

**ENGINEERS**  
**INSIGHT**

**VOLUME 30**  
**JULY 2023**

# Engineers Insight Editorial Board



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Prof Ir Ts Dr Vinesh  
Thiruchelvam



Ts Dr Arun  
Seeralan  
Balakrishnan



Fatin Ayuni Mohd  
Suhaimi



Dr Wong Siew  
Fan

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## Young Scientist Network -Academy of Sciences Malaysia Colloquium

**Ir. Ts. Dr. REENA SRI A/P SELVARAJAN**

**23<sup>rd</sup> August 2023**

Dr. Reena is an affiliate of the Young Scientists Network of the Academy of Sciences Malaysia (YSN-ASM) and a team member of the Science Policies and Governance working group. Recently, she attended the YSN-ASM colloquium held at Bangi Resort Hotel from December 16th till December 18th, 2022. Dr. Reena contributed her ideas on planning 2023's agendas of YSN-ASM as a route to achieving the 10-10 MySTIE Framework. YSN-ASM is a platform that gathers enthusiastic and excellent young scientists from across the country to create opportunities for better solutions to both national and international challenges. It represents the voice of young Malaysian scientists on issues at different levels to ensure the scientific progress and sustainability of the country. Wishing Dr. Reena a greater impact on the World of Science. A press release video can be found at the link attached below: <https://lnkd.in/guy4BtkC>



### **Scratch Programming for B40 Students** **Ir. Ts. Dr. REENA SRI A/P SELVARAJAN** **14<sup>th</sup> October 2022**



If one thing could change the world, then education is the KEY. And it was Dr. Reena's long-awaited wish that came true. Students from SJK (T) Kinrara, Puchong, particularly students from B40 socio-economic backgrounds, were selected, as many of them never had the chance to own and explore a PC at home. These children were trained in the field of creative computing for 16 consecutive weeks (40 hours) and exposed to basic computing skills and scratch programming. This project was organized by the School of Technology, and Dr. Reena was part of the teaching team. The basic computing skills and programming knowledge acquired by the students will be utilized as a stepping stone for their future direction.

### **Global Young Scientist Summit (GYSS) 2023**

**Ir. Ts. Dr. REENA SRI A/P SELVARAJAN**

**14<sup>th</sup> October 2022**



With over 1500 applicants worldwide, Dr. Reena is one of the selected and invited delegates to represent Malaysia at the prestigious Global Young Scientists Summit (#GYSS), which was held from January 17–20. The 4-day summit was organized by Singapore’s National Research Foundation (NRF), which unites globally recognized scientific leaders who are recipients of the Noble Prize, Fields Medal, Millennium Technology Prize, and Turing Award. Approximately 350 onsite participants from five continents were engaged in various activities such as plenary lectures, panel discussions, research presentations, and dialogue sessions with Noble Laureates. And Dr. Reena was one of the 20 participants invited to have a dialogue session with Sir David Macmillan (Nobel Prize Winner in Chemistry, 2019). According to Dr. Reena, attending the summit broadened her perspectives and gave her a direction to level up her game in both academic and research fields. Inputs from the Summit will be internalized for developing FYP and GDP titles. In addition, her visit to SUTD’s future communication lab has fostered internship opportunities for our APU undergraduate students.

## Achievements

Detailed information can be found at the article published by EasyUni (APU):  
<https://www.easyuni.com/malaysia/asia-pacific-university-of-technology-and-innovation-apu-8/news/1147/apu-engineering-scientist-meets-nobel-laureate/>



## **Training on Innovation Readiness Level (IRL) Ir. Ts. Dr. REENA SRI A/P SELVARAJAN - 2023 On 23<sup>rd</sup> August 2022**

Dr. Reena was selected to represent the Academy of Sciences Malaysia and APU in attending a training on the **Innovation Readiness Tool (IRL)** Organised by i-connect (**Malaysian Collaborative Network Platform for Disruptive Innovation**), which unites 40 delegates, mainly from the nation's leading innovation agencies (MRANTI, MOSTI, Collaborative Research in Engineering, Science, and Technology (CREST) Centre NanoMalaysia Berhad, HDC). The training session was conducted to explore Innovation Readiness Level (IRL), a tool to evaluate the innovation readiness level of a research product or idea to penetrate the market. The two days of intensive training were held at Melzaura Mini Ballroom from December 22nd to 23rd, 2022. The knowledge acquired from the training will be disseminated by creating innovation portfolios for APU





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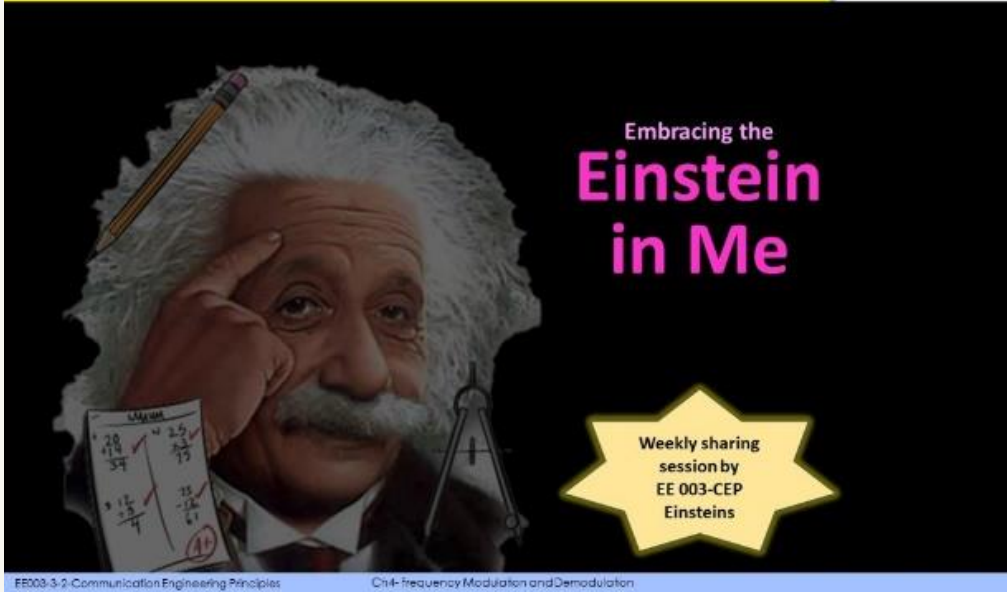
**Project Einstein**  
**(Embracing the Einstein within Me)**  
**Innovation in Teaching and Learning Technique**  
**- Ir. Ts. Dr. REENA SRI A/P SELVARAJAN**

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### EVENT DESCRIPTION:

"Embracing Einstein in Me" is a 3-minute weekly sharing session that was introduced during the lecture hours to innovate the teaching and learning techniques and to instill the values of Sustainable Development Goals in the Curriculum. Students were asked to present on any topic related to science, especially the concepts and principles that they had learned in the module (communication engineering principles). I'm truly amazed by these young minds, as their presentation comprised a variety of topics ranging from time travel to virtual reality to the James Webber telescope, and it also paves the way for many upcoming innovative engineering projects. As an academician, Dr. Reena realized that young minds are full of ideas, and their enthusiasm has the utmost potential for creating positive impacts, especially in the field of STEM. Dr. Reena said, "If we could nurture it by instilling the values of the Sustainable Development Goals, we could foresee a better future"

Welcoming our Young Einstein  
Keith Maate Kwijuka  
Session 8 (12-10-2022)



# **ITEX 2023 – Ts. Dr. ARUN SEERALAN BALAKRISHNAN**

## **On 11<sup>th</sup> & 12th of May 2023**

Ts. Dr. Arun and his two students, Amogha and Manikanth, designed a harvesting heat energy system from automotive exhaust gas that met the judging criteria that can help in environmental protection and energy efficiency.



**From left: Manikanth Goud Gurujala, Ts. Dr. Arun Seeralan Balakrishnan, and Amogha Seelan showed their prototypes with the Gold medal received at ITEX'23.**

Leaving the lights on, using incandescent bulbs, and keeping electronics plugged in are some of the common habits at home that can lead to energy waste, which can lead to bigger environmental problems such as overconsumption of power, air pollution, climate change, and others.

To address this issue, the **International Invention, Innovation, and Technology Exhibition 2023 (ITEX'23)** has opened seven categories this year to all inventors: University and Educational Institution categories; Research institutions; corporates; startups; Technical and Vocational Education and Training (TVET); international; and Individuals to showcase their potential prototypes and gain recognition for their inventions.



This year, **Asia Pacific University of Technology & Innovation (APU)** was represented at ITEX'23 by **Senior Lecturer Ts. Dr. Arun Seeralan Balakrishnan** and two Mechatronics students, **Amogha Seelan** and **Manikanth Goud Gurujala**, by emphasizing their design of a waste heat energy harvesting system to generate electrical power from automobile exhaust gas with enhanced efficiency'.

"ITEX'23 is one of the most important exhibitions and competitions, as many educational institutions and industries participated. It feels so cheerful and motivated to secure a Gold medal among other educational institutions and industries.

"We participate in ITEX'23 since many authorities, such as investors, venture capitalists, manufacturers, distributors, and corporate sectors, attended ITEX'23 to explore new business ventures.

"ITEX is the perfect platform to reveal new product developments. Investors can use this platform to find new investors and persuade them to fund their projects," said Ts. Dr. Arun.

"Winning the gold medal award by the APU team demonstrates to other educational institutions and industrial partners that we, as a team, are producing calibrated young engineers who will soon serve society."

Ts. Dr. Arun is the main inventor of the harvesting heat energy system using TEGs with Heat Pipes, and two of his students supported him in competing as a team in the ITEX'23 competition, where they earned the Gold medal in the University and Educational Institution category.

According to Amogha Seelan and Manikanth Goud Gurujala, as students, they learned a lot from participating in ITEX'23, especially in terms of getting experience in developing mechanical prototypes that match the judges' requirements.

"We learned a lot about conducting research and using engineering tools to analyse and develop a prototype that would assist us in finding a solution that will benefit society," said Amogha.

Manikanth added, "As a team, it was a great experience to showcase the project to the public and to the judging panel and show that our project meets the expected criteria. The award means a lot to us, and it is an excellent acknowledgment of our efforts."

TEGs and heat pipes are already on the market, but their study focuses on keeping the temperature on the chilly side by utilizing heat pipes properly.

TEGs could generate voltage and current when there is a temperature differential on both sides (hot and cold). So, using heat pipes containing water, the heat energy from the exhaust gas is absorbed to keep the temperature on the cold side of TEG around 30 degrees Celsius.

Furthermore, they extended their research by using Nanofluids in heat pipes through a simulation process using Ansys workbench software, and this contribution related to 'harvesting heat energy systems from the exhaust gas of automobiles, which reduces the temperature that has been thrown out as a waste to our environment and reduces the CO<sub>2</sub> given as a waste to the atmosphere.

## APU CREDIT TEAM SECURES 3 SILVER AT ITEX 2023

On 11th & 12th of May 2023



In a triumphant display of innovation and tenacity, the APU Team from the Centre of Research and Development IOT (CREDIT) club has clinched not one, not two, but **THREE** silver medals at the prestigious ITEX 2023. This remarkable achievement is a testament to the team's relentless pursuit of excellence and their commitment to pushing the boundaries of technological innovation.

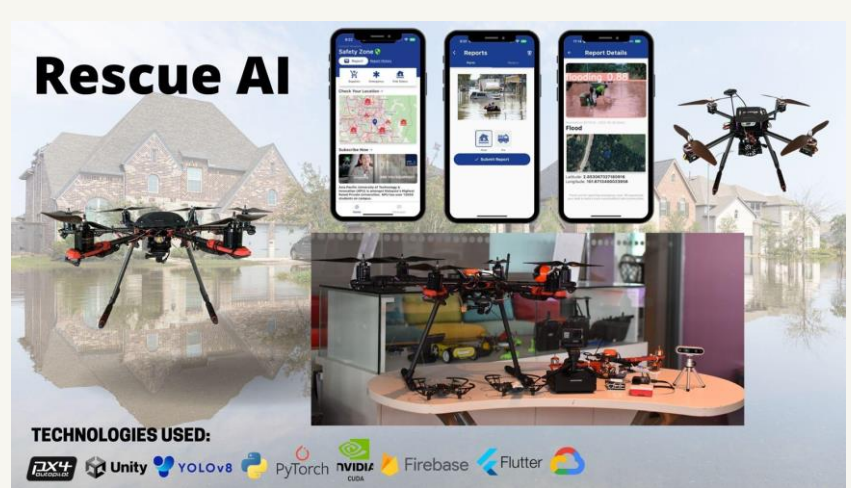
The team presented three groundbreaking prototypes, each addressing a distinct category: automation and manufacturing, environment and energy, and medical health. These prototypes are the fruits of a collaborative effort involving students and lecturers from various fields, all converging to create functional, cutting-edge solutions under the expert guidance of the Head of the Centre, Dipl-Ing. Ir Narendran Ramasenderan, and the Chief Innovation & Enterprise Officer, Prof. Ir. Eur. Ing. Ts. Dr. Vinesh Thiruchelvam.





Firstly, Alzhimex, a beacon of hope for Alzheimer's patients, utilizes light therapy and gamification to mitigate cognitive decline. By providing intermittent light therapy during the day and the crucial periods after waking and before sleeping, Alzhimex uses game interfaces to assess cognitive capabilities, spatial navigation, and memory retention.

Secondly, MaviHub, a revolutionary machine vision solution, is set to transform the manufacturing industry. With a combination of static and dynamic cameras, MaviHub can detect manufacturing defects and harmful emissions such as carbon, methane, and ozone in real-time. This data is then collated into a metaverse digital twin of the production floor, providing an unprecedented level of oversight and control.



Finally, Rescue AI, the disaster metaverse, employs long-range (LORA) sensors and drones to predict disaster occurrences. With the ability to simulate the scale and impact of a disaster up to 72 hours in advance, Rescue AI could be a game-changer in disaster management. The drones, equipped with computer vision, can respond to victims' requests via a smartphone app and deliver necessary medical supplies and food.

These inventions are set to be commercialized through the center and its spinoff tech startup, Iotech Solutions, marking a significant milestone in the journey of these young innovators. This achievement is a shining example of what can be accomplished when bright minds come together with a shared vision and unwavering determination. The APU Team's success at ITEX 2023 is a testament to their talent, hard work, and the transformative power of technology.

Stepping up to the challenge were Ravivarma Sivathasan, Sarim Ahmed Khalil, Ryan Teo Han Ji, Rohit Thomas, Krishna Ravinchandra, Mohammad Owais Noor Butt, Assoc. Prof. Ir. Dr. Sivakumar Sivanesan, and Assoc.Prof. Ts. Dr. Sathish Kumar Selva Perumal, Ir. Ts. Dr. Alexander Chee Hon Cheong, Ir. Ts. Dr. Yvette Shaan-Li Susiapan, Yee Han Xiang, Sio Ying Xuan, Hema Latha Krishna Nair, Ng Joo Kiat, Cheng Yi Heng, Chang Kah Boon, Tan Tze Ying, Cajun Tai Ka Joon, Haresh Haridas students from the School of Engineering and School of Computing APU under the guidance of Dipl-Ing. Ir. Narendran Ramasenderan from CREDIT.

The project was exhibited at the **34rd International Invention, Innovation & Technology Exhibition (ITEX 2023), Malaysia.**



### **ITEX 2023 – Ir. Eur. Ing. Dr. Harvin Karur Gurchran Singh On 11<sup>th</sup> & 12<sup>th</sup> of May 2023**

Ir. Eur. Ing. Ts. Dr. Harvin Kaur Gurchran Singh has made significant contributions to the field of drilling fluid additives, and her work has been recognized with a Silver medal at ITEX'23.



Her research on the use of Rambutan Peel as a Water-based Drilling Fluid Additive has the potential to revolutionise the drilling industry, as it could lead to the development of more environmentally friendly and cost-effective drilling fluids.

Ir. Eur. Ing. Ts. Dr. Harvin's research includes an experimental investigation of the usefulness of bio-degradable food waste products (Rambutan peel) as an ideal supplement for controlling mud rheological qualities because it not only works similarly to a synthetic drilling fluid but also has a low environmental impact.

### **ITEX 2023 – Ir. Eur. Ing. Ts. Dr. Lau Chee Yong & Team On 11<sup>th</sup> & 12<sup>th</sup> of May 2023**

The team led by Ir. Eur. Ing. Ts. Dr. Lau Chee Yong, which comprised his student Ng Jing Wei, Goh Kwok Liang, Jason Seah, Matthew Lim Jian Le, and Sean Tan Ming Yuan, also won Silver for MedAI, a medication cabinet with built-in artificial intelligence.



**From left, Ng Jing Wei, Jason Seah, Ir. Eur. Ing. Ts. Dr. Lau Chee Yong, Goh Kwok Liang, Sean Tan Ming Yuan, and Matthew Lim Jian Le showed Silver's MedAI prototype.**

MedAI's main function is to export the medication at a predetermined time and remind the user to take it, considerably reducing the possibility of overdosing and medication forgetfulness by the user. It is visible and configurable via mobile phone.

It can also remind the user to refill medication if it runs out, record the amount and time of medication consumption for later diagnosis and tracking, and save important data such as the user's blood pressure and heart rate via specialized devices.

### **ITEX 2023 – Team Innovus mentored by Ir. Jacqueline Lukose On 11<sup>th</sup> & 12<sup>th</sup> of May 2023**

Team Innovus, mentored by Ir. Jacqueline Lukose, which included Dheneshwar Arasu, Ishaq Easa Muzammil, Muhammad Abdool Hakim Lallmamode, Stephane Jean-Michel Benstrong, Howard Young, and Taimoor Khalid, was also awarded a Silver medal for their prototype, E-Wall.

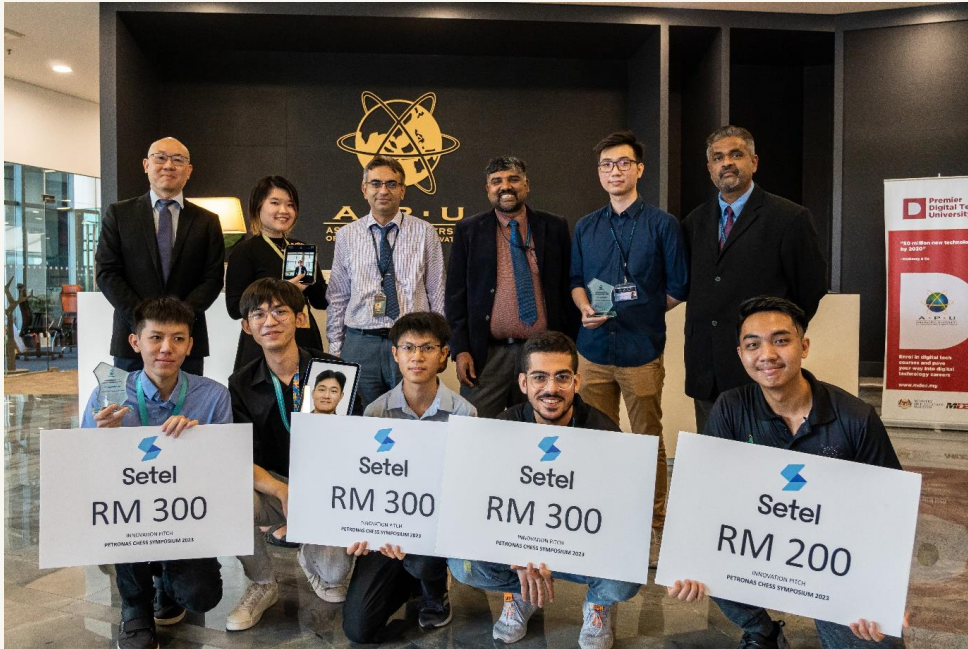


**From left, Stephane Jean-Michel Benstrong, Ishaq Easa Muzammil, Dheneshwar Arasu, Ir. Jacqueline Lukose, Howard Young, Taimoor Khalid and Muhammad Abdool Hakim Lallmamode with their Silver medal and certificates.**

E-Wall is a technology that uses an autonomous collecting platform to collect and automate the separation of e-waste. It collects e-waste using machine vision and a clever sorting system before transporting it to recycling centers. This method greatly lowers the likelihood of e-waste getting into landfills and damaging the environment. The APU team's success at ITEX'23 is a testament to the power of collaboration, innovation, and determination. By working together towards a shared goal, these brilliant minds have demonstrated what can be accomplished when they are unshakably dedicated to their work.

Their achievement is a shining example of the transformative power of technology, and it is sure to inspire others to follow in their footsteps.

# PRESTIGIOUS 2023 PETRONAS CHESS SYMPOSIUM IR. NARENDRAN A/L RAMASENDERAN JUNE 3, 2023



On June 3, 2023, the iconic Kuala Lumpur Convention Centre came alive with the prestigious 2023 Petronas CHESS Symposium. This groundbreaking event, with the ambitious objective of fostering dynamic partnerships between academia and industry, was a shining beacon for sustainable, innovative solutions. With participants hailing from myriad disciplines, it was a celebration of trailblazing projects tackling global challenges. The Centre for Research and Development of IOT (CREDIT) emerged as a prominent participant, bringing forth four brilliant teams from the esteemed School of Engineering and School of Computing at Asia Pacific University.

Highlighting our forward-thinking approach, the engineering department's Smart 3D Green Plastic Filament Monitoring and Management System team was recognized as the 2nd runner-up for their inventive solutions addressing plastic waste. Also from our engineering prowess, the RescueAI team was hailed as the 3rd runners-up for their groundbreaking Disaster Management solution equipped with Robotic Autonomy.



The Smart 3D Green Plastic Filament Monitoring and Management System, a visionary project by Mohammed Saad Mahmood Al-Kubaisi, Sarim Ahmed Khalil, and Ryan Teo Han Ji from CREDIT, sought to repurpose marine plastic bottles into 3D printer filaments. This environmentally conscious initiative was designed to reduce landfill and marine pollution, focusing on the needs of 3D printing enthusiasts, professionals, educational institutions, and sustainable product manufacturers. Through extensive market research and collaboration, we made sure our innovative solution was in line with customer expectations.

RescueAI, a CREDIT's creative team made up of Ng Joo Kiat, Cheng Yi Heng, and Cajun Tai Ka Joon, delivered an advanced disaster management system. Combining sensor fusion and machine learning AI, the solution predicts and models disaster scenarios using real-time data and physics-based simulations. The system incorporated aerial drones and autonomous water surface vehicles to verify sensor data, assisting first responders by orchestrating rescue efforts on a live digital twin disaster map.

## Achievements

In the realm of computing, the Power Play team, featuring Tang Jian Shiun and Tey Jia Yi, bagged the 2nd runner-up spot with their Intelligent Resource Maintenance System (IRMS). They set out to redefine resource maintenance in the energy industry by integrating IoT sensors and employing data analytics. IRMS provides real-time monitoring of resource conditions and accurate identification of potential oil reservoirs. The system boasts features like pipeline inspection and solar farm monitoring through cutting-edge minidrones managed by swarm intelligence algorithms. IRMS's comprehensive dashboards empower operators and maintenance teams to optimize resource utilization, manage pipeline risks, and ensure top-notch performance of solar farms.

Securing the third runner-up position was Team Arcturus, consisting of Ang Zi Yang and Cheryl Lim Wye Yee. Their solution aimed to resolve the challenges faced by oil rig operators by integrating IoT sensors onto oil drills for real-time condition monitoring and potential oil reservoir identification. A mix of machine learning algorithms analyzed seismic and oil reservoir data, aiming to supercharge operational efficiency. They further developed comprehensive dashboards, providing a panoramic view of the oil reservoir's condition, drill status, and oil extraction progress.

All of these inspiring teams received guidance from renowned mentors, including Head of the Centre for Research and Development of IOT, Dipl-Ing. Ir. Narendran Ramasenderan; Head of the School of Engineering, Associate Professor Ir.Dr. Sivakumar Sivanesan; Chief Innovation & Enterprise Officer Prof. Ir. Eur. Ing. Ts. Dr. Vinesh Thiruchelvam; Mr. Amad Arshad; Mr. Victor Khoo Shien Yang; and Head of the School of Computing, Assoc. Prof. Ts. Dr. Tan Chin Ike. With their collective brilliance and our teams' relentless innovation, CREDIT continues to pave the way for a more sustainable and efficient future.

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# Institution of Mechanical Engineers (IMEchE)

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## INDUCTION & HANDOVER CEREMONY

**TS.DR. ARUN SEERALAN**  
**22<sup>nd</sup> March 2023**



**Guest Of Honour: Mr. Phil Peel president of the Institution of Mechanical Engineers - (IMEchE - UK)**

Induction and Handover Ceremony: This event was held to award the ex-committee members of the IMechE APU Student Chapter for their work done last year. It was also held to introduce the new committee members. The invitees included lecturers from the School of Engineering (SOE), the ex-committee members, and the guest of honour, the president of the Institution of Mechanical Engineers (IMEchE), Mr. Phil Peel. A speech was delivered by the guest of honour, followed by a speech from Dr. Vinesh Thiruchelvam, some of the ex-committee members, and new IMechE APU SC president Muhammad Ridwan Bayrajee. Then, a guest of honour was invited to award the ex-committee members their certificates. After the ceremony, catering was provided to the guests.





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## IASS HANDOVER CEREMONY

### 14<sup>th</sup> April 2023

### EVENT REPORT

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### EVENT OVERVIEW:

The handover ceremony for the IASS team 22/23 and IASS team 23/24 was held in the APU Auditorium on 14 of April 2023, Thursday, from 3:00 pm until 5:00 pm. This event was exclusively for both team members. The emcee and speakers of the event were Jorryne Mark Nkongoki, one of the secretaries of IASS team 23/24, and Jordan Leonard Yeo Yong Wei, the chairperson of IASS team 22/23. Lim Jun Kit, the chairperson of IASS team 23/24 gave an opening and appreciation speech during the handover ceremony.

After that, the focus of event was the show casting and listing of the various events held by the committee through the presentation of slide show and explanation by IASS team 22/23 especially on the achievements of the previous committee. The ceremony included presentation of various events held such as, talks and workshops, such as ‘Engineer’s Week and ‘MATLAB Workshop’. They were successfully held by the previous committee. This was to show appreciation for the contributions and efforts of the IASS team 22/23. Furthermore, the presentation also showcased the new events being planned.



Besides, during the slideshow and presentation, emcee and committee members also inducted the new committee members of 2023/2024, whereby the IASS team 22/23 passed on the baton to the IASS team 23/24. At the same time, certificates were presented to the previous committee members by Assoc. Prof. Ts. Dr. Sathish Kumar Selva Perumal. The new team was then announced by the new Chairperson, Lim Jun Kit, who gave a heartwarming speech, and promised to deliver on his role as the new chairperson.

Apart from that, the new Vice-Chairpersons are Mathumitha A/P Tamilarasu and Gurujala Manikanth Goud, Secretaries, Jorryne Mark Nkongoki and Jushita Pediredla, with Lim Jing Xiang as Treasurer. Senior Executive Committee member is Thiik Thiik Agoth Cithiik, and Executive Committee are: Shah Saud, Frederick Amal Emerson, Syed Abdul Moiz Ahmed Pirzada, and Wai Zin Phyo



The event ended with a speech by Assoc. Prof. Ir. Dr. Siva Kumar Sivanesan. Finally, food and beverages were provided to all attendees by the IASS team. There was also a photography session with all members and lecturers who attended the event and made it a success. The purpose of the event which was to show our appreciation of the contributions and efforts of the IASS team 22/23, as well as the handover of responsibilities to the new team, and the event itself was a resounding success.

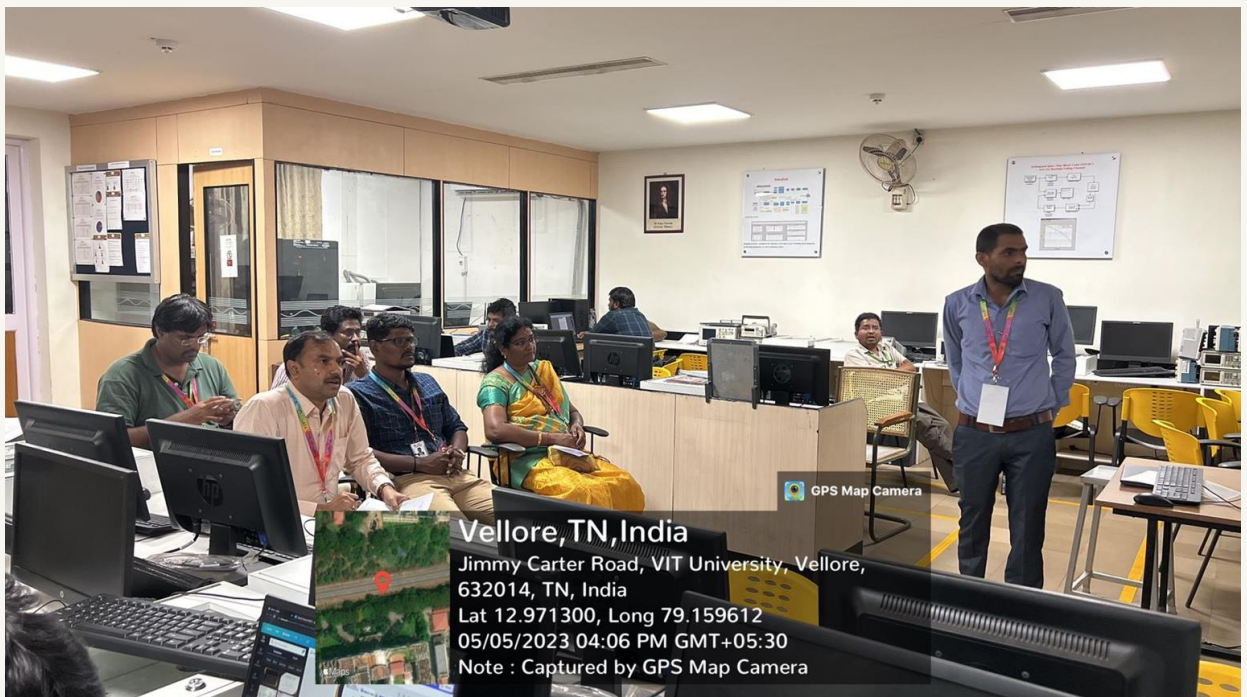


## Dr CHANDRASEKHARAN NATARAJ, SOE – HONOURED AS GUEST SPEAKER AND SESSION CHAIR AT THE INTERNATIONAL CONFERENCE ViTECoN 2023

APU senior lecturer **Dr Chandrasekharan Nataraj** from the school of engineering was honored as a guest speaker at the international conference ViTECoN 2023 organized by the School of Electronics Engineering (SENSE), VIT University, Vellore, Tamil Nadu, India. He delivered the session speech on the special track of IOT with the title of “IOT for next-generation mobile networks”. The main theme of the speech was an infusion of mobile networks with IOT and highlighted useful insights and research opportunities in those areas. He was also invited as a session chair for the IOT track and evaluated nearly 15 articles during the session at the conference. In addition, he offered constructive feedback and suggestions to researchers in the aspect of improving novelty in their research work.



ViTCoN 2023 is the IEEE-sponsored 2nd International Conference on Vision Towards Emerging Trends in Communication and Networking Technologies. The conference was conducted as Hybrid Conference (In-person and Virtual). The International Conference on Vision Towards Emerging Trends in Communication and Networking Technologies (ViTECoN-2023) is the premier forum for the presentation of new advances and research results in the fields of Electronics and Communication Engineering. The conference will bring together leading researchers, engineers, and scientists in the domain of interest from around the world. The scope of the conference includes but is not limited to Electronics, Communication Engineering, Computing, Signal Processing and Image Processing, Genetic Algorithms, Robotics, Machine Learning and Deep Learning, Machine Translation, Neural Networks, Next Generation Communication and Networking, etc.



Vellore Institute of Technology, a renowned university in India, was founded in 1984 as Vellore Engineering College by Dr G. Viswanathan, a former Parliamentarian and Minister in the Tamil Nadu government. The Deemed-to-be University status was conferred in June 2001 by the MHRD Govt. of India. VIT attracts students from all the states and union territories of India and 60 different countries, owing to its academic excellence



## MEMORANDUM OF AGREEMENT

### (ASIA PACIFIC UNIVERSITY OF TECHNOLOGY & INNOVATION and XIAMEN UNIVERSITY MALAYSIA)

Xiamen University Malaysia (XMUM) has signed a memorandum of agreement (MoA) with Asia Pacific University of Technology & Innovation (APU). The agreement was signed by **XMUM Vice President Assoc. Prof. Dr. Zhang Ying** and **APU Vice Chancellor Prof. Dr. Ho Chin Kuan** witnessed by **XMUM Director of Laboratory Centre Assist Prof. Dr. Yong Yean Kong** and **APU Head of School Assoc. Prof. Ir. Dr. Siva Kumar Sivanesan**.



From left: Assoc. Prof. Ir. Dr. Siva Kumar Sivanesan, Prof. Dr. Ho Chin Kuan, Assoc. Prof. Dr. Zhang Ying, and Assist Prof. Dr. Yong Yean Kong showing the signed MoA during the signing ceremony

XMUM and APU wish to establish a long-term collaborative relationship to promote cooperation on higher education and extend the opportunities available to students. The parties have agreed to establish a common framework for the organization of laboratory practical programme in XMUM and promote collaborative research between the two institutions. The purpose of this Agreement is to set out the basis on which a subscription-based laboratory practical programme can be held in XMUM for the students of APU in each semester according to the academic terms of APU.

The programmes identified for the partnership include Petroleum Engineering and Diploma in Mechatronic Engineering, School of Engineering. The projected number of students are about 5 per cohort for each of the programme. Students from both programmes are required to take the Petroleum Geochemistry module, which is a Year 2 module for both Petroleum Engineering and Diploma in Mechatronic Engineering programme. One of the assessments in this module is laboratory experiment where students are required to complete three laboratory experiments, namely, Gas Chromatography lab, Ultraviolet-visible lab and Fourier Transform infrared lab. However, both the programmes do not have the laboratory equipment to conduct the mentioned experiments. Hence, Dr. Wong Siew Fan proposed the collaboration with XMUM in utilizing their equipment to ensure that APU students are not at a disadvantage of missing the lab component.



The MoA signing ceremony began with Dr. Wong Siew Fan delivered the opening speech during the ceremony.



From left: Prof. Dr. Ho Chin Kuan and Assoc. Prof. Dr. Zhang Ying signing MoA as representative of the universities



From left: Assoc. Prof. Ir. Dr. Siva Kumar Sivanesan and Assist Prof. Dr. Yong Yean Kong signing the MoA as witnesses

The MoA signing ceremony ended with gift exchange between the two parties.



## THE APPLICATION OF ZIRCONIA WEBINAR – Ir. Ts. Dr. Alexander Chee Hon Cheong, 2023



The poster features a background image of a modern interior with a red wall and a white structure. In the top right corner, the IEM logo is displayed with the text 'The Institution of Engineers, Malaysia'. Below the logo, a dark grey box contains the text 'BEM Approved CPD: 2' and 'Ref. no: IEM23/HQ/195/T (w)'. The main title 'WEBINAR TALK ON ZIRCONIA: APPLICATIONS OF ZIRCONIA' is written in a mix of black and white fonts on a yellow background. Below the title, it says 'Organised by: Engineering Education Technical Division, IEM'. At the bottom left, there is a circular portrait of Ir. Ts. Dr. Alexander Chee Hon Cheong, and to his right, the word 'SPEAKER:' is written in a stylized font, followed by his name 'Ir. Ts. Dr. Alexander Chee Hon Cheong'.

A webinar titled "The Application of Zirconia" was delivered by Ir. Ts. Dr. Alexander Chee, in a session that focused on the versatile uses of zirconia, with a specific emphasis on biomaterial applications and research on CuO-doped 3Y-TZP. The event was organized by the Engineering Education Technical Division, Institution of Engineers, Malaysia (IEM) and saw an impressive turnout of more than 40 participants. The two-hour webinar was expertly moderated by Ir. Ts. Dr. Yvette Shaan-Li Susiapan, ensuring a seamless flow of information and engaging discussions



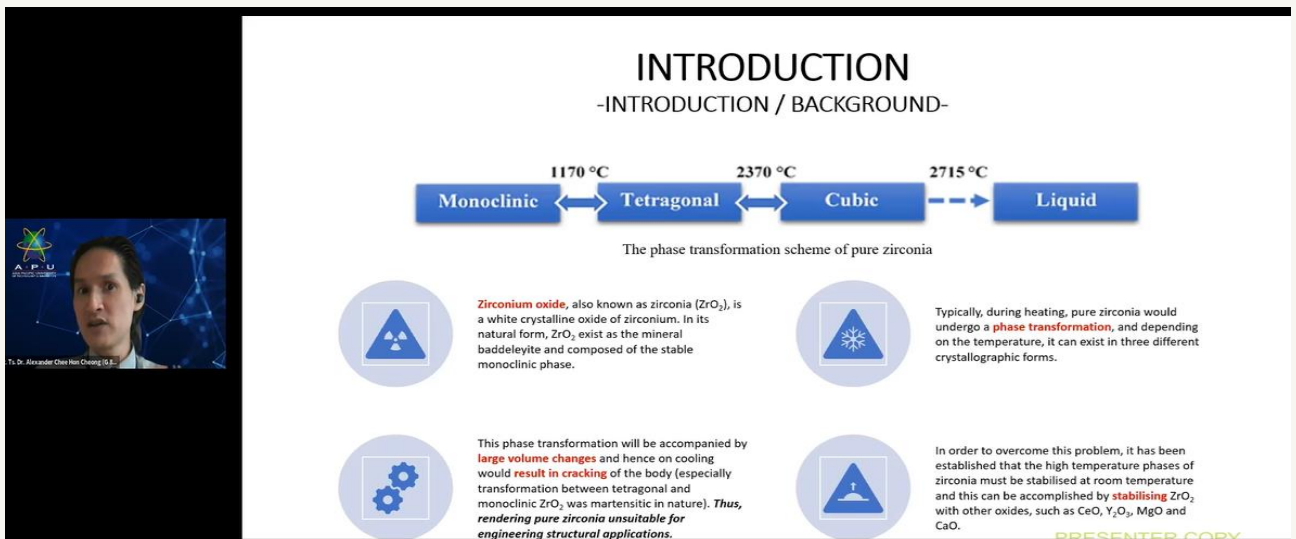
**IEM**  
The Institution of Engineers, Malaysia

WEBINAR TALK

THE APPLICATION OF ZIRCONIA:  
THE CHARACTERISTIC OF COPPER-DOPED ZIRCONIA PRODUCED BY CONVENTIONAL AND PRESSURELESS TWO-STEP SINTERING

**Ir. Ts. Dr. Alexander Chee Hon Cheong**  
Programme Leader / Digital Learning Architect / Senior Lecturer  
Asia Pacific University of Technology and Innovation

The webinar began with a warm welcome from the IEM, setting the stage for an insightful exploration of zirconia's applications in biomaterials and the groundbreaking research on CuO-doped 3Y-TZP.







**INTRODUCTION**  
-INTRODUCTION / BACKGROUND-

1170 °C      2370 °C      2715 °C

Monoclinic ↔ Tetragonal ↔ Cubic → Liquid

The phase transformation scheme of pure zirconia

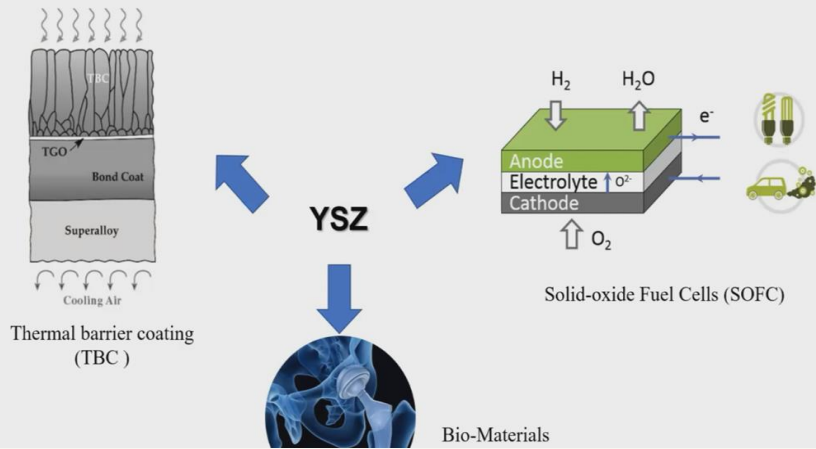
-  **Zirconium oxide**, also known as zirconia ( $ZrO_2$ ), is a white crystalline oxide of zirconium. In its natural form,  $ZrO_2$  exist as the mineral baddeleyite and composed of the stable monoclinic phase.
-  Typically, during heating, pure zirconia would undergo a **phase transformation**, and depending on the temperature, it can exist in three different crystallographic forms.
-  This phase transformation will be accompanied by **large volume changes** and hence on cooling would **result in cracking** of the body (especially transformation between tetragonal and monoclinic  $ZrO_2$  was martensitic in nature). Thus, **rendering pure zirconia unsuitable for engineering structural applications**.
-  In order to overcome this problem, it has been established that the high temperature phases of zirconia must be stabilised at room temperature and this can be accomplished by **stabilising**  $ZrO_2$  with other oxides, such as  $CeO$ ,  $Y_2O_3$ ,  $MgO$  and  $CaO$ .

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The session delved into the fundamental properties of zirconia and its exceptional suitability as a biomaterial. The speaker provided vivid examples and case studies to demonstrate how zirconia has revolutionized dental restorations and orthopedics, offering superior aesthetics, durability, and biocompatibility. The audience was fascinated by the potential for zirconia to improve the longevity and performance of joint replacements and enhance the field of regenerative medicine.



## -THE APPLICATION OF STABILIZATION OF ZIRCONIA-

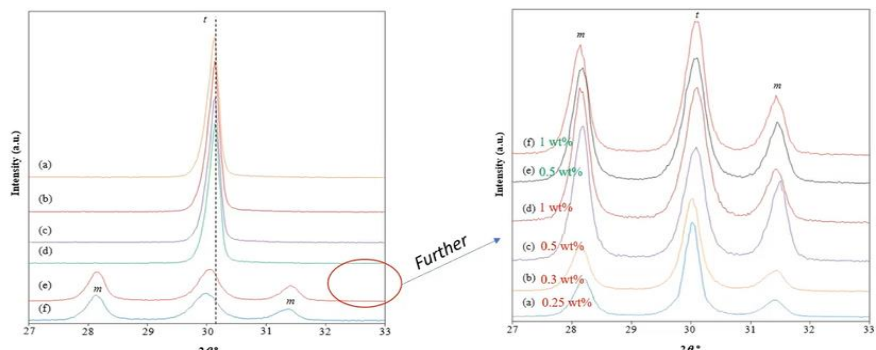


In addition to biomaterials, the webinar presented the research on CuO-doped 3Y-TZP, a cutting-edge development in the field. The speaker explained how the doping of zirconia with copper oxide can enhance its mechanical and electrical properties, opening up new possibilities for various applications. The audience gained insights into the potential use of CuO-doped 3Y-TZP in biomaterial besides the application such as solid oxide fuel cells (SOFC) and thermal barrier coatings (TBC), enabling advancements in clean energy generation and thermal protection systems.



## RESULT AND DISCUSSION

### -CONVENTIONAL SINGLE-STEP SINTERING- Tetragonal Phase Stability



The Application of Zirconia webinar focusing on biomaterials and the research on CuO-doped 3Y-TZP not only provided a platform for knowledge exchange but also strengthened the engineering community by establishing a reference point for biomaterial industry

# Institution of Mechanical Engineers (IMechE)

## Access-Control List (ACL) Workshop

**Ts.Dr. ARUN SEERALAN**  
**13<sup>th</sup> June 2023**



Access-Control List (ACL) Workshop: This workshop was held to improve the knowledge of APU students on the filtering of network traffic on Cisco routers. This event was conducted by Dr. Kamalakannan Machap who is a lecturer at APU. He introduced ACL concepts to our attendees, demonstrated its configuration, provided awareness about the security risks of using improper ACL configurations, and encouraged the participants to share their experiences on the topic. In addition, the participants were given the opportunity to apply the knowledge acquired on the spot, by using PCs provided by APU. This workshop was organised by the APU IMechE Student Branch. The project manager for this event was the vice president of APU ImechE SC, Zainab Yasmin, assisted by Zahra Tasnim, who was the assistant project manager for this event and, by the other committee members on the APU IMechE SC.

Workshop

**APU MALAYSIA**  
STUDENT CHAPTER

Institution of  
**MECHANICAL**  
**ENGINEERS**

# Institution of Mechanical Engineers (IMechE)



SoE Newsletter

# Institution of Mechanical Engineers (IMechE)

## SEHARA BERSAMA PIBKS DI MRANTI

**TS.DR. ARUN SEERALAN**  
**13<sup>th</sup> May 2023**



**SEHARA BERSAMA PIBKS DI MRANTI:** This event was held to educate the public on how to build and program boe-bot. The event was held at MRANTI Makers Lab, where our members brought pre-programmed and pre-built boe-bot provided by APU. A maze had also been built by our members, on the event location, to demonstrate the capabilities of the buoy bots. During the event, the abilities of the boe-bot were demonstrated to the public, by making the machine solve the maze. Furthermore, our members taught the public the basics of building a boe-bot, that is, how to program it using Arduino language, how the sensors work, and how wirings of the boe-bot were made. This event was held in collaboration with the APU IASS Club.



### **VISIT TO MAKERSLAB, MRANTI, TPM**

**IR.TS.DR.R.DHAKSHYANI ,2022**



An industrial visit was conducted on Monday, November 14<sup>th</sup>, 2022, with 20 final year engineering students organized by Senior Lecturer Ir.Ts.Dr.R.Dhakshyani to Makers Lab, MRANTI. It is situated in Technology Park Malaysia at Bukit Jalil, Kuala Lumpur. Boasting a 2,000 square-foot space, the MakersLab under Malaysian Research Accelerator for Technology and Innovation (MRANTI) offers a spectrum of 4IR focused tools, technologies, and technology immersion programmes to help increase local inventions. It is ideal for nurturing entrepreneurs to build their prototypes right up to the commercialization stage of their innovations. Aspiring entrepreneurs can test their products through the many workshops and certificate programmes to enhance their interest in Science, Engineering, Technology and Mathematics (STEM). Engineering students are mostly confined to classroom learning where it is more theory-taught based than a practical approach.

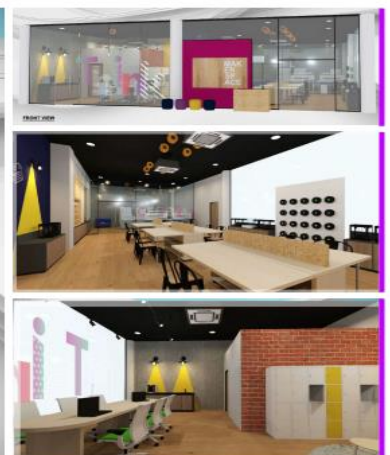
# Industrial Visit

However, Makers Lab gives students the opportunity to experiment with the many facilities there such as teaching them industrial design and then on how to use a 3D printer to make anything. Innovation has no age limit. Makers Lab also welcomes anyone who has an interest in turning their ideas into reality by helping them in designing their products. It was an excellent educational trip that benefitted both the lecturer and students



**MakersLab**

**MRANTI**



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Note: Illustration above depicts the artist impression.

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### Industry visit to Ajinomoto (Malaysia) SND BHD

**Muhammad Syahmi Afif Mokhtar Yazid - 2023**



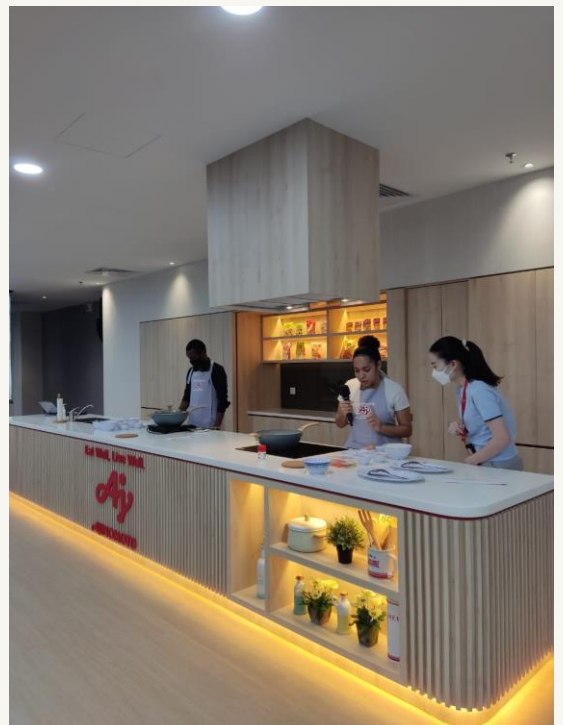
Ajinomoto (Malaysia) Berhad started its business operations in 1961 as AJI-NO-MOTO® Monosodium Glutamate (MSG) producer. It is one of the very first Japanese companies to be set up in Malaysia. Ajinomoto (Malaysia) Berhad has since grown into a dynamic food and seasoning manufacturer, marketing a diverse brand name trusted by Malaysians. The AJI-NO-MOTO® Umami seasoning has become an indispensable item in almost every household. In 2022, a new plant was established at Bandar Enstek, Negeri Sembilan, that serves as a 'Global Customer-Centric Halal Food Company'.

The visit was attended by 3 lecturers, 2 lab technicians and 16 students from Petroleum Engineering on 30<sup>th</sup> May 2023. The tour included a 1 hour stopover at the visitor gallery where we were briefed on the nature of the business, corporate philosophy, history & milestone, vision and mission, policies, and sales branch & overseas market. We also had the opportunity of visiting the production and packaging facilities. After that, we were served with chicken soup tasting session to differentiate a soup without and with Ajinomoto flavour.

# Industrial Visit



After the tour, we had a question-and-answer session, and cooking demonstrations from 2 of our students for the next 30 minutes. They cooked fried rice with vegetables using Ajinomoto flavouring and supervised by the person in charge. Lastly before we departed back to APU, all of us were invited for lunch followed by a closing ceremony.



# Institution of Mechanical Engineers (IMechE)

## CSR ACTIVITY - IMechE

**Ts.Dr. ARUN SEERALAN**  
**27 May 2023**



**Spreading awareness of plastic waste disposal harm to marine life while sharpening social interaction, leadership, teamwork, and critical thinking.**

Malaysia is a high-consumption country, with single-use plastics such as plastic bags, straws, and bottles. These plastics are often not properly disposed of and end up in the environment, where they can damage waterways and oceans.

Many people are unaware of the negative impacts of plastic pollution and do little to reduce their plastic footprint. As more plastic enters the environment, it contributes to the problem of plastic pollution.

Plastic waste is extremely harmful to marine life, killing fish and other marine life, and making it unsafe for human consumption.

20 volunteers from the Asia Pacific University of Technology & Innovation (APU)'s IMechE Student Chapter undertook an initiative to cleanup the beachfront in Port Dickson, Negeri Sembilan.

APU's IMechE Student Chapter in partnership with IMechE Malaysia Branch is an independent student-led organization that is affiliated with the Institution of Mechanical Engineers (IMechE) — professional body for mechanical engineers in the United Kingdom and around the world.

This volunteer work is done as part of corporate social responsibility (CSR) and Environmental, social, and governance (ESG) activities.

This volunteer activity is part of the program's corporate social responsibility (CSR) and environmental, social, and governance (ESG) efforts, which are guided by **Prof. Ir. Eur. Ing. Ts. Dr. Vinesh Thiruchelvam, APU's Chief Innovation & Enterprise Officer.**

“The main objective of this event is to spread awareness about plastic waste disposal towards marine life because Malaysia is one of the top ten countries that contribute the most plastic marine debris to the ocean. Thus, cleaning the beach and collecting plastic waste material will protect the open ocean from harmful floating plastic,” said **Ts. Dr. Arun Seeralan Balakrishnan, Academic Liaison Officer for APU's IMechE Student Chapter**, who joined the students during the awareness activity.

“It took four hours to gather various waste, including small pieces of plastic on the beach sides, and we were able to collect 20 huge pieces of plastic waste.”



## CSR Activity

According to Mechatronics student, **Amogha Seelan B A**, volunteering is a fantastic way to give back to your community and make a difference in the world.

“Beach cleaning is a particularly rewarding activity because it contributes to the long-term preservation of our oceans and beaches for future generations.

“I enjoyed working as a volunteer because it taught me how to manage our committee members and create a proper event plan,” he explained.

His classmate, **Muhammad Ridwan Bayrajee**, pointed out that volunteering is important to him because he participates in volunteer initiatives in his native country.

“Volunteering can help us develop leadership and teamwork skills,” he added “We learn how to encourage and inspire people, as well as how to delegate tasks, solve problems, collaborate, and compromise, when we are in charge of leading a team of volunteers.”



**Zainab Yasmin Baig**, a Computer Engineering student, mentioned that “some people do not care about the environment,” and wonders how as a future engineer she could help resolve this problem with what she learned at APU.

“This activity is beneficial for us because apart from being able to see the outside world, we can participate and contribute, and we will try to use what we learn to solve harmful plastic waste problems in the future,” she said.

It is critical to raise awareness about the dangers of hazardous waste disposal since it can help to prevent pollution from affecting marine life. By teaching people on the dangers of plastic waste disposal, we can help ensure that it is disposed of correctly and responsibly.