

# NAM

## S&T Newsletter



A Quarterly of the  
Centre for Science and Technology of the Non-Aligned  
and Other Developing Countries (NAM S&T Centre)

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### FROM THE DG'S DESK

Warmest Greetings to all our Esteemed Readers!!



The 16<sup>th</sup> Governing Council Meeting of the NAM S&T Centre held on 27-28 July 2023 was hosted by the Ministry of Education, Tertiary Education, Science & Technology (MoETEST), Government of Mauritius. It was a great privilege and an honour for the Centre to have Her Excellency Mrs. Leela Devi Dookun-Luchoomun, Vice Prime Minister and Minister of Education, Tertiary Education, Science and Technology of Mauritius as the Chief

Guest to grace the occasion. 44 delegates from 12 member countries including Chief Executives and senior officials and representatives of the NAM S&T Centre Secretariat attended the meeting.

During the past quarter of the year, the NAM S&T Centre in partnership with the Academy of Scientific Research and Technology (ASRT), Cairo, Egypt has successfully organized an International Training Programme on 'Low Cost Technologies for Arsenic Removal from Groundwater' as a part of the Centre's multilateral collaborative project titled 'Reducing Arsenic Exposure from Food and Water in Developing Countries – A Roadmap for Technological Solutions for the Future' during 5-6 September, 2023 in Cairo. The Training Programme was attended by over 158 participants including scientists, researchers, academicians, policymakers and other professionals from 14 countries. The programme provided opportunities for the participants to facilitate the exchange of knowledge and expertise on arsenic contamination of groundwater and capacity building of developing countries for transfer of low-cost technological solutions for removal of arsenic from groundwater and removal of other heavy metals from water.

The NAM S&T Centre, in partnership with the JSS Academy of Higher Education and Research, Mauritius (JSSAHERM) announces the organization of an International Conference on 'Improving Efficiency and Effectiveness in Health Delivery Systems in Developing Countries: Research, Implementation and Policy Issues' during November 21-23, 2023 in Mauritius. Detailed guidelines for submission of applications for the Conference are available at the Centre's website: [www.namstct.org](http://www.namstct.org).

The Centre invites applications from suitable candidates from its Member Countries and Members of NAM S&T-Industry Network for "Joint NAM S&T Centre-ZMT, Bremen (Germany) Fellowship Programme on Blue Economy in Tropical Coastal Marine Research" and "Joint NAM S&T Centre-JSS AHER, Mysuru, India Fellowship Programme" for the year 2024. The guidelines for the fellowships and other details are available at the Centre's website: [www.namstct.org](http://www.namstct.org).

I would like to wholeheartedly thank the Focal Points of the NAM S&T Centre and the scientific communities in its Member Countries for their goodwill and kind support that helped the Centre over the years, to take several important initiatives in the promotion of South-South Cooperation in Science and Technology and to assist the NAM and other developing countries for their collective self reliance.

Happy Reading!!

*Amitava Bandopadhyay*  
**(Amitava Bandopadhyay)**  
Director General

### Sixteenth Meeting of the Governing Council (GC) of the NAM S&T Centre

(Hosted by Mauritius)

27-28 July 2023

The 16<sup>th</sup> meeting of the Governing Council (GC) of the Centre for Science and Technology of the Non-Aligned and other Developing Countries (NAM S&T Centre) was held in Mauritius on 27-28 July 2023 (in Physical Mode) and was hosted by the Ministry of Education, Tertiary Education, Science & Technology (MoETEST), Government of Mauritius. 44 delegates from 12 countries including



Inauguration of 16<sup>th</sup> Governing Council (GC) Meeting of NAM S&T Centre, Mauritius, 27-28 July 2023

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### Centre Organised

#### International Training Programme on Low Cost Technologies for Arsenic Removal from Groundwater

Cairo, Egypt 5-6 September 2023

Arsenic in drinking water is a widespread global concern. Chronic arsenic exposure is associated with many human health risks, including skin lesions and cancers of the liver, lung, bladder and skin and with many non-cancer health conditions, such as cardiovascular diseases, adverse reproductive outcomes, neurological disorders and impaired cognitive development in children. Due to the lack of awareness about the problem, the silent presence of higher arsenic content in groundwater left unnoticed and is creating a latent magnification of the problem in many Asian, African and other developing countries.



Inauguration of International Training Programme on  
Low Cost Technologies for Arsenic Removal from Groundwater

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Chief Executives and representatives of the NAM S&T Centre Secretariat attended the meeting.

During the ceremonial opening, at the outset, Ms. Carole Ricco, Assistant Permanent Secretary (MoETEST), Mauritius welcomed and thanked H. E. Mrs. Leela Devi Dookun-Luchoomun, Vice Prime Minister and Minister of Education, Tertiary Education, Science and Technology of Mauritius; Mr. Keerunduth Samlall, Ag. Senior Chief Executive, MoETEST; Mr. Youdhisteer Munbodh, Permanent Secretary, MoETEST, Mauritius (representing the Government of Mauritius as the Vice President of the 15<sup>th</sup> GC of the Centre) for sparing their valuable time to join the GC Meeting, and sought their vision, blessings and guidance to empower and encourage the Member Countries of the NAM S&T Centre to get maximum benefits out of the NAM S&T Centre platform. She also welcomed Mr. M. N. Ranasinghe, Secretary, Ministry of Education, Government of Sri Lanka (representing the Government of Sri Lanka as the President of the 15<sup>th</sup> GC of the NAM S&T Centre); Prof. Dr. Gina Elfeky, Supervisor, Scientific & Cultural Relations Sector, Academy of Scientific Research and Technology (ASRT), Egypt (representing the Government of Egypt as the Vice President of the 15<sup>th</sup> GC of the Centre) and Dr. Hussein A. Al-A'raj, Vice-President, Higher Council for Innovation and Excellence (HCIE), Palestine (representing the Government of Palestine as the Vice President of the 15<sup>th</sup> GC of the Centre); other delegates and senior officials.

Mr. M. N. Ranasinghe, Secretary, Ministry of Education, Government of Sri Lanka and the President of the 15<sup>th</sup> GC of the NAM S&T Centre welcomed the delegates and expressed gratitude to the Government of Mauritius and thanked Honorable Mrs. Leela Devi Dookun-Luchoomun for inviting the GC Members of the Centre to convene its 16<sup>th</sup> GC Meeting in Mauritius. Mr. Ranasinghe said that Sri Lanka has been an active member of the NAM S&T Centre from its inception and is honoured to hold the positions of both Vice-President and President of the Governing Council in recent years.

He mentioned that the NAM S&T Centre has been working for solidarity and partnership among the NAM and other developing countries with a number of programmes and activities on international cooperation in Science & Technology, and it has been a privilege for Sri Lanka to take up the role of the President of the Centre in its 15<sup>th</sup> GC Meeting held in February 2021 (in virtual mode) in which several important policy decisions were taken, and during its tenure as the President, his country tried to assist the Centre in its functioning up to the fullest possible extent. Mr. Ranasinghe added that support on acquisition of advanced technologies, high-technology know-how and related skills are needed through the partnership with the NAM S&T Centre and its programmes have been highly effective, and Sri Lanka would be greatly interested in collaboration with the Member Countries of the Centre in Science, Technology, Engineering and Mathematics (STEM) education in the future.

He assured continued support from Sri Lanka to the Centre under the new Presidency, and encouraged the Centre and its Member Countries to forge collaboration and expand alliances in emerging areas that are of common interest to the developing world.

Dr. Amitava Bandopadhyay, Director General (DG), NAM S&T Centre expressed his gratitude to Her Excellency Mrs. Leela Devi Dookun-Luchoomun, Vice Prime Minister and Minister of Education, Tertiary Education, Science and Technology, Mauritius; and Mr. Keerunduth Samlall, Ag. Senior Chief Executive, MoETEST; and welcomed the delegates from the Member Countries and other dignitaries to the Governing Council Meeting.

Dr. Bandopadhyay thanked the Government of Mauritius, specifically Mr. Youdhisteer Munbodh, Permanent Secretary, MoETEST, Mauritius who also holds the position of one of the Vice-Presidents of the NAM S&T Centre; and other colleagues of the Ministry, particularly, Prof. Dr. Kiran Bhujun, Director, Tertiary Education and Scientific Research Division; Mr. Vedanand Bhurosah, Assistant Director, Tertiary Education and Scientific Research Division; Ms. Carole Ricco, Assistant Permanent Secretary and other officers of MoETEST in the Ministry. He appreciated the efforts of the entire team of MoETEST for the admirable job of shouldering the responsibility of coordination and day-to-day work in organising the Governing Council Meeting on behalf of the Government of Mauritius.

Dr. Bandopadhyay thanked Mr. M. N. Ranasinghe, President, 15<sup>th</sup> Governing Council of the NAM S&T Centre (Sri Lanka); Prof. Dr. Mahmoud M. Sakr, Vice President, NAM S&T Centre (Egypt); and Dr. Hussein A. Al-A'raj, Vice-President, NAM S&T Centre (Palestine) for their continued support and guidance towards the functioning of the Centre. He warmly welcomed Prof. Dr. Gina Elfeky who represented Egypt in the Governing Council Meeting. He also thanked the Focal Points of the NAM S&T Centre in its Member Countries, other dignitaries and delegates for attending the Governing Council Meeting.

The Chief Guest, Her Excellency Mrs. Leela Devi Dookun-Luchoomun, Vice Prime Minister and Minister of Education, Tertiary Education, Science and Technology of Mauritius, in her inaugural address welcomed the delegates and expressed her pleasure at having been present at such an auspicious occasion of the Ceremonial Opening of the GC Meeting of the NAM S&T Centre which is an Intergovernmental Organization with 47 Member Countries from the African, Asian, European and Latin American regions established to promote South-South Cooperation in Science and Technology.

She stated that Mauritius has been a Member of the Non-aligned Movement for a long time and the country has been the Vice President of the Governing Council of the NAM S&T Centre since 2017. She added that Mauritius looks forward to continue working in close collaboration with the NAM S&T Centre and that the power of science and technology cannot be minimised in this ever-evolving society and highlighted that S&T has played a preponderant role during the COVID-19 pandemic. She further mentioned that S&T plays a pivotal role to reshape the modern world. The Vice-Prime Minister assured that during the Mauritius Presidency of the NAM S&T Centre, the Government of Mauritius would fully play its part and show its commitment by hosting at least two International Programmes in the next three years. She proposed that these events may be in areas of common interest like Pharmaceuticals, Blue Economy or even Educational Policy, for instance. She concluded by stating that all the Members of the NAM S&T Centre should work together to attain a better world through cooperation in Science and Technology, and emphasized a highly relevant African proverb "*Alone, we can go fast, but together, we can go far*".

Subsequently, following four books of the NAM S&T Centre published by Springer Nature, Singapore were released by the Honourable Vice Prime Minister and other dignitaries of the 15<sup>th</sup> GC of the Centre:

- (i) Smart Agriculture for Developing Nations: Status, Perspectives and Challenges: Edited by Kandiah Pakeerathan (Sri Lanka) – Released by H.E. Mrs. Leela Devi Dookun-Luchoomun [Mauritius]
- (ii) Extreme Natural Events: Sustainable Solutions for Developing Countries: Edited by A. S. Unnikrishnan (India); Fredolin Tangang (Malaysia) and Raymond Durrheim (South Africa) – Released by Mr. M. N. Ranasinghe [Sri Lanka]



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- (iii) Blue Economy: An Ocean Science Perspective – Edited by Edward R. Urban Jr. (USA) and Venugopalan Ittekkot (Germany) – Released by Prof. Dr. Gina Elfeky [Egypt]
- (iv) Science, Technology & Innovation Diplomacy in Developing Countries: Perceptions and Practice – Venugopalan Ittekkot (Germany) and Jasmeet Kaur Baweja (India) - Released by Dr. Hussein A. Al-A'raj [Palestine]

Prof. Dr. Gina Elfeky, Supervisor, Scientific & Cultural Relations Sector, ASRT, Egypt attended the meeting on behalf of Prof. Dr. Mahmoud Sakr, President, ASRT and Vice President of the 15<sup>th</sup> GC of the NAM S&T Centre who could not be present due to some unavoidable circumstances.

Prof. Gina in her remarks expressed gratitude to the Government of Mauritius for hosting the 16<sup>th</sup> Governing Council Meeting of the NAM S&T Centre. While elaborating on the long-standing fruitful collaboration between the ASRT and NAM S&T Centre, she invited the Member Countries to send their experts/scientists to participate in the International Training Programme on "Low Cost Technologies for Arsenic Removal from Groundwater" in Cairo, Egypt during 5-6 September 2023 that would be jointly organised by ASRT, Egypt and the NAM S&T Centre.

Mr. Youdhisteer Munbodh, Permanent Secretary, Ministry of Education, Tertiary Education, Science & Technology, Mauritius and Vice President of the 15<sup>th</sup> GC of the NAM S&T Centre welcomed the delegates and distinguished guests.

Mr. Munbodh expressed his thanks to Sri Lanka who has been the President of the NAM S&T Centre for the last three years, and Egypt and Palestine as the two Vice Presidents and the NAM S&T Centre for the achievements of the Centre in the difficult period of time and particularly the Director General of the Centre and his staff for their excellent contribution in all the endeavours of the Centre.

Mr. Munbodh stated that Mauritius has made great strides in Science and Technology Education in the past decades, improving its curriculum and offering more advanced materials and instruction to its students. He added that the research is targeted at topical areas with a potential to create impact and ensure benefits to the economy and society which include, amongst others, Renewable Energy, Traditional Medicine, Artificial Intelligence, Sustainability, and Climate Change etc., to meet the challenges of Industry 4.0 and to develop a knowledge-based and innovation-led economy.

Mr. Munbodh concluded by stating that there is a need to develop a network to enhance collaboration in Science, Technology and Innovation which could be applicable for all the NAM Member Countries to build up a platform for sharing information, knowledge, experience and expertise. He also assured full support to the Centre from his Ministry as well as various other concerned Ministries of Mauritius on capacity building programmes, multilateral cooperation, ensuring peace, prosperity and stability in the NAM countries.

Dr. Hussein A. Al-A'raj, Vice-President, Higher Council for Innovation and Excellence (HCIE), Government of the State of Palestine and Vice President of the 15<sup>th</sup> GC of the NAM S&T Centre in his remarks thanked the NAM S&T Centre for its continuous support to Palestine in general and to HCIE in particular. He thanked the Government of Mauritius for hosting the 16<sup>th</sup> Governing Council Meeting of the NAM S&T Centre in physical mode. He proposed a collaborative initiative between the Higher Council of Innovation & Excellence (HCIE), Palestine and the NAM S&T Centre for the upcoming period to foster technological advancements and address global challenges of mutual interest including (i) HCIE and NAM S&T Centre may co-finance the upcoming 9<sup>th</sup> forum on Digital Life and Innovation in Palestine: the forum will feature keynote speakers from the Member Countries of the NAM S&T Centre and other relevant sources, addressing topics that are of shared interest and concern; and (ii) To promote accessibility and engagement within the local community, he recommended hosting some of the training courses of the NAM S&T Centre in Palestine.

He emphasised to have the topics covered by NAM S&T Centre for capacity building activities for the Member States in areas including: Combating Plastic Pollution in Terrestrial Environments, Green Forms of Energy and Energy Storage Technologies, Technology Transfer, Smart Agriculture, Commercialization of Scientific Research Outcomes and latest Water Reuse Technologies.

Dr. Hussein A. Al-A'raj expressed his happiness that the Centre is implementing a collaborative Project on "Reducing Arsenic Exposure from Food and Water in Developing Countries – A Road Map for Technological Solutions for the Future" under partial support from PGTF/G-77. He also praised the exceptional work carried out by the scientific team involved in the Arsenic project from Palestine that has yielded successful results.

He concluded by stating that all the Members of the Centre should work together to attain a better world through cooperation in Science and Technology and invited the delegation to visit the State of Palestine as a gesture of support and to obtain first-hand ideas about science, technology and innovation in Palestine.

After the Opening Session, the Working Level Meeting of the GC started under the Chairmanship of Mr. M. N. Ranasinghe, Secretary, Ministry of Education, Sri Lanka. During the meeting, Mauritius was unanimously elected to hold the office of President of the 16<sup>th</sup> Governing Council of the Centre; Egypt, Palestine and South Africa as Vice-Presidents.

The newly elected Chairman, Mr. Youdhisteer Munbodh applauded the work of the Centre under the leadership of Sri Lanka as the President of the 15<sup>th</sup> GC. He said that it was an honour for the Government of Mauritius at having been elected unanimously as the President of the Centre for the 16<sup>th</sup> Session of its Governing Council.



Group Photo of 16<sup>th</sup> Governing Council (GC) Meeting of NAM S&T Centre

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He emphasised that the NAM S&T Centre could play an important role in facilitating cooperation between the Member Countries in various areas such as Artificial Intelligence (AI), Internet of Things (IoT), Smart Agriculture, Climate Change, Education and Health etc. He concluded by stating that all the members of the Centre should work together to attain a better world through cooperation in science and technology.

The other delegates representing the newly elected Bureau, viz., Prof. Dr. Gina Elfeky, Supervisor, Scientific & Cultural Relations Sector, Academy of Scientific Research and Technology (ASRT), Government of Egypt; Mr. Selby Modiba, Deputy Director, Multilateral Cooperation, Department of Science & Innovation, South Africa and H.E. Dr. Hussein A. Al-A'raj, Vice-President, Higher Council for Innovation and Excellence (HCIE), Government of the State of Palestine also made their remarks.

The Governing Council then took up various items of Agenda for discussion.

The GC took note of various scientific activities including international workshops and training courses, fellowship programmes and publications since the last GC Meeting and congratulated the Director General and his team for diligent and efficient working towards successful planning and execution of the Centre's multifarious activities.

Dr. Amitava Bandopadhyay requested the delegate from Egypt, Prof. Dr. Gina Elfeky to follow up the matter with the concerned authorities in ASRT about the NAM S&T Centre - ASRT, Egypt Fellowship Programme so that the programme may be revived as early as possible.

The GC noted and approved the removal of such fellowships programmes which have been inactive for a long time and no response received from the respective partner agencies.

The delegate from Malaysia, Mr. Teoh Phi Li requested the NAM S&T Centre to send proposals to explore a new Fellowship Programme with the scientific agencies in Malaysia. Mr. Teoh further added that the NAM S&T Centre should also try to collaborate with the Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) for a new Fellowship Programme for the Member Countries of the NAM S&T Centre.

The GC expressed happiness to note various initiatives of the Centre to establish International S&T Partnerships with other Inter-governmental Organisations and agencies. In this connection, the President urged the Member Countries and agencies to come forward with relevant proposals for implementation of partnership with the Centre.

Based on the proposals made by various countries and after some deliberations, six international activities were accorded in-principle approval. The Centre would follow them up and negotiate with the prospective host countries/agencies for finalisation of exact topics, dates, programmes and other matters.

NAM S&T Centre also requested support from the Focal Point from Mauritius for organising an additional joint International Workshop/Training programme sometime in 2024 in Mauritius. Other Member Countries were also requested to send proposals to host programmes in partnership with the Centre.

The GC noted and satisfied with the Summary Report on the assessment on the performance of the Centre and requested the Secretariat to use the inputs from the assessment process to plan and design future scientific activities and events that would be organised by the Centre.

The GC suggested that the newly elected office bearers and other Members of the GC should personally pursue with other developing countries located in their respective regions which are not Members of the Centre - urging them to join the Centre and further strengthen the efforts on South-South Cooperation.

The GC appealed those Member Countries, which have not yet ratified the Statute of the Centre, to expeditiously take up the matter with their respective authorities. In this connection, the Director General clarified that the Ratification (or acceptance, approval or accession, as the case may be) of the Statute by the Member Countries is just a routine formality as required for complete diplomatic recognition of the NAM S&T Centre, and there would be no additional financial burden for the Member States due to ratification.

The GC congratulated the Centre for inducting JSS Academy of Higher Education & Research (JSS AHER), Mysuru, India as a new Network Member after the last GC Meeting in 2021.

The GC requested the Member Countries to publicize the benefits of becoming a Member of the *NAM S&T – Industry Network* - to the S&T institutions & agencies, and industrial organisations in their countries urging them to join the Network.

The Secretariat will send the follow-up mails to the delegations from Ethiopia, Malaysia, Kenya and Sri Lanka as well as all other Member Countries to approach various S&T organisations and agencies in the countries in their respective regions and widely disseminate the concept of the *NAM S&T-Industry Network* and its usefulness so that some of them join the Network.

The GC noted the year wise income and expenditure of the Centre and was happy about the efficient financial management by the Centre even during the Pandemic. The GC expressed serious concern that the Centre had been facing severe financial constraints due to non-payment of the membership subscription by a number of Member Countries. The GC made a strong appeal to the non-paying Member Countries to expedite payment of their membership subscription dues to the Centre.

On the issue of auditors, the delegate from South Africa suggested that the terms of Auditors should be defined and their contract should be extended for a maximum period of 2 terms (i.e. 6 years only). After discussion, the GC approved the proposal for continuation of M/s S.N. Chandak & Associates, New Delhi as Auditors of the Centre only for the current financial year 2023-24. After that the Secretariat will appoint new Auditors for the years 2024-25 and 2025-26. If the 17<sup>th</sup> GC is satisfied with their work they can continue for one more term i.e. for 3 years.

Mr. Vedanand Bhurosah on behalf of the President, Mr. Youdhisteer Munbodh thanked all the participants/delegates for their guidance to the Centre and taking part in fruitful and successful deliberations in the GC Meeting.

The Director General thanked the Government of Mauritius, and in particular, H.E. Mrs. Leela Devi Dookun-Luchoomun, Vice Prime Minister and Minister of Education, Tertiary Education, Science and Technology of Mauritius; Mr. Keerunduth Samlall, Ag. Senior Chief Executive, MoETEST and Mr. Youdhisteer Munbodh, Permanent Secretary; Prof. Dr. Kiran Bhujun; Mr. Vedanand Bhurosah and all the officials of the MoETEST for making excellent arrangements for hosting the meeting.



(Contd. from Page 1 - Low Cost Technologies..., Egypt)

Considering this serious problem of arsenic contamination of groundwater, a multilateral collaborative project entitled “Reducing Arsenic Exposure from Food and Water in Developing Countries – A Roadmap for Technological Solutions for the Future” is being implemented by the *Centre for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre)*, New Delhi, India with partial financial support from G-77 under the Perez-Guerrero Trust Fund (PGTF) for South-South Cooperation. The project aims to cope with the serious consequences of arsenic contamination of groundwater in developing countries and suggest low-cost treatment technologies for the removal of arsenic from groundwater, in order to minimize its exposure through contaminated food and water sources. The implementation of the project is being coordinated by the UN Office for South-South Cooperation (UNOSSC), New York, USA.

Earlier, under the project, the NAM S&T Centre had successfully organized an International Workshop on “Water Purification Technologies, Arsenic Removal from Groundwater and Integrated Water Management” in partnership with the CSIR-Central Salt and Marine Chemicals Research Institute, Bhavnagar, India during 28-30 June, 2022 to discuss the status of arsenic contamination of groundwater and the remedial measures available for developing countries.

The second activity under the project was an International Training Programme on “Low Cost Technologies for Arsenic Removal from Groundwater” that was organized by the NAM S&T Centre in partnership with the Academy of Scientific Research and Technology (ASRT), Egypt during 5-6 September, 2023 in Cairo, Egypt in order to facilitate the exchange of knowledge and expertise on arsenic contamination of groundwater and capacity building of developing countries for transfer of low-cost technological solutions for removal of arsenic from groundwater and removal of other heavy metals from water.

The Training Programme was attended by over 158 participants from 14 countries including India, Indonesia, Malaysia, Mauritius, Mexico, Myanmar, Palestine, South Africa, United Arab Emirates, United Kingdom, Vietnam, Zambia and Zimbabwe and the host country Egypt.

The Overall Training Programme was divided into - an Inaugural Session, 4 Technical Sessions, a Panel Discussion and a Closing Session. Under various technical sessions 6 Keynote Training Lectures, 9 Scientific Papers and 3 Country Status Reports were presented. The four technical sessions were: 'Country Status Reports on Arsenic Contamination of Groundwater', 'Desalination and Water Treatment Technologies', 'Arsenic Contamination of Food and Water: A Serious Global Public Health Risk' and 'Low-Cost Treatment Technologies for Removal of Arsenic, Iron, Fluoride and Other Toxic Heavy Metals from Groundwater'.

The Inaugural Session started with Welcome Remarks by Prof. Dr. Gina Elfeky, Supervisor of Cultural and Scientific Sector, Academy of Scientific Research & Technology (ASRT), Cairo. Prof. Dr. Elfeky, in her address, warmly welcomed the distinguished keynote speakers, various invited guests, participants from the NAM Members and other developing countries and other local attendees from Egypt.

Following this, Prof. Dr. Enas AbouTaleb, Professor of Wastewater Treatment Technologies, Water Research and Pollution Control Department, Environmental Science Division, National Research Centre, Cairo gave a brief about the Training Programme and outlined the origin and objectives of the same and broadly described the topics to be discussed.

The Opening Remarks were given by Dr. Amitava Bandopadhyay, Director General, NAM S&T Centre, who in his address, highlighted that as an esteemed Member Country of the NAM S&T Centre - Egypt has held the position of the President of the Governing Council of the NAM S&T Centre in the past and currently holds the office of one of its Vice Presidents. The Centre has successfully organized several scientific programs in diverse areas of S&T with ASRT in the past and would further wish to enhance the S&T cooperation in the areas of commonality and mutual interest in the future. He further outlined the role of NAM S&T Centre in promoting South-South Cooperation in Science, Technology and Innovation for collective self reliance of developing countries and helping its Member Countries in achieving *UN Sustainable Development Goals-2030*.



**Group Photo: International Training Programme on Low Cost Technologies for Arsenic Removal from Groundwater**

Prof. Dr. Mahmoud Sakr, President, Academy of Scientific Research & Technology, Cairo gave the Presidential Address. Prof. Dr. Sakr highlighted that the Arab Republic of Egypt (ARE) is an active Member of the NAM S&T Centre, and especially is one of the founders of the Non-Aligned Movement. The Egyptian scientific and research community has been benefitted from the cooperation with the NAM S&T Centre through ASRT. He further mentioned that the Arab Republic of Egypt has participated in the activities of the NAM S&T Centre by hosting five scientific events of the Centre from the year 2014 to 2023. A total of 75 Egyptian professors and researchers from various disciplines have participated in the programmes organized by the NAM S&T Centre since 2014. In addition, 23 Egyptian researchers and professors have won the Centre's Fellowship grants. He further underlined the new important S&T cooperation between the ASRT and NAM S&T Centre through organization of this Training Programme.

(Contd. from Page 5 - Low Cost Technologies..., Egypt)

A Vote of Thanks was given by Mrs. Reham Sabry from the Academy of Scientific Research & Technology, Cairo. Mrs. Sabry thanked the organizing committee and other volunteers for their support and help for the successful organization of the event.

Keynote Speakers during the Training Programme were: Prof. Dr. Xavier Poshiwa, Great Zimbabwe University, Masvingo [Zimbabwe], Prof. Dr. Abdel-Hammed M. El-Asar, Egypt Desalination Research Centre of Excellence (EDRC), Desert Research Centre [Egypt], Prof. Bhaskar Sengupta, OBE, Heriot-Watt University, Edinburgh, Scotland [United Kingdom], Dr. Swachchha Majumdar, CSIR – Central Glass and Ceramic Research Institute, Kolkata [India] and Ms. Nadia Martínez-Villegas, Camino a la Presa San Jose [Mexico]. The respective lectures delivered by them were on “Arsenic Contamination of Water Sources in Southern Africa: A Review”, “New Technologies for Water Desalination”, “Arsenic in the Food Chain: Causes and Health Risks” and “Arsenic Remediation Technologies for Community-Level Water Supply”, “Water Purification Technologies for Arsenic Remediation of Groundwater: Perspectives from Developing World” and “The Contamination of Water and Soil from the Dissolution of As-bearing Mineral Waste in Matehuala, Mexico”.

During the Technical Sessions, from Egypt 5 presentations were made by: Prof. Dr. Hossam El Nazer, National Research Centre, Cairo; Prof. Dr. Hanan Ibrahim Abdel Rahman, National Research Centre, Cairo; Prof. Dr. Aly Mohamed Ezz El-Arab Aly, National Research Centre, Cairo; Prof. Dr. Sayeda Mohamed Abdo and Dr. Reda Mohamed Moghazy, National Research Centre, Cairo and Prof. Dr. Elham El Zanati, National Research Centre, Cairo. Their respective papers were on “Fabrication of Low Cost Antibacterial Hybrids Based on Local Resources for Water Treatment”, “Cost Effective Coagulation Clarification Using Iron-Based Polymeric Coagulant for Arsenic Removal from Water Resources”, “Health Issues due to Arsenic Contamination”, “Remediation of Arsenic in Polluted Water Using Microalgae: Current Applications and Future Perspectives” and “The Potential of Vacuum Membrane Distillation Technology for the Removal of Arsenic from Water”.

There were seven presentations made by the foreign participants.

From Palestine, a Country Status Report titled “Groundwater Pollution with Arsenic in Palestine: Sources, Adverse Effects and Purification Techniques” was presented by Dr. Bayan Khalaf, Arab American University, Jenin. Dr. Shivaraju H.P., JSS Academy of Higher Education & Research, Mysuru, Karnataka from India presented a Country Status Report titled “Removal of Arsenic Contamination in Water: Affordable and Low Cost Technologies for Developing Countries. From Mauritius, a Country Status Report titled “Challenges and Opportunities in Monitoring of Arsenic in Food and Water for Mauritius” was given by Prof. Kishore Boodhoo, University of Mauritius, Réduit.

Dr. Badr Mohamed, Technology Innovation Institute (TII), Abu Dhabi from UAE presented a paper titled “Innovative Water Solutions: Advanced Treatment Systems Shaping the UAE's Water Future”. The Paper Presentation titled “Desalination Technology to Solve Africa's Water Crisis” was made by Dr. Sumaya Clarke, University of the Western Cape, Cape Town, South Africa.

From Malaysia, a joint Paper Presentation titled “Development of Low Cost Ceramic Membrane for Arsenic Removal from Water” was given by Dr. Mohd Riduan Bin Jamalludin and Dr. Siti Khadijah Hubadillah, Universiti Malaysia Perlis (UniMAP), Perlis.

Dr. Shepherd Manhokwe, Midlands State University, Gweru from Zimbabwe presented a paper titled “Food Toxicity Caused by Transfer of Arsenic through Groundwater Irrigation: A Review”.

After all the technical presentations, a Panel Discussion on “Low-Cost Treatment Technologies for Arsenic Removal from Groundwater” was held amongst the panel members and with the participants in order to facilitate an exchange of viewpoints and experience among the experts and in response to questions from the participants.

The Panel Members included: (i) Prof. Dr. Enas AbouTaleb [Egypt]; (ii) Prof. Hanan Ibrahim Abdel Rahman [Egypt]; (iii) Dr. Farag Samah [Egypt]; (iv) Dr. Kishore Boodhoo [Mauritius]; (v) Dr. Shepherd Manhokwe [Zimbabwe] and (vi) Dr. Swachchha Majumdar [India].

It was discussed that the presence of elevated levels of arsenic in groundwater has become a major concern for most of the countries globally. Although arsenic contamination of water sources have been reported in a number of developing countries, the contamination scenario in some of the South East Asian and African Countries appears to be worse than others, both in terms of area and population affected. Arsenic pollution of groundwater is particularly challenging for these countries since tube well water extracted from shallow aquifers is the major source of drinking water for most of its population. There are many treatment technologies available for removal of arsenic from groundwater including membrane technology, co-precipitation, reverse osmosis, oxidation and ion exchange, adsorption, Subterranean Arsenic Removal (SAR) technology etc. However, further research is needed to improve real time field testing and monitoring of the drinking water sources, to develop new and cost effective arsenic remediation technologies along with finding new sources of safe drinking water.

The Closing Session was chaired by Prof. Dr. Gina Elfeky, ASRT, [Egypt] and Dr. Amitava Bandopadhyay, NAM S&T Centre, [New Delhi]. It was concluded that expanding international cooperation and extending capacity building support to developing countries in water related programmes such as desalination, water efficiency, wastewater treatment, recycling and reuse technologies will help the arsenic affected communities against its detrimental impacts on human health and environment as well as to achieve SDG-6 on access to safe and clean drinking water.

The Chairpersons thanked all the keynote speakers and other participants from various countries for their active engagements in the deliberations in various sessions and successful organization of the International Training Programme.

## Special Features

### WHO TRADITIONAL MEDICINE GLOBAL SUMMIT 2023: MEETING REPORT

The first WHO Traditional Medicine Global Summit “*Towards Health and Well-being for All*” was held in Gandhinagar, Gujarat, India during 17-18 August 2023, to look anew at the application of rigorous scientific methods to unlock the vast potential of traditional, complementary and integrative medicine (TCIM) amidst important challenges and opportunities to realize universal health coverage and promote health and well-being for people and the planet.

The participants in the Summit, coming across all WHO regions, included a range of stakeholders: from health and TCIM practitioners, civil society representatives and indigenous peoples to health policy and decision-makers and government officials from the G20 and other countries. Based on the research and evidence-informed discussions and initiatives presented in the Summit’s five plenaries and six parallel sessions, the participants endorsed the outcomes of the Summit in a meeting report published in the form of a “*Gujarat Declaration*”.

The meeting report sets out an action agenda towards the implementation of evidence-based TCIM interventions and approaches in support of the goal of universal health coverage and health-related Sustainable Development Goals, among others, and the application of science, technology, innovation and knowledge exchange to validate and unlock, as appropriate, the contribution of TCIM and indigenous knowledge to advance planetary health and people's health and well-being across the life course.

During the Summit, the participants agreed to support the following action agenda:

#### 1. Health and Well-being of People and the Planet

- Scale up efforts to further implement evidence-based TCIM interventions and approaches in support of the goal of universal health coverage (UHC) and all health-related Sustainable Development Goals (SDGs).
- Apply science, technology, innovation and knowledge exchange to validate and unlock, as appropriate, the contribution of TCIM and Indigenous knowledge to advancing planetary health and people's health and well-being across the life course.
- Prioritize well-being for societies and economies aligned with the time-tested wisdom and values of Indigenous knowledge and TCIM systems, and as also recommended in the WHO global framework for achieving well-being and by the WHO Council on Economics of Health for all making this a driving force in achieving the health-related SDGs towards health and well-being for all.

#### 2. Global Health Leadership on Traditional, Complementary and Integrative Medicine

- Contribute to the development, implementation, monitoring, and transformative impact of the WHO Global Traditional Medicine Strategy for the period 2025-2034, and advocate for increased political and financial commitments at global, regional, national and community levels.
- Scale up the multi-regional, multi-disciplinary and multi-stakeholder collaborations demonstrated at the Global Summit through the WHO Global Traditional Medicine Centre.
- Respect and support Indigenous Peoples' stewardship of knowledge, practices and natural resources relevant to the health and well-being of people and the planet.

#### 3. Research and Evidence

- Advocate and mobilize research funding commensurate with TCIM demand and use and based on global, regional and national TCIM evidence mapping and research priority-setting, making appropriate use of existing and new research, evidence syntheses and knowledge translation principles and WHO initiatives, such as the Structured Operational Research and Training Initiative (SORT IT) and the Evidence-informed Policy Network (EVIPNet), including to validate proposed TCIM interventions and for consideration in WHO guidelines and national health policies and systems.
- Encourage all countries to strengthen capacities and capabilities to produce, translate and use TCIM research and Indigenous knowledge.
- Evolve inclusive and multi-disciplinary research methods to capture research, not only on specific active ingredients for pharmaceutical applications, but also on complex, holistic and individualized TCIM and Indigenous knowledge and lifestyle approaches.
- Support the evidence-based integration of TCIM in national health policies and systems based on highest quality research. Accelerate the production, regulation and formal utilization of scientifically proven TCIM products and practices.



(Contd. from Page 7 - Special Features.....)

#### 4. Universal Health Coverage, Primary Health Care and Health Systems

- Facilitate the evidence-informed, appropriate integration of TCIM into national health systems using a primary health care approach, and according to country contexts and priorities, to progressively realize UHC and all health-related SDGs.
- Support countries to redefine, where appropriate, laws, policies and health services to enable people to make holistic, relevant, evidence-informed choices for their health and well-being, encompassing disease prevention, health maintenance and primary care and planetary health.
- Support and promote the development of curricula standards for the education of TCIM practitioners according to country contexts and priorities. Incorporate evidence-based TCIM components into health workforce education related to well-being and health promotion, disease prevention, food and nutrition, lifestyle and behaviour for better health outcomes.

#### 5. Data and Routine Information Systems

- Advance policies that promote standardized TCIM documentation, including through expanded and accelerated use of the WHO International Classification of Diseases (ICD-11) to enable integration of evidence and data collection on TCIM in a standardized way within routine health information systems.
- Set up standardized indicators for TCIM within national health information systems to enable monitoring of the utilization of TCIM practices, the further assessment of their safety and effectiveness within countries, and the sharing and comparing of data across countries.
- Establish a global network of TCIM reference clinical centres that can routinely undertake standardized data collection and monitoring based on WHO ICD-11 coding of the implementation and impact of TCIM interventions, both for individual patients and for disease conditions, with standardized information on safety and effectiveness (clinical and economic), as well as community demand and utilisation.

#### 6. Digital Health Frontiers, including Artificial Intelligence

- Enable the appropriate development and application of digital health technologies, and artificial intelligence (AI) in particular, to advance digital health resources on TCIM for people's health and well-being supported by the development of comprehensive governance models, policies, regulatory frameworks, normative guidance and science- and evidence-based knowledge sharing.
- Ensure that evidence and equity underpin the development of AI models that otherwise could pose risks to inclusiveness and access, and to people's health and well-being.

#### 7. Biodiversity and Sustainability

- Support and promote the implementation of the United Nations Convention on Biological Diversity, including the Kunming Montreal Global Biodiversity Framework, as the most ambitious global agreement on biodiversity conservation, management and sustainable use in the history of environmental governance.
- Ensure full participation of, and consultation with, Indigenous Peoples, including through the establishment of a formal high-level consultation mechanism with Indigenous Peoples linked to the Kunming Montreal Global Biodiversity Framework, to develop, adopt and support the implementation of policies and actions related to the protection of traditional and Indigenous knowledge of health and medicine.

#### 8. Human Rights, Equity and Ethics

- Fully recognize, respect and protect the rights of Indigenous Peoples, as provided in the UN Declaration on the Rights of Indigenous Peoples.
- Incorporate ethical methods and processes in TCIM research and practice through the development and implementation of ethical frameworks that are culturally appropriate and socially relevant and inclusive; and build capacities for ethical practices by incorporating these principles in health policy and workforce education.
- Develop guiding principles for working with communities and Indigenous health practitioners that are founded on the values of free, prior informed consent, confidentiality, mutual respect, open communication, equity, empowerment, ownership and meaningful involvement in decision making.
- Fully respect diversity of all kinds and commit to implementing gender equality, equity and rights based approaches to health that enhance participation, build resilience, and empower

<https://www.who.int/publications>, 2 September 2023



## Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme - 2023

### Research Completion Report of Dr. Marwa Abd Elhamied Kamel Ismael, Egypt



**Dr. Marwa Abd Elhamied Kamel Ismael**, Researcher at Water Pollution Research Department, Environment and Climate Change Research Institute, National Research Centre, Egypt was sponsored by the NAM S&T Centre under its Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme for the year 2023 to carry out her research on “**Evaluating the genetic diversity of human rotavirus in local Indian community through full genome sequencing of VP6 and VP7 genes, and phylogenetic analysis**” under the guidance of **Dr. Akila Prashant** from July–August 2023 at the JSS Medical College, Mysuru, India.

The aim and objectives of the research work were to conduct the environmental surveillance of rotavirus in sewage and diarrheal samples (of children) in a local hospital, Mysuru; to determine the prevalence of Group A and C Human Rotavirus that is circulating in the environment and children under the age of five; to detect novel genotypes and any shifting in genotype distribution in India; to make full genome sequencing of VP6 & VP7 genes of human rotavirus group A & C, in order to detect mutations and new strains of human rotavirus circulating in the community and phylogenetic analysis of the resulting sequences to determine the origin of these strain, and detect any assortment with genes from animal origin occurred in the environment.

1-13 diarrheal samples were collected from children under the age of five, from Pediatric Outpatient Department (OPD), JSS Medical Hospital, Mysuru to analyze the prevalence of human rotavirus using Reverse transcription polymerase chain reaction (RT-PCR) technique, followed by sequencing. A questionnaire about epidemiological information, sample specifications and volunteer personal data were established during the fecal sample collection. A total of 24 sewage samples were collected from four different open drains located within the Mysuru city, namely, Shivarathreeswara Nagar, Subhash Nagar, Narashimha Raja Mohalla and Udayagiri. Isolation of rotavirus from sewage samples was performed using adsorption elution method, where a water filtration system consisting of cellulose nitrate membrane with specific pore size= 0.45µm, and a vacuum pump are present to filtrate the samples and isolate the desired virus. RNA extraction using QIAzol reagent was performed to all the fecal samples and RT-PCR was performed using random hexamer and cDNA synthesizing kit. Due to unexpected delay in delivery of rotavirus specific primer, the PCR & Nested-PCR steps are postponed until the delivery of the required primers. Two scholars (PhD students) who were also collaborating in this research work will be continuing the remaining PCR steps to get the final results under the guidance of Prof. Dr. Akila Prashant.

### Research Completion Report of Dr. Mohammad Kafi, Iran



**Dr. Mohammad Kafi**, Professor in Crop Physiology at the Department of Agrotechnology, Ferdowsi University of Mashhad, Iran was sponsored by the NAM S&T Centre under its 'Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme' for the year 2023 to carry out his research on “**Comparative Assessment of Phytochemical Constituents, Antioxidant and Anti-Proliferative Potential of *Cuminum cyminum* and *Bunium persicum* grown in South Khorasan, Iran**” under the guidance of **Dr. M. V. S. S. T. Subba Rao** from July–August 2023 at the JSS Medical College, Mysuru, India.

Cumin (*Cuminum cyminum*) is one of the main ingredients of spices as well as traditional medicines in Southeast, Western Asia and North Africa and possesses various health benefits such as anti-diarrheal, anti-hematotoxic, anti-toxoplasmosis, anti-cholinergic and anti-histaminic properties. Black cumin (*Bunium persicum*) contains essential oils and high levels of oxygenated monoterpenes, especially  $\gamma$ -Terpinene, cuminaldehyde, p-cymene and limonene, which are known to exhibit potent anti-microbial and anti-oxidant effects. In order to test the secondary metabolites of cumin grown in drought conditions; two main types of Cumin, *Cuminum cyminum* and *Bunium persicum* which are grown in the dry regions of south Khorsan, Iran were taken and generated extracts with solvents of increasing polarity viz., hexane, dichloromethane (DCM), ethanol and water, to study their phenolic, flavonoid, protein and carbohydrate contents and the effects of these extracts on breast cancer cells. Breast cancer cell lines MCF-7 (ER+, PR+ and HER2-), MDA-MB-231 (ER-, PR- and HER2-) and Normal Human Keratinocyte cell line HaCaT were procured from the National Centre for Cell Science (NCCS), Pune, Maharashtra, India.

50 grams of cumin powder was sequentially extracted with 300mL each of n-hexane, DCM, 70% aqueous ethanol and water. The residue was air dried using diethyl ether. The pooled hexane and dichloromethane extracts were concentrated using a rotary evaporator. Ethanol and water extracts were also concentrated using a rotary evaporator, but only till the extracts were reduced to approximately 30mL. Free phenolic compounds were separated using ethyl acetate. The pooled ethyl acetate fraction was

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dehydrated by the addition of anhydrous disodium sulfate. Dehydrated ethyl acetate fraction was filtered and concentrated using a rotary evaporator. The concentrated extracts were recovered and stored in  $-80^{\circ}\text{C}$  for further use. Total protein and carbohydrate content in the extracts were determined by Bradford method and Phenol-Sulfuric Acid Method respectively, estimation of Total Phenolic Acid Content was done using F-C Method, estimation of Total Flavonoid Content was carried out using Aluminum Chloride Method, determination of Antioxidant Potential was done by Ferric Reducing Antioxidant Power (FRAP) method, Antioxidant Potential was determined using DPPH (2,2-diphenylpicrylhydrazyl) Radical Scavenging Activity, Phenolic Compounds in Free Phenolic Extracts were characterized using Reverse Phase High Performance Liquid Chromatography (RP-HPLC) and then assessment of Anti-Proliferative Potential of Free Phenolic Acids of Cumin was carried out.

Hexane extract of *C. cyminum* and DCM extract of *B. persicum* were higher in yield compared to other extracts. Proximate analysis of the *C. cyminum* and *B. persicum* extracts revealed the presence of proteins, carbohydrates, phenols and flavonoids in different amounts, characterization of *C. cyminum* and *B. persicum* extracts using RP-HPLC showed the presence of Benzoic acid and Cinnamic acid derivatives, ethanolic extracts of *C. cyminum* and *B. persicum* exhibited potent DPPH Radical Scavenging Activity and Ferric Reducing Antioxidant Potentials. To determine the anti-proliferative activity of these extracts; breast cancer cell lines MCF-7 and MDA-MB-231, and Normal Human Keratinocytes HaCaT were exposed to increasing concentration [(0.25, 0.5, 1mg/mL in Dulbecco's Modified Eagle's Media (DMEM))] of the extracts for 48h and the viability was determined using sulforhodamine B (SRB) assay. *C. cyminum* and *B. persicum* extracts exhibited dose dependent anti-proliferative effects on MCF-7 and MDA-MB-231 cell lines at 48h. The ethanolic extracts exhibited potent anti-proliferative activity against MCF-7 while the hexane extracts were found to be potent on MDA-MB-231 cell lines. These extracts exhibited anti-proliferative activity even on normal human keratinocytes (HaCaT) indicating its poor selectivity. It was concluded that, the *B. persicum* extracts were found to be more effective in inhibiting the growth of cancer cells as evident by morphological changes observed under microscope.

A poster titled “**Comparative Assessment of Phytochemical Constituents, Antioxidant and Anti-Proliferative potential of Cumin cyminum and Bunium persicum Grown in South Khorasan, Iran**” was presented during the National Conference on “Trends and Innovations in Health, Nutrition, Food and Crop Security” at Tumkur University, Bengaluru, India and **received the award for the “Best Poster Presentation”**.

## Research Completion Report of Mrs. Pooniam Cathan Govinden, Mauritius



**Mrs. Pooniam Cathan Govinden**, Agricultural Superintendent at the Ministry of Agro Industry and Food Security, Mauritius was sponsored by the NAM S&T Centre under its 'Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme' for the year 2023 to carry out her research on “**Qualitative Analysis of different Wheat Samples using Near Infrared (NIR) Spectroscopy and Chemometric Data Interpretation by Unscrambler X Software**” under the guidance of **Dr. Krishnaveni Nagappan** from **April-May 2023** at the JSS College of Pharmacy, Ooty, India.

Food safety including food authenticity has great impact in today's economy as well as public health. To ensure food safety, it is important that the sensory and nutritional characteristics of foodstuffs are compliant both to national and international standards. Traditional methods of analysis which require toxic solvents, costly laboratory-based equipment and reagents are time-consuming, laborious, destructive and most importantly not adaptable for on-site detection. Consequently, with evolution and new on-going challenges in the fields of Science and Technology, developments of accurate, chemical-free, robustness to high pressures and temperatures including rapid techniques for the evaluation and quality control of food commodities are essential for both the producer and the consumers. One such promising light-based technique, which is emerging, is the use of Near-infrared spectroscopy (NIR) analytical tool in determining proximate chemical compositions (fat, protein, fibre and dry matter) of food commodities, authentication of added-value food products, geographical provenance and microbiological count. This analytical instrument allows characterisation of food samples both quantitatively and qualitatively in terms of their physical features and chemical compositions.

Wheat samples of different brands and compositions were purchased locally from Ooty and the quantitative analysis of different wheat samples were conducted. Before analysis, calibration of the NIR spectrometer using polystyrene was done in the transmittance mode to generate an internal reference for the apparatus. The spectroscopic analysis of the samples was conducted using the Luminar 5030 NIR Spectrometer (Brimrose Corporation of America). Collection of the spectra were acquired at a transmission range of <5 seconds integration measuring time by placing the petri plate containing around 1.0 gm of sample on top of the probe. Typically, the spectrometer is equipped with an integrated detector unit which generates photometric signal at a range of 3.5 AU (Brimrose, Technical Specification). Thus, once being in contact with the detector unit, the accumulated electromagnetic transmittance would generate the appropriate photometric signal. Additionally, the NIR spectrometer is connected to a computer having the NIR software installed for operating purposes. After running the NIR

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software, the scanning of the sample would start and correspondingly, generate the NIR transmittance versus wavelength (nm) graph. Unscrambler X software was used for spectral conversion and data interpretation. For sample differentiation and classification extracted as chemical information, multivariate calibration methods which comprise of the partial least squares (PLS) and principle component analysis (PCA) were developed and employed as models for stable regression. All the NIR spectral graphs for different samples showed similarities when compared to the wheat reference standard graph. The NIR spectral regions for all samples ranged between 1400 and 2100 nm. The collected NIR transmittance data and chemical analytical results were computed and interpreted by the unscramble software. The software tried to establish relationships between the different wheat samples with respect to numerous chemical parameters. Comprehensively, the chemometric discipline was applied to extract and extrapolate chemical data using mathematical/statistical formulas.

Nowadays, for process/quality control applications in food factories, spectral techniques are evolving considerable, NIR being one of them. Additionally, NIR technique considering as rapid, reliable and easy-to-use, is used for the traceability of geographical origin of food commodities. This short period research work conducted at the JSS College of Pharmacy, Ooty mostly covered the use of NIR spectrometer in accessing quality parameters of different wheat flours and understanding the basic principle of the chemometric data interpretation. Comparative work (chemical analysis and NIR spectrometer) has emphasised on the efficacy of the equipment properties. However, for better conclusive results, more in depth research is essential.

### Research Completion Report of Ms. Liyana Pathiranage Sithara Vinodani, Sri Lanka



**Ms. Liyana Pathiranage Sithara Vinodani**, Research Assistant at the University of Sri Jayawardenepura, Sri Lanka was sponsored by the NAM S&T Centre under its 'Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme' for the year 2023 to carry out her research on “**Standardization of Amurthashtaka kwatha and its constituent Plant Materials using Thin-layer Chromatography (TLC), High Performance Thin-Layer Chromatography (HPTLC), Fourier transform infrared spectroscopy (FTIR), High Performance Liquid Chromatography (HPLC) and Assessment of Anti-inflammatory Activity**” under the guidance of **Dr. B.M. Gurupadayya** from **June-July 2023** at the JSS Academy of Higher Education & Research (JSS AHER), Mysuru, India.

Herbal medicines are extensively used in the prevention, diagnosis and treatment of illnesses in traditional medical practice, and most of them are proven to be safe and efficacious throughout their long term use. Amurthashtaka kwatha is one of the oldest and commonest kwatha used in the treatment of fever associated with inflammation and is made up of eight plants; Arista (bark of *Azadirachta indica*), Musta (rhizome of *Cyperus rotundus*), Indrayava (seeds of *Holarrhena antidysenterica*), Katukarohini (rhizome of *Picrorhiza scrophulariiflora*), Chandana (heartwood of *Santalum album*), Amrita (Stem of *Tinospora cordifolia*), Patola (whole plant of *Trichosanthes cucumerina*), and Nagara (rhizome of *Zingiber officinale*). Kwatha is a liquid preparation made by boiling the herb in water for a period of time to extract the soluble constituents and the process is widely known as decoction.

Under the standardization process, this experiment has focused to investigate the chemical techniques such as Thin-Layer Chromatography (TLC), High Performance Thin-Layer Chromatography (HPTLC), High Performance Liquid Chromatography (HPLC) and Fourier transform infrared spectroscopy (FTIR) studies to ensure the presence of active marker compounds in the formulations. The constituent herbal plants of Amurthashtaka kwatha have various pharmacological activities including anti-inflammatory, anti-pyretic, anti-diabetic, anti-microbial, anti-cancer, anti-fungal, anti-oxidant etc. Each plant has its own medicinal properties which make the Kwatha more therapeutically effective. In this study, in-vitro anti-inflammatory activity of Amurthashtaka kwatha was investigated by Human Red Blood Cell (HRBC) membrane stabilization technique. Symptoms of inflammation include redness, swelling and pain, joint stiffness, loss of joint function as a result of infection, irritation, or injury. HRBC membrane acts similar as the lysosomal membrane. Paracetamol was used as standard and anti-inflammatory activity was expressed as the percentage of RBC lysis.

The results of TLC, HPTLC and HPLC methods qualitatively and quantitatively identified that phyto constituents are present in individual plants and Amurthashtaka kwatha formulation. The FTIR results identified the chemical groups present in the plant samples. The results of HRBC membrane stabilization assay proved that Amurthashtaka kwatha possess anti-inflammatory activity. The membrane stabilizing activity assessment of Amurthashtaka kwatha showed significant results compared to paracetamol and methanolic Amurthashtaka kwatha. 2mg/mL and 1mg/mL samples of Amurthashtaka kwatha were used for the assessment of membrane stabilizing activity, however both 1mg/mL samples showed similar activity as the 2mg/mL samples indicating increased concentration does not affect the membrane stability. Methanolic Amurthashtaka kwatha did not show any significant activity in membrane stabilization.

Proper Ayurvedic drug standardization requires rational approach and in this regard fundamental aspects of Ayurvedic drug should be preserved. The results obtained through this study are reproducible and could be used for routine monitoring of raw material. Amurthashtaka kwatha is endowed with various biological properties and hence efforts have been made here to provide scientific data on the same.



## Meetings and Visits of Director General, NAM S&T Centre

### Meeting with the Vice President (Egypt), NAM S&T Centre Governing Council

Dr. Amitava Bandopadhyay, Director General, NAM S&T Centre met Prof. Dr. Mahmoud M. Sakr, President, Academy of Scientific Research and Technology (ASRT), Cairo, Egypt and Vice President, NAM S&T Centre Governing Council at his office on September 4, 2023 during his visit to Cairo in connection with organisation of the International Training Programme on “Low Cost Technologies for Arsenic Removal from Groundwater” held during September 5-6, 2023. The meeting was also attended by Prof. Dr. Gina Elfeky, Supervisor of Scientific and Cultural Relations Sector, ASRT.

During the meeting, Dr. Bandopadhyay thanked Prof. Sakr for his kind support to the NAM S&T Centre over the years for S&T collaboration between Egypt and the Centre. Dr. Bandopadhyay appraised him of current activities of the Centre including International Workshops, Training Programmes, Publications and Fellowship Programmes. Dr. Bandopadhyay especially highlighted the recent publications by the Centre on Lightning; Dryland Agriculture; Extreme Natural Events; Blue Economy; STI Diplomacy and Smart Agriculture. All these six books were published by the renowned International Publishing House, Springer Nature, Singapore.

During the meeting, Prof. Elfeky appraised Prof. Sakr about the outcome of a meeting held with the Environment Group of ASRT in which it was tentatively decided that ASRT will organise an International Workshop on an environment related topic in October 2024 in Egypt. The exact topic and dates will be decided by mutual consultation. In addition, it was also decided during the meeting of the Group that ASRT will work towards 1-2 joint scientific publications with the NAM S&T Centre during the next three years. Prof. Sakr agreed to both ideas for collaboration between ASRT and the NAM S&T Centre. Dr. Bandopadhyay also presented to Prof. Sakr a few recent publications from the NAM S&T Centre. During the meeting with Prof. Sakr, Ms. Jasmeet Kaur, Programme Officer and Mr. Rahul Kumra, Assistant Administrative Officer, NAM S&T Centre were also present.

Dr. Bandopadhyay took this opportunity to invite Prof. Dr. Sakr and Prof. Dr. Elfeky for a visit to the NAM S&T Centre Secretariat in New Delhi at a mutually convenient time.



Director General, NAM S&T Centre with Prof. Dr. Mahmoud M. Sakr, President, ASRT, Cairo, Egypt

## Science, Technology & Innovation News

### MATERIALS SCIENCE

#### Chemists Develop Unique Design for Tough but Stretchable Gels

Chenfeng Ke, Associate Professor of Chemistry in Arts & Sciences at Washington University in St. Louis, has developed a unique design for tough but stretchable hydrogels, reported on Aug. 23 in the journal *Chem*. The new material is both flexible and durable, a ring-shaped sugar molecule that encases its polymer network and allows it to stretch without sacrificing strength.

Ke can 3D-print the so-called crystalline-domain reinforced slide-ring hydrogels, or CrysDoS-gels. He and his co-authors have also created a materials library and offer methods for how this material can be added to existing materials to enhance their durability, such as in plastic additives to enhance the durability of parts in automobiles in the future.

"There are a series of tradeoffs with these traditional plastic materials - they're usually one or the other," stretchable or rigid, Ke said. "But if you connect two things with a slidable joint, you have very interesting properties of both."

The new material is simple and adaptable, Ke said, and can be combined with a variety of hydrogels to improve the properties of different plastics. For example, it could be added to stretchable materials to make them stronger, or to rigid materials to make them more flexible. In this study, the chemists demonstrated a potential application of the newly discovered CrysDoS-gels by 3D-printing them as stress sensors. "Think of it increasing the lifespan of plastic parts to reduce the waste we produce," Ke said.

<https://phys.org>, August 23, 2023

### HEALTH R&D

#### Scientists Identify Potential New Treatment for Liver Disease

Scientists have discovered that a drug, Pegzofermin, which mimics the body's hormone, improved liver fibrosis and inflammation in NASH (non-alcoholic steatohepatitis) patients. Currently, there are no FDA-approved treatments for NASH, a common and often silent liver disease.

In a nationwide multi-center clinical trial, scientists identified a promising new drug medication that improved liver fibrosis in NASH patients by 27%. Scientists from the University of California San Diego School of Medicine have led an investigation into a promising treatment for individuals with NASH-related fibrosis. The findings, recently published in *The New England Journal of Medicine*, indicate that a drug that mimics a hormone in the body improved both liver fibrosis or scarring of the liver and liver inflammation in patients with NASH.

"Identifying an effective drug for NASH is extremely promising for patients as currently there are no FDA-approved therapies for this condition," said Rohit Loomba, gastroenterologist and hepatologist at UC San Diego School of Medicine Health. "NASH can adversely impact the quality of life in patients and can progress to cirrhosis. Its complications can lead to death or liver transplantation."

"Our findings will further the science of this disease and provide a potential new treatment option to those affected by NASH-related fibrosis." The researchers have found out that the drug called Pegzofermin, mimicked fibroblast growth factor 21 (FGF21) - a liver-secreted peptide hormone that is naturally produced in the body. FGF21 controls energy use in the body and regulates lipid metabolism in the liver. It has also been shown in previous studies to lower blood glucose and insulin levels, reducing body weight and liver fat.

"The study's results show that the new potential treatment not only improves fibrosis but also improves inflammation and liver injury along with significant improvements across multiple non-invasive biomarkers of NASH activity and scarring," said Loomba, gastroenterologist, and hepatologist at UC San Diego Health.

The 24-week, randomized clinical trial involved 222 participants with NASH assigned to either receive the drug or a placebo. Of the patients who received the drug at a higher dose, approximately 27% showed an improvement in liver fibrosis, relative to 7% of the patients who received the placebo. The most frequently reported side effect from the drug was gastrointestinal in nature, including nausea.

Currently, there are no medications approved by the U.S. Food and Drug Administration for the treatment of NASH, a type of non-alcoholic fatty liver disease (NAFLD).

Loomba adds that the next steps for this research will be a larger, multi-center, international trial with a more diverse patient population and a longer treatment period to better assess the safety of the drug. "If successfully shown to be both safe and effective in a larger Phase 3 trial, this drug could be used to treat millions of patients with NASH, including our patients at UC San Diego Health," said Loomba.

<https://scitechdaily.com>, August 22, 2023

(Contd. from Page 13 - STI News)

## The Next Genomics Wave: The Powerful Era of Single-Cell Genomics

Jason Buenrostro and Fei Chen are leaders in the field of single-cell genomics, developing new tools to learn more about how cells with the same genome can have varied functions. For more than 20 years, scientists Fei Chen and Jason Buenrostro have been able to unravel the sequence of the human genome, the precise recipe of everyone's DNA, which has led to incredible advances in discovering genes responsible for countless diseases. But within the last five to seven years, new and more sophisticated research tools have emerged. Known as single-cell genomics, these tools enable scientists to peer into individual cells – ranging from skin, nerve, muscle, immune cells and even to cells that haven't been discovered before – to learn more about how they function.

Jason Buenrostro and Fei Chen, lead laboratories within Harvard's Department of Stem Cell and Regenerative Biology. They have developed some of the most influential single-cell genomics tools that are being used today by the researchers worldwide, helping to move this previous niche area of biology into a cornerstone of research.

"The cells across the various human tissues are diverse and it's extremely valuable to understand how all of the cells are changing as we develop, grow and age," Buenrostro explains. "Single-cell sequencing has allowed us to do that."

Single-cell genomics provide detailed information about our DNA and RNA – the instructions carried from DNA to make proteins. It also provides clues into influences, known as epigenetic modifications, which decide if a gene will be turned on or off in each cell. Researchers like Buenrostro and Chen, and many others, use this information regarding what is within the individual cells to better understand how cells are changing in normal processes as well as in those associated with disease.

"If you think about it, every cell in the body has the same genome," says Chen. "But each type has to do different things." So what are the unique components of each cell that tells it to function in a particular way? And what regulates that? If you pored over all the contents of a tissue, it would be impossible to answer these questions when looking at a mixture of cells, Chen explains. "You need to use single-cell genomics to reveal the diversity that exists within tissues and organs – including the many cell types, subtypes and states the cells are in and how they interact, change and evolve."

The power of single-cell genomics can also be attributed to advance new computational tools to interpret and analyze all the data points. Having the tools to both sequence the individual cells and understand the overflowing data stream, has matured thinking in the field to ask more pointed and powerful biological questions.

<https://hsci.harvard.edu>, July 25, 2023

## SPACE

### Chandrayaan-3 Lands on the Moon's South Pole - Successful Landing gives India Access to New Space Frontiers

India has become the first nation to reach the south pole of the Moon after its Chandrayaan-3 probe successfully landed as planned. The landing comes just days after Russia's Luna-25, destined for the same region, crashed on the lunar surface.

Chandrayaan-3 will perform a raft of experiments, including a spectrometer analysis of the mineral and chemical composition of the Moon's surface, returning valuable data on the properties of lunar soil and rocks. It hopes to confirm the presence of water ice in the region, which could supply oxygen, fuel and drinking water for future space exploration.

Mylswamy Annadurai, director of Chandrayaan-1, India's first Moon mission, told Nature India that the soft landing of Chandrayaan-3 mission will open many opportunities. "This will consolidate India's position in the future international lunar missions, including that of Artemis."

Scott Hubbard, former NASA Ames Center Director, presently designated at the Stanford University, said, safely landing a spacecraft on another world is an outstanding scientific and engineering achievement. "With the successful landing of Chandrayaan-3, India has joined a very exclusive club."

The voyage by Indian Space Research Organisation (ISRO) started on July 14. Launch vehicle LVM-3 sent Chandrayaan-3 on a 384,000km journey from the Satish Dhawan Space Centre in Sriharikota on India's southeast coast. Chandrayaan-3 orbited Earth several times to gain speed before embarking on its month-long lunar trajectory. Three successive orbit reduction manoeuvres on August 6, 9 and 14 moved the spacecraft closer to the Moon. The final manoeuvre on August 16 placed Chandrayaan-3 into an orbit of 153km x 163km, inching it closer to its final landing. On August 17, the lander separated itself from the propulsion module, and slowed down to place itself in an orbit where the Perilune (orbit's closest point to the Moon) was 30 km and Apolune (farthest point from the Moon) was 100 km. Chandrayaan-3 comprises an Indian-built lander module (LM), propulsion module (PM) and a rover. The mission goal is to develop and demonstrate new technologies for inter-planetary missions.

The *Vikram* lander carries an instrument called Chandra's Surface Thermophysical Experiment (ChaSTE) to measure surface thermal properties, an Instrument for Lunar Seismic Activity (ILSA) to measure seismicity around the landing site, the Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere (RAMBHA) to study the gas and plasma environment, and a passive laser retro reflector array provided by NASA for lunar ranging studies.

The rover *Pragyan* (Sanskrit for 'wisdom') is to carry out a chemical analysis of the lunar surface in situ as it moves about in



(Contd. from Page 14 - STI News)

the highlands near the Moon's South Pole. The six-wheeled rover will conduct experiments here for one lunar day, equivalent to 14 Earth days. The rover has two instruments to study, the local surface elemental composition — an Alpha Particle X ray Spectrometer (APXS) and a Laser Induced Breakdown Spectroscope (LIBS).

There have been several challenges in building the two instruments that are being carried by *Pragyan*. “The main challenge was to indigenously design the electronics such that the excellent energy resolution provided by the state-of-the-art Silicon Drift Detector (SDD), the X-ray detector used in APXS, is not degraded,” Principal Investigator Santosh Vadawale, an Astrophysicist at the Physical Research Laboratory, Ahmadabad, told Nature India. APXS uses Cm-244 radioactive sources to excite elements on the lunar surface. “Obtaining these sources and handling them throughout the development cycle and various phases of testing was a major challenge because of the radiation safety aspects,” said Vadawale.

<https://www.nature.com>, August 23, 2023

## ARTIFICIAL INTELLIGENCE/ETHICS & SOCIETY

### Assessing the Risks of Generative Artificial Intelligence (AI) in the Workplace

Amid the exponential growth of generative AI, there is a pressing need to evaluate the legal, ethical and security implications of these solutions in the workplace.

One of the concerns highlighted by industry experts is often the lack of transparency regarding the data on which many generative AI models are trained. There is insufficient information about the specifics of the training data used for models like GPT-4, which powers applications such as ChatGPT. This lack of clarity extends to the storage of information obtained during interactions with individual users, raising legal and compliance risks.

The potential for leakage of sensitive company data or code through interactions with generative AI solutions is of significant concern.

OpenAI, the organisation behind ChatGPT, has been cautious in providing detailed information on how user data is handled. This poses challenges for organisations seeking to mitigate the risk of confidential code fragments being leaked. Constant monitoring of employee activities and implementing alerts for the use of generative AI platforms becomes necessary, which can be burdensome for many organisations.

“Further risks include using wrong or outdated information, especially in the case of junior specialists who are often unable to evaluate the quality of the AI's output. Most generative models function on large but limited datasets that need constant updating,” says Vaidotas Šedys, Head of Risk Management at Oxyllabs.

The implications extend beyond individual companies. For example, Stack Overflow – a popular developer community – has temporarily banned the use of content generated with ChatGPT due to low precision rates, which can mislead users seeking coding answers.

Legal risks also come into play when utilising free generative AI solutions. GitHub's Copilot has already faced accusations and lawsuits for incorporating copyrighted code fragments from public and open-source repositories.

“As AI-generated code can contain proprietary information or trade secrets belonging to another company or person, the company whose developers are using such code might be liable for infringement of third-party rights,” explains Šedys. “Moreover, failure to comply with copyright laws might affect company evaluation by investors if discovered.”

While organisations cannot feasibly achieve total workplace surveillance, individual awareness and responsibility are crucial. Educating the general public about the potential risks associated with generative AI solutions is essential. Industry leaders, organisations and individuals must collaborate to address the data privacy, accuracy and legal risks of generative AI in workplaces.

<https://www.artificialintelligence-news.com>, July 17, 2023

## GENETIC ENGINEERING/PLASTIC POLLUTION

### Genetically Modified Bacteria Break Down Plastics in Saltwater

Researchers have genetically engineered a marine microorganism to break down plastic in salt water. Specifically, the modified organism can break down polyethylene terephthalate (PET), a plastic used in everything from water bottles to clothing that is a significant contributor to microplastic pollution in oceans.

“This is exciting because we need to address plastic pollution in marine environments,” says Nathan Crook, corresponding author of a paper on the work and an Assistant Professor in chemical and biomolecular engineering at North Carolina State University.

“One option is to pull the plastic out of the water and put it in a landfill, but that poses challenges of its own. It would be better if we could break these plastics down into products that can be re-used. For that to work, you need an inexpensive way to break the plastic down. Our work here is a big step in that direction.”

To address this challenge, the researchers worked with two species of bacteria. The first bacterium, *Vibrio natriegens*,

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thrives in saltwater and is remarkable in part, because it reproduces very quickly. The second bacterium, *Ideonella sakaiensis*, is remarkable because it produces enzymes that allow it to break down PET and eat it.

The researchers took the DNA from *I. sakaiensis* that is responsible for producing enzymes that can break down plastic, and incorporated the genetic sequence into a plasmid. Plasmids are genetic sequences that can replicate in a cell, independent of the cell's own chromosome. In other words, you can sneak a plasmid into a foreign cell, and that cell will carry out the instructions in the plasmid's DNA. And that's exactly what the researchers did here.

By introducing the plasmid containing the *I. sakaiensis* genes into *V. natriegens* bacteria, the researchers were able to get *V. natriegens* to produce the desired enzymes on the surface of their cells. The researchers then demonstrated that *V. natriegens* was able to break down PET in a saltwater environment at room temperature.

"This is scientifically exciting because this is the first time someone has reported successfully getting *V. natriegens* to express foreign enzymes on the surface of its cells," Crook says.

"From a practical standpoint, this is also the first genetically engineered organism that is capable of breaking down PET microplastics in saltwater," says Tianyu Li, first author of the paper and a Ph.D. student at NC State. "That's important, because it is not economically feasible to remove plastics from the ocean and rinse high concentration salts off before beginning any processes related to breaking the plastic down."

"However, while this is an important first step, there are still three significant hurdles," Crook says. "Firstly, we'd like to incorporate the DNA from *I. sakaiensis* directly into the genome of *V. natriegens*, which would make the production of plastic-degrading enzymes a more stable feature of the modified organisms. Secondly, we need to further modify *V. natriegens* so that it is capable of feeding on the by-products it produces when it breaks down the PET. Lastly, we need to modify the *V. natriegens* to produce a desirable end product from the PET - such as a molecule that is a useful feedstock for the chemical industry.

"Honestly, that third challenge is the easiest of the three," says Crook. "Breaking down the PET in saltwater was the most challenging part." We are also open to talking with industry groups to learn more about which molecules would be most desirable for us to engineer the *V. natriegens* into producing," Crook says. "Given the range of molecules we can induce the bacteria to produce, and the potentially vast scale of production, which molecules could industry provides a market for?"

The paper, "Breakdown of PET microplastics under saltwater conditions using engineered *Vibrio natriegens*," is published open access in the *AIChE Journal*.

<https://www.sciencedaily.com>, September 14, 2023

## PLASTIC POLLUTION/ ENERGY

### Making Hydrogen from Plastic Waste

Researchers have found a way to harvest hydrogen from plastic waste using a low-emission method that generates graphene as a by-product, which could help offset production costs.

Hydrogen is viewed as a promising alternative to fossil fuel, but the methods used to make it, either generate too much carbon dioxide or are too expensive. Rice University researchers have found out a way to harvest hydrogen from plastic waste using a low-emission method that could more than pay for itself.

"In this work, we converted waste plastics - including mixed waste plastics that don't have to be sorted by type or washed - into high-yield hydrogen gas and high-value graphene," said Kevin Wyss, a Rice doctoral alumnus and lead author on a study published in *Advanced Materials*. "If the produced graphene is sold at only 5% of current market value - a 95% off sale! - clean hydrogen could be produced for free."

By comparison, 'green' hydrogen - produced using renewable energy sources to split water into its two component elements - costs roughly \$5 for just over two pounds. Though cheaper, most of the nearly 100 million tons of hydrogen used globally in 2022 was derived from fossil fuels, its production generating roughly 12 tons of carbon dioxide per ton of hydrogen.

"The main form of hydrogen used today is 'gray' hydrogen, which is produced through steam-methane reforming, a method that generates a lot of carbon dioxide" said James Tour, Rice's T. T. and W. F. Chao Professor of Chemistry and a professor of materials science and nanoengineering. "Demand for hydrogen will likely skyrocket over the next few decades, so we can't keep making it the same way we have up until now if we're serious about reaching net zero emissions by 2050."

The researchers exposed plastic waste samples to rapid flash Joule heating for about four seconds, bringing their temperature up to 3100 degrees Kelvin. The process vaporizes the hydrogen present in plastics, leaving behind graphene - an extremely light, durable material made up of single layer of carbon atoms.

"When we first discovered flash Joule heating and applied it to up cycle waste plastic into graphene, we observed a lot of volatile gases being produced and shooting out of the reactor," Wyss said. "We wondered what they were, suspecting a mix of small hydrocarbons and hydrogen, but lacked the instrumentation to study their exact composition."

(Contd. from Page 16 - STI News)

"We know that polyethylene, for example, is made of 86% carbon and 14% hydrogen, and we demonstrated that we are able to recover up to 68% of that atomic hydrogen as gas with a 94% purity," Wyss said. "Developing the methods and expertise to characterize and quantify all the gases, including hydrogen, produced by this method was a difficult but rewarding process for me. I am glad that techniques I learned and used in this work - specifically life-cycle assessment and gas chromatography can be applied to other projects in our group. I hope that this work will allow for the production of clean hydrogen from waste plastics, possibly solving major environmental problems like plastic pollution and the greenhouse gas-intensive production of hydrogen by steam methane reforming."

<https://www.sciencedaily.com>, September 14, 2023

## SUSTAINABLE DEVELOPMENT GOALS SUMMIT 2023

### Invest in SDGs 'Like Never Before' - SDGs Summit 2023

*A "rescue plan" for the Sustainable Development Goals (SDGs) must now result in policies, budgets and investment to ensure a more just, equitable and green future by 2030, UN Secretary-General António Guterres said on 19 September.*

He was speaking at the conclusion of the two-day SDG Summit at UN Headquarters, where world leaders adopted a political declaration to ramp up progress to achieve the 17 goals, which are in danger of derailment due to the impact of the COVID-19 pandemic and other global crises. Goals that address hunger, health, biodiversity, strong institutions, pollution and peaceful societies are all off-track.

#### Words into Action

"Now is the time to lift the declaration's words off the page, and invest in development at scale like never before," Guterres said.

The political declaration includes a commitment to financing for developing countries and clear support for an SDG Stimulus of at least \$500 billion annually. The Secretary-General urged countries to make the most of the momentum from the Summit, presenting a "development to-do list" for the way forward.

#### 'Real Investments'

He stressed the need to transform support for the SDG Stimulus "into real investments in developing countries." In this regard, he called for establishing a Leaders Group that will develop clear steps to get funds flowing before the end of 2024. Leaders must turn commitments made at the Summit into concrete policies, budgets, investment portfolios and actions. Additionally, they should strengthen support for action across six key SDG areas, namely food, energy, digitalization, education, social protection and jobs and biodiversity.

He also advised them to "start planning now for massive increases in investments in social protection", and to "bring to life" a global initiative to ensure an additional four billion people are covered by 2030.

"As the political declaration makes clear, it's high time for developed countries to meet their Official Development Assistance target of 0.7 per cent of gross national income," he continued.

#### No more Business as usual

Meanwhile, the upcoming meetings of the International Monetary Fund (IMF) and the World Bank must not be "business as usual", he warned.

"In addition to recapitalization, we need to see an urgent additional re-channelling of \$100 billion in unused Special Drawing Rights," he said.

The largest-ever allocation, worth \$650 billion, was carried out in August 2021 in response to the economic crisis generated by the COVID-19 pandemic.

#### Climate Proposals and Plans

Mr. Guterres pressed Governments attending the meetings to also bring proposals to "massively leverage private funding in support of developing countries."

Similarly, he urged them to arrive at the COP28 UN climate conference in Dubai next month with concrete plans and proposals for avoiding the worst effects of climate change, upholding global promises of support, and helping developing countries to transition to renewable energy.

In conclusion, he said "The development to-do list is not just homework. This is hope work. And action is the price of hope."

<https://news.un.org>, September 19, 2023



### *Distinguished Visitors to the NAM S&T Centre*



**His Excellency Mr. Demeke Atnafu, Ambassador of Ethiopia to India**

### **Open Class Room Online Lecture Series in Satellite Meteorology (Weekly) – South Asian Meteorological Association (SAMA) & Birla Institute of Technology (BIT), Mesra, India**

Meteorological Satellites have emerged as important observation tools for real-time monitoring of weather phenomena, data inputs for Numerical Weather Prediction (NWP) and for the detection of cyclones, thunderstorms, fog, pollution and snow cover, without being limited by natural or geographical conditions. With the development of satellite meteorology, the impacts of extreme weather have been minimized to a greater extent. Satellite observations have a huge impact on the NWP model analyses and forecasts. Imparting a preliminary knowledge on meteorological satellites, weather forecasting and monitoring through satellites and meteorological advisories to the scientific communities especially students is essential to make them understand a holistic approach to tackle the weather and climate related disasters.

In view of the above, the NAM S&T Centre has invited Scientists, Technologists, Environment Professionals, Policymakers and other professionals to join the “**Online Lecture Series on Satellite Meteorology (Weekly)**” that is being organized by South Asian Meteorological Association (SAMA), New Delhi, jointly with the Birla Institute of Technology (BIT), Mesra, India, on every Saturday from 2<sup>nd</sup> September 2023 to 20<sup>th</sup> January 2024. The series aims to cover interesting lectures on the principles of Satellite Meteorology and its applications which will be delivered by senior scientists, professors and experts from reputed institutions engaged in this field.

The Lectures are targeted to early career scientists, research scholars and masters students pursuing career in meteorology, atmospheric sciences, and climate and weather sciences. Such lectures of utmost importance will provide a greater knowledge and understanding of this emerging new branch of space science, i.e. satellite meteorology, to the developing world.

Earlier, NAM S&T Centre had invited Scientists, Researchers and other experts to join the “**Open Class Room Online Lecture Series in Atmospheric and Climate Sciences**” which was also organized by South Asian Meteorological Association (SAMA), New Delhi in collaboration with SRM Institute of Science and Technology (SRM IST), Chennai, Tamil Nadu, India during 7<sup>th</sup> January-24<sup>th</sup> April 2023. We are pleased to mention that SAMA had received an overwhelming response from the Member Countries and S&T – Industry Network Members of the NAM S&T Centre with the participation of an enormous number of scientists and researchers in these lectures.

## JOINT NAM S&T CENTRE - ZMT BREMEN (GERMANY) FELLOWSHIP PROGRAMME ON “BLUE ECONOMY IN TROPICAL COASTAL MARINE RESEARCH”

### CALL FOR APPLICATIONS FOR 2024

The NAM S&T Centre invites applications from suitable candidates for the **Joint NAM S&T Centre - ZMT Bremen (Germany) Fellowship Programme** on “*Blue Economy in Tropical Coastal Marine Research*” for the year 2024.

This Fellowship Programme was initiated in January 2008 for affiliation of the Scientists from the developing countries with the *Leibniz Centre for Tropical Marine Research (ZMT), Bremen, Germany* [[www.leibniz-zmt.de](http://www.leibniz-zmt.de)] for a period of up to 3 months to work with its Senior Researchers and Faculty Members for upgrading research skills in the fields related to Ecology, Biogeochemistry, Geology, Theoretical Ecology and Modelling, Social Sciences and Tropical Coastal Marine Systems, and undertaking short-term Joint Research Projects at ZMT, Bremen. ZMT research is organized in five thematic, interdisciplinary program areas. Depending on the research topic, the selected Fellows can also benefit from the ZMT's association with Bremen University and other well-established marine research institutes in Bremen.

The Fellowship will be awarded to the scientists *only from the Member Countries of the NAM S&T Centre* and *NAM S&T-Industry Network Members* and only one scientist may be selected from a particular country/Network Member organization. The NAM S&T Centre sponsors up to five scientists each year. While the Centre covers the international airfare of the selected Fellows from its **eligible Member Countries/ Network Member organizations**, ZMT provides a monthly subsistence allowance of 1250 Euros to meet the accommodation and other expenses in Bremen.

**The last date for submission of applications for the Fellowship is Tuesday, 31 October 2023.**

## JOINT NAM S&T CENTRE – JSS AHER, MYSURU, INDIA FELLOWSHIP PROGRAMME

### CALL FOR APPLICATIONS FOR 2024

The NAM S&T Centre invites applications from suitable candidates for the **Joint NAM S&T Centre – JSS AHER, Mysuru, India Fellowship Programme** for the year 2024.

This Fellowship Programme was initiated in the year 2022 for the affiliation of scientists and researchers from the Member Countries and S&T-Industry Network Members of the NAM S&T Centre at the institutes under the JSS Academy of Higher Education & Research (JSS AHER), Mysuru, Karnataka, India [[www.jssuni.edu.in](http://www.jssuni.edu.in)] for carrying out short-term research for a period of six weeks in various fields of Science, Technology, Engineering and Medicine. This year, proposals in the areas such as **Pharmaceutical Sciences; Drug Discovery and Molecular Simulation; Maternal and Child Health; Molecular Genetics; Preclinical Studies; Bioinformatics; Gut Microbiome Studies; Cancer Biology; Neurobiology; Protein Engineering; Analytical Chemistry** and **Materials Science** will be preferred.

The Fellowship will be awarded to the scientists *only from the Member Countries of the NAM S&T Centre* and *NAM S&T-Industry Network Members* and only one scientist may be selected from a particular country/Network Member organization. The NAM S&T Centre sponsors up to five scientists each year. While the Centre covers the international airfare of the selected Fellows from its **eligible Member Countries/Network Member organizations**, JSS AHER will provide free furnished accommodation and a pocket allowance equivalent to @US \$250 per month in local currency for the duration of the fellowship to each scientist selected under the Fellowship Programme. The JSS AHER will also arrange free of cost transport by road between Bengaluru (nearest International airport to reach Mysuru) and Mysuru to the selected scientists on their arrival/departure.

**The last date for submission of applications for the Fellowship is Wednesday, 15 November 2023.**

**Details on guidelines of the Fellowships and the application forms are available at the Centre's Website: [www.namstct.org](http://www.namstct.org)**

## Centre Announces

### International Conference on Improving Efficiency and Effectiveness in Health Delivery Systems in Developing Countries: Research, Implementation and Policy Issues (IEEHDS-2023)

**21-23 November, 2023  
Mauritius**



Promoting health and well-being is one of the 17 Global Goals that make up the 2030 Agenda for Sustainable Development. An integrated approach is crucial for progress across the multiple goals. On the other end, “One Health” is an approach to the designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public-health outcomes. The “One Health” approach is critical to addressing health threats in the animal-human-environment interface.

To achieve SDG 3 – “Good Health and Well-Being” and “One Health”, ensuring healthy lives and promoting well-being for all at all ages is an important task. To achieve healthy living, the best practices of different countries must be discussed and the policies should be recommended to the respective Governments.

In this context, the Centre for Science & Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre), New Delhi, India, in partnership with the JSS Academy of Higher Education and Research, Mauritius (JSS AHERM), announces the organization of an International Conference on 'Improving Efficiency and Effectiveness in Health Delivery Systems in Developing Countries: Research, Implementation and Policy Issues' during **November 21-23, 2023** in Mauritius.

The Conference will be hosted and organized by JSS AHER, Mauritius.

Experts and scientists desirous of participating in the Conference, except those from Mauritius, are required to submit their applications directly to the NAM S&T Centre at e-mail: [namstcentre@gmail.com](mailto:namstcentre@gmail.com) as early as possible.

Applicants from Mauritius should, however, submit their requests directly to Prof. Dr. Ashish Wadhwani, Head and Coordinator, Faculty of Health Sciences JSSAHER, Mauritius at [dradwadhvani@jssuni.edu.in](mailto:dradwadhvani@jssuni.edu.in) / [ashishwadhwani@jssaher.edu.mu](mailto:ashishwadhwani@jssaher.edu.mu).

**More details about the Training Programme are available at  
Centre's Official Website: <https://www.namstct.org>.**

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