SET eDigest

SUNWAY UNIVERSITY
A CLASS ABOVE

Issue 13 | December 2022

"Climate change is destroying our path to sustainability. Ours is a world of looming challenges and increasingly limited resources. Sustainable development offers the best chance to adjust our course"
Ban Ki-moon

School of Engineering and Technology

Contents

Editorial Team

Editor

Jacky Tan

Co-editors

Professor Lau Sian Lun

Professor Adarsh Kumar Pandey

Teo Wei Nie

Email us
set@sunway.edu.my

Distinguished Professor Saidur Rahman awarded Commercially Important Person (CIP)

Distinguished Professor Saidur Rahman, Head of Research Centre for Nano-Materials and Energy Technology who received the Commercially Important Person (CIP) Award by the Bangladesh Government for the outstanding contribution to the economy of Bangladesh on 18 December, 2022.

Commercially Important Person (CIP) is awarded by the Ministry of Expatriates' Welfare and Overseas Employment, People's Republic of Bangladesh for the outstanding economic contribution of the country.

Best Paper Award to Dr Muhammed Basheer Jasser and his team in IEEE International Conference - ICCSCE2022

Doctor of Philosophy in Computing (PCO) student, Zahida Sharif and her supervisors Dr Muhammed Basheer Jasser, Professor Angela Amphawan, Professor Yau Kok Lim have won the Best Paper Award for her research paper titled "Towards Latency Aware Multi-joint Optimization Method for VNF Placement and SFC Routing Via Swarm Intelligence" at 12th IEEE International Conference on Control System, Computing and Engineering (ICCSCE2022) organized by IEEE Control System Society Malaysia Chapter held at

Penang, Malaysia during 21–22 October 2022 with more than 40 papers from authors from different countries.

Best Paper Award to PSST Student, Kalidasan Balasubramiam in IEEE International Conference - PECon2022

Doctor of Philosophy in Sustainability Science and Technology (PSST) student, Kalidasan Balasubramaniam who is working under the supervision of Professor Adarsh Kumar Pandey and Professor Saidur Rahman has won the Best Paper Award for his research paper titled "Optical Absorptivity and Thermal Conductivity Analysis of Silver Nanoparticle Dispersed Salt Hydrate PCM" at 2022 IEEE International Conference on Power and Energy (PECon2022) jointly organized by IEEE Power & Energy Society (PES) Malaysia Chapter and IEEE Power Electronics Society (PELS) Malaysia Chapter held at Langkawi, Malaysia during 5–6 December 2022 with papers from 26 Countries. The 9th edition of 2022 IEEE International Conference on Power and Energy (PECon2022) featured a unique platform for discussing issues and developments in Renewable energy, electrical power, power electronics, electrical drives, control systems and its associated engineering fields.

PSST students won the Inaugural Best Innovation Award from Sunway iLabs' 2022 Make It Challenge

Doctor of Philosophy in Sustainability Science and Technology (PSST) students Mr. Kalidasan Balasubramanian, Muhammad Hazim Bin Mohamed Khir and Muhammad Nazim, won the Inaugural Best Innovation Award from Sunway iLabs' 2022 Make It Challenge. The students represented the competition in the name “TEAM ENERGY”, the team was supervised by Professor Adarsh Kumar Pandey and Professor Saidur Rahman from RCNMET.

TEAM ENERGY also won RM2,000 cash prize and a wildcard entry for the upcoming LaunchX Startup Incubation Programme that helps commercialise the idea into a real start up. In addition, the Team Energy has also been called for an interview, which is intend to

publish on digital media, as recognition of the team's contribution throughout the journey.

The TEAM ENERGY came up with an economical solution to mitigate the thermal comfort of building during summer and winter season using Phase Change Materials (PCMs). Energy being the significant need for the livelihood of people, conventional methods of its generation from power plant causes emission of greenhouse gases. On keen observation, through the statistic information it is noted that in Malaysia, buildings consume a total of 48% of the electricity generated in the country. Commercial buildings consume 38,645 GWh of electric power and residential buildings consume 24709 GWh. Among the total energy consumption, a major portion is used for building cooling. Thus, the team came up with a solution to tackle the extensive usage of air conditioning units that are directly linked to thermal power plants. The team looked into some of their own research to see if there's any applicable ones and turned out, one of the research areas that they have been working over the past years as they have significant potential in resolving the aforementioned issue. Phase change materials encapsulation in building is alternative way for building heating and cooling with zero emissions. On the contrary, is the popularity and awareness about these materials among the peoples and investors. Thus, the team, came up to bridge the gap of unawareness about the phase change material among people. By pitching the concept of thermal comfort management of building, TEAM ENERGY ensured to reach the concept of energy storage using phase change materials among the participants and organizing committee panels.

1st Sunway-Asian/Oceania Radiation Physics Networking Workshop

Over the period 27– 29 November 2022, the Sunway University Research Centre for Applied Physics and Radiation Technologies (CAPRT), hosted the 1st Sunway-Asian/Oceania Radiation Physics Networking Workshop. The event, organized in consortia with King Saud University and the University of Melbourne, was held in conjunction with the 5th International Forum on Advances in Radiation Physics (IFAPRP5), one of a series of meetings of the International Radiation Physics Society (IRPS), with meetings previously held in Buenos Airies, Sunway University and King Saud University (Riyadh).

It was an honour to have Y.M. Raja Dato' Abdul Aziz Raja Adnan (Director of Nuclear Security IAEA, retd.), Prof. Christopher Chantler (University of Melbourne, Australia), Prof. Mohammed Alkhorayef (King Saud University, Saudi Arabia) and Assoc. Prof. Thomas Osipowicz (Director, Centre for Ion Beam Applications, National University of Singapore) as advisors for the events.

These focused meetings were intended to provide timely updates covering the latest radiation physics developments and emerging ideas within the underpinning science and radiation technologies in healthcare and industry. We were honoured to have with us invited speakers from Indonesia, Thailand, Vietnam, Bangladesh, Australia, the United Kingdom, Philippines, Kuwait, Saudi Arabia, as well as a number of Malaysian speakers. It is anticipated that this workshop will go a long way towards increasing the impact of CAPRT efforts on the international stage.

SET Conference Seminar Series #4/2022

The SET Conference Seminar Series #4/2022 was held on 22 September 2022 via MS Teams.

At the start of the conference seminar series, Professor Serge Demidenko, the Dean of School of Engineering and Technology welcomed the audience with an opening remark. He then introduced the first presenter, Assoc. Prof. Dr Chua Hui Na who gave a presentation on "Using Word2Vec-LDA-Word Mover Distance for Comparing the Patterns of Information Seeking and Sharing during the COVID-19 Pandemic". Assoc. Prof.

Dr Lee Yun Li gave a presentation on "Emotion Classification through Text with Proposed Hybrid Learning Emotion Model". The conference seminar series is closed by Professor Mayeen Uddin Khandaker with his presentation on "Ionizing radiation dosimetry with glass and carbon-based media for medical and industrial applications."

The conference seminar series was well attended by 46 academic staffs and students, including undergraduate students.

SET Conference Seminar Series #5/2022

The SET Conference Seminar Series #5/2022, which is the last one for the year, was held on 1 December 2022 via MS Teams.

As customary, Professor Serge Demidenko, the Dean of School of Engineering and Technology welcomed the audience with a short and sweet opening remark. The first presenter, Dr Muhammed Basheer Jasser kickstarted the seminar series with his presentation on "Towards an Optimized Channel Estimation in Optical Spatial Multiplexing Systems via Swarm Intelligence Algorithms". This is followed by Prof. David Andrew Bradley's presentation on the development of radioluminescence sensors. Thereafter, Dr Farihahusnah Hussin presented on "Effect of binder ratio on the physical properties of porous carbon pellet for CO2 capture". Last but not least, Professor Yap Kian Meng presented on "Open Agricultural Burning Detection with Natural Inspired Swarm-based Detection Platform".

The conference seminar series was well attended by 36 academic staffs and students, including undergraduate students.

Blockchain Applications in Healthcare

Written by Dr Mohammad Dabbagh

Department of Computing and Information Systems

This article outlines some of the significant use cases of blockchain in healthcare sector. However, it is important to have a brief introduction on what blockchain is and what are its key features before discussing about its use cases in healthcare.

Blockchain is an emerging technology which has the potential to transform a diverse range of industries and due to its abundant advantages, it has attracted a huge interest from researchers and practitioners in recent years. Blockchain provides a decentralized ledger where information can be exchanged between two peers on top of a peer-to-peer network without the intervention of a third party. The cryptographic algorithms that are deployed in a blockchain play an important role towards addressing the security and immutability of data records in a blockchain. There is also no single point of failure in a blockchain because its decentralized architecture enables each node in a network to store a copy of all data records. The key characteristics of blockchain makes it as an ideal solution to revolutionize not only financial industry but also other sectors such as healthcare industry.

Blockchain technology has a wide range of applications and use cases in healthcare sector. The following are some of the key areas where healthcare sector would benefit from adoption of blockchain:

- Direct service payment: financial transactions between healthcare service providers and healthcare service consumers are usually controlled by a third party like a credit card provider or a financial institution which imposes a transaction processing fee. Utilization of blockchain can help to remove the third-party involvement in payment transactions which results in reducing the processing fee while improving the security of transactions.

- Secure storage of sensitive medical data: storing important medical data in a secure and safe way is an important challenge in healthcare companies. Secure algorithms within a blockchain allow data hiding of sensitive data pertaining patients and their medical data. These sensitive data may include patient health information, electronic health records, medical insurance claims, payment records, data collected from IoT devices, etc.

- Tracking medical supply chain: a key concern across the healthcare industry, as in many others, is ensuring the origin of medical supplies to confirm their legitimacy and authenticity. Blockchain has profound impacts on pharmaceutical supply chain management, and its decentralization feature provides full transparency in the entire supply chain management process. Once a ledger is built for a medical drug, it will mark the starting point of manufacturing. The ledger will then continue to record data at each stage of supply chain, including who handled it and where it has been, until it reaches the consumer.

- Digital identity management: another key challenge in healthcare industry is to have access to accurate and verifiable identifications of patients, healthcare provides, hospitals, pharmacies, and research institutes. Blockchain is able to tackle this issue by providing integrity and transparency through its decentralized structure and combat differential versioning of identities, thus enabling secure identification.

Healthcare companies have already started to explore a diverse range of blockchain applications into their businesses due to the decentralized structure of blockchain and its ability to provide secure healthcare solutions. Although several progresses have been recently reported on the applications of blockchain in healthcare industry, the field is not fully mature yet and various advancements and innovations are expected to be made in near future.

Research Grants to Design Swarm-Intelligence Algorithms to Solve Real-World Problems in Smart Cities

Smart cities aim at enhancing the living standards of their citizens by making use of advanced technologies to innovate various sectors. Since these innovations often consist of optimizing certain systems, or processes, optimization algorithms are widely used in applications relating to smart cities.

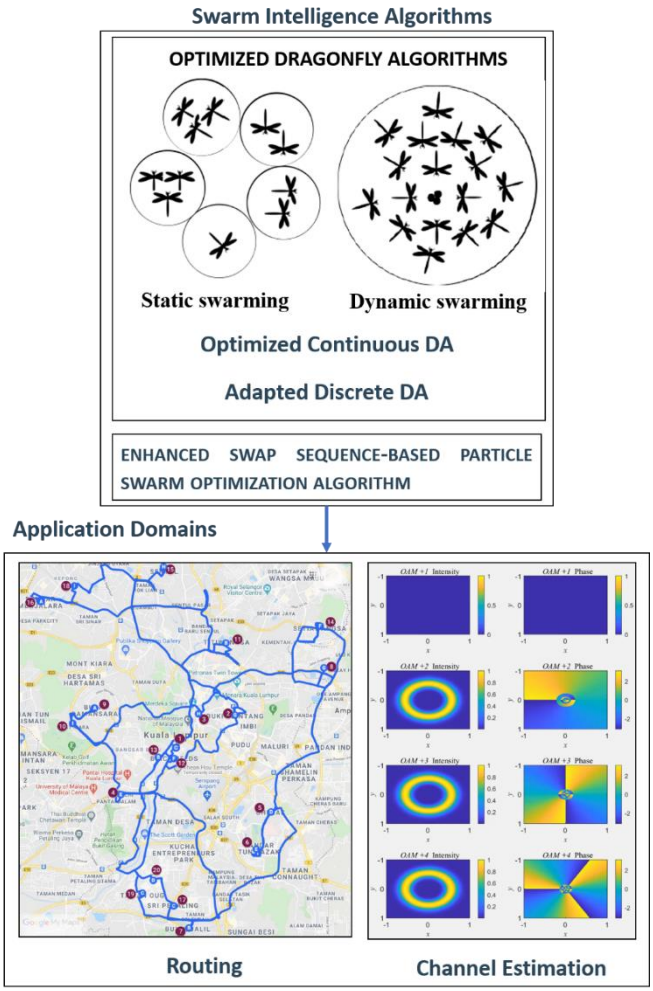
Written by Dr Muhammed Basheer Jasser

Department of Computing and Information Systems

A prevalent optimization application in smart cities is routing which can benefit various systems such as channel routing in networks and in transportation systems. Routing can be represented as a Traveling Salesman Problem (TSP) which can be solved using optimization algorithms. Another important aspect of smart cities is having good communication channels. Optical communication channels, especially optical spatial multiplexing systems are beneficial as they allow data to be transmitted quickly and safely. However, they rely on accurate channel estimation approaches to reduce signal degradation. Artificial Neural Networks (ANNs) are popular algorithms used for channel estimation. Recently, swarm intelligence algorithms have been proven to be better training algorithms for ANNs as compared to the conventional gradient-descent-based algorithms. The Dragonfly Algorithm (DA) is a swarm intelligence algorithm that is inspired by the behaviour of dragonflies in nature. The original DA algorithm is suitable for solving continuous optimization problems such as the training of ANNs. Despite having a good performance, the original DA has a low exploitation phase and its performance can be improved. Moreover, it cannot be applied to discrete optimization problems such as TSP.

Dr. Muhammed Basheer Jasser, a Senior Lecturer from the School of Engineering and Technology of Sunway University, and his team from several Malaysian and international universities are working on designing new swarm intelligence algorithms to address the problems of channel estimation and routing in smart cities. They have introduced an adapted discrete dragonfly algorithm and an enhanced swap sequence-based particle swarm optimization algorithm for solving the TSP problem addressing the routing problem. They also introduced an optimized continuous dragonfly algorithm to enhance the effectiveness of the original DA. Moreover, they have employed these algorithms in optimizing channel estimation in optical spatial multiplexing systems and in routing problems in smart cities.

The research outcomes have been funded by several research grants and published in top prestigious Q1 journals and presented at top conferences. Recently, Dr. Basheer, the principal investigator and leader of the projects, was invited as a keynote speaker to present some of the research outcomes at the IEEE International Conference on Space-Air-Ground Computing held in Huizhou, China in 2021.



Pre-reading – increasing student's absorption and understanding of Lecture during the class

The topic is new and maybe first time introduced in every lecture, students surely will find some difficulty to understand most of the lecture delivered, even the lecturer does the best to bring the knowledge across to them. When students were asked how much do they understand the lecture materials after the class ends,

most of them responded very limited or up to 30% of the lecture materials covered in that class.

Written by Mr. Yeap Boon Han

Department of Computing and Information Systems

Surprisingly only a few said they can barely understand more than 50% of the lecture, even though they put away the disturbing smart phone and pay full attention and focus on the lecture. Online classes are even worse, most of the students find they have much more difficult to understand the lecture through the online platform.

So, in order to enhance for better understanding of the subject materials, they need to further reading and doing practical exercises. This usually take lots of time as they may need to read a large number of subject materials because of their poor understanding of the lecture topic during the class.

I had carried out an "experiment" with a group of students, who was instructed to do the pre-reading before the lecture class. After five lecture classes and interviewed with them, they found that they could understand up to 50% and even 70% better than if they did not do the pre-reading.

Therefore, if the students can capture at least 50% and more understanding of the learning materials during the lecture class, they may just need to read a minimum amount of subject materials to support and enhance their understanding. This is how pre-reading before the lecture class comes to play the important role.

How pre-reading helps?

Students may have some ideas what topics will be covered in the next lecture class through the Subject Outline or Lecture Plan. However, in every lecture, new knowledge or concepts or theory will be introduced, perhaps in first time, to the students, so the contents can be challenges to them.

If the students have done some pre-reading for the topic to be covered in the next lecture class, they already have noted and have at least some ideas on what learning materials or concepts are expected and what should be prepared for the coming lecture. When the lecturer explains the topic concepts during the lecture class, they can understand better and more effective because the students already have some pre-knowledge about these concepts from their pre-reading in advance.

Furthermore, not only pre-reading prepares them for a pre-understanding of lecture beforehand, it also helps the students to prepare or to create some questions from their pre-reading. This will provide the opportunities for students to ask questions or to clarify their confusion or misunderstanding during the lecture class. Hence it will further increase and enhance their understanding of the lecture topics.

Therefore, in order to help the students to improve or increase their understanding of lecture during the class, students should do some pre-reading on the topics that will be delivered in the coming class.

How to do pre-reading?

Not easy for student to do pre-reading because the topic they are going to read are normally new and even difficult to them or are not interesting for them to read, so they may not have the motivation to initiate the reading. Therefore, in order to initiate the reading and get some fruitful understanding from this reading, students should have some skill of doing the pre-reading.

Here are some suggestions which had been used during the experiment and shown to be useful for pre-reading.

When reading a new topic, the students should just briefly read through the concepts and pay attention to the keywords and terminologies which are the essential points of reading. It is ok if not fully understand the whole reading, but just barely know or be aware of the concepts or key terms. The students shall also note down some questions from the pre-reading which the students can clarify and discuss them during the lecture.

The most important point in doing pre-reading is try not to push yourself too hard as if you are going to fully absorb everything from a new topic. Pre-reading shall mainly provide you some pre-knowledge of the topic before your lecture class. What you need is the brief understanding of the concepts or key terms that will help you to enhance and increase your understanding of the lecture during the class.

Therefore, it is worthwhile to encourage student to spend an hour on pre-reading before attending the lecture class. This will bring greater benefit to the students in their learning.

Braving the Impossible to Become Possible

Joanavene Tan Qie Ven is a Scholastic Award Holder and also a First-Class Honours student with a CGPA of 4.00 in BSc (Hons) Information Technology (Computer Networking and Security) from the School of Engineering and Technology.

During her time at Sunway University, she was a Sunway Sports Scholarship holder which rightfully meant she was very involved outside the classroom. She was the President of Sunway University's Chess Club where she organised Sunway University's Inaugural Chess Tournament in 2018. The event drew the attention and participation of not only locals but also international chess enthusiasts like Russia, Sri Lanka, Indonesia, Bangladesh and the Philippines.

She also represented Sunway University at Masiswa's biannual inter-varsity Chess tournaments in 2017 and 2019, where Sunway University emerged as Champions in the woman's category.

Today, Joanavene is a Product Management Associate of the Regional IT Risk and Compliance team in Shopee Singapore Pte Ltd. She works with a sub-team in overseeing the IT Risk and Compliance aspects for various digital banks based in Singapore, Indonesia and the Philippines where she is responsible for evaluating digital bank product risks, ensuring digital bank product compliance and overseeing the change management process of go-live digital bank systems, new features of digital bank systems, vendor as well as in-house developed digital bank software/applications to prevent audit findings. These areas are very new and specialised, which are challenging and can be daunting too.

After graduating with a BSc (Hons) Information Technology (Computer Networking and Security), she started as a Cybersecurity Analyst at United Overseas Bank, Malaysia (UOBM). She used her knowledge gained at the University to advance her learning curve which otherwise was quite a steep one. Her exemplary work was well recognised and was then promoted to the position of Manager within one year, a remarkable achievement for the youngest employee ever to be promoted to that position in UOBM.

A curious and adventurous person, Joanavene swims and loves chess while constantly staying abreast with the latest technological advancements. She is a true team player and still keeps in touch with her course mates. She believes that the holistic approach at Sunway University has not only equipped her with academic prowess but has also developed her soft skills to demonstrate complex problem-solving abilities in addition to having strong communication, great teamwork and leadership.

Reflecting on her Sunway journey, it all started at the Sunway Education Fair when she met Dr Lau Sian Lun, who was the then Head of Department. He opened her mind to the limitless possibilities of taking up various computing courses during the education fair and when she explored the events, surroundings and facilities at Sunway University, it was clear that this would be the place for her to leverage a promising career prospect.

The career path that she has chosen has been an eye-opener and surely an inspiration to the current batch of students. It is based mainly on her interest, in addition to the global demands and requirements. It must be noted though that things will not always work according to plans. She first received a job offer from Deloitte as an Auditor Associate in the Cyber Risk department. Sadly, the hiring process was frozen due to the Covid-19 pandemic. Staying positive, her career path worked out better than expected. Within one month after the hiring freeze, she was offered a job position as a Cybersecurity Analyst at United Overseas Bank, Malaysia (UOBM). Her rise to excellence was further demonstrated when she was headhunted by Shopee Singapore Pte Ltd.

She believes that as upcoming professionals, young people should always have a hunger for knowledge, and be flexible to adapt to different situations. A positive outlook and perseverance are big plus points that will

help them overcome various challenges encountered in their career development.

Such wise insights from someone at this age are truly inspirational and going by her quote, “Nothing is impossible. Always remember… ‘I’ ‘m’ ‘possible’!”, she surely is a role model for the younger generation of graduates to follow.

New Appointment

Professor Angela Lee Siew Hoong

Associate Dean (Employability)

Professor Adarsh Kumar Pandey

Associate Dean (Engagement)

New SET Members

Professor Satesh Narayana Namasivayam

Professor

Department of Engineering

Dr Nurul Atiqah Izzati Md Ishak

Research Fellow

Research Centre for Nano-Materials and Energy Technology

November to December Events

Date(s)	Event
28–29 November 2022	1st Sunway-Asian/Oceania Radiation Physics Networking Workshop
6–8 December 2022	The 2nd Euro-Asia Conference on CO2 Capture and Utilization
10–11 December 2022	SET Strategic Planning Meeting cum Team Building
13–15 December 2022	International Conference on Emerging Materials for Sustainable Energy and Environment (EMSEE-2022)
16 December 2022	MXene Course: From Fundamentals to Applications

Research Collaboration

Staff Name	Department/ Centre/ Group	Partner/ Institution	Validity	Purpose of Scope
Professor Mohammad Khalid	Graphene and Advanced 2D Materials Research Group (GAMRG)	Manipal University Jaipur	15 August 2022 – 15 August 2025	a) Develop academic and cultural exchange in areas of education. b) Faculty and student exchange. c) Exchange of scholarly materials and information. d) Participation in joint or collaborative research projects and grants. e) Articulation arrangement for students to complete their course of study and graduation, provided all conditions and standards for admission and respective programmes are fulfilled. f) Joint research supervision.
Professor Mohamed Kheireddine Aroua, Dr Jane Gew Lai Ti	Research Centre for Carbon Dioxide Capture and Utilisation (CCDCU)	University of Technology Sarawak	23 November 2022 – 23 November 2025	a) Develop academic research and collaboration in areas of advanced materials and their application in energy, heat transfer, energy storage, renewable energy, desalination. b) Faculty and student exchange. c) Exchange of scholarly materials and information. d) Participation in joint or collaborative research projects and grants. e) Articulation arrangement for students to complete their course of study and graduation, provided all conditions and standards for admission and respective programmes are fulfilled.