Graduate Colloquium – ICARC 2025

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Message from the Vice Chancellor

It is with immense pleasure that I extend my heartfelt appreciation to the Faculty of Computing for organizing the 5th International Conference on Advanced Research in Computing – ICARC 2025. Centered around the theme **"Converging Horizons: Uniting Disciplines in Computing Research Through AI Innovation,"** this conference underscores our commitment to integrating economic and sustainable perspectives into computing research—an essential step in navigating today's rapidly evolving technological landscape.

ICARC has established itself as a vital platform for advancing cutting-edge scientific knowledge across various disciplines within our teaching and research domains. It serves as a beacon of our dedication to exploring the transformative opportunities and challenges presented by information and communication technology in the modern world.

I take great pride in recognizing the Faculty of Computing for their unwavering commitment to excellence in organizing this prestigious event. The collaboration and technical co-sponsorship from IEEE, along with the submission of accepted papers to the IEEE Xplore Digital Library, demonstrate the high academic and research standards upheld by the Faculty. This accomplishment not only aligns with our vision of becoming a world-class academic institution but also strengthens our role in addressing global technological demands.

ICARC 2025 will spotlight key research areas such as Artificial Intelligence, Machine Learning, and Computer Vision, among others. By doing so, it will not only contribute to Sri Lanka's national vision but also position us to lead and influence global discussions on emerging trends in computing.

I am confident that this conference will foster meaningful knowledge exchange, promote interdisciplinary research collaborations, and open avenues for product commercialization. As we embark on this collective journey, I hope ICARC 2025 serves as a catalyst for pioneering innovations and shaping a future driven by technological excellence.

I look forward to witnessing the profound impact and success of ICARC 2025. My sincere gratitude goes to all researchers, session chairs, sponsors, and contributors for their invaluable efforts in making this event a resounding success.

Wishing you all a productive and insightful conference.

Professor M. Sunil Shantha
Vice-Chancellor
Sabaragamuwa University of Sri Lanka

Message from the Dean of the Faculty

Greetings,

It is my great pleasure to extend a warm welcome to all of you to the 5th International Conference on Advanced Research in Computing (ICARC), organized by the Faculty of Computing at Sabaragamuwa University of Sri Lanka for the fourth consecutive year. Scheduled for the 19th and 20th of February 2025, this hybrid event brings together academics, researchers, industry professionals, and students to explore advancements in computing and technology.

This year's theme, *"Converging Horizons: Uniting Disciplines in Computing Research Through AI Innovation,"* highlights a transformative shift in the AI landscape. It emphasizes the importance of integrating diverse fields of computing to foster interdisciplinary collaboration. Leveraging AI as a unifying force, this theme focuses on addressing complex global challenges, driving innovation, and pushing the boundaries of research.

ICARC 2025 is technically co-sponsored by IEEE Global, IEEE Sri Lanka Section, IEEE Computer Society Sri Lanka Chapter, IEEE Communication Society, IEEE Signal Processing Chapter, IEEE EMBS Chapter, and IEEE IAS Chapter. Additionally, the Sri Lanka Medical Association joins as the Knowledge and Innovation Partner, introducing a unique interdisciplinary approach to this year's event.

Over the past five years, ICARC has established itself as a flagship event for the Faculty of Computing. It has significantly enhanced the faculty's research profile while creating opportunities for global collaboration. ICARC is proud to maintain a strong tradition of publishing high-quality, indexed proceedings, ensuring international visibility for its contributors. Achieving eight indexed publications within four years reflects its growing prominence within the academic community.

This year, we are organizing the Graduate Colloquium for the first time in parallel with ICARC. It provides a supportive and engaging platform specifically designed for early-career researchers in computing. ICARC continues to be a platform where young researchers connect with industry experts and academic mentors. It fosters innovation and professional growth, strengthening its reputation as a premier event in computing research.

I sincerely thank the organizing and technical teams for their tireless efforts, which have made this event possible. It is an honor to lead such a dedicated team.

As we embark on this conference, I encourage all participants to engage actively in sessions and enjoy the atmosphere of Sabaragamuwa University as we celebrate 29 years of service to the nation.

Warm regards,

Professor S. Vasanthapriyan
Dean
Faculty of Computing,
Sabaragamuwa University of Sri Lanka
19-02-2025

Message from the General Chair – ICARC 2025

Greetings and congratulations on the successful organization of the 5th International Conference on Advanced Research in Computing (ICARC 2025). Over the years, ICARC has evolved into a distinguished platform for researchers, practitioners, and industry experts to engage in thought-provoking discussions and present cutting-edge advancements in computing. This year's theme, *"Converging Horizons: Uniting Disciplines in Computing Research Through AI Innovation,"* underscores the transformative role of Artificial Intelligence (AI) in fostering interdisciplinary collaboration and innovation across diverse domains.

The rapid progression of AI is not only enhancing traditional computing paradigms but also forging new hybrid fields that integrate principles from multiple disciplines. At ICARC 2025, we aim to explore the synergy between AI and various computing domains, paving the way for groundbreaking research and impactful technological developments. ICARC 2025 promises an enriching experience, featuring keynote and plenary sessions by esteemed scholars and industry leaders, technical paper presentations, pre-conference workshops, tutorials, and interactive discussions. The conference continues its tradition of excellence, proudly marking its fourth consecutive year with IEEE Technical Co-sponsorship. Notably, accepted papers will be submitted for inclusion in IEEE Xplore, provided they meet IEEE's quality and scope requirements.

The conference encompasses a broad spectrum of technical tracks, including Artificial Intelligence and Machine Learning, Text Analytics and Natural Language Processing, Computer Networks and Internet of Things, Knowledge Management and Software Engineering, Generative AI Enhanced Teaching and Learning, Digital Transformation and Industry 5.0, Digital Transformation in Healthcare, as well as an Open Track and a dedicated Graduate Colloquium. Additionally, ICARC 2025 is honored to have technical co-sponsorship from IEEE Global, IEEE Sri Lanka Section, IEEE Computer Society Sri Lanka Chapter, IEEE Communication Society

Chapter, IEEE Engineering in Medicine and Biology Society (EMBS) Sri Lanka Chapter, and IEEE Industry Applications Society (IAS) Sri Lanka Chapter.

I extend my sincere appreciation to the dedicated organizing committee, reviewers, keynote and plenary speakers, and all participants whose unwavering commitment has contributed to the success of this event. A special note of gratitude goes to the Faculty of Computing, Sabaragamuwa University of Sri Lanka, for their steadfast support and leadership in hosting ICARC 2025. Additionally, we are deeply grateful to our patrons and sponsors, whose generosity and encouragement have been instrumental in making this conference a reality.

As we come together to explore the frontiers of AI-driven computing research, I encourage you to engage in stimulating discussions, foster collaborations, and contribute to shaping the future of computing. I look forward to witnessing the impactful research and innovations that will emerge from this esteemed gathering.

Dr. KPN Jayasena
General Chair, ICARC 2025
19-02-2025

Message from the Graduate Colloquium Chair – ICARC 2025

Greetings and congratulations on the successful organization of the 1st Graduate Colloquium organized parallel to the 5th International Conference on Advanced Research in Computing (ICARC 2025). Throughout its evolution, ICARC has established itself as a prominent forum where researchers, professionals, and industry leaders convene to exchange ideas and showcase the latest breakthroughs in computing. This year's focus on *"Converging Horizons: Uniting Disciplines in Computing Research Through AI Innovation"* emphasizes the pivotal role of Artificial Intelligence (AI) in redefining traditional boundaries, enabling new synergies, and shaping the future of interdisciplinary research.

This colloquium marks a significant milestone in our commitment to fostering emerging research talent in computing. Designed specifically for early-career researchers, this provides a unique platform to present dissertation work, engage in scholarly discussions, and receive invaluable feedback from distinguished experts in the field.

In today's rapidly evolving technological landscape, interdisciplinary collaboration and innovation are more crucial than ever. The Graduate Colloquium - ICARC 2025 is built on the idea that research thrives in a community that encourages constructive critique, mentorship, and the exchange of diverse perspectives. This Graduate Colloquium is not just about showcasing research, it is about refining ideas, expanding professional networks, and setting the stage for future contributions to the field. Throughout this colloquium, participants will have the opportunity to present their ongoing research in a supportive environment, where senior academics and industry experts will provide guidance to help shape their work.

I strongly encourage all participants to actively engage with their peers, seek constructive feedback, and embrace this opportunity to grow as

researchers. Let this Graduate Colloquium serve as a stepping stone in your academic journey, inspiring new ideas and pushing the boundaries of computing research.

On behalf of the organizing committee, I express my sincere gratitude to all the mentors, reviewers, and contributors who have made this colloquium possible. Your support and dedication play a vital role in shaping the future of computing research.

I look forward to an engaging, insightful, and inspiring colloquium. May this experience ignite new possibilities and set the course for impactful discoveries!

Dr. RAHM Rupasingha
Chair, 1st Graduate Colloquium
ICARC 2025

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ABSTRACTS

OF THE GRADUATE COLLOQUIUM 2025