UNIMAS
UNIVERSITI MALAYSIA SARAWAK

FACULTY OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

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CITA

The 13th International Conference on Information Technology in Asia 2023

"Nurturing Digital Intelligence for a Sustainable Future"

3rd – 4th August 2023 | Virtual Conference

Technical Co-Sponsor

IEEE
SARAWAK SUBSECTION

Vice Chancellor's Message

Dear Participants,

It is my great pleasure to extend a warm welcome to all of you to the 13th International Conference on Information Technology in Asia 2023 (CITA'23). On behalf of Universiti Malaysia Sarawak (UNIMAS) and the Faculty of Computer Science and Information Technology (FCSIT), I am honoured to welcome researchers, experts, engineers, and postgraduate students from around the world to this prestigious event.

CITA'23 is a pivotal platform for exchanging knowledge, ideas, and best practices in the dynamic field of Information Technology. This biennial conference has established itself as a leading forum, fostering collaboration and stimulating advancements in various aspects of IT. It is a testament to the commitment and dedication of the organising committee that we have the privilege to convene once again.

This year, our conference theme, "Nurturing Digital Intelligence for a Sustainable Future," reflects our collective responsibility to harness the power of Information Technology to create a more sustainable and inclusive world. As we embark on this journey, we must strive to strike a balance between technological advancements and environmental stewardship. Through innovative research, insightful discussions, and fruitful collaborations, we can pave the way for a digital revolution that embraces sustainability at its core.

The conference program encompasses a wide range of topics, spanning from 5G and Advanced Connectivity to Artificial Intelligence, from Cloud Computing to Virtual and Augmented Reality, and much more. The diversity of subjects covered in the program reflects the multidisciplinary nature of Information Technology and highlights the vast opportunities for exploration and discovery.

I would like to express my heartfelt appreciation to the organising committee for their unwavering commitment and meticulous planning in bringing together this remarkable event. Their dedication has ensured that CITA'23 will be a memorable and enriching experience for all participants.

To our esteemed speakers, I extend my gratitude for accepting our invitation to share your insights and expertise. Your contributions will undoubtedly inspire and ignite intellectual discussions, setting the stage for innovative ideas and collaborative endeavours.

I would also like to commend the reviewers who have dedicated their time and expertise to meticulously evaluate the research papers. Your rigorous assessment has contributed to maintaining the high standards of quality that this conference upholds.

To the participants, I extend a warm welcome. Your presence here signifies your passion and commitment to advancing the field of Information Technology. I encourage you to seize this opportunity to engage in thought-provoking discussions, build meaningful connections, and foster collaborations that transcend borders and disciplines.

Finally, I would like to express my sincere gratitude to all the sponsors, partners, and institutions whose support has been instrumental in making this conference possible. Your commitment to academia and research is invaluable, and we are truly grateful for your continued support.

I wish you all a rewarding and memorable experience at the 13th International Conference on Information Technology in Asia 2023 (CITA'23). May the knowledge shared, collaborations forged, and ideas generated during this conference contribute to the advancement of Information Technology and its profound impact on our sustainable future.

Thank you, and welcome to CITA'23!

Professor Datuk Dr Mohamad Kadim bin Suaidi

Vice Chancellor, Universiti Malaysia Sarawak (UNIMAS)

Conference Chair's Message

Dear Participants,

It is with great pleasure that we welcome you to the 13th International Conference on Information Technology in Asia 2023 (CITA'23). This prestigious biennial conference, organized by the Faculty of Computer Science and Information Technology (FCSIT), Universiti Malaysia Sarawak (UNIMAS), brings together professionals, researchers, engineers, experts, and postgraduate students from both industry and academia.

CITA'23 serves as a vital platform for the exchange of knowledge and ideas, fostering collaboration and advancements in the field of Information Technology. With the conference theme, "Nurturing Digital Intelligence for a Sustainable Future," we aim to address the challenges, opportunities, and potential solutions in the journey toward sustainable digital transformation.

In this era of rapid technological advancements, it is crucial to explore the latest developments and trends across various domains. We invite you to delve into an array of topics including 5G and Advanced Connectivity, Artificial Intelligence, Big Data & Data Science, Blockchain, Cloud Computing, Computational Modelling and Simulation, Computer Systems & Communication Technologies, Cybersecurity, Game design and analytics, Gamification and playful learning, Human Computer Interaction, Information System, Innovative game evaluation methods, Internet of Things (IoTs), Signal and Image Processing, Smart Technologies, Software Engineering, and Virtual and Augmented Reality.

CITA'23 will take place virtually from 3rd to 4th August 2023, providing a convenient and accessible platform for global participation. We encourage researchers to submit original papers highlighting their innovative techniques, methodologies, and approaches, contributing to the collective knowledge in the field of Information Technology.

We extend our heartfelt gratitude to the conference organizing committee, distinguished speakers, reviewers, and all contributors for their dedication and support. It is your unwavering commitment that makes CITA'23 a highly anticipated event in the realm of Information Technology.

We look forward to an enriching and fruitful conference, where ideas will be shared, collaborations will be forged, and the foundations for a sustainable digital future will be laid. Let us collectively nurture digital intelligence and embark on a journey toward a brighter, more sustainable tomorrow.

Warmest regards,

Stephanie Chua
Conference Chair, CITA'23

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Mr Kee-Man Chuah, Universiti Malaysia Sarawak
Ms Emmy Hossain, Universiti Malaysia Sarawak

Keynote Speaker

Professor Sadok Ben Yahia

Department of Software Science
Tallinn University of Technology
Estonia

Sadok Ben Yahia Full Professor at the Technology University of Tallinn (TalTech) since January 2019. He obtained his HDR in Computer Sciences from the University of Montpellier (France) in April 2009 and since January 2019. He is the head of the Data Science Group in the IT School, and his research interests mainly focus on data-driven approaches for near-real-time Big Data analytics, e.g., urban mobility in smart cities (e.g., information aggregation & dissemination, traffic congestion prediction), Recommendation System, and fake content fighting.

Data-Driven Approaches for Resilient and Sustainable Urban Mobility

The transportation sector is responsible for 23% of energy-related CO2 emissions. Decarbonizing transportation is challenging, as it is still 92% dependent on non-renewable resources. However, current transport decarbonization-related policies are insufficient to decrease CO2 emissions to the expected level. Therefore, strategic approaches to reducing emissions from urban transport are critical to addressing the challenges of climate change.

In this talk, we present our recent research activities on a framework to build the next level of innovative data-driven traffic light strategies as the most impactful action to reduce CO2 emissions within the context of urban mobility for Connected and Autonomous Cars. This Framework is committed to embracing the next generation of Edge-AI, benefiting from the ease of implementation and increased computation power toward more composable, distributed, and federated intelligence, as well as security by design frameworks. Powerful eye-bird-view multimodal data fusion approaches feed AI models for accurate CO2 and urban noise level predictions, that feed to dashboards for awareness purposes. Advanced reinforcement learning techniques make use of urban noise predictions to implement the best traffic light strategy in real time. We will also discuss the challenges to achieve resilience by proactively detecting misbehaving entities within Vehicle-to-Everything settings.

Invited Speaker

Professor Dr.-Ing. Sian Lun Lau

School of Engineering and Technology
Sunway University
Malaysia

Dr. Sian Lun Lau received his Dr.-Ing. and MSc in Electrical Communication Engineering from the University of Kassel, Germany. He also holds a BEng with Hons in Electronics and Telecommunications Engineering from Universiti Malaysia Sarawak (UNIMAS).

During his nine years (2004 – 2013) as a researcher at the Chair for Communication Technology (ComTec) at the University of Kassel, he has worked and managed various German National- and EU-funded research projects. Among them are EU IST-MobiLife, ITEA S4ALL, BMBF MATRIX and EU-SEAM4US. He joined Sunway University, Malaysia in February 2013 as a senior lecturer and Head of the Department of Computing and Information Systems until March 2021. He is currently a Professor and the Head of the Department of Engineering. In the same year, he has taken up the new role as the Associate Dean (Internationalization). He also leads the Sunway DataXSight (Research Cluster in Data Science).

He is currently a senior member of the Institute of Electrical and Electronics Engineers (IEEE) and serves as the Vice Chair of IEEE Computer Society Malaysia Chapter for term 2023/2024. His research interests include ubiquitous computing, sustainable smart city, context-awareness and applied machine learning. He recent research projects include DeepSpray+, SustHack and ProtoPolicyAsia.

Leveraging Data Intelligence for Sustainable Decision-Making

The ability to acquire data has been introduced since the early 90s and technologies continue to evolve towards the vision of data intelligence in recent years. With the rise of big data, artificial intelligence and cloud computing, data-driven insights and decision-making are getting more important today in organisations and globally. This talk briefly presents the evolution of data-centric technologies and explores the synergy between sustainability and data intelligence, emphasising the importance of applying the latter to achieve sustainability across sectors. Challenges and considerations will also be addressed to encourage all to begin conversations on how collaborations and partnerships will bring our world toward a more sustainable future. The talk envisions a future where data intelligence shapes global sustainable development, encouraging attendees to embrace its potential.

Opening Ceremony

The 13th International Conference on Information Technology in Asia 2023
"Nurturing Digital Intelligence for a Sustainable Future"

3rd August 2023, Thursday | (GMT+08:00) Malaysia Time

9:30am – 9:35am	Negaraku
	Doa
9:35am – 9:40am	Welcoming Remark by the CITA'23 Chairperson
9:40am – 9:50am	Officiating Speech by the Vice Chancellor of UNIMAS
9:50am – 10:00am	CITA'23 Montage

Conference Programme Day 1

3rd August 2023, Thursday | (GMT+08:00) Malaysia Time

9:30am – 10:00am	Arrival of participants
10:00am – 10:30am	Opening Ceremony
10:30am – 12:30pm	**Paper Presentation Session 1** Chairperson: Mdm Hamizan Sharbini **Time** — **Title and Authors** 10:30-10:50 — **A Song Classifier for Predicting User Preference Based on Spotify Song Attributes** *Yong Yang BOON, Siew Mooi LIM, Annebel Yun Ying CHOONG & Hui Yun CHIA* 10:50-11:10 — **A Machine Learning Algorithm-based Perimeter Intrusion Detection Approach** *Shahneela PITAFI, Toni ANWAR, Zubair SHARIF & HINA* 11:10-11:30 — **Fine-tuning Multilingual Transformers for Hausa-English Sentiment Analysis** *Yusuf ALIYU, Aliza SARLAN, Kamaluddeen USMAN DANYARO & Abdullahi SANI B A RAHMAN* 11:30-11:50 — **U-Net Autoencoder for Edge-Preserved Denoising of Low Dose Computed Tomography Images: A Novel Technique** *Muhammad ZUBAIR, Helmi MD RAIS & Qasem AL-TASHI* 11:50-12:10 — **Colorectal Cancer Recognition Using Deep Learning on Histopathology Images** *Amgad MUNEER, Shakirah Mohd TAIB, Mohd Hilmi HASAN & Alawi ALQUSHAIBI* 12:10-12:30 — **Optimizing Advanced Persistent Threat (APT) fingerprinting using Machine learning techniques** *Yin Yi Soo, Manmeet Mahinderjit Singh, Gian Chand Sodhy and Thulfiqar Jabar*
12:30pm – 2:00pm	Lunch Break
2:00pm –3:00pm	**Keynote Address by Prof Sadok Ben Yahia** Title: Data-Driven Approaches for Resilient and Sustainable Urban Mobility Chairperson: Assoc Prof Dr Johari Abdullah
3:00pm – 4:00pm	**Paper Presentation Session 2** Chairperson: Miss Emmy Hossain **Time** — **Title and Authors** 3:00-3:20 — **Digital Twin for the Security of Cloud-Assisted BANs** *Najm Us SAMA, Kartinah ZEN, Aziz UD DIN, Nazia AZIM & Atiq UR RAHMAN* 3:20-3:40 — **Post Quantum Code-Based Cryptosystems with Dual Inverse Matrix** *Farshid HAIDARY MAKOUI, Thomas Aaron GULLIVER & Mohammad DAKHILALIAI* 3:40-4:00 — **Detecting Haze Hotspots Through Network Modeling** *Syahidatul Syahida BINTI MOHAMMAD ZAINAL & Jane LABADIN*

Conference Programme Day 2

4th August 2023, Friday | (GMT+08:00) Malaysia Time

8:30am – 9:00am	Arrival of participants
9:00am – 9:45am	**Invited Speaker Address by Prof Dr Lau Sian Lun** Title: Leveraging Data Intelligence for Sustainable Decision-Making Chairperson: Assoc Prof Dr Chiew Kang Leng
9:50am – 11:30am	**Paper Presentation Session 3** Chairperson: Assoc Prof Dr Edwin Mit **Time** — **Title and Authors** 9:50-10:10 — **IoT Based Water Quality Monitoring in Relation to Flood and Drought in Brunei Darussalam** *Rasyidah ISMAIL, Wida S SUHAILI & Ravi K PATCHMUTHU* 10:10-10:30 — **IoT Aquaculture System for Sea Bass and Giant Freshwater Prawn Farming in Brunei** *Wida S SUHAILI, Hisyamuddin RAMLEE, Mysyaffa AZIZ, Ravi K PATCHMUTHU, Shahriar SHAMS, Ismit MOHAMAD, Mohamed Hasnain ISA & Beston NORE* 10:30-10:50 — **Fog Computing in Optical Access Networks: An Energy-efficient and Deadline-aware Task Scheduling Mechanism** *Fathiyah HAJI AHMAD, S H Shah NEWAZ, D S SANKAR, Rudy RAMLIE & Nazmus Shaker NAFI* 10:50-11:10 — **Optimization in Vehicular Ad-Hoc Network (VANET) with Moth-Flame Optimization (MFO) Algorithm and K-Means Clustering** *Sham Rizal RAMLEE, Sazlinah HASAN & Shamala K SUBRAMANIAM* 11:10-11:30 — **Augmented Reality-based Mathematics Learning Framework Validation Using the Fuzzy Delphi Method** *Nur Izza AHMAD, Syahrul Nizam JUNAINI & Suriati Khartini JALI*
11:30am – 2:00pm	Lunch Break
2:00pm – 3:40pm	**Paper Presentation Session 4** Chairperson: Assoc Prof Dr Jacey-Lynn Minoi **Time** — **Title and Authors** 2:00-2:20 — **Current Trend of Software Requirement Engineering Process in IT Small and Medium Enterprises (SMEs)-A Systematic Literature Review** *Shuib BASRI, Ganesh KUMAR, Fatin FAKHIRA, Putri EMIELDZA, Abdullateef O BALOGUN & Hussaini MAMMAN* 2:20-2:40 — **A Framework of Data Quality Assurance using Machine Learning** *Boon Ding NG & Edwin MIT* 2:40-3:00 — **A Review of Semantic-Based Reasoning Framework for Context-Aware Mobile-Crowdsourcing** *Nana Hauwa ADBULSALAM, Sufri MUHAMMAD & Raihani MOHAMED* 3:00-3:20 — **A Concise Review for Exploring Behaviors To Embrace Investment Robo-advisors** *Sukfun CHEONG, Pantea KEIKHOSROKIANI & Suzi Iryanti FADILAH*

	3:20-3:40	**A Literature Study on Digital Technology Applications in China Construction Industry** *Siak Kor CHEW, Fah Choy CHIA & Valitherm ANANTHAN*
3:45pm – 4:00pm	**Closing Ceremony** Closing Remarks by Conference Chair Announcement of Top 3 Best Paper	