ENGINEERS INSIGHT

SCHOOL OF ENGINEERING | OCTOBER 2017 | VOLUME 20

Inotech & Automation Day 2017

In this volume

If you would like to be a part of the 'Engineers Insight' editorial team or have an article / paper published please contact: shankar@apu.edu.my

Lead Editor
Shankar Duraikannan

Editorial Team
Prof Ir Dr Vinesh Thiruchelvam

Contributors
Dr.Thang Ka Fei
Mr Shankar Duraikannan
Ms.Vickneswari A/P Durairajah
Mr Rasdi Bin Razalie

Engineers Insight' is a quarterly issue by the School of Engineering for the reading pleasure of the staff and students allowing for knowledge sharing and capturing of events for the benefit of engineering education.

GREAT ENGINEERS FROM THE PAST TILL MODERN TIME

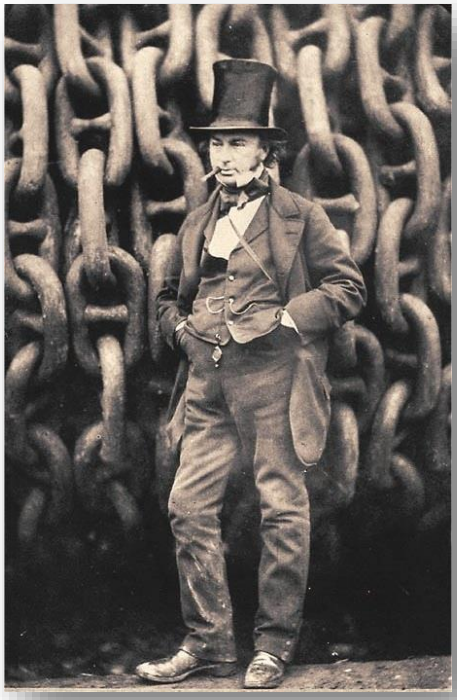
Dr. Thang Ka Fei

Hello all aspiring engineers! As this is the last issue of the year, I think it would be appropriate to conclude the Engineers Insight newsletter for the year 2017 by sharing the story of several great engineers in our lives, from the past till now! Throughout history, there have been many extraordinary people who have patented new technologies, constructed great infrastructures and even revolutionized the way work was being carried-out for higher efficiency and output. These individuals highlighted below are the testament of how engineers have changed the quality of life and the well-being of mankind, which are worthy of much respect and gratitude!

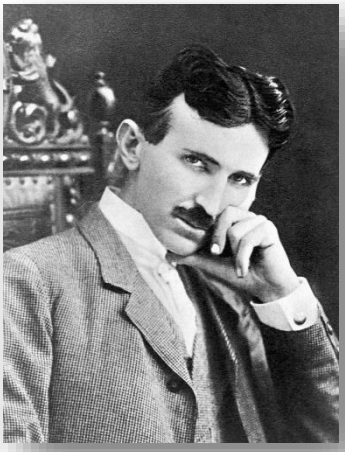
Archimedes (287 – 212 BC)

Archimedes was a Greek mathematician, physicist, engineer and inventor. Archimedes was known to apply concepts of infinitesimals and the method of exhaustion to derive and prove a range of geometrical theorems, including the area of a circle, the surface area and volume of a sphere, and the area under a parabola. His other mathematical achievements include deriving an accurate approximation of *pi*, defining and investigating the spiral bearing his name (i.e. Archimedes screw), and creating a system using exponentiation for expressing very large numbers. He was also one of the first to apply mathematics to physical phenomena, and founding hydrostatics and statics.

Isambard Kingdom Brunel (1806 – 1859)

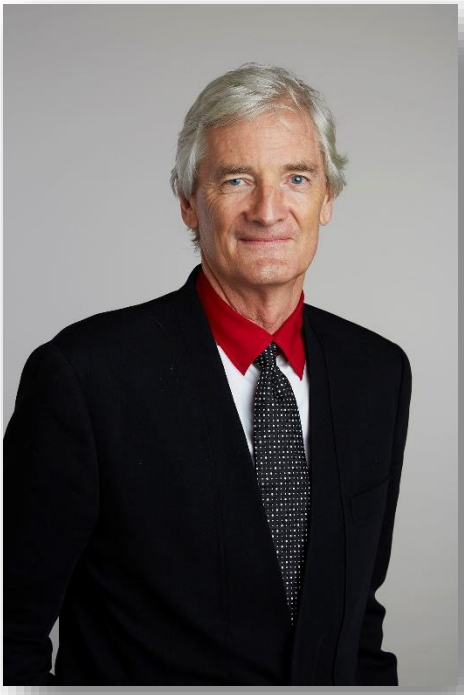


Isambard Kingdom Brunel was an English mechanical and civil engineer who is voted in 2002 as the second Greatest Briton of all time, after Winston Churchill. Isambard Kingdom Brunel was one of the 19th century engineering giants as his achievements in civil structural designs and constructions are far-reaching and many of them are still in-use today. His contributions include the Thames tunnel which has become one of the London Underground system today, Clifton Suspension Bridge linking Clifton in Bristol to Leigh Woods in North Somerset, England, which was the longest span of any bridge in his time, Great Western Railway linking London to Exeter. Apart of civil structures, Isambard Kingdom Brunel also designed steamships, with the first ship SS Great Western being the longest ship in his time which had travelled from Bristol to New York crossing the Atlantic Ocean. He has also designed SS Great Britain, being the first modern ship built in metal, and SS Great Eastern as the third ship, which was notable for its role in laying the first lasting transatlantic telegraph cable, which enabled telecommunication between Europe and North America. There is even a university, i.e. Brunel University London, which was named in recognition of his achievement.



Nikola Tesla (1856 – 1943)

Nikola Tesla was a Serbian-American engineer and physicist. He was credited for his discovery of rotating magnetic field, a fundamental principle in physics and the basis of nearly all devices that use alternating current (AC). Tesla brilliantly adapted the principle of rotating magnetic field for the construction of alternating current induction motor and the polyphase system for the generation, transmission, distribution and use of electrical power. Tesla's AC induction motor is widely used throughout the world in industry and household appliances. It started the industrial revolution at the turn of the century. Tesla's further invention includes that of fluorescent light, laser beam, wireless communications, wireless transmission of electrical energy, remote control, robotics and many others as substantiated by over 700 patents worldwide.



James Dyson (Born 1947)

Sir James Dyson is a British inventor, industrial designer and founder of the Dyson Company. He is best known as the inventor of the Dual Cyclone bag-less vacuum cleaner that are sold world-wide today. Being frustrated with the dust bag of his Hoover vacuum cleaner, Sir James Dyson set to create a vacuum cleaner that does not require the replacement of dust bag. After more than 15 years and about 5100 prototypes, the Dyson Dual-Cyclone has become the fastest-selling vacuum cleaner in the UK and US. Furthermore, Sir James Dyson's other inventions include that of Dyson Airblade, which is a fast hand dryer that uses a thin sheet of moving air as a squeegee to remove water, rather than attempting to evaporate it with heat. In addition, he has also invented the fan without blades, which is known as Air-Multiplier and most recently the Dyson Supersonic, which is a hair dryer with a smaller motor located in the handle so as to provide better balance and smaller size, as well as quieter operation. In 2017, Sir James Dyson has continued to invest in R&D of new products, with spending of £7m a week on research and development of new products. The company is the UK's biggest investor in robotics and artificial intelligence research, employing over 3,500 engineers and scientists, and engaging in more than 40 university research programmes.

Elon Musk (Born 1971)

Elon Musk is a South-African-born Canadian American investor, engineer and an inventor. He is best known for founding Tesla Motors and SpaceX, among other involvements in PayPal, "Hyperloop" transportation concept, OpenAI, Neuralink and SolarCity. All of these are evolving around his vision of changing the world and humanity. His goals include reducing global warming through sustainable energy production and consumption, and reducing the "risk of human extinction" by "making life multiplanetary" by establishing a human colony on Mars. Notably, Elon Musk leadership and direct involvement in Tesla's first electric roadster has seen the company evolving as the leading electric car maker and the most valuable US car maker today. Another great achievement comes in the form of commercial space travel, with SpaceX, which Elon founded in 2002. By 2008, SpaceX was well established, and NASA awarded the company the contract to handle cargo transport for the International Space Station, with plans for astronaut transport in the future in a move to replace NASA's own space shuttle missions. Elon Musk has also pursued an interest in Artificial Intelligence. He became co-chair of the nonprofit research company OpenAI, which launched in late 2015 with the stated mission of advancing digital intelligence to benefit humanity. Additionally, in 2017 it was revealed that Musk was backing a venture called Neuralink, which intends to create devices to be implanted in the human brain and help people merge with software. In December 2016, Musk was ranked 21st on the Forbes list of The World's Most Powerful People.

I hope you will be inspired by the achievements of these great engineers, via their diligence, dedication and relentless pursuit of solutions to complex problems that they encountered. These are good learning examples to all aspiring engineers!

INNOVATIVE DESIGNS TOWARDS SUSTAINABLE PRODUCTS – SERIES 7

Vickneswari A/P Durairajah

Sustainable products have always been the driving force in cultivating innovative ideas. The product that is said to be sustainable through innovation in my seventh series of Innovative Design toward Sustainable Products is the "Seabin". Let's walk through the need for a sustainable idea development behind this product.

Our oceans are extremely polluted, with marine life sharing their home with everything from plastic bottles, to paper, to detergent, to oil. This is, of course, a major issue that has done a significant amount of damage to our environment and the health & safety of sea creatures across the globe. The Seabin has become a revolution in ocean cleaning technology. It will help create cleaner oceans with healthier and a sustainable living condition for the marine life.

The Seabin isn't big or bulky and can fit into the problem corners of marinas without being obtrusive or taking up dock space for boats. The waste in the Seabin is collected easily and disposed of responsibly in the already establish waste disposal system of the marina. The first version of Seabin is as shown in figure 1.

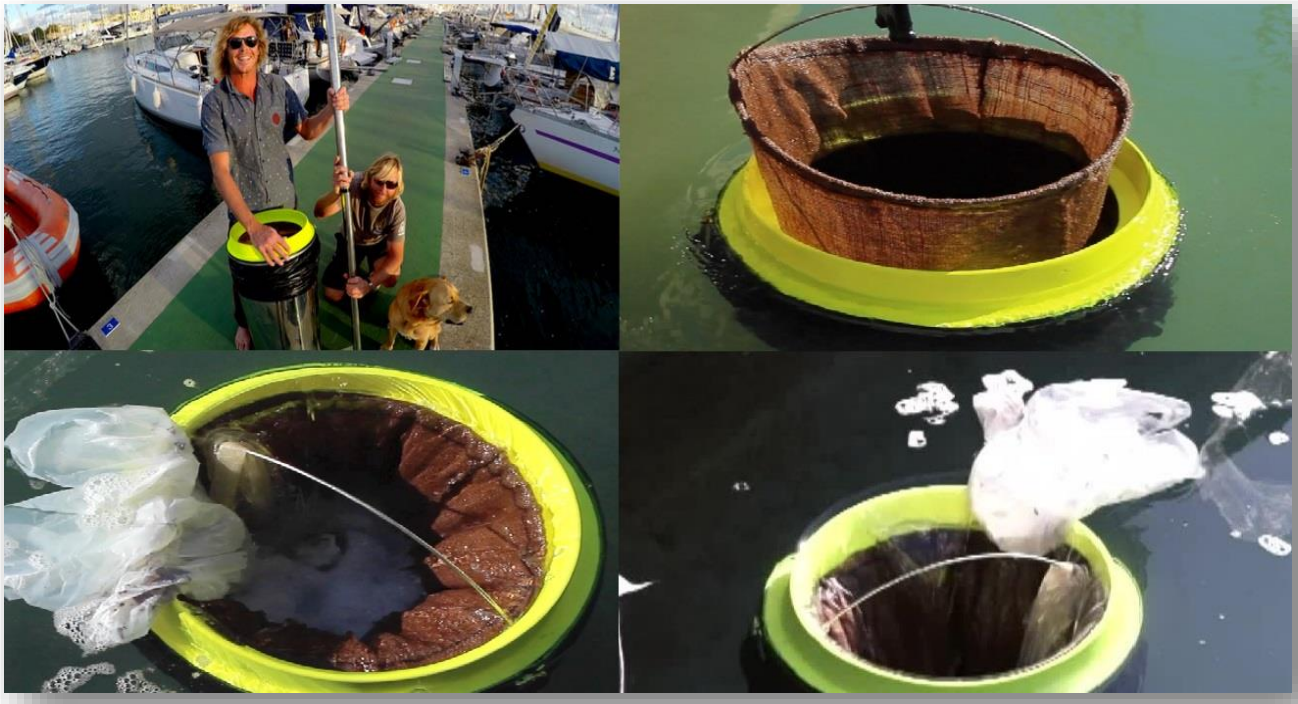


Figure 1: Seabin V1

The Seabin is usually located in the water and is fixed to a floating dock. There is a shore based water pump on the dock which runs on shore power.

The water pump creates a flow of water into the bin bringing with it all floating rubbish and debris. The rubbish/debris is caught in a natural fibre catch bag and the water is then sucked out the bottom of the bin and up to the water pump where it is then pumped back into the marina as shown in Figure 2.

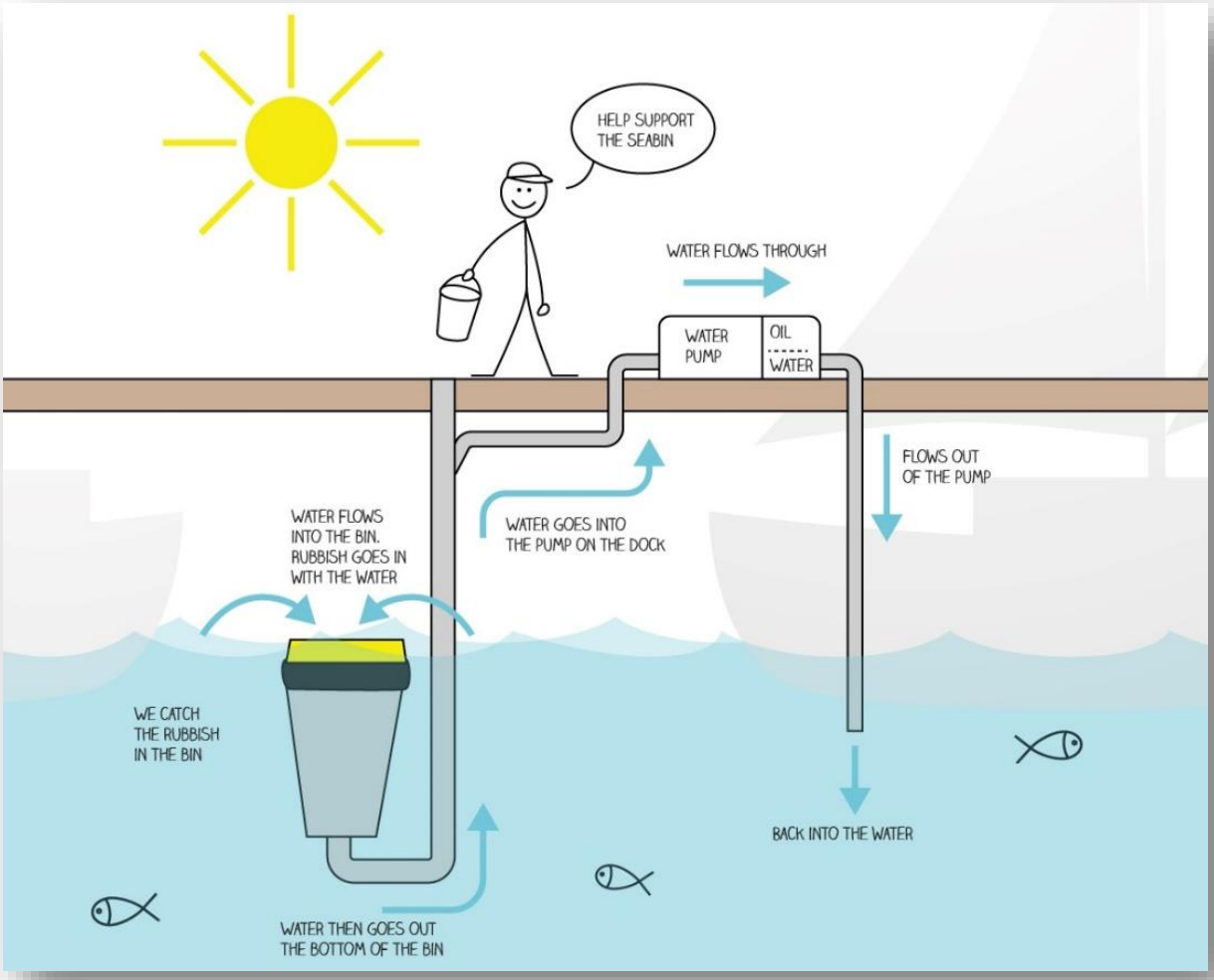


Figure 2: Seabin working principle

After much research and trials by inventing V2, V3 and V4 with minor changes to the design and choice of materials used; finally the Seabin V5 has arrived which now has better options to fit an oil/water separator and a better docking system that has been implemented as shown in Figure 3. The working principle of the Seabin for all versions are similar.

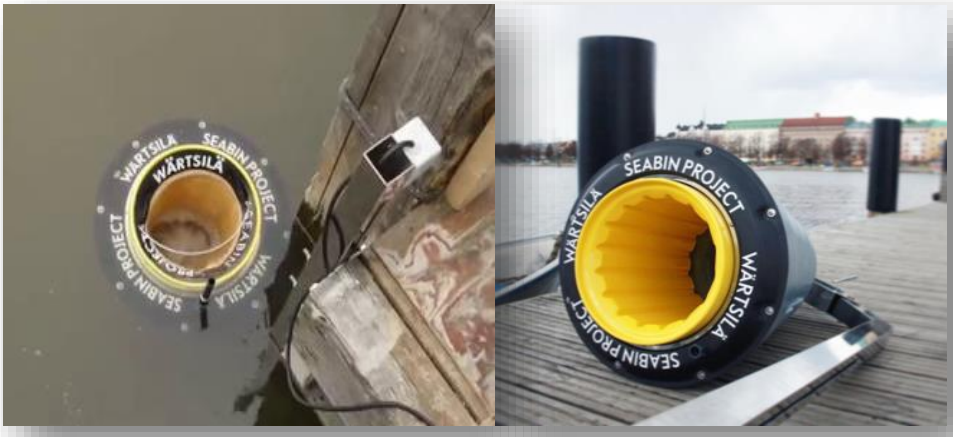
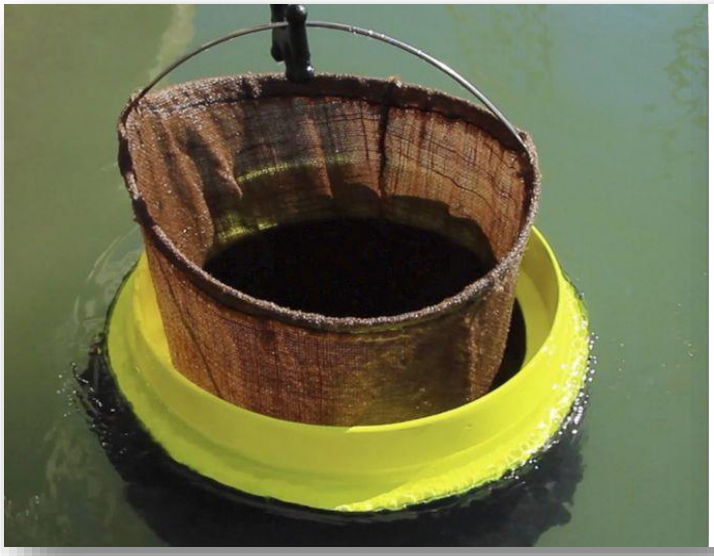


Figure 3: Seabin V5

The V5 is optimized for both fixed and floating docks whereas the other versions were for floating docks only. The V5 design developments now cover the whole marina market. The V5 has been designed to move up and down with the height of the tide regardless of the tidal range and to still function when disrupted by large wake created by the boating traffic. The inner catch bag is composed out of a handle made of marine grade stainless steel that is reusable and a natural fibre cloth that is woven leaving a 2 mm diameter pore, this allows the Seabin to trap micro-plastics down to 2 mm. The catch bag is also biodegradable and will compost within two years in the correct conditions.

The Seabin V5 is using a 24V submersible water pump to circulate the water through the Seabin. The low voltage of the water pump opens up a range of power options that enables the Seabins to uitlize low energy consumption for a lower carbon foot print. The master mind behind this ingénues idea are two surfers from Australia; Peter Ceglinski and Andrew Turton. They managed to raise USD$267,000 in an Indiegogo campaign to help build this device, and have signed up a contract with a French company Poralu Marine who will help in manufacturing of this product. Ceglinski and Turton have developed a solar powered model of the Seabin for testing purpose, so that it can operate untethered to land and is not reliant on carbon-emitting fuel sources.

Why is this approach said to be sustainable? That is because it will be enable reduction of a large amount of carbon foot print and hence save the Mother Nature. Further to that the Seabin trash catching bag as shown in Figure 4 is made out of hessian fibre which is commonly known as Burlap. Hessian fibre comes from jute as shown in Figure 5, a plant from the Corchorus genus and is grown mainly in Asian countries.



Jute is the second most important vegetable fibre after cotton and is readily available making it an easily accessible and affordable material to use. Jute has very low requirements for fertilizers and pesticides making it a sustainable and environmentally friendly crop and material for the trash catching bag. Another important feature of hessian fibre is its compostability. This does not create a problem since burlap is 100% biodegradable, recyclable and compostable!

Think about it! You might be the next inventor of such innovative ideas for a greater sustainable world. Let's embrace the idea of sustainability and put it into practice.

Figure and adapted from:
https://www.indiegogo.com/projects/cleaning-the-oceans-one-marina-at-a-time
https://yourstory.com/2016/03/Seabin/
For more information watch the video at:
https://vimeo.com/user44721275
https://vimeo.com/215850850

The Institution of Engineers, Malaysia

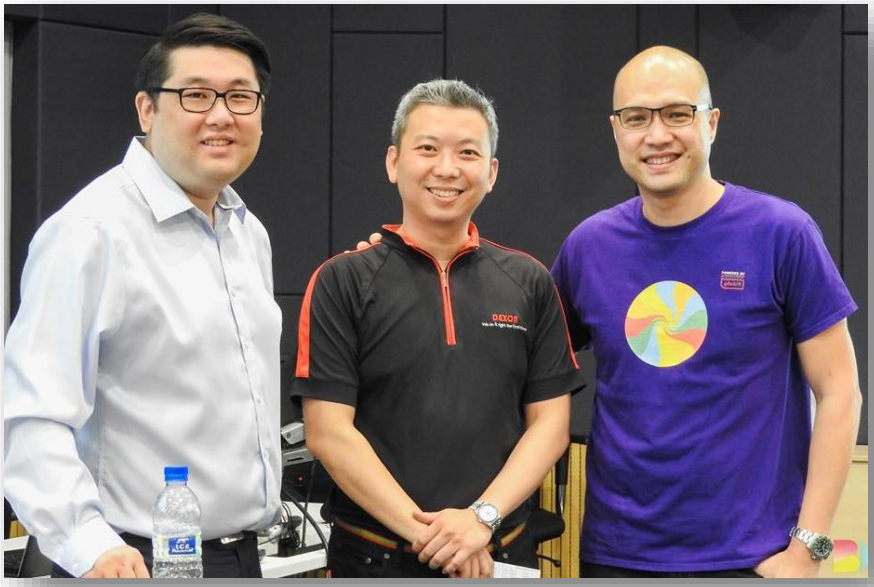
SEMINARS & WORKSHOPS

Petroleum Geophysics & Exploration – July 6, 2017
Prof Dr Mehrdad Soleimani, Sharood University of Technology, Iran

The Institution of Engineers, Malaysia

SEMINARS & WORKSHOPS

My Journey As An Entrepreneur – July 27, 2017
Entrepreneurs Organization

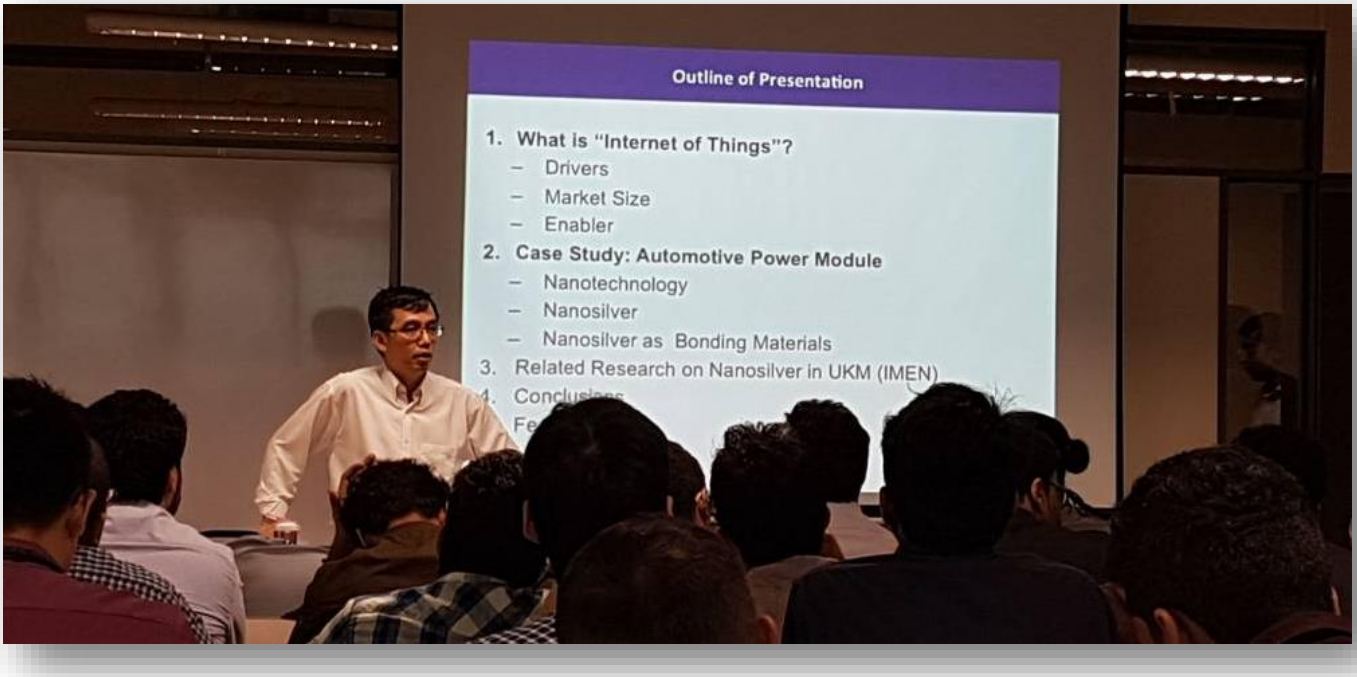


The Institution of Engineers, Malaysia

SEMINARS & WORKSHOPS

IoT & Nano-Silver Sintering– August 22, 2017

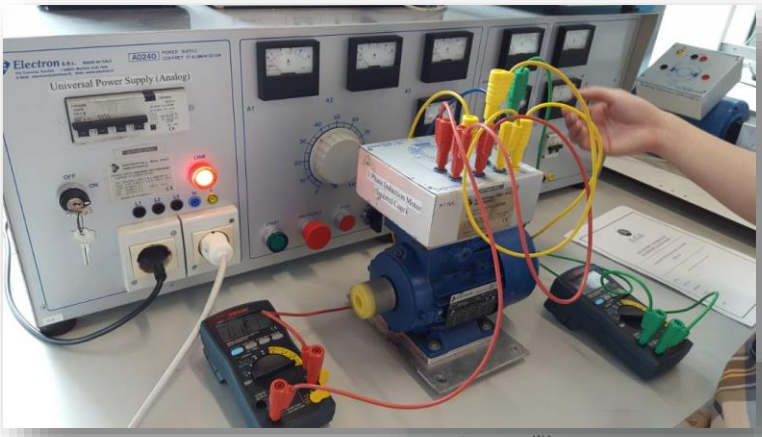
Dr Kim S Siow, Institute of Micro Engineering and Nano Electronics Universiti Kebangsaan Malaysia



The Institution of Engineers, Malaysia

SEMINARS & WORKSHOPS

Electrical Machines Operations and Handling – September 8, 2017
Mr Ravi Lakshmanan, Senior Lecturer, School of Engineering, APU



The Institution of Engineers, Malaysia

SEMINARS & WORKSHOPS

Oil Well Cementing Operations – September 15, 2017
Mr Shameed Ashraf, Fluid Tech Engineer, Schlumberger

The Institution of Engineers, Malaysia

INDUSTRIAL VISITS

Westport – July 20, 2017

The Institution of Engineers, Malaysia

INDUSTRIAL VISITS

Agensi Nuklear Malaysia – August 3, 2017

The Institution of Engineers, Malaysia

INDUSTRIAL VISITS

SIRIM Berhad – August 9, 2017

The Institution of Engineers, Malaysia

INDUSTRIAL VISITS

High Voltage Engineering Lab, UM – September 28, 2017

SOE COMPETITIONS

ITEX 2017

Our prestigious team from School of Engineering (SoE) achieved excellent results in the recently concluded 28th ITEX, which was held at Kuala Lumpur Convention Centre (KLCC), with the project, “Automated Cylindrical Mandrel System for Filament Winding”. At the event, the team has successfully attained Silver award. The team, comprising Nicholas Tan Ooi Kian, Justin Chong, Ting Ding Ching, Chama Serenje and Goolfee Mohammad Haadi were under the mentorship of Ir. Dr. Alvin Yap Chee Wei and Brian Lim Siong Chung

ITEX is an international platform for local and international inventors and research scientists to present their inventions and innovations to a business community keen on commercialising unique inventions. Organised by MINDS (Malaysian Invention & Design Society) since 1989, this annual event attracts inventors with their latest inventions and innovations from universities, research institutions, individual inventors, young inventors, and corporations from Malaysia, Asia and Europe. ITEX recognizes unique inventions through the Inventions of Design Competition where local and international Awards are awarded. These winning inventions gain maximum recognition and attract even more business opportunities. The award shows that our student’s work is recognized in the innovation industry. It is a pleasant achievement and this has once again shows that our students possess qualities that are able to meet industry expectations. Do join us in congratulating the students for their success and thumbs up to their mentors for the guidance!

SOE COMPETITIONS

INOTECH 2017

"InoTech 2017" is an event planned and organized for innovative young engineering students to exhibit their talents on recent technologies in their relevant field of engineering in the Invention & Innovation Exhibition. Competition is incorporated with the exhibition to increase the motivation and competency of students to prepare them for the industrial difficulties of the real world. The purpose of this activity is to equip students with the skills of thinking clearly and constructively, speaking persuasively and listening critically while exploring their ability to solve technical problems creatively and sustainably.

The event was conducted within the university campus on the 7th of September 2017 and jointly organized with the Institute of Engineers, Malaysia (IEM). IEM Excomm annually supports a design competition within local universities and for 2017 we were fortunate to have their support for APU's Inotech 2017. IEM's contributions were to make available judges for the Inotech Design Competition, promote the event within the IEM circle of publications/magazines/bulletins and also to endorse APU as a partner is design innovation for the development of Science, Technology, Engineering and Mathematics (STEM) education in Malaysia.

This is a competition open to external participants as well and this year we were very happy to have 16 teams from UniKL MICET also competing. A total of 60 projects were registered to participate in the event, each showcasing very impressive innovations which wowed our guest judges. Our judges this year were Assoc. Prof. Ir. Dr. Mohamed Thariq Bin Haji Hameed Sultan, Ir. N. Jayaseelan, Professor Ir. Dr. Mandeep Singh, Mr. Karthikeyan a/l Rajamohan, Mr. Jason Khoo Kok Leng, Mr. Zailan Arabee Bin Abdul Salam, Prof. Dr. R. Logeswaran N. Rajasvaran and Ir. Dr. Dhakshyani Ratnadurai.

The first prize winner was Shams Ur Rehman from APU, for the project 'Automatic PCB Classification and Defect Detection'. Second prize winners were Noraishah binti Mohammed, Nurul Afiqah binti Zainudin and Nur Asyiqin binti Zolhisham from UniKL, for the project 'Biocomposite panel of corn straw and coconut husk for green and sustainable building material'. The third prize winners were Muhammad Farhan bin Mohd, Fozi, Puteri Nurdiana Asyiqin binti Ruslan and Adam Harith bin Zafrul Fazry from UniKL, for the project 'Papaya seeds facial for lighter and glowing skin.'

MOGADISHU NEVER SURRENDERS

Rasdi Bin Razalie

Dear colleagues and student friends,

With immense pleasure I would like to share my exciting experience in the making of 'Black Hawk Down' a historical documentary on the First Battle of Mogadishu which happened on October 3 – 4, 1993 in Mogadishu, Somalia. The documentary was shot between May 22 and 25, 2017 in collaboration with Muzium Tentera Darat, Port Dickson, MyRenact and Astro.

This documentary was to bring into light the battling spirit of the Malaysian Army representatives in rescuing the US Army soldiers when Mogadishu was under siege by Somali Militants. On 3 October 1993, the US Task Force Ranger team with the aim of capturing Mohamed Farrah Aidid, the leader of the Somalian militiamen fell into this so called militant trap. The assault force consisted of nineteen aircraft, twelve vehicles that included nine Humvees, and 160 men. The operation was intended to last no longer than one hour.

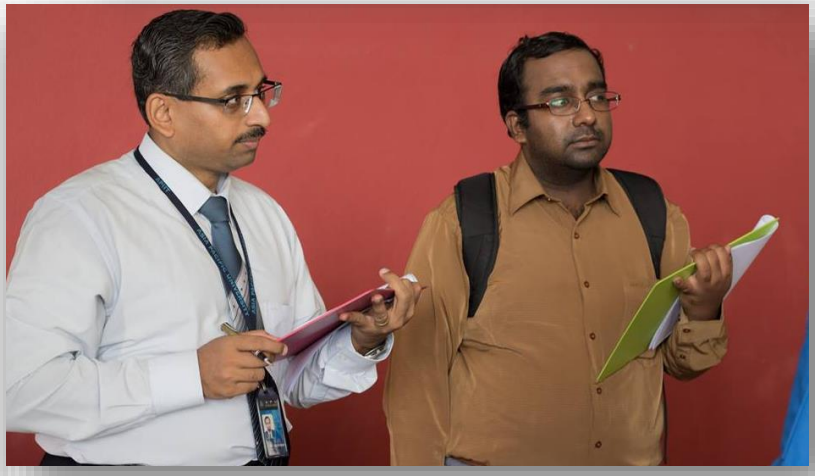
Shortly after the assault began, Somali militia and armed civilian fighters shot down two UH-60 Black Hawk helicopters by RPGs (*Ruchnoy Protivotankoviy Granatomyot*-Hand-held anti-tank grenade launcher) and three others were damaged. The wounded survivors got stranded at the crash sites and the subsequent operations to secure and recover the crews of both helicopters extended the initial operation into an overnight standoff. One of the crash sites was overrun by hostile Somalis overnight. On November 4, 1993, a daylight rescue operation was executed by a combined task force to rescue the trapped soldiers at another crash site. The Malaysia Army wing - 19 RAMD (Mekanis) at Sungei Petani Kedah along with Pakistani and US Army rescued the survivors of the other crash site. One of the Malaysian soldiers was killed during the rescue operation. The battle resulted in 19 deaths, 73 wounded and one helicopter pilot captured among the U.S. raid party and rescue forces.

A·P·U
ASIA PACIFIC UNIVERSITY OF TECHNOLOGY & INNOVATION
SCHOOL OF ENGINEERING

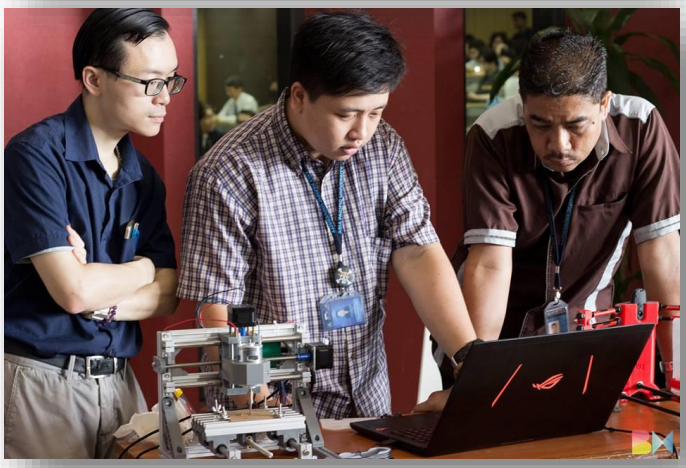
SOE EVENTS

AUTOMATION DAY 2017 - INVITED GUESTS

INOTECH 2017 - JUDGES



INOTECH 2017 PARTICIPANTS



INOTECH 2017 PARTICIPANTS

A Perfectly Planned Dream or Vision Can Come True, Plan your Dreams/Visions for 2018