



10th ANNUAL RESEARCH SESSION
SABARAGAMUWA UNIVERSITY OF SRI LANKA
16th DECEMBER 2020



**Abstracts of the 10th Annual Research Session,
Sabaragamuwa University of Sri Lanka**

Published by : Sabaragamuwa University of Sri Lanka

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ISSN : 2756-9306

**Citation : Abstracts of the 10th Annual Research Session,
Sabaragamuwa University of Sri Lanka.**

Available from : Sabaragamuwa University of Sri Lanka.
P.O. Box 02, Belihuloya 70140, Sri Lanka.
Tel: +94 (0)45 2280014
Email: ars@crkd.sab.ac.lk
Web: <http://www.sab.ac.lk/crkd/ars>

**10th ANNUAL RESEARCH SESSION
SABARAGAMUWA UNIVERSITY OF SRI LANKA**

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Message from the Vice-Chancellor

Sabaragamuwa University of Sri Lanka

On behalf of Sabaragamuwa University of Sri Lanka, I take great pride in welcoming all the attendees for the 10th Annual Research Session (ARS 2020) to be held on 16th December 2020 at Sabaragamuwa University of Sri Lanka (SUSL). The Annual Research Session of SUSL is a multi-disciplinary scholarly platform that allows sharing an insight into the recent researches conducted by the University academics, the postgraduate students, and the undergraduate students of SUSL. The Annual Research Session of this year covers major areas of academic disciplines that include Agricultural Sciences, Applied Sciences, Geomatics, Management, Medicine, and Social Sciences & Languages. Therefore, I strongly believe that the ARS 2020 will contribute to enhance the research culture of the University immensely.

The Annual Research Session of this year is of course exceptional, particularly in terms of the circumstances in which it is taking place. While I regret that the COVID pandemic prevented us from holding the ARS 2020 completely at the university premises, yet I am excited about the opportunities of holding an innovative virtual event.

Organizing and conducting this type of a multi-disciplinary scholarly event is indeed an immense challenge. Therefore, I take this opportunity to express my appreciation to the organizing committee for accepting this challenge to make the 10th Annual Research Session a reality.

Finally, I look forward to welcoming you all to this exciting ARS 2020 and to meet you all in December 2020. Moreover, I do hope that you would join us to make the ARS 2020, a fruitful and a memorable event.

Prof. R.M.U.S.K. Rathnayake
Vice-Chancellor
Sabaragamuwa University of Sri Lanka

Message from the Director

Centre for Research and Knowledge Dissemination Sabaragamuwa University of Sri Lanka

It is with great pleasure that I convey this message to the 10th Annual Research Session of the Sabaragamuwa University of Sri Lanka. As an annual event, organized by the CRKD, ARS intends to give a platform to all academics, postgraduate and undergraduate students to share the latest research findings with the multi-disciplinary scientific community of the SUSL and pave a pathway for their innovations and creativity.

The symposium would indeed be a great success in terms of its quality and the quantity of the submitted research papers. Fifty-one papers submitted by academics and postgraduate students were accepted for the oral presentation. Further, seventeen papers from undergraduates were also accepted for the poster session. Each paper received rigorous and professional reviews. I appreciate all the reviewers and the editorial committee for their tireless work in reviewing the papers. This year, ARS is featuring a renowned keynote speaker, Prof. Rangika Halwatura, who is attached to the Department of Civil Engineering, University of Moratuwa widely known in his field for the impact and innovative nature of his research contributions to Civil Engineering Science.

I appreciate and acknowledge the leadership and guidance of the Vice-Chancellor Prof. R.M.S.U. Rathnayake and the support of the Registrar and the Actg. Bursar in making this 10th ARS a success. This year, due to the measures that were taken for COVID-19, organizers had to face a new challenge in organizing a virtual session. I would like to thank all the members of the organizing committee, Dr. P.G.R.N.I. Pussella (Chairmen - ARS), Dr. R.M.A.S. Bandara (Co-Chair - ARS) and Dr. P.K.C.M. Wijewickrema (Secretary - ARS), Faculty Coordinators and Ms. S.M.F. Shafnaz (Research Assistant - CRKD) for their tremendous efforts, to make this event a success. I would like to thank the Dean of the Faculty of Graduate Studies, Prof. H.M.S. Priyanath, who has made significant contributions, by bearing all the responsibilities to organize the postgraduate's colloquium.

More importantly, my sincere thanks extend to the authors of manuscripts, the keynote speaker, the technical program committee members, reviewers, technical session chairs, language editors, poster presenters and all other participants who assisted in this endeavor in numerous ways to make this event a reality.

Prof. Chandrika Dissanayake
Director/CRKD

Message from the Chairman of the 10th Annual Research Session 2020

Sabaragamuwa University of Sri Lanka

It is a great pleasure to put forward this message to the Tenth Annual Research Session (ARS) of Sabaragamuwa University of Sri Lanka. This event was initiated in 2014 and, this year we have the prime objective of providing a solid platform to disseminate innovative research findings achieved by the academics and postgraduate and undergraduate students attached to different faculties of the university during their research careers. In addition, this offers a very good opportunity to the participants to present their research works, to a wider community of academics and, at the same time, they have been given a very good platform to get comments and suggestions from senior academics of the university for making further improvements in their researches.

This year, the ARS is encompassed with presentations mainly under, three categories. Firstly, there are 21 presentations from the academic staff members of the university who have conducted and finalized post-graduate researches in local and international universities and research institutions all over the world. Furthermore, 30 postgraduate students attached to the Faculty of Graduate Studies of the university are presenting their research findings and proposals to this gathering. Also, a poster session has been arranged, specially, for the under-graduate students attached to SUSL to show their talents in the research field. Also, it is great to announce that the “Abstracts of the Annual Research Session, Sabaragamuwa University of Sri Lanka” is registered as an international standard publication under the ISBN.

We would like to take this as an opportunity, to express our sincere appreciation to our key note speaker Prof. Rangika Halwathura, Senior Lecturer, Department of Civil Engineering, Faculty of Engineering University of Moratuwa. Furthermore, we would like to express our positive reception to the Vice Chancellor of SUSL and Director of the Centre for Research and Knowledge Dissemination (CRKD) and the staff for their invaluable support extended to make this event a success. In addition, we would like to thank all those who worked hard and gave their fullest support to organize this event successfully. Finally, we wish all the presenters as well as non-presenting researchers of SUSL every success in their career paths.

Dr. PGRNI Pussella.
Chairman of the Organizing Committee
ARS 2020 – Tenth Annual Research Session.
Sabaragamuwa University of Sri Lanka

Message from the Dean

Faculty of Graduate Studies Sabaragamuwa University of Sri Lanka

It is indeed with great pleasure that I issue this congratulatory message for the Annual Research Session (ARS) of Sabaragamuwa University of Sri Lanka as it is a very significant event organized annually to provide scholars, postgraduate and undergraduate students with a platform to disseminate their research findings. This Annual Research Session organized by the Center for Research and Knowledge Dissemination (CRKD) of Sabaragamuwa University of Sri Lanka is particularly significant for the Faculty of Graduate Studies (FGS) as FGS is fortunate enough to organize its Graduate Colloquium – 2020 in collaboration with the CRKD as one of the main events in the Annual Research Session. FGS annually organizes the Graduate Colloquium to encourage postgraduate students to share their research findings and progress, with a panel of experts who will help them improve their postgraduate studies. I am confident that the postgraduate students of the FGS will be immensely benefited by this event.

I take this opportunity to congratulate the organizing committee for taking the challenge of organizing the Annual Research Session in a very professional manner despite this tremendously tough situation in the wake of COVID-19 pandemic. I have no doubt that the Annual Research Session – 2020 will offer our university academia and postgraduate students to share their latest research findings and insights with their colleagues and experts in a multi-disciplinary forum.

On behalf of the FGS, I would like to extend my sincere thanks to the Director – CRKD and the organizing committee who shouldered the task of organizing the annual research session – 2020.

Finally, I wish all the participants to experience an interesting, a thought-provoking, and a productive event.

Professor H.M.S. Priyanath
Dean
Faculty of Graduate Studies

Summary of the Keynote Speech

Natural Science Vs Artificial Science

Prof. R. U. Halwatura

Civil Engineering Department, University of Moratuwa, Sri Lanka

Nature is a huge teaching space that offers many lessons for those who take the time to reflect and discover. In decades ago, scientists and inventors studied characteristics of things in nature and came up with amazing technologies and products invented as a result of studying nature. However, in the recent past we forgot this simple fact and started ruling nature. As a result, the human factor was deteriorating more than inventions/ innovation, Instead the disruptions have come into the picture. This was evident immensely in the recent past. Nature has started responding and that will hint us to recheck our actions. It was well known that any civilization can't exist without novelty. However, if that goes against nature and natural justice, a reversal of the whole process should be expected soon. That was again evident with COVID 19.

Sustainability has become the most important challenge not just for the present, but also for the decades to come. Scientifically-based solutions should drive technological innovations that enable compliance with the still-growing environmental constraints. Research in this particular field of interest is advanced from the physical, chemical, biological, lifecycle assessment, engineering, and materials science perspective, often leading to synergistic approaches. The success in a research will come in many ways. However, the whole story of the research process line will start with finding a moral question, which can lead to groundbreaking outcomes. At the same time, if a person can try to find a natural or near natural solution to a natural problem than an artificially created issue, that will surely pave the sustainable future ahead.