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October 16th, 2024

***“EXPLORING INNOVATIVE HORIZONS THROUGH MODERN TECHNOLOGIES
FOR A SUSTAINABLE FUTURE”***



**Faculty of Technology
South Eastern University of Sri Lanka
Sri Lanka**

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MESSAGE FROM THE CHAIRMAN & VICE CHANCELLOR



As the Acting Vice Chancellor of the South Eastern University of Sri Lanka and the Dean of the Faculty of Technology, I am honoured and delighted to pen this message to the Fourth International Conference on Science & Technology (ICST 2024), themed “Exploring Innovative Horizons through Modern Technologies for a Sustainable Future.” This theme is timely, addressing the pressing global challenges faced today since the era of technology and its structured evolution is crucial for achieving a sustainable future for the generations to come. The technological advancements are further required to address the pressing issues we face today. It is vital that innovations being developed worldwide today are disseminated and shared to ensure balanced application and effectively tackle these challenges.

The Faculty of Technology, the youngest at the South Eastern University of Sri Lanka, has shown remarkable growth and development in research and innovation, making significant contributions to both the local and global communities. This conference serves as a vital platform for researchers, academicians, research students, professionals and policymakers to exchange ideas, share information and discuss advancements that can lead to sustainable solutions. This year, our collaboration with the Sri Lanka Association for the Advancement of Science (SLAAS) has significantly enriched and empowered the research culture of the conference, extending beyond the borders.

We are proud to have received over fifty research papers from local and international scholars, highlighting our commitment to fostering a vibrant research culture. I extend my heartfelt gratitude to the keynote speakers, Prof. Dilanthi Amaratunga from the University of Huddersfield, United Kingdom, and Prof. Chaklam Silapasuwanchai from the Asian Institute of Technology, Thailand, sponsors, distinguished guests, scholars, presenters, the organizing committee, staff of the faculty, students and the administrative staff for their fullest cooperation and enormous support extended to make this historic event a success. I also wish to extend my thanks for all who directly and indirectly supported during the different stages of this conference to make a very success one.

I wish all presenters a great success in sharing their findings and contributing to our collective pursuit for a sustainable future.

Sincerely,

Dr. U. L. Abdul Majeed

Dean, Faculty of Technology

Vice Chancellor, South Eastern University of Sri Lanka

Sri Lanka.

MESSAGE FROM THE COORDINATOR



As the coordinator of the International Conference on Science and Technology-2024 (ICST2024), I am excited to compose this message, a prominent event among the Technology Faculties in our country. The Faculty of Technology at the South Eastern University of Sri Lanka proudly orchestrated this distinguished gathering on 16th October 2024.

The theme of the ICST2024 is “Exploring Innovative Horizons through Modern Technologies for a Sustainable Future,” which reverberates deep relevancy with the current state of affairs in the country. This event will be garnered by distinguished researchers, scientists, engineers, technocrats, technologists, and industrialists from around the globe. This annual event marks a significant stride among the technology faculties in the Country, showcasing our commitment to advancing knowledge and addressing pertinent issues. The wide spectrum of topics will be a good stimulus for new research ideas and new horizons.

As Sri Lanka gradually recuperates from the challenging aftermath of the COVID-19 Global Pandemic and the unprecedented economic downturn, initiatives like this conference are vital in propelling us forward towards a brighter future. At this crucial juncture, the use of Innovative Horizons and Modern Technologies for Sustainable Development Goals would uplift the nation. The emerging youth in the country is highly coupled with the technology that can be utilized to enhance research, innovations, and product development. Faculty of Technology always promotes research, innovation, and new product development, this is another platform for the scientific community to prosper further.

ICST2024 will have a significant prominence with two well-renowned keynote speakers: Prof. Dilanthi Amaratunga, an eminent personality on the global front and currently the Head of the Global Disaster Resilience Centre, United Kingdom. The other one is Prof. Chaklam Silpasuwanchai from the Asian Institute of Technology, Thailand.

We received 80 full paper submissions for double-blind peer review where 52 papers were accepted for oral presentations. The compiled abstract is available in the form of both hardcopy and electronic formats at the University e-repository and conference website. The selected best papers will be published either in the Sri Lankan Journal of Technology or the Journal of Information Communication Technology.

I highly appreciate the interest of all presenters who used this opportunity to gain their skills and knowledge from different perspectives. The remarkable support provided by the Steering Committee, Track Coordinators, Editor, Editorial Team, Editorial Assistants, Reviewers, Authors and other staff members was truly impressive, and their unwavering dedication did not go unnoticed, who were preparing this event for nearly a year. Moreover, I would like to extend gratitude to the Platinum sponsors for their generous financial support in making this event a grand success.

Dr. Muneeb M. Musthafa

Coordinator

4th International Conference on Science and Technology

Faculty of Technology

South Eastern University of Sri Lanka

Sri Lanka.

MESSAGE FROM THE KEYNOTE SPEAKER



Many congratulations for the organising committee of the “2024 International Conference on Science & Technology ICST (ICST-2024)” at the Faculty of Technology, South Eastern University of Sri Lanka for initiating this very timely conference with the theme: "Exploring innovative horizons through modern technologies for a sustainable future”.

The conference has many fields of interest including Network and Security Technologies, Agriculture Economics and Entrepreneurship, Food Science and Technology, which are closely aligned to achieving the Sustainable Development Goals (SDGs). Developed and deployed correctly, digital technologies are powerful tools that can have a transformational effect on SDGs. Technologies can help governments, businesses, and philanthropic organizations accelerate their efforts to achieve the 17 SDGs. Of the 169 SDG targets, 103 are directly influenced by the technologies, with established examples of deployment that provide insight into their potential to make an impact. A broad range of SDG targets, including 20 particular targets and 25 associated indicators, finds that further deployment of existing digital technologies will, on average, help accelerate progress toward the SDGs by 22% and mitigate downward trends by 23%. An estimated 70% of new value created in the economy over the next decade will be based on digitally enabled platforms – and leading innovators are re-imagining how we innovate, create, distribute and capture value in the new systems that are emerging

Technology is not a silver bullet, but it holds the potential to transform sectors rapidly and globally: to increase the productivity of systems while lowering emissions and waste, to enable us to monitor and manage the Earth’s surface and resources at a speed and scale we couldn’t have dreamed of before; to collect and harness vast amounts of data; and make breakthrough advances in areas like climate, healthcare, agriculture, energy, education and mobility.

Leveraging technology to achieve the SDG is evidenced in hazards early warning systems. With ever-increasing climate-related hazards, delivering climate justice to those on the frontlines of the climate crisis is everyone’s responsibility. Early warning systems are helping decrease the number of deaths and to reduce losses and damages resulting from hazardous weather, water or climate events. Major gaps still exist, especially from the point of view of the effectiveness of the communication modes that are being used in this process. This is something I very much hope to reflect on during my keynote speech at the conference. This is just one aspect of this conference and indeed there are many more really interesting themes including Food Science and Technology.

I am waiting to hear deliberations and the post-conference summary arising from this very interesting and timely event.

Many congratulations!

Professor Dilanthi Amaratunga, BSc (Hons), PhD, FHEA, FRICS, FRGS, CMgr FCMI
Consultant, University of Huddersfield, UK
Joint Editor-in-chief: International Journal of Disaster Resilience in the Built Environment
Member, UNDRR Europe - Science and Technology Advisory Group
Expert member of the ICG/IOTWMS WG-1 on Tsunami Risk, Community Awareness & Preparedness
Expert of UN Women – Women’s Resilience to Disasters Programme
Steering Committee Member, UK Alliance for Disasters Research
Member of the UNDRR MCR2030 Regional Coordination Committee for Europe.

MESSAGE FROM THE KEYNOTE SPEAKER



It is my great pleasure to pen this message for the fourth iteration of an esteemed conference organized by the Faculty of Technology, South Eastern University of Sri Lanka. I extend my heartfelt wishes for the success of this gathering, whose theme, "Exploring Innovative Horizons Through Modern Technologies for a Sustainable Future," could not be more timely or relevant.

We stand at a pivotal moment in human history. Our world grapples with rising mental health crises, persistent conflicts, and the unprecedented emergence of artificial intelligence. These challenges are not just headlines; they are urgent calls for our collective action and wisdom. As global citizens and technologists, we bear a profound responsibility. Our choices today will sculpt the contours of tomorrow's world, particularly in the realm of AI and its impact on society. Our civilization has been through a long technological journey - from stone tools to silicon chips, from the dawn of agriculture to the digital age, and now to the threshold of an AI-dominated era. We'll confront both the immense potential and the daunting risks that AI presents to our civilization.

At the heart of my presentation lies a crucial proposition: the need for a Human-First perspective in our approach to AI. We must grapple with fundamental questions: What defines our humanity? How do we ensure our coexistence with AI enhances rather than diminishes our essential nature? These are not abstract philosophical musings, but vital inquiries that will shape our future. As we venture into this new frontier, let wisdom be our compass, not fear our driver. Our goal should be to harness AI's power to amplify human potential, not replace it. In this AI era, our uniquely human qualities - empathy, creativity, ethical reasoning - will become more crucial than ever. We have the power to create a future where technology serves humanity's highest aspirations. A future where progress is measured not merely in teraflops, but in the flourishing of human spirit and society. The challenges before us are formidable, but so is our capacity to overcome them.

I invite you to join me in this critical exploration. Together, let's chart a course that honors our humanity while embracing the transformative power of AI. In doing so, we align perfectly with our conference's theme, striving for innovation and sustainability in equal measure.

With unwavering determination and hope,

Chaklam Silpasuwanchai, Ph.D.

Assistant Professor

Asian Institute of Technology, Thailand.

MESSAGE FROM THE GENERAL PRESIDENT SLAAS (EASTERN CHAPTER)



It is a great honour and delight for me to extend my compliments on the occasion of the 4th International Conference on Science and Technology (ICST 2024) of the Faculty of Technology, South Eastern University of Sri Lanka, which is jointly organized by the Sri Lanka Association for the Advancement of Science (SLAAS) – Eastern Chapter, under the theme of “*Exploring Innovative Horizons through Modern Technologies for a Sustainable Future.*”

It is noteworthy that ICST 2024 has ten technical tracks and covers a number of interesting areas of research related to the Conference Theme, which are topical in the present context. I fervently wish that this International Conference will provide an excellent forum to the national and international students, academicians and research scholars to interact and exchange ideas on their latest innovations and findings, and in building productive collaborations for cutting-edge research in their chosen field of work.

I thank very much to Mrs. A. R. Fathima Shafana and members of the organizing committee for their gracious invitation to write up this message for the ICST 2024. I sincerely express my warmest best wishes to the organizing committee of the ICST 2024 and all others who have provided their immense support to make this event a grand success. The painstaking efforts and commitment of all the members of organizing committee in preparation for this Conference is truly appreciated.

Finally, I extend my appreciation to the presenters for enriching the conference with your contributions, and congratulate them for successfully publishing their research findings. I wish sincerely that the ICST 2024 will be a resounding success.

Prof. A. G. Johnpillai

General President

Sri Lanka Association for the Advancement of Science -SLAAS (Eastern Chapter)

Sri Lanka.

ABSTRACT OF KEYNOTE SPEECH

Perceptions Towards Communication Modes of Multi-Hazard Early Warning in Sri Lanka: Community Perspective

Dilanthi Amaratunga

Global Disaster Resilience Centre, University of Huddersfield, UK

The climate emergency is the biggest ever economic, social and environmental threat facing the planet and humanity. The global and interconnected risk landscape, therefore, requires integrated solutions that address cascading and interrelated risks. A multi-hazard early warning system is such a solution and is a key element of a comprehensive DRR strategy. Early warning messages about impending hazards that could or may cause disasters must reach all citizens, including emergency response organizations, communities at risk, public safety organizations, and others. Information and Communication Technologies (ICTs) are an important and integral component of Multi-Hazard Early Warning Systems (MHEWS), that manage and deliver alerting messages to those in affected areas and wider at the national or international level which allows them to take action to mitigate the impacts of the hazard. MHEWS has the ability to address several hazards and/or impacts of similar or different types in situations where hazardous events may occur alone, simultaneously, cascading or cumulatively over time, and taking into account the potential interrelated effects. To be effective, multi-hazard early warning systems should include the participation of different stakeholders and actively involve the people and communities at risk in order to ensure that the system has an enabling environment which incorporates the appropriate technology, regulatory and legal frameworks, adequate operational capacities, as well as to clearly defined roles and responsibilities for all participating agencies including communities. ICT accessibility is important in developing MHEWS. Vulnerable groups, including persons with disabilities, older adults, people in marginal or remote areas without access or connectivity, women and girls, individuals with low literacy levels, Indigenous people, and migrants, are often in a higher risk during the disaster; thus their needs should be taken into careful consideration when disseminating the alerts through mixed channels. However, there is lack of having effective and efficient communication modes and resistance of the community to adapt to novel technologically based communication modes. In order to identify the community-level perception of the existing communication modes in Sri Lanka, including the current status, gaps and barriers in the existing Technological applications, and thereby develop strategies to bridge the existing gap, a field survey was carried out across several local entities. Over 1400 responses were collected. As per the results obtained under the response analysis, traditional modes of communication were highlighted as the most effective communication mode both at urban and rural levels, amongst several other key findings, which will be the basis of this keynote speech. It further highlighted the need to raise awareness about the importance of risk knowledge, facilitate public education, disseminate messages and warnings efficiently and ensure that there is a constant state of preparedness and that early action is enabled.

ABSTRACT OF KEYNOTE SPEECH

Will AI Replace Jobs? A Human-First Perspective

Chaklam Silpasuwanchai

Computer Science and Information Management, Asian Institute of Technology, Thailand.

As AI models scale in size and are supplied with increasing volumes of data, they approach levels of intelligence that could surpass human capabilities in various domains, a milestone often referred to as Artificial General Intelligence (AGI). This development could revolutionize industries, driving unprecedented economic growth, enhancing productivity, and accelerating advancements in fields such as healthcare and technology.

However, alongside these potential benefits, the widespread adoption of AI poses substantial risks to the job market, particularly for individuals whose skills involve reasoning, writing, and mathematics. Jobs traditionally considered secure within the middle and upper-middle classes are increasingly vulnerable to automation, as AI systems outperform human workers in cognitive tasks. The presentation highlights that while new job opportunities will emerge, they will primarily favor individuals with exceptional cognitive skills, leading to heightened inequality within professional and knowledge-based fields.

This poses critical societal challenge: the erosion of job security for those with median cognitive skills, resulting in broader social issues such as reduced self-worth and increased mental health concerns. There is a need for a human-centric approach that emphasizes skills AI cannot replicate, such as imagination, deep understanding of human behaviour, and ethical reasoning. Imagination, defined as the ability to conceive novel ideas and solutions, remains a uniquely human trait that AI, despite its creative capabilities, cannot authentically replicate. Similarly, the deep, holistic understanding of other humans—encompassing empathy and nuanced perception—poses a significant challenge for AI, as it involves complexities of the human mind that are not fully understood. Ethical reasoning, which guides human instincts about right and wrong, further highlights the limitations of AI, as it is rooted in values that are difficult to codify. Forward-thinking strategies such as the advocating for targeted investments in education that promote imagination, ethical reasoning, and a deep understanding of human nature are proposed to address these challenges. Additionally, AI literacy has to be enhanced to provide individuals with a comprehensive understanding of the capabilities and limitations of AI. By fostering a balanced approach that values and cultivates distinctly human skills, societies can better navigate the evolving job market and ensure that technological advancements contribute to sustainable growth without compromising social stability or human worth.

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