

SET *eDigest*

SUNWAY
UNIVERSITY 
A CLASS ABOVE

Issue 11 | June 2022

“Graphene is a single plane of graphite that has to be pulled out of bulk graphite to show its amazing properties.”

Andre Geim

School of Engineering and Technology



Preface

Dear Colleagues and Friends,

Around a week ago I received the last official reports on our performance as a school in 2021. The delay is well understandable - it takes time and serious efforts to consolidate all the reports on various activities, results, and business indicators of such a large and diverse organisation as Sunway Education Group. Yes, at the end of 2021 we, at the School of Engineering and Technology, already largely knew our excellent achievements in research, teaching, and physical growth. However, some data were still not available or were somewhat fluid (for example, exact numbers of publications and citations, outcomes of earlier grant and studentship applications, student counts, and so on). Our Associate Deans and I will update you on the final results during the future town hall meeting. However, beforehand, I would like to specifically mention here a couple of key business performance indicators that are of particular importance to our continuing progression and are of a truly impressive calibre. First of all, it is the steady growth in our student numbers. In 2021 we achieved not just a double-digit increase (year-to-year) in total student numbers but also overperformed the year-end target by over 5%. This was particularly impressive as our work during the year was significantly complicated and often negatively affected by the ongoing COVID-19-associated restrictions and problems. Besides, we achieved the results with the lower sizes of our academic and administrative teams while providing sustainable development in all aspects of the School's operation, including the development of new labs, the introduction of new disciplines, expansion of our research activities, close engagement with stakeholders, etc. Finally, we were prudent and strategic in managing our financial resources and various assets. As a result, our very research-intensive School completed the year while being solidly based in the positive financial territory. In fact, 2021 has become our most financially successful year so far. I would like sincerely thank you for your hard and devoted work and congratulate you on this success.

However, we all need to keep in mind that the superior achievements of 2021 have become a new basis for the forward planning and target setting for the current year 2022. And these new targets have been highly ambitious and thus quite challenging. In addition to that, the COVID-19 pandemic recovery has been slow. It means the negative consequences of the pandemic and changes in the overall dynamics of the world's and country's economy, adjusting and refocusing priority areas, new planning and targeting, etc., are going to affect our work for a while. At present, we are already in the middle of 2022. And I would like to present you with some general information and share thoughts on our operations ahead in the second half of the year.

For a number of objective and subjective reasons, the student enrolments in the January and March intakes were significantly lower than the target indicators. This makes it very difficult to achieve the planned year-end student population growth. However, I hope we will be able to benefit from the strong interest shown by the students and their parents in our undergraduate and postgraduate programmes during the recent Open Day. We should also expect rising interest in our new Engineering programmes, which recently have received approval for being validated by our Lancaster University partners. In recent months, the University has also significantly intensified its marketing and media promotion campaigns. And as a School, we also need to offer mounting ongoing support towards attracting new students while helping our colleagues to carry out numerous functions during the forthcoming Open Day at the beginning of August. It is essential for us also to be continuously proactive in the social media domain, to skillfully and friendly entertain and answer inquiries of potential students and their families, to make our new students feel welcome and valuable, and many more. This is a very important area where the School does rely on the help of its entire team.

In addition to that, we will need to continue our very successful march towards new heights in the School's research performance - the rather significant growth is needed and expected to be on par with the top research players in the country, region, and globally. As we all know, the Jeffrey Cheah Foundation and the Sunway University leadership have allocated significant resources in 2022 while specifically focusing them on supporting the upward trajectory progression of the research at our university. We will need to prove that these investments have been worthy and led to positive effects. Besides, it is already the right time to start to think about our research agenda and activities for the next year.

Finally, the School will need to balance its revenues and expenses while strictly following budget allocations. This has to be achieved whereas delivering the expected academic and research outcomes and services as well as being a valuable contributor to society. On the brighter side, we are going to have several very capable new staff soon joining us. In addition to that, I am sure the efforts and results of our existing will be again generously recognised by the University during the forthcoming staff promotion campaign. We will continue enhancing our laboratory base and facilities. And we will extend our overall footprint while starting to plan for future growth and relocation to the new School of Engineering and Technology building.

All in all, I do believe that despite the challenges, by working together productively and smartly, we will be able to deliver great performance in 2022 that will be more than what we achieved the year earlier.

Professor Serge Demidenko

Dean, School of Engineering and Technology

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MDEC PDTI Best Faculty Award goes to Sunway University, School of Engineering and Technology

A Premier Digital Tech Institution is one that has been designated by MDEC as a recommended university for tertiary digital technology and IT programmes. Sunway University has been awarded “Premier Digital Tech Institution” status since 2017. Through great teaching, effective administrative support, and individualised attention, the School of Engineering and Technology (SET) provides students with a superior learning experience. Our team of devoted and experienced academics imparts information and abilities in engineering and technology while also instilling in students' strong values and professionalism in order to serve the society. Sunway University is proud to announce that the SET has won the BEST FACULTY 2021 awarded by Malaysia Digital Economy Corporation (MDEC). The selection criteria are based on the highest number of industry engagements, number of micro-credentials developed, success stories by the schools, academic members and student and last but not least the ability to demonstrate PDTI branding effort through all the events run in the school.

Sunway University, School of Engineering and Technology is known for its dedication to providing high-quality technology courses and ensuring that our highly skilled alumni thrive and satisfy future digital employment demands both locally and abroad. Being a member of MDEC's Premier Digital Tech Ecosystem as a Premier Digital Tech Institute, with possibilities to engage with important industry companies like Cisco and Oracle Academy to create curricula that meet industry standards and serve the needs of technology graduates. Artificial intelligence, computer vision, human computer interface, image or visual processing, biometrics/multi-biometrics, intelligent systems, embedded systems, wireless sensor networks and other aspects of networking, and high-performance computing are among the research areas in which the Department of Computing and Information Systems has the expertise.



MDEC PDTI Best Student Award goes to Shamalan Rajesvaran

Shamalan Rajesvaran, a final year data analytics student at Sunway University, was recently awarded the Best Student Award by the Malaysia Digital Economy Corporation (MDEC) for his stellar achievements in his extracurricular involvements. The Best Student accolade was awarded to university students who have achieved notable honours and victories in competitions.

“I am truly humbled by this award. It is an honour to be awarded this prestigious award by MDEC. This award only spurs me to work harder and strive for greater heights”, said Shamalan.

Shamalan, who has helmed multiple leadership positions in prominent student organizations and NGOs, has always been positively driven to step out of his comfort zone and diversify his skill set. Over the past year, he has emerged champion in The Institute of Chartered Accountants in England and Wales (ICAEW)'s Malaysian Case Challenge. As part of the competition, he and his team had to vie closely with 20 teams nationwide. They were required to thoroughly analyse a case study and provide a detailed report on the background, solution, risk, mitigation and feasibility.

Furthermore, his team's success in emerging as champion in the ICAEW Malaysian Case Challenge has enabled them to progress to the ICAEW's Greater China and Southeast Asia Regional Case Challenge. As representatives from Team Malaysia, they were tasked to compete with teams from China, Indonesia, Singapore and Vietnam.

Furthermore, Shamalan has also taken a fervent interest in public speaking. He has achieved the Innovative Planning award from Toastmasters International. This award is presented to individuals who have completed all 5 Levels of the Innovative Planning pathway, focusing on developing a solid connection with the audience when presenting and delivering a speech. This award necessitates the recipient to complete at least 20 speeches and is followed by speech evaluations as part of the Toastmasters International's Manual.



The MDEC Best Student award is given only through a nomination process. The process is unique as its recipients can only be nominated through their respective universities by faculty members who know the students in a professional capacity and recognise their efforts and achievements in their extracurricular. Shamalan was nominated by the School of Engineering and Technology.

As he is currently in his final semester, he intends to continue his active work learning new things whilst

ensuring that he achieves his First-Class Honours degree. During his time at Sunway University, he has served as the Project Director of Industry Insights (I²) at the International Council of Malaysian Scholars (ICMS) and Vice-Chairperson of Amnesty International Malaysia's National Youth Committee, among other roles.

Shamalan emphasizes that his family has played a pivotal role in providing extensive support, encouragement and unconditional love to spur and encourage his drive to succeed. He also extends his appreciation to his Professor Angela Lee, who has been kind and incredibly encouraging in providing constant motivation and valuable opportunities to expand his skillset.

The sky's the limit! Congratulations, Shamalan!

Outstanding Reviewer of the Nuclear Engineering and Technology Journal



Professor Mayeen Uddin Khandaker (Research Centre for Applied Physics and Radiation Technologies, School of Engineering and Technology) has been awarded as one of the "Outstanding Reviewers" for the year 2021 in recognition of his outstanding efforts, dedication, and professionalism. The "Certificate of Excellence in Reviewing" for the Nuclear Engineering and Technology journal (Scopus and Web of Science indexed journal) was awarded to him in December 2021 by the Editor-in-Chief of Nuclear Engineering and Technology journal, Professor Man Gyun Na.

Former Ph.D. student of Professor David Andrew Bradley founded TRUEinvivo Limited

The highly evocative video, featuring the work of Professor David Andrew Bradley's former Ph.D. student, Shakardokht Jafari. Dr Shakardokht Jafari founded TRUEinvivo Limited (<https://www.trueinvivo.co.uk/>) after discovering that glass beads are excellent radiation detectors that can be used to improve the survival rates in radiotherapy. Also, Dr Shakardokht Jafari has been among a group of women based in the UK who have been recognised to be making national and international impact in their areas of endeavour. The photos (Figs. 1 and 2) show part of an event held at the British Houses of Parliament, fronted by the UK government funding agency 'Innovate UK', honouring a very select group of women who have made considerable progress in their work, aided by Innovate UK funding. Professor Bradley (Non-Executive Director of TRUEinvivo) and Dr Shakardokht Jafari continue to work together, with TRUEinvivo focusing on bead technology and the group in Malaysia (Sunway University, Multimedia University, and the University spinoff Lumisyns Sdn. Bhd.) on real-time Radioluminescence dosimetry.



Fig. 1. Professor David Andrew Bradley and Dr Shakardokht Jafari inside the British Houses of Parliament, UK.



Fig. 2. Dr Shakardokht Jafari with the poster featuring her as a recipient of Women in Innovation Awards with funding provided by Innovate UK.

The International Collaborative Project conducted by Sunway University, funlead corp. Japan and Aerosense Inc, Japan, is now featured in Japan Nikkei newspaper

funlead (Headquarter, Toshima-ku, Tokyo), Aerosense (Headquarter, Tokyo Bunkyo-ku, Tokyo), and Sunway University Research Centre for Human-Machine Collaboration (HUMAC) had submitted a joint proposal to Asia Pacific Telecommunication Union (APT). The proposal's name is "Using drone and high-resolution imagery technology to predict plant health and artisanal-fishing in mangrove/nipah and riverine ecosystems in Collaborative Research Grant 2021 to promote collaborative work between APT members and Japan companies. Sarawak". The proposal was adopted in the International

Malaysia, during the 2004 Sumatra offshore tsunami, the coastline of peninsular Malaya experienced less damage in the well protected mangrove areas. Since 2005, government agencies have been actively working on the conservation of mangrove.

In Sarawak, mangrove coverages make up 22% of the entire mangrove areas in Malaysia. Maintaining the ecosystem formed by mangroves, also known as the "cradle of life in the sea", is an urgent issue in realizing sustainable fishing in the region.



The demonstration of experiment will be conducted in Sarawak's Rajang mangrove national park, the work is to collect scientific data to help government policy decisions for mangrove conservation, to visualize, to create the map of distribution and growth of mangroves.

In this demonstration of experiment adopted in the "International Collaborative Research Program 2021", Sunway University is the programme owner, Aerosense is responsible for drone's data capture and analysis, funlead will analyze the data.



Through this demonstration of experiment, we aim to contribute to disaster prevention, fishing, and climate change.

SET Town Hall Meeting (March 2022 Semester)

The Town Hall Meeting was held on 28th April 2022 (Thursday). The Dean shared with the School of Engineering and Technology (SET) team on the new Associate Dean (Education) appointment, one new addition to the SET team, 2022 Staff Promotions, student enrolment statistics, Premier Digital Tech and Institution status updates, and other important updates. The Associate Dean (Research and Postgraduate Studies), Professor Mohamed Kheireddine Aroua, shared statistics on SET publications and postgraduate students, research grants and funding, research events and activities, research external engagement and collaboration activities, research awards and achievements, research grant opportunities, and other updates. Last but not least, Associate Dean (International and Engagement), Professor Lau Sian Lun, shared updates on strategies in employability, engagement, and internationalization, goals, academic reputation, calls for contribution for SET Internationalization Team, social media statistics and reminders, and other updates.



SET Town Hall Meeting March 2022 Semester

SET Conference Seminar Series #1/2022

The SET Conference Seminar Series #1/2022, the first one for the year was held on Thursday, 17th March 2022 via MS Teams. The seminar was well attended by 42 academic staffs and students.

The seminar started with Professor Mohamed Kheireddine Aroua welcoming the audience on behalf of the Dean of School of Engineering and Technology, Professor Serge Demidenko. He then introduced the first presenter, Dr Muhammed Basheer Jasser who gave a presentation on "A Discrete Adapted Dragonfly Algorithm for Solving the Traveling Salesman Problem". This is followed by Professor Lau Sian Lun's presentation on "Exploratory Investigation on a Naive Pseudo-labelling Technique for Liquid Droplet Images Detection using Semi-supervised Learning". Finally, Dr Chin Teck Min presented on "Studying the perception of using visualization dashboard to measure cybersecurity maturity stage". Due to an unforeseen circumstance, Assoc. Prof. Dr Chua Hui Na was not able to attend the SET Conference Seminar to present her topic.

SET Conference Seminar Series #2/2022

The SET Conference Seminar Series #2/2022 was held on Thursday, 19th May 2022 via MS Teams. The seminar was attended by some 29 academic staffs and students.

The Dean of School of Engineering and Technology, Professor Serge Demidenko gave a short welcoming remark before inviting Professor Angela Lee Siew Hoong to present on "A Data Mining Approach to Analyse Crash Injury Severity Level". This is followed by a very interesting topic by Professor Lee Chien Sing on "The effectiveness of object-oriented-QR Monopoly in enhancing ice-breaking and education UX: A preliminary study". Finally, Professor Mayeen Uddin Khandaker presented on "Radon concentration in groundwater sources for public consumption in Bosso community, north central Nigeria and consequent annual effective dose estimation" through a pre-recorded video as he was away on a conference.

Pursuing Professional Career Development to Address Technological Challenges of Tomorrow



By Professor Serge Demidenko Dean, School of Engineering and Technology and Professor Lau Sian Lun, Associate Dean (Employability and Engagement) and Associate Dean (International) – School of Engineering and Technology and Head – Department of Engineering, Sunway University

The emerging phenomena of Industrial Revolution 4.0 are significantly driven by many enabling high-technology fields such as artificial intelligence, interconnectivity, robotics and automation, data analytics, advanced materials, smart objects, and systems, among others. They require a new generation of well-prepared engineers while opening up outstanding opportunities for such specialists to advance our world into a brighter technological future and progress their professional careers. Traditionally, universities are at the core of developing highly knowledgeable and skilful engineers and technologists leading tomorrow's technological progress.

By addressing the ongoing demand for quality engineering specialists, Sunway University has embarked on developing and introducing its new undergraduate and postgraduate engineering offerings. These offerings become valuable additions to the successful existing disciplines of science and technology. These new programmes have enjoyed strong support from the Jeffrey Cheah Foundation, enhanced by the advanced level of the ongoing research activities, cooperation with the industry, and close links with the world's leading academic partner institutions.

Last month for several days, we celebrated a large cohort of graduates at the magnificent Sunway Lagoon Amphitheatre. For them, it certainly was one of the most important and memorable events of their lives. It was the destination they all have worked progressively hard to achieve. When talking to the fresh graduates, it was very pleasing to hear from them that the years of effort, sweat, and even sometimes tears were worthy of that moment of triumph. They were very proud and happy when they walked across the stage to be congratulated by the Chancellor and President. They received their testamurs under the bright soffit lighting, flashes of photo cameras, the ovation from peers, parents, and academics. It was a true milestone of our former students' lives that signified the fruits of their commitment, diligence and determination.

However, graduation should not be considered just as an important result, but rather a foundation and new starting point in their professional career and continuation for specialist advancement. This is where our former students will continue to learn, further enhance their knowledge and skills, and develop the capability to address today's and tomorrow's complex problems. While many of them may think that they must brave this journey on their own, there is an important platform one should explore – professional organisations and associations in the relevant fields of engineering and technology. To name a few, one could have come across the Institute of Electrical and Electronics Engineers (IEEE) – the world's largest association of professional technical professionals with over 400,000 members in over 160 countries around the world, or the Institution of Engineering Technology (IET) – the multidisciplinary professional society dating back to the end of 19th century, or some of the more focused and highly reputable professional associations and learned societies like the Institution of Mechanical Engineers (IMechE), Institution of Chemical Engineers (IChemE), Institution of Civil Engineers (ICE), and many more. One may ask, why should I join such an organisation? What benefit will I get other than being associated with a particular professional body?

First and foremost, becoming a member of a professional body allows you to be part of a bigger community of technical professionals with similar interests and specialities. One gets to network with like-minded people and have access to activities crafted for the interests and benefits of its members. When you know the community better, you will also meet people who may become a mentor to you. As you grow professionally, having a solid network with

professionals in the same field will provide timely insights, advice, and guidance.

Secondly, the professional body will also grant you access to resources that keep you abreast with the latest developments in your fields of expertise. Many professional bodies publish newsletters and magazines to share the latest developments with their members. Some also organise conferences, seminars (including webinars), and training workshops. Apart from technical and professional events, there will undoubtedly be room for networking and casual gatherings. No matter your priorities, the professional body of your choice will have something that will interest and benefit you.

Thirdly, many of these professional bodies are not-for-profit. Hence, members volunteer to contribute to the success of the events and publications. This will also mean it is a good platform for you to demonstrate your leadership as you get involved in a professional body's activities including volunteering. Being a volunteer is the best way to learn and grow, especially when you are a fresh graduate looking for opportunities. Leadership is not about positions or titles – it is about being able to contribute, communicate, solve problems, and help others to grow. One can also take up leadership roles in a professional body to grow their professional profile. Your involvement will bring you new experiences and recognition as a professional, regardless of the capacity you wish to contribute.

Finally, for those who wish to perform professional practice with a license, one has to satisfy the requirements set by the government or a charter-granting authority. Some of the examples in Malaysia are Professional Engineer/Ir. (BEM), Chartered Engineer (IET, IChemE) and Professional Technologist (MBOT). Licensed professionals, such as Professional or Chartered Engineers, are internationally recognised for their qualification, capability, and contributions. They are also authorised to practice engineering and provide engineering services to the public. This is also why we will encourage our students to join professional bodies upon graduation, to begin their journey as licensed professionals as soon as possible.

As a premier higher education institution, we hope our graduates will remember that life after completing their studies is exciting and rewarding as professionals. One should plan and define their career goals early. We would be delighted to share and guide them in planning and finding a suitable professional body in one's field or area of interest. Once becoming a member, they should

also participate in events and activities to learn and meet people. Soon, one will also have the opportunity to volunteer to organise activities or even take up leadership roles to contribute and give back to society.

Source:

<https://www.businesstoday.com.my/2022/03/26/pursuing-professional-career-development-to-address-technological-challenges-of-tomorrow/>

Sunway University Leads Regional Efforts in Recognising and Solving Climate Change



By Professor Mohamed Kheireddine Aroua, Associate Dean (Research and Postgraduate Studies) – School of Engineering and Technology and Head – Research Centre for Carbon Dioxide Capture and Utilisation, Sunway University

Climate change is a real threat to life on Earth and carbon dioxide (CO₂) is recognised as the major contributor. This highlights the reduction in CO₂ emissions as a worldwide emergency and priority. As we speak, tremendous amounts of research are being carried out worldwide to tackle the challenge of integrating CO₂ capture with its utilisation. As a result, new scientific discoveries and innovative technologies are emerging to mitigate carbon dioxide emissions.

Recognising the importance of this issue, the Centre for Carbon Dioxide Capture and Utilisation (CCDCU) of Sunway University (member of the EuroAsia Carbon Dioxide Capture and Utilisation Network) in collaboration with Lancaster University, organised an event consisting of virtual seminars with the title “Mitigating Climate Change Through Carbon Dioxide Capture and Utilisation”. The event was held in conjunction with Lancaster COP26 Festival, as well as after the success of a 2-day seminar on “Emerging Technologies for CO₂ Capture and Utilisation”.

Sunway University's initiative to collaborate with global institutions to organise climate change-related seminars is timely and in recognition of the critical role partnerships and collaborations play in tackling such global challenges.

During these seminars, International speakers from Massachusetts Institute of Technology (USA), Lancaster University (UK), Aristotle University of Thessaloniki (Greece), National University of Singapore (Singapore), Inha University (Korea), United Arab Emirates University (UAE), Dawood University of Engineering and Technology (Pakistan), University of Indonesia (Indonesia) along with local speakers from Universiti Malaysia Perlis and Sunway University presented and discussed the most recent innovations, trends, and techno-economic aspects related to CO2 Capture and Utilisation.

Integrating CO2 capture and usage is the way forward to tackle one of the grand challenges facing earth and humanity. As mentioned by Professor Mohamed Kheireddine, head of CCDCU, "CO2 capture and its utilisation are crucial to protecting life on earth, it is also essential for creating life on other planets as demonstrated recently during NASA's mission at planet Mars where CO2 from Mars atmosphere was captured and used to generate oxygen, an essential gas for life."

With the success of these virtual events, CCDCU attempts to continue planning and organising exciting seminars in the future. The CCDCU also strives to continue its contribution towards global climate change issues through education, research and innovation while collaborating with world-class institutions. Sunway Group and Sunway University have made large investments in the form of research infrastructure and funding to support the global quest for Climate Action (SDG13) with a number of initiatives, particularly the recent establishment of the EuroAsia Carbon Dioxide Capture and Utilisation Network-EACO2CUNet which comprises 29 researchers from 23 Universities across 14 countries and the signing of a three-year research collaboration agreement with MIT.

Efforts like these, which bring together the best minds, new ideas and inspire the younger generation, will eventually lead to discoveries on the best methods to mitigate climate change issues globally.

Source:

<https://www.businesstoday.com.my/2022/03/26/sunway-university-leads-regional-efforts-in-recognising-and-solving-climate-change/?nowprocket=1>

The Rise of Smart Cities: Needs, Challenges, Future Directions, and Ways for Improvement



By Dr Muhammed Basheer Jasser, Senior Lecturer and Program Leader of BSc (Hons) Information Technology, Department of Computing and Information Systems, School of Engineering and Technology, Sunway University

Smart cities use technological solutions to enhance the living standards of their citizens while preserving the environment and prioritising sustainability. Advances in multiple domains contribute to making cities smart. The main domains include the environment, safety, security, health, mobility, and education sectors. Optimisation is required in smart cities where finding the best ways to accomplish certain tasks by individuals is profitable. For example, in delivery systems, finding optimal routes for delivery vehicles will be cost-efficient.

Various technologies such as Artificial Intelligence, Internet of Things (IoT), and Big Data are prevalent in smart cities as they allow the improvement and innovation of multiple systems in different sectors. For example, in the environment sector, IoT-based systems, sensory technology, and prediction models can be used to predict the energy consumption in an industry so that energy-efficient models can be designed.

Despite the continuous efforts and plans to employ technology to build smart cities, I think there are still ways to provide quality services making smart cities smarter. However, these also bring with them a set of challenges.

More automation efforts in smart cities could still be achieved to provide better services with lesser need to interact with humans. For example, deploying electric driverless vehicles will reduce the need for human intervention and carbon emissions. Another example is

to employ face recognition techniques to allow accessing premises using face data.

Better quality services could also be delivered to inhabitants by employing more data collected from people (e.g. sensory and personal data). This data could be used in artificial intelligence models to provide better user experience, for example, in shopping malls where customers can be provided with predictions for customers' shopping preferences.

Although using data promotes the life quality of smart cities' communities, data protection and ownership are still serious concerns for many. For example, a face recognition system could be employed to allow people to enter premises, but data privacy would weigh heavily on users' minds. Transparency is also important to demonstrate how people's data is collected and used as this increases the people's trust in the smart cities' management and deployed systems.

Although quality services could be achieved by automation and using people data, safety is still a critical concern for both people's lives and their assets when dealing with safety-critical systems. Driverless cars, for example, have been discussed at length for years now. However, addressing safety still requires more effort as several safety procedures are necessary to avoid exposing human lives to danger.

One way to address safety is employing robust modelling techniques that deal with safety-critical systems with utmost care. An example of robust techniques is formal methods to model systems' safety using precise mathematical notations.

Conclusion

Smart cities aim at enhancing the citizens' living standards by using technologies to innovate various sectors. Computing solutions are introduced to tackle the problems encountered in smart cities including artificial intelligence techniques.

Although efforts are done on making smart cities smarter, there is a need for further planning to tackle the persistent challenges when dealing with systems employed in smart cities including safety, automation, and privacy.

Although ways for tackling these challenges are proposed briefly in this article, there is more to be done to resolve various challenges yet to be discussed.

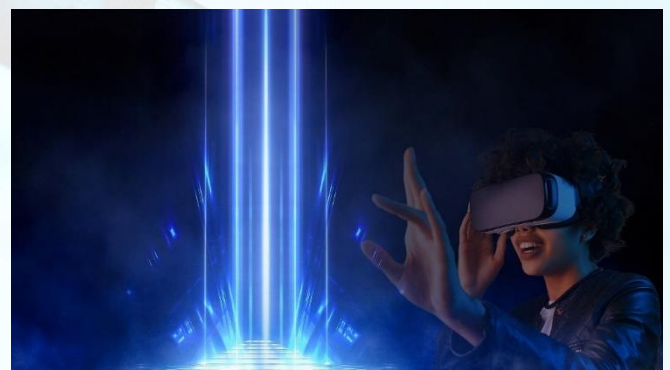
Source:

<https://www.businesstoday.com.my/2022/05/22/%ef>

[%bf%bcthe-rise-of-smart-cities-needs-challenges-future-directions-and-ways-for-improvement/](#)

Feel the Weight in the Virtual World

VR- and AR-powered products are envisioned as the next major platform for human communication after mobile phones. Facebook is building out the immersive digital worlds it calls the "metaverse," taking the immersive technology to unprecedented heights, expecting to reach a billion people within the next decade. Advances in 5G technologies and consumer VR hardware in recent years (e.g., Oculus Quest 2 and HTC Vive Cosmos Elite), open up the infinite possibilities of AR and VR application developments. There is thus a pressing need to provide a more realistic sensation in humans' virtual interaction process, such as to simulate the shape, size, weight, compliance, temperature, and texture in objects manipulation. Despite the advancements in technology, simulating the real sense of weight in a virtual environment is still a massive challenge. This is due to the absence of real gravitational forces and the complex nature of humans in determining the heaviness of an object. Weight is perceived through the combination of multiple sensory systems, and a wide range of factors – including touch, visual, and force senses – can influence the perception of heaviness.



The needs for weight perception in VR are most apparent in the training field, where precision in manual tasks is crucial. For instance, in a micro-surgery training simulation, a surgeon may need precise feedback to perceive the weight of his/her tool to ascertain how to adjust the force applied onto an affected area. This applies to assembly line simulations where fragile objects are produced. If the objects do not reflect the real world, then the skills acquired in VR won't be transferable. VR gaming has garnered massive

popularity by providing the players with a truly immersive, first-person perspective of game action. Without the weight feedback, all game objects have the same equivalent weight as a remote controller. Having different weight perspectives can further enhance the gaming realism experience. Players can feel the different weights of the ball in bowling or feel the weight of the falcon standing on the hand in the falconry training.



Direct haptic is the major stream of weight perception research focusing on the innovation of haptic devices that can generate the direct proprioceptive force sensations in grasping, holding, or lifting an object. Indirect haptic focuses on simulating the feeling of weight by generating non-gravitational haptic forces through tactile sensation such as skin deformation at fingertips. Haptic interfaces could create a real sense of weight by rendering tactile and proprioceptive sensations; however, they suffer from physical limitations in weight perception rendering to balance the maximum throughput over the size and weight of the actuators.

From the reviews of literature studies of weight perception in VR (Lim et al., 2021), it is observed that most weight simulation methods were designed and applied to specific application scenarios and setups. The shortcomings of techniques and approaches in the studies indicate that there is still a gap toward building a robust multi-gesture weight perception simulation that is adaptable to different application needs.

At Sunway University, Ms Lim Woan Ning (Senior Lecturer of Department of Computing and Information Systems and her students are working on an innovative model to create the weight sensation without the actual matching haptic stimulus, known as pseudo-haptics. The model relies on human cognitive characteristics to induce haptic illusions in weight perception by combining the visual feedback and the voluntary-exerted force to create the sense of weight. This research involves the technological challenge in

capturing the hand pressure during the interaction, and the design challenge in simulating the objects' behavior according to the pressure to create the pseudo-weight illusion. As the model requires relatively simple hardware compared to active haptic devices, it is less costly, has better mobility and faces less hardware problems of heavy device weight and weak motor output.

For further reading, you can get the following review paper from the IEEE Access journal:

W. N. Lim, K. M. Yap, Y. Lee, C. Wee and C. C. Yen, "A Systematic Review of Weight Perception in Virtual Reality: Techniques, Challenges, and Road Ahead," in IEEE Access, vol. 9, pp. 163253-163283, 2021, doi: 10.1109/ACCESS.2021.3131525.

Technology and Risk: Catalysts for Growth, Amidst Global Uncertainty

I consider myself lucky to be an alumni of BSc (Hons) Information Systems. One word to describe the three years is 'thrilling'. From the knowledge and skills, I acquired to the countless opportunities beyond the lecture hall. I was always fascinated and passionate in the rapid digital field evolution especially in the age of Big Data. A particular concept that intrigued me is how a single raw data can give such a meaningful piece of information when analysed correctly. There was and still is a growing demand of organisations recognising the role of data in gaining insights and to have analytical skills to make informed decisions that can drive organisational success. That has been one of the reasons why I decided to pursue my bachelor's degree in Information Systems with a scholarship under The Star Education Fund.

After graduating with Second Class Upper Division, I landed a job with PricewaterhouseCoopers (PwC) as an IT Risk Assurance Associate at. I have to owe it to the programme for equipping me with the proficiency that is expected in a real-life work setting. One of the skills I am expected to have is an analytical mind which I highly use in my day-to-day tasks. This programme has also equipped me with the skills I need to achieve my dream of becoming a data analyst. One of the notable subjects that sparked my interest even more was an elective module I took, Analytics Engineering under Assoc. Prof.

Dr Lee Yun Li. I understood how insights are a great advantage to a business. Not only to improve their customers' experience, but even their revenue too.

Fortunately, with this programme, I was under the supervision of Professor Lee Chien Sing for my final year Capstone Project besides taking a number of modules with her. She opened a great door for me to contribute to the society after completing my research project. In which I am currently a data contributor & data reviewer for Oxford Covid-19 Government Response Tracker (OxCGRT), a project under University of Oxford where we collect information on policy measures that different governments have taken to tackle COVID-19. Not only am I able to contribute to a current world affair with a prestigious institution, I am also broadening my network with individuals from around the world. My involvement with this project also allowed me to take my Capstone Project to a new level as I conducted a data analytics research on "Perceptions of Malaysians towards the Government's COVID-19 Measures". I analysed the level of acceptance for the measures and factors that might affect an individual's perceptions.

With the theoretical understanding of how important information is in an organisation from the core modules I took and my elective modules that were more to the data and analytics pathway, I believe the reason I pursued this programme has been rationalised. I am glad with my decision to pursue my tertiary education here and proud to be a Sunway alumni.



*Athira Zuhaira Binti Ahmad Yusri
BSc (Hons) Information Systems
IT Risk Assurance Associate, PwC*

New Appointment



**Dr Selina Low
Yeh Ching**

Associate Dean
(Education)

New SET Member



**Dr Jayesh
Cherusseri**

Senior
Research
Fellow

Graphene and
Advanced 2D
Materials
Research
Group



**Dr Houshyar
Honar Pajooch**

Senior Lecturer

Department of
Computing and
Information
Systems

Research Collaboration

Staff Name	Department/ Centre/ Group	Partner/ Institution	Validity	Purpose of Scope
Professor Lau Sian Lun, Professor Jari Porras	Department of Engineering	Lappeenranta- Lahti University of Technology (Finland)	May 2022 – May 2024	The purpose of this CRA is to jointly perform the research on ‘Susthack - Synchronizing sustainable development actions between Finland and Malaysia – the Hackathon approach’

Grants Awarded

Internal Research Grant (IGS 2022)

Project Lead	Project Title
Assoc. Prof. Ir Abdul Aziz Omar	Development of baseline data for the spatial and temporal distribution and accumulation rate of marine microplastics debris in Malaysian mangrove ecosystem
Dr Chew Ming Tsuey	Prognostic Factors of CT Perfusion and HRCT Correlation Among Patients With COVID-19 pneumonia
Dr Farihahusnah Husin	Reduction of CO ₂ concentration from Biogas production process: A life cycle analysis of porous carbon pellet from a solid waste
Dr Mohd Azlan Kassim	CO ₂ Capture using Novel Non-aqueous Green Hybrid Solvent of Polyamine-based Deep Eutectic Solvent and Sulfolane
Dr Muhammed Basheer Jasser	Optimized Dragonfly Algorithms for Improving Channel Estimation and Routing in Optical Spatial Multiplexing Systems in Smart Cities
Dr Numan Arshid	Development of Flexible and Lightweight 2D Nanomaterials Based Electrochemical Energy Storage Devices for Portable Electronics
Dr Tan Kim Han	MXenes with non-precious transition metal (iron) as electrode active material in vanadium redox flow batteries (VRFB)
Professor Adarsh Kumar Pandey	Operative Thermal Management of Solar Photovoltaic Batteries via ZnO Tetrapod Enhanced Phase Change Materials
Professor Angela Amphawan	Spatial Mode Diversity for Enhanced Resilience of Free Space Optics System during Floods
Professor Angela Lee Siew Hoong	Ubiquitous Health (U-Health) Smart Home Adoption
Professor David Andrew Bradley	Detecting first signs of graphite neutron damage in the operation of a reactor
Professor Mohamed Kheireddine Aroua	Development of Amine based Functionalized Graphene as New Class of Nanofluids for the Efficient Absorption of CO ₂
Professor Mohammad Khalid	One-step controlled synthesis of 2D Mxene/activated carbon hybrid electrode for high energy density lithium-ion batteries and supercapacitors
Professor Serge Demidenko	Analytical Evaluation of Uncertainty Propagation for Probabilistic Design Optimisation

Kick-start Grant Scheme (KSGS2022)

Project Lead	Project Title
Dr Lam Siok Ee	Fundamental evaluation of the proton-irradiated carbon-rich media for dosimetry and damage studies

International Research Networks Grant Scheme (IRNG 2022)

Project Lead	Project Title
Professor Adarsh Kumar Pandey	Promoting Sunway-Asian Countries Research Collaborations on Phase Change Materials as Thermal Energy Storage and its Potential Solar Energy Applications
Professor Angela Lee Siew Hoong	Cyber Security Analytics Maturity Research
Professor David Andrew Bradley	IRNGS-CAPRT Network 2022
Professor Mohamed Kheireddine Aroua	EuroAsia Carbon Dioxide Capture and Utilisation Network - EACO2CUNet
Professor Mohammad Khalid	Advanced NanoMaterials for Clean Energy, Water and Sensor Technology

External Grant 2022

Project Lead	Grant Scheme	Project Title
Professor Angela Lee Siew Hoong	UNESCO Grant	Creating an Online Repository on Digital Skills and Competence in TVET
Professor Lau Sian Lun	MOSTI Grant	Cloud-based intelligent Measurement, Monitoring and analytics system in support of radiation medicine

13TH - 15TH DECEMBER 2022 | SUNWAY RESORT HOTEL, MALAYSIA

TOPICS OF INTEREST

- Energy Conversion
- Electrochemical Energy Storage
- Nanocatalysis/Gas Storage
- Environment
- Thermal storage

IMPORTANT DEADLINES

Abstract submission:

15th August 2022

Early bird registration:

15th September 2022

Regular registration:

12th December 2022

Category	Early Bird Registration	Regular Registration
Regular (Academician/ Company/Industry)	RM 1,200	RM 1,400
Student	RM 1,000	RM 1,200
International	\$350	\$400
Additional paper	50% discount for the next paper	50% discount for the next paper
Participant/Attendee	RM 500	RM 500

The main objectives of the EMSE2022 conference are to bring together prestigious scientific scientists, researchers, and research scholars to exchange and share research findings on current breakthroughs in emerging materials for sustainable green energy. Furthermore, EMSE2022 aims to create a platform to increase prospects for successful collaboration across research groups. Above all, EMSE2022 wishes to highlight and address issues concerning sustainability and the environment, as well as practical challenges experienced and future potential.



PLENARY SPEAKER

Professor Rachid Yazami

- Inventor of graphite anode
- Founding Director and Chief Technology Officer (CTO) of KVI Holdings
- Nobel Laureate nominee 2019

KEYNOTE SPEAKERS



Professor Thierry Brousse

- Expert in supercapacitors based on carbon/pseudocapacitive materials.
- Vice-dean of the University of Nantes, France



Professor Vijayamohan K Pillai

- Expert in Materials Electrochemistry for energy storage application.
- Dean, R&D and chair of Chemistry at IISER -Tirupati



Dr. Michael Naguib

- Inventor on the first patent on MXenes
- Assistant Professor, Department of Physics and Engineering Physics, Tulane University, USA

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