

of Alicante, Spain; Mingyuan He, East China Normal University, China; Ehud Keinan, Technion-Israel Institute of Technology, Israel; Johannes A. Lercher, Technical University of Munich, Germany; Chaojun Li, McGill University, Canada; Martyn Poliakoff, Nottingham University, UK; Li-Zhu Wu, Technical Institute of Physics and Chemistry, CAS, China.

Special recognition must also be given to the organisers of the Conference, in particular Zhimin Liu, Chair of the Organising Committee, and Buxing Han, Chair of the Scientific Committee and Chair of ICGCSD. Their efforts resulted in a highly successful event that provided a platform for experts and young scientists alike to exchange ideas, explore new technologies and strengthen global collaboration.

The Conference underscored its importance by showcasing breakthroughs and fostering discussions that will shape the future of chemistry, and there was no better way to signify this than through the presence of six IUPAC Presidents at the event.

See <https://iupac.org/event/10th-iupac-international-conference-on-green-chemistry/>

Chemistry, a Lever for Sustainable Development of African Countries

by Modou Fall, Matar Seck, and Abdoulaye Dramé

The Senegalese Committee for Chemistry (SCC) organized the FASC I JACS 2024 including the 6th edition of its Annual Days of Chemistry of Senegal (*i.e.* Journées Annuelles de Chimie du Sénégal—JACS) in conjunction with the 9th Assembly General of the Federation of African Societies of Chemistry (FASC) at Radisson Blu Hotel in Dakar on 19-21 November 2024. The conference was themed “Chemistry, A Lever for Sustainable Development of African Countries.” The opening ceremony was presided over by Aminata Niang Diène, Rector of Cheikh Anta Diop University of Dakar (UCAD), on behalf of the Minister of Higher Education, Research and Innovation of Senegal.

FASC aspires to bring together all the chemical societies in Africa. Its objective is to promote the advancement of chemical sciences and the practice of chemistry that could be instrumental to the fulfillment of the development aspirations and objectives of the people in Africa. FASC organizes its General Assembly every two years, rotating around the African continent. During the 7th edition held in Gaborone (Botswana) in

September 2019, the organization of the 9th edition was entrusted to Senegal, through SCC, the National Adhering Organization representing Senegal at FASC and at IUPAC. It was confirmed on December 2022 during the 8th Assembly General in Marrakech (Morocco) that the 9th General Assembly of FASC would be organized on 19-21 November 2024 in Dakar, in conjunction with the 6th Annual Days of Chemistry of Senegal.

Taking advantage of its membership to IUPAC, SCC applied for Endorsement and for Financial Support for Conferences in Scientifically Emerging Regions to cover the costs for contribution to the Conference program of an IUPAC lecturer and/or provide financial support for young scientists or advanced students from designated scientifically emerging regions. Both applications were approved by IUPAC Division I (Physical and Biophysical) during IUPAC 2023 in The Hague.

Aims of the Conference

Africa is a continent with remarkable economic potential, yet the least developed. The continent contributes with just 2% of world research output, accounts for only 1.3% of research spending, and produces 0.1% of all patents [1]. Studies have found that barriers to conducting research in Africa included shortage of training facilities, loss of interest or motivation to continue research, and only little collaboration between researchers in Africa as well as effective talent management.

The conference targets the challenges and issues. Ambitious researchers presented their scientific results, while the conference offered platforms for networking and knowledge sharing, as well as training on scientific research management. The aim of the conference was to show, through the various themes developed, how chemistry is at the forefront of innovation and sustainable development. This was an opportunity for African researchers and their peers to demonstrate the involvement of chemistry in all areas of life: health, energy, food, water, the environment, the economy, *etc.* The following points summarize the specific aims of the conference:

- Facilitating connections and opportunities for collaboration between chemists within the continent.
- Bringing together Africa's scientific, technological, and industrial communities.
- Fostering global collaboration and partnership in chemical research to enhance its quality and contribution to the achievement of the UN SDG.
- Supporting the communities to deliver solutions to global challenges in the areas of environment,



Some participants visiting the memorial island of Gorée. Here, in front of the Slaves House.

energy; food, health and water

- Helping IUPAC, ACS, RSC, FASC, *etc.* promote their activities.
- Exposing our Early Career Chemists to senior scientists.
- Introducing and creating mentor-mentee relationships with our Early Career Chemists.

Scope of participation

The conference was attended by 138 delegates representing about 20 countries. It can be seen from the distribution by country that 61 % of the communications were given by participants from the host country (Senegal), while Nigeria and South Africa follow with respectively 8 and 7 participants, respectively. These 3 countries are currently the 3 Africa representatives with National Adhering Organizations at IUPAC.

Many participants sent abstracts but couldn't attend. These included participants from Algeria, Botswana; Kenya, Uganda, Mauritius, Mozambique and Ghana. The Organisation for the Prohibition of Chemical Weapons (OPCW) provided support to the event and seven experts from Burkina Faso, Cameroon, Morocco, Nigeria, Tanzania, and Tunisia could attend the event, among which were three plenary speakers.

Participation of emergent researchers

Beside the strong support from OPCW which covered the participation of seven senior experts in their fields of specialization, other partners of the conference supported the participation of emergent researchers through the continent. As a result, eight young chemists from Senegal and nine others from Gambia, Mauritania, Burkina Faso and Nigeria benefited from scholarships offered by RSC and IUPAC, which covered their accommodation and conference participation costs, including

social events (gala dinner and excursion). It is worthwhile to note that the 2nd prize for best communication was awarded to an IUPAC grantee.

Scientific content

The conference programme encompassed 96 plenary and oral communications distributed into six topics and six "Technical talks." 11 communications couldn't be classified in the six topics and were categorized as Off-Topic communications. The breakdown for these 102 presentations is shown in the figure below.

The inaugural conference was given by Ehud Keinan, IUPAC President, on the theme "Humanity faces a bright future, and so Chemistry." T3—Chemistry of Water and Environment and T5—Chemistry and Health were the most popular themes, with 33 and 26 communications respectively. However, the frontier between the different topics is not hermetical and the scientific committee followed in most cases the preferences of the authors.

Only one communication dealt directly with T6—Chemical Safety and Security. However, many communications classified in T3 and T5 topics are related to the use of chemistry for a safe environment and to address health issues. It might be recommended that OPCW provides experts in the next FASC meeting foreseen in Kenya.

Slots for 6 "Technical Talks" were mainly allocated to sponsors to present their specific actions:

- Alejandra Palermo (RSC): Inclusion and diversity-focus on gender parity and disability in the chemical sciences
- Andrew Shore (RSC): Open Access and Open Science in Publishing
- Clifford Chuwah (Springer Nature, The Netherlands): Presentation of Chemistry Africa

Conference Call

- Shima Heikal (Elsevier): Elsevier solutions to help advancing chemistry education and chemistry research
- Veresha Dukhi (ACS International): About CAS and SCIFINDER
- Yedilfana Setarge Mekonnen (EURAXESS Africa and Addis Ababa University): Unlocking Research Funding and Networking Opportunities in Horizon Europe through EURAXESS Worldwide Africa.

Lastly, 27 poster communications were presented in two sessions.

Contribution from industry

The National Water Company of Senegal (*Société Nationale des Eaux du Sénégal, SONES*) participated in the conference. Just after the plenary communication done by Courfia Kéba Diawara on the theme "Reverse Osmosis and scientific issues for seawater desalination in west Africa," Ousmane Coulibaly, Hydraulic Engineer/Project Manager at SONES gave a presentation of the SONES Desalination Plant under construction in Dakar. He presented the technical configuration, relevance, area of influence and social impact. The seawater desalination plant will help meet the demand for water in Dakar, especially in localities

at the end of the network and with high topography. Discussions focused on infrastructure costs, financing and environmental impacts.

Tangible outcomes

Various tangible outcomes arose from the conference. For instance:

African Chemists are aware of what is available in the continent in terms of research activities, facilities and specialization: through the plenary and some oral conferences given by African leading scientists in South Africa, Morocco, Tunisia, *etc.*, some ideas for joint research projects were put forward.

African Chemists increased their skills in fund-raising: the talks of Yedilfana Setarge Mekonnen and of Alejandra Palermo informed the attendees about the opportunities offered by EURAXESS AFRICA on one hand, and on the solutions of RSC for inclusion and diversity in chemical sciences on the other hand.

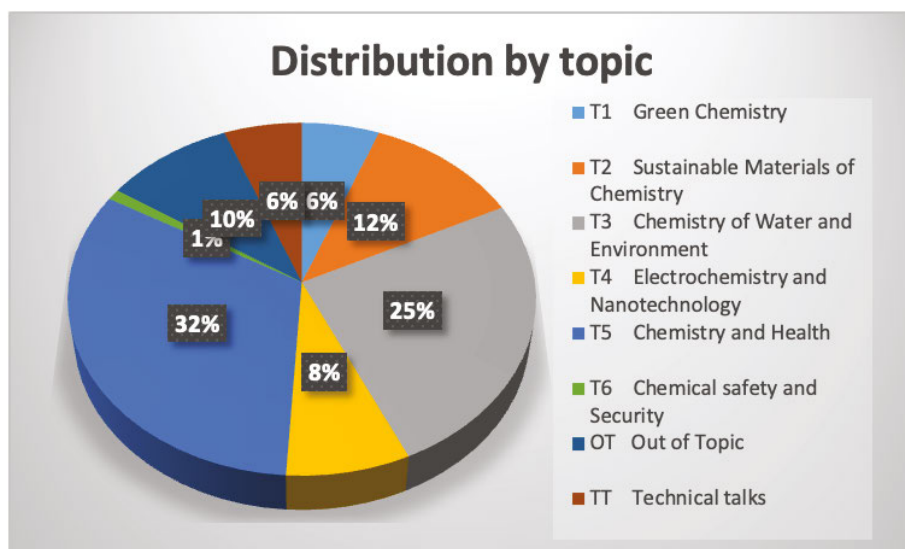
Continental chemists have learnt more about green chemistry, sustainable materials for chemistry, the role of chemistry in solving societal, environmental and health issues, *etc.* As an example, green chemistry was addressed during 3 highlights. The two first ones were the talks of Shima Heikal, appointed by Elsevier (Unlocking a sustainable future with green



With 5 IUPAC Grantees. From left to right: Aderibigbe Adesina, Ehud Keinan, Khalidou Ba, Modou Fall, Gloria Obuzor, Bilquis Jallow, Sitor Diouf and Mame Mor Dione

Prof. Matar Seck remitting to IUPAC President a gift.





A look at the various topics at the conferences reveals the top three topics were Green Chemistry, Chemistry of Water and Environment and Sustainable Materials of Chemistry.

chemistry approaches) and of Dogo Seck representing the National Academy of Sciences and Techniques of Senegal (Promoting Green chemistry in Africa for more Food Security and sustainable agriculture). There were also the presentation of the 13 principles for a greener Africa [2], based on the original 12 principles of green chemistry but that are more suited to the problems facing chemists and chemical engineers in Africa.

Emergent chemists are trained in publication.

As a prelude of the conference, the Senegalese Committee for Chemistry, in partnership with Springer Nature, organized on 14 October 2024 a webinar on the procedures for publication in international journals. This first workshop in French would be followed after the conference by another one on the same subject but in English. During the conference, Andrew Shore, representative of RSC gave a Technical Talk on Open Science and Open Access in Publishing, while Clifford Chuwah from Springer Nature presented Chemistry Africa which is chosen to eventually publish articles stemming from or related to the conference.

Academic and social bonds are built or reinforced between African and international chemical societies and with individuals also. Many presidents of African national chemical societies signed the proclamation initiated by IUPAC President and stating that "The Governments should expand funding for basic chemical research." [3] This proclamation was subsequently published in January 2025 and the signatures of African presidents on the proclamation are essential to enhance African visibility in the global chemistry arena. The IUPAC President plans to explore ways to help add more African chemical societies as regular members (National Adhering Organizations) of

IUPAC.

On another hand, the African Network of Electroanalytical Chemists (ANEC) and their partner, (International Science Programme of Uppsala University) could be presented during their communications by its President Emmanuel Ngameni and Executive Secretary Issa Tapsoba whose total participation costs were supported by OPCW. This aroused great interest among electrochemists who were well represented at the conference.

Promotional activities of chemical societies and publishers: RSC and Elsevier had exhibition space where they could welcome visitors, present their products and distribute prospects and diverse materials. Elsevier is ready to provide free trial access for Reaxys database to UCAD users and also for other institutions in Senegal. For their part, ACS offered to all a 50 % discount on the ACS membership fee and expressed a possibility of free trial access for SciFinder.

Prizes, awards, and acknowledgments

During the closing ceremony presided by Ismaila Diouf, dean of the Faculty of Sciences and Techniques of UCAD, the organizing committee awarded prizes to the presenting-authors of the two best oral communications and to the best poster. The prizes were composed of gifts and certificates.

1st Prize for the best oral communication:

Dineo Elsie Moema, University of South Africa, Johannesburg: *Supramolecular solvent-based liquid phase microextraction of sulphonamides in tomato juice followed by high performance liquid chromatographic: Assessment of the Greenness Profile Using Analytical Eco-scale, AGREE, and AGREEprep.*

- **2nd Prize for the best oral communication:** Seynabou Sokhna, Alioune Diop University of Bambey, Senegal: *Evaluation of the anti-HIV activity of triazenes*.
- **Prize for the best poster communication:** Abdou Khadre Djily DIME Alioune Diop University, Bambey, Senegal: *Regioselective Amination of Porphyrins via Ring-Opening of Electrogenerated Pyridiniums Precursors*.

FASC AGM

During the AGM, the new FASC Executive Office holders were announced:

- **President:** Hatem Ben Romdhane (Tunisia)
- **Vice-President:** Modou Fall (Senegal)
- **Executive Treasurer:** Vincent Nyamori (South Africa)
- **Executive Secretary:** Clarence Mgina (Tanzania)
- **Past President:** Gloria Obuzor (Nigeria)

Co-opted members

- **Eastern Africa Representative:** Yedilfana Mekonnen (Ethiopia)
- **Southern Africa Representative:** Lydia Rhyman (Mauritius)
- **Western Africa Representative:** David Chukwuebuka Ike (Nigeria)
- **Northern Africa Representative:** Ezzahi Amine (Morocco)
- **FASC 2026 Conference host:** Naumih Noah (Kenya)
- **Afr. J. Chem. Ed (Editor):** Temechehn Engida (Ethiopia)
- **FASC Newsletter:** Neil Coville (South Africa)

The next FASC GM and Conference will be held in Nairobi, Kenya, in conjunction with the Kenya Chemical Society meeting in 2026, with Naumih Noah as the local organizing committee chair.

Social Events

The social programme for the delegates included an evening dinner with wonderful entertainment provided by The Guissé Brothers, a group of Senegalese musicians. At the end of the conference, around thirty participants took part in the excursion to Gorée, a memorial island off the coast of Dakar.

Acknowledgements

Verbal recognition was expressed to all partners of the conference, and gifts were presented to those

represented at the conference:

- International Union of Pure and Applied Chemistry
- Organization for the Prohibition of Chemical Weapons (OPCW)
- Royal Society of Chemistry (RSC)
- American Chemical Society (ACS)
- Chinese Chemical Society (CSC)
- UCAD: Rectorat; Doctoral School of Physics, Chemistry, Earth, Universe and Engineer Sciences (ED-PCSTUI) and Director of ENSMG; Senegal
- Senegalese Pharmaceutical Regulatory Agency (ARP), Senegal
- National Quality Assurance Authority for Higher Education, Research and Innovation (ANAU-Sup), Senegal
- Elsevier
- African Center of Excellence for Environment, Health and Society (CEA-Agir), Senegal
- Federation of African Societies of Chemistry (FASC)
- Institut Supérieur d'Enseignement Professionnel (ISEP) of Diamniadio, Senegal
- National Water Company of Senegal (SONES), Senegal
- Amadou Mahtar Mbow University (UAM), Senegal
- SOACHIM/Senegal
- Mauritanian Chemical Society
- Director of UFR SATIC, UADB, Senegal
- Springer Nature
- National Academy of Sciences and Techniques of Senegal (ANSTS), Senegal
- La gazette du Laboratoire.

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2. Asfaw, N., Chebude, Y., Ejigu, A., Hurisso, B.B.; Licence P.; Smith, R.L., Tang, S.L.Y., Poliakoff; M. 2011. "The 13 Principles of Green Chemistry and Engineering for a Greener Africa" *Green Chemistry* 2011 (13) 1059-1060: <https://doi.org/10.1039/C0GC00936A>
3. See Presidents' Forum webpage at <https://iupac.org/presidents-forum/> and proclamation first released 24 Jan 2025.

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