Darfur, Zalingei, Sudan"



During Francofilt-2, our colleague Soumana GAGARA (Zou), gave a presentation on the aforementioned topic.

United Nation field personnel, like Zou, are tasked to install wastewater treatment systems for UN personnel and the local communities (in Sudan) affected by pressing instabilities. They need to do it while protecting the environment and making sure that UN installations do not severely affect the local ecosystems.

Soumana's presentation highlighted the best practices that he implemented by:

- Installing 6 water treatment plants (via membrane technologies);
- Reducing the number of malaria cases;
- Upgrading sanitary facilities;
- Developing drip water irrigation systems to support local communities.

Last week Zou presented his Francofilt-2 to many United Nation colleagues living across the globe and his work was highly praised by his peers and supervisors.

Please join me in congratulating Zou for being acknowledged by his peers and for his significant contribution aimed to improve people's living conditions on the continent.

His contacts:

African Union - United Nations Hybrid Operations

Mission in Darfur, Sudan.

Email: sgagara@gmail.com

Young researchers



Dr. Onoriode Paul Avbenake

Lecturer

Chemical and Petroleum Engineering Department
Bayero University, Kano, Nigeria

My name is Onoriode Paul Avbenake a lecturer in Chemical and Petroleum Engineering Department Bayero University, Kano, Nigeria and a member of the African Membrane Society since 2013. Prior to my appointment in 2016 I was a PhD student in Chemical Engineering Department Ahmadu Bello University, Zaria, Nigeria. My research interest was Catalysis, specifically,

heavy crude oil/bitumen upgrading using metal catalysts. This piece is a recount of my experience and challenges during the course of the program as a result of low research budgeting in the African continent.

My work required a high temperature and pressure batch autoclave for the pyrolysis reaction as well as SEM (with EDX) and TGA for the catalysts characterization and Viscometer (with SSA and temperature control), API Gravity meter, XRF, CHNS, FT-IR, GC-FID (calibrated with n-Alkanes standard), GC (with gaseous feed) to name a few for crude oil/bitumen characterization. Admittedly, about 90% of these are unavailable so I had to secure a 7-month bench work stint at Sultan Qaboos University, Oman immediately after my admission in April 2015. Upon arrival in October I had completed the first phase of the work by synthesizing suitable bi-metallic catalysts on oxide support and testing same with Omani heavy crude oil. The second phase was to upgrade Nigerian oilsand (Bitumen) and this is the genesis of my African experience/challenges.

I want to digress a moment to discuss issues that underpins the topic at hand. Firstly, 98% of PhD students in Nigeria are self-sponsored because the largest funding body PTDF is specific to fossil fuel and renewable energy courses and the scholarship award is a single sum of \$2,000. Having said that, the major setback is its competitiveness marred with nepotism and 'Federal Character' (a policy where some regions are saddled with higher cut-off point than others, that is, a potential awardee with a very high point in some regions could be denied the scholarship whereas, their counterpart with extremely low point in other regions would be awarded considering only 5 slots are allotted to each state). Secondly, most institutions have compulsory 2 semester courses of approximately 18 units as graduation requirement for students with M.Sc. Thirdly, they are not subscribed to publishing giants like Elsevier, ACS, Wiley, etc so access to literature is extremely limited. And finally, lack of equipment and analytical tools for smooth research.

Based on the foregoing, my second year was fraught with attending PhD classes, lecturing in a different institution to get by financially, scout for available reactor and analytical equipment within the country and prepare the first phase results for publication which was eventually published in Elsevier's Fuel journal in 2018 and a second part was accepted for presentation in SPE's Heavy Oil conference in Kuwait. This earned me an invite to contribute a book chapter to be published by Elsevier currently under review.

Meanwhile, the search brought back few analytical equipment like FT-IR, Viscometer (without SSA and temperature control), CHNS and GC-MS scattered in different institutions around the country but no reactor. In a bid to be relevant research-wise I entered into an informal collaboration with a research group from Durham University, UK. Their research interest was fog harvesting from biomimetic materials. They provided most of the relevant tools and training to execute the research, we obtained chemicals and glass wares back in Nigeria and the research was going smoothly, even discovered an interesting phenomena over a 3-year period (2016-2018) until we had to conclude our

findings with SEM analysis. I had to venture in another equipment searching rampage where I discovered there are 7 machines in different institutions in Nigeria with 5 currently down and the other 2 were obsolete with back scattering detector (BSD) producing a very unclear image with lots of noise not suitable for publication. Considering we were dealing with biological samples and analysis was required few hours following sample preparation, exporting the samples to their lab in the UK was not an option. Frustrated by lack of SEM, the group pulled out of the collaboration before we stumbled upon a method in January 2019 that could preserve and restore the leaf microstructure for SEM analysis in South Africa.

On the other hand, exasperated by lingering researches my PhD supervisor magnanimously provided funding for the fabrication of a reactor in China, considering research funding is commonly the sole burden of the student in this part of the world. Although, the reactor was incomparable to the Parr® batch reactor I used in Oman, in February 2019 I was fully back to my PhD work while finalizing the fog harvesting research. Unfortunately, reviewers at ACS's Langmuir requested we further fabricate the leaf surface before the manuscript could be accepted for publication, which is impossible in view of the fact that the equipment is not available in Nigeria. However, the work has been presented orally at the 93rd ACS Colloid & Surface Science Symposium, Georgia Tech in Atlanta, GA, USA in June 2019 and poster at the 18th European Conference on Application of Surface and Interface Analysis, Dresden, Germany in September 2019.

Currently I am compiling my PhD research work for final presentation at my institution after toiling for nearly 5 years. From the foregoing I usually tell my colleagues that PhD in Africa is beyond just the research unlike what is obtainable in other continents where a candidate has access to a monthly stipend and all the equipment and analytical tools are available in their lab or within reach. Precisely in Nigeria, it entails the daily rigour of making ends meet, the tireless search for the few research equipment available in various institutions scattered over the country, accruing funds for conducting analysis outside the country/continent for samples that are exportable and ultimately the mental engagement that comes with the research whose objectives have already been cut-down by insufficient research/analytical equipment compelling the researcher to consider publishing/presenting their work in a local journal/conference limiting access to their research from the global community. Upon successful completion of my degree in 2020 I have already proposed to embark on the project of setting up an equipment and analytical tools repository across the country in the Centre for Applied Research and Separation Science (CAROSS) website to ease access to available equipment for upcoming researchers.

Defense of dissertations under Professor Saad ALAMI YOUNSSI, Director of Laboratory of Materials Membranes and Environment, Faculty of Sciences and Technologies Mohammedia, University Hassan II of Casablanca, Morocco:

Abdelmjid BOAZIZI defended his dissertation on December 01, 2018 on “preparation of TiO₂-based ultrafiltration membrane and ZrO₂-based nanofiltration doped with TiO₂ on a ceramic support for microfiltration in Moroccan bentonite. Application to the filtration of synthetic solutions and industrial effluents”.

Majda Breida defended his dissertation on June 29, 2019 on “Filtration of saline solutions by gamma alumina ultrafiltration and polyamide nanofiltration membranes. Application to water denitrification and heavy metals removal”.



Danielle W. Park

I earned my Bachelor's degree in mechanical engineering from the University of Michigan in 2018. In my undergraduate studies, I became involved in research early on in my first year and explored a variety of research areas including piezoelectric cardiovascular sensors, air quality sensors, and direct contact membrane distillation. During a summer research opportunity at the University of Missouri, I designed and built a direct contact membrane distillation system and used my experimental results to validate numerical models developed by a graduate student I was collaborating with. After co-authoring my first paper with my colleague, I realized that I enjoyed the research process and became excited about the field of sustainability, energy, and water. Because of this experience, I chose to pursue my doctoral studies at the University of Colorado, joining the Bright Research Group in fall 2018 to study membrane fouling in reverse osmosis systems using Raman spectroscopy. I am now in my second year of graduate school and gaining lots of hands-on experience in the lab as well as encountering challenging topics in my courses. Next semester, I hope to take a course in computational fluid dynamics, develop my own predictive models and validate them with experimental data.

This past May, I was at a membrane engineering summit (MAST Center) in Arkansas to provide sponsor updates on my research project. At this meeting, Abdoulaye Doucoure (Ablo) gave a presentation introducing the African Membrane Society, AMSIC. My experience of graduate school has been extremely challenging, both technically and personally. With each discouraging event, it is easy to lose sight of the big picture. As I heard Ablo speak about AMSIC, I felt renewed in my excitement for advocating for sustainability, energy and water for humanity. For this reason, I joined the African Membrane Society—to connect with fellow scientists and engineers who care about the same things I do. If you ever find yourself in Colorado, I would love to grab some coffee and chat about experiences, research, and vision!

Publications

Supekar, O., Park, D., Greenberg, A., Gopinath, J., and Bright, V., 2019, "Real-Time Detection of Early-Stage Calcium Sulfate and Calcium Carbonate Scaling Using Raman Spectroscopy," *Journal of Membrane Science*, p. 117603.

Park, D., Norouzi, E., Park, C. (2019) "Experimentally-validated Computational Simulation of Direct Contact Membrane Distillation Performance." *International Journal of Heat and Mass Transfer*, Vol. 129, pp. 1031-1042

Park, D., Norouzi, E., Park, C. (2017) "Experimental and numerical study of water distillation performance of small-scale direct contact membrane distillation system." *Proceedings of 2017 ASME International Mechanical Engineering Congress & Exposition*, November 3-9, 2017, Tampa, Florida, IMECE2017-72175

2020 CONFERENCES ON MEMBRANES AND FILTRATION**February**

2-6: The 10th International Membrane Science & Technology Conference, Sydney, Australia

<https://www.imstec2020.com/>

14-15: International Conference on Advancements in Membrane Technologies (IMS2020), Chennai (India)

March

16-20: AMTA Membrane Technology Conference & Exposition, Phoenix, AZ, (USA)

<https://www.amtaorg.com/>

April

14-17: MELPRO 2020, Prague (Czech Republic)

<https://www.melpro.cz/>

June

10-12: MEMPRO-7 Membrane Integration in Processes, Montpellier (France)

<http://www.iemm.univ-montp2.fr/spip.php?article776&lang=fr>

29-2:16th International Conference on Inorganic Membranes, ICIM 16, Taipei (Taiwan)

<http://www.icim2020.org/>

July

7-10: Nanofiltration 2020, Reutlingen (Germany)

<http://nanofiltration2020-mt.ifg.kit.edu/index.php>

9-10: Network Young Membrains Meeting 2020, NYM2020, London (UK)

<http://www.icom2020.co.uk/nym.asp>

12-17: International Congress on Membranes & Membrane Processes 2020, ICOM 2020, London (UK)

<http://www.icom2020.co.uk/>

August

2-7: Gordon Conference, New London, NH (USA)

<https://www.grc.org/membranes-materials-and-processes-conference/2020/>

2-8: Eleventh Symposium of the Malian Society of Applied Sciences

(African Membrane Society Mini Symposium), Bamako, (Mali)

<http://msas.ml/bko2020/indexconE.html>

October

7-8: Second International Symposium on Nanomaterials and Membrane Science for Water, Energy and Environment, Tangier, (Morocco)

<http://www.smmmd.ma>

October

20-24:13th World Filtration Congress, WFC13, San Diego, (USA)

<https://wfc13.societyconference.com/v2/>

November

3-6: African Membrane Society 3rd International Congress, Dakar, (Senegal)

www.sam-ptf.com/

3-6:7th IWA, Regional Membrane Technology Conference, Dakar, (Senegal)

www.sam-ptf.com/amsic3/index.html

2020 CONFERENCES ON NONWOVENS, FILTRATION & FLUID PROCESSING APPLICATIONS

AHR Expo (Air-Conditioning, Heating, Refrigeration Exposition)

3–5 February 2020 - Orlando, Florida, USA - <https://ahrexpo.com/about/>

20th African Water Association International Congress and Exhibition

24–27 February 2020 - Kampala, Uganda- <https://www.afwa-hq.org/index.php/en/>

FiltXPO 2020

26–28 February 2020, Chicago, Illinois, USA - <https://www.filtxpo.com/>

Focusing on issues that connect filtration and separation process and product development across many industries.

Mostra Convegno Expocomfort 2020

17–20 March 2020 - Milan, Italy - <https://10times.com/mostra-convegno-expocomfort>

A biennial exhibition for residential and industrial installations, HVAC and renewable energies.

Parenteral Drug Association

March 28– April 1- Raleigh, North Carolina (USA) -

<https://www.pda.org/global-event-calendar/event-detail/2020-pda-annual-meeting>

Enhancing the future with innovative medicines and manufacturing

INDEX

31 March – 3 April 2020 - Geneva, Switzerland - <https://www.indexnonwovens.com/en/>

Exhibition for nonwovens' professionals.

13th World Filtration Congress

20–24 April 2020 - San Diego, California, USA - <https://www.wfc13.com/v2/>

Hannover Messe 2020

20–24 April 2020 - Hannover, Germany - <https://www.hannovermesse.de/en/side-events/conferences/>

Trade fair for industrial technology.

INTERPHEX 2020

28–30 April 2020 New York city, NY, USA - <https://www.interphex.com/>

Exhibition for the pharmaceutical and biotechnology industries.

Techtextil North America

12–14 May 2020 - Atlanta, GA, USA -

<https://techtextil-north-america.us.messefrankfurt.com/us/en.html>

International Trade Fair for Technical Textiles and Nonwovens.

Aquatech China 2020

3–5 June 2020 - Shanghai, China - <https://www.aquatechtrade.com/china/>

International exhibition for process, drinking & wastewater in Asia.

INDOWATER 2020

9–11 June 2020 - Surabaya, Indonesia - <https://indowaste.com/>

Indonesia's water, wastewater and recycling technology event.

AWWA ACE

14–17 June 2020 - Orlando, Florida, USA - <https://www.awwa.org/ace/>
American Water Works Association's Annual Conference & Exposition

Singapore International Water Week (SIWW)

5–9 July 2020 – Singapore - <https://www.siww.com.sg/>

ICOM 2020

12–17 July 2020 - London, UK - <http://www.icom2020.co.uk/>
International Congress on Membranes & Membrane Processes.

SIWI World Water Week

23–28 August 2020 - Stockholm, Sweden - <https://www.worldwaterweek.org/>

ECWAECH international water exhibition

8–10 September 2020 Moscow, Russia - <https://www.ecwatech.ru/en-gb.html>
Water industry show for Russia and Eastern Europe.

BIOPROCESS INTERNATIONAL

21-24 September Raleigh, NC, USA - <https://informaconnect.com/bioprocessinternational/>

RISE 2020 (Research, Innovation & Science for Engineered Fabrics)

29-30 September Raleigh, NC, USA - <https://www.riseconf.net/>

WEFTEC 2020

3–7 October 2020 - New Orleans, Louisiana, USA - <https://weftec.org/now/>
93rd Annual Technical Exhibition & Conference

IDA 2020 International Water Reuse and Recycling Conference

4–6 October 2020 - Rome, Italy
<https://idadesal.org/>

IWA World Water Congress & Exhibition

18 October 2020 – 23 November 2019 - Copenhagen, Denmark - <https://worldwatercongress.org/>

African Membrane Society 3rd International Congress (AMSIC-3)

3-6 November, Dakar, Senegal - <http://www.sam-ptf.com/amsic3/index.html>

2020 CONFERENCES IN AFRICA

20th African Water Association International Congress and Exhibition

24–27 February 2020 - Kampala, Uganda- <https://www.afwa-hq.org/index.php/en/>

Eleventh Symposium of the Malian Society of Applied Sciences (African Membrane Society Mini Symposium)

2–8 August 2020 – Bamako, Mali - <http://msas.ml/bko2020/indexconE.html>

Second International Symposium on Nanomaterials and Membrane Science for Water, Energy and Environment

7–8 October 2020 - Tangier, Morocco - <http://www.smmd.ma>

African Membrane Society 3rd International Congress (AMSIC-3)

3-6 November - Dakar, Senegal - <http://www.sam-ptf.com/amsic3/index.html>