



**FACULTY OF APPLIED SCIENCES
SOUTH EASTERN UNIVERSITY OF
SRI LANKA**

**CONFERENCE PROCEEDINGS
of
12th Annual Science Research Session - 2023**

“Exploration Towards Green Tech Horizons”

14th of December 2023

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MESSAGE FROM THE VICE CHANCELLOR



Dear Organizing Committee, Distinguished Guests, and Esteemed Researchers,

I extend my warmest greetings to all participants of the 12th Annual Science Research Session (ASRS 2023). It is indeed an honour to address you as the Vice-Chancellor of the South Eastern University of Sri Lanka and to commend the efforts put forth in organizing this significant event.

The Annual Science Research Session has become a hallmark of academic excellence, providing a platform for scholars to showcase their innovative research and contribute to the collective advancement of knowledge.

The abstracts reflect a wide spectrum of disciplines, and it is evident that the researchers have delved into cutting-edge topics that have the potential to make substantial contributions to their respective fields. The commitment to excellence in research demonstrated by the contributors is commendable, and I believe that the knowledge disseminated through these proceedings will undoubtedly have a positive impact on our academic community and beyond.

I would like to express my sincere appreciation to the Organizing Committee for their tireless efforts in coordinating this event. Your dedication to fostering a culture of research and academic inquiry is a testament to the commitment of the South Eastern University of Sri Lanka to advancing knowledge and promoting scholarly endeavours.

To the researchers, I extend my heartfelt congratulations on your achievements and the valuable contributions you have made to the scientific community. Your dedication to pushing the boundaries of knowledge is inspiring, and I am confident that your work will pave the way for further advancements in your respective fields. As we navigate the challenges of our rapidly evolving world, it is through events like ASRS that we strengthen the foundations of our academic community and forge new paths of discovery. I encourage all participants to engage in fruitful discussions, exchange ideas, and establish connections that will foster collaborative efforts in the pursuit of knowledge.

Once again, congratulations to everyone involved in the success of the 12th Annual Science Research Session. I look forward to witnessing the impact of the research presented and to the continued success of the academic community at the South Eastern University of Sri Lanka.

Best regards,

Prof. A. Rameez

Vice-Chancellor

South Eastern University of Sri Lanka

MESSAGE FROM THE CONFERENCE CHAIRPERSON



As the Chairperson of 12th Annual Science Research Session (ASRS 2023), I am delighted to extend my warmest greetings to each of you.

Our conference is a testament to the collective pursuit of knowledge, innovation, and collaboration in Scientific research under the theme of "Explorations towards Green Tech Horizons".

It is with great pleasure that I witness the convergence of brilliant minds from diverse backgrounds, coming together to share insights, engage in meaningful discussions, and foster connections that have the potential to shape the future of our field. I would like to express my sincere appreciation to the Chief guest, keynote speaker, organizing committee, and all the participants who have contributed to the success of this conference. Your commitment to advancing our understanding and addressing the challenges within scientific research is truly commendable.

The breadth and depth of the presentations and discussions have been inspiring, reflecting the cutting-edge research and thought leadership within our community. I am confident that the ideas exchanged and connections made during this conference will lead to further breakthroughs and collaborations that will propel our field forward.

I encourage you to take full advantage of the remaining sessions and networking opportunities. Engage with your peers, exchange ideas, and build relationships that can extend beyond the confines of this conference. The connections made here have the potential to drive collaborative research, innovative projects, and lasting professional relationships.

As we move forward, let us carry the spirit of collaboration, curiosity, and dedication to excellence that defines ASRS 2023. I look forward to witnessing the continued impact of the knowledge shared and connections forged during this conference.

Once again, thank you for your invaluable contributions to ASRS 2023. May the remainder of the conference be as enriching and rewarding as the days that have preceded it.

Best regards,

Dr. M.H. Haroon
Dean
Faculty of Applied Sciences
South Eastern University of Sri Lanka

MESSAGE FROM THE CONFERENCE COORDINATOR



The Annual Science Research Session (ASRS) which is organized by the Faculty of Applied Sciences of South Eastern University, is a twinkling event of the faculty that develops an excess of partnerships within the premises as well as everywhere in the country. Presently it has become a customary venue where scholars and professional people from all over the country come together and share their fruitful knowledge and new findings.

As the coordinator of the ASRS 2023, It gives me immense pride to state that as a result of the collective effort of the faculty members, we are about to celebrate the 12th research session which constantly proceeded over the past twelve years. The faculty decided to have the conference in hybrid mode since it will be an at-hand platform for the researchers throughout the country.

The platform developed with the background of various pure and applied scientific themes such as chemistry, physics, mathematics, biology, computer science, statistics, environmental sciences, and science education, demanded the publication opportunities of the scholars of the reputed institutes and organizations of the country.

The event is a production of a consecutive processes carried by the team members, reviewers, academic and non-academic members of the faculty throughout the past few months. All contributions given for the success of the event are greatly respected. All the invitees are obviously treasured for their company in the occasion.

Finally, I and my team will congratulate all the authors of the abstracts and the presenters who bloomed the todays event and wish them all to have a memorable event.

Dr. A.M.N.M. Adikaram
Coordinator,
12th Annual Science Research Session
Faculty of Applied Sciences
South Eastern University of Sri Lanka

A BRIEF BIOGRAPHY OF THE KEYNOTE SPEAKER



Professor Athula Senarathna

B.Sc. (SL), M.Sc. (London), DIC, Ph.D. (FRG),
AvH Res.Fell. (FRG), MIGSL
Emeritus Professor in Geology
University of Peradeniya, Peradeniya,
Sri Lanka

Professor Atula Senaratne holds a B.Sc. degree in Geology from the University of Peradeniya, Sri Lanka and a M.Sc. degree in Environmental Technology from the Imperial College of Science, Technology and Medicine, University of London. He obtained his Ph.D. Degree from the Johannes Gutenberg University of Mainz, Federal Republic of Germany.

He joined the academic staff of the Faculty of Science in 1980 and since then served the Faculty of Science of the University of Peradeniya and the University system in Sri Lanka at different capacities. He was the Head, Department of Geology from 1999 to 2004. He also served as the Director –Science Industry Interaction Cell, Faculty of Science and Chairman of the Board of Study in Earth Sciences of the PGIS.

He was responsible for two new mineral discoveries, Gold-Graphite (2019) in Seruwila and largest iron ore deposit in Sri Lanka, in 2001. From Aug. 2012 to end of July 2015, he held the highest position of the University, the post of Vice Chancellor.

At the national level, he served as the Chairman of the Water Resources Board of Sri Lanka, Director-Atomic Energy Authority of Sri Lanka and as a member of the Presidential Task Force “Natural Hazards”. He was also the President of the Geological Society of Sri Lanka in 2001-2002.

He has received many awards at national and international levels. He received Alexander von Humboldt Foundation Research Fellowship /Germany in 1996/97, D.A.A.D. (German Academic Exchange Service) Fellowship, Johannes Gutenberg University, Mainz, F.R.G. in 1984-1988, U.S.A.I.D. Fellowship, Water Resources Division, U.S. Geological Survey, Colorado, U.S.A., in 1983 and The Third World Scholarship, Imperial College of Science and Technology, University of London in 1981- 1982.

In 2013, he was appointed to the Chair of the Department of Geology of the University of Peradeniya. In 2014, he was decorated with the coveted Ananda Coomaraswamy medal of the Geological Society of Sri Lanka for his outstanding contributions to the knowledge of Geology of Sri Lanka.

After his retirement in December 2022, he was awarded the title of Professor Emeritus in appreciation of his services to the University of Peradeniya.

Keynote Address

FROM ROCKS TO TREASURY

Professor Athula Senarathna

Emeritus Professor in Geology, University of Peradeniya, Sri Lanka

Sri Lanka is a Lower Middle-Income country with a GDP per capita of USD 4,073 (as of 2017) and a total population of 21.4 million people. Following 30 years of civil war ended in 2009, Sri Lanka's economy grew at an average 5.8 percent during the period of 2010-2017, reflecting a peace dividend and a determined policy thrust towards reconstruction and growth, although there were some signs of a slowdown in the last few years up to 2019 and came to an abrupt halt in 2019 with the epidemic, COVID 19.

To put Sri Lanka back on the fast track of development it is essential to focus on high profit exports. Mineral commodities are at the top among the foreign exchange earners in fast growing economies around the globe. Usually cost of mining stay below 30% of the export market prices of most of the minerals allowing over 70% profit margin.

This paper presents Sri Lanka's prospects of mineral resources as the top foreign exchange earner and as the vehicle which can take us to long awaited prosperity.

Invited Speech

SUSTAINABLE MANAGEMENT OF WETLANDS IN INDIA: A RAMSAR SITE IN THE EASTERN PART OF KOLKATA

Dr. Swati Nandi Chakraborty

*Guru Nanak Institute of Pharmaceutical Science & Technology Kolkata
metropolitan area, West Bengal, India.*

The East Kolkata Wetlands (EKW), a Ramsar site, located in the eastern part of Kolkata city, is one of the largest natural waste-recycling regions of India. EKW is a mixture of man-made and natural wetlands and is the largest waste-water wetland among the 37 Ramsar sites in India. This sprawling wetland complex spans over 12,500 hectares and stands as a testament to the harmonious co-existence of urban development and ecological preservation. Amidst the tranquil wetlands, a fascinating tapestry of agricultural cultivation unfolds. The rich alluvial soil, nurtured by the constant ebb and flow of water, provides an ideal canvas for a variety of crops. The crops harvested here not only sustain local communities but also find their way into the bustling markets of Kolkata, providing fresh, locally sourced produce to urban dwellers. But this unique and diverse ecosystem has largely remained unexplored for its microbial biodiversity. Thus, this study investigates the isolation and characterization of microorganisms from EKW. 18 of the isolated bacterial strains were reported to produce chitosan - a biopolymer derived from chitin that exhibits immense potential in biopesticide formulation, offering an environmentally friendly alternative to synthetic pesticides. Chitosan-based biopesticide have been shown to have antifungal and antimicrobial properties, which stimulates the plant's natural defence system, thereby enhancing its resistance against plant pathogens. The utilization of chitosan-based biopesticides aligns with the growing global interest in sustainable and organic farming practices. Moreover, the research also delves into plastic degrading capabilities of these microorganisms, addressing the escalating global problem of plastic pollution. The isolated strains are evaluated for their efficiency in breaking down common plastic polymers, and it was found that a consortium of 6 bacterial strains were successfully able to degrade plastics. Biodegradation of plastic-waste does not result in greenhouse gas emission, thus contributing to the development of sustainable strategies for plastic waste management. The findings of this research highlight the novel microbial resources within EKW that possess dual functionalities of chitosan production and plastic degradation. The study thus, underscores the importance of harnessing microbial diversity from natural ecosystems for the sustainable advancement of agriculture and environmental management practices.

Keywords: East Kolkata Wetlands, Ramsar site, chitosan-based biopesticide, plastic biodegradation, sustainable agriculture, greenhouse gas emission

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