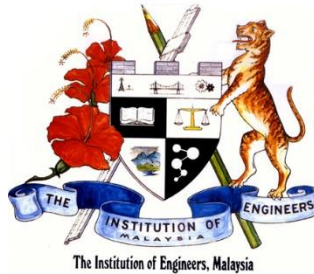


# ENGINEERS INSIGHT



**A . P . U**  
ASIA PACIFIC UNIVERSITY  
OF TECHNOLOGY & INNOVATION



**A . P . I . I . T**  
ASIA PACIFIC INSTITUTE  
OF INFORMATION TECHNOLOGY

**SCHOOL OF ENGINEERING**

**JULY 2017**

**VOLUME 19**



**MLC 2017**

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- IEM Industrial Visits
- SoE Competitions
- SoE Final Year Projects

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

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'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.



Several engineering modules have now incorporated Group Assignments as part of the in-course assessment; students are typically organized into groups of 3 to 5 students and are given open-ended problems to solve, quite often real-work engineering problems. The motivation of making Group Assignments available is simple, it is to:

- a) Emulate actual working environment where engineers are mostly working in teams;
- b) Encourage learning from one another especially among peers; collaborative learning has been proven to be highly effective.
- c) Solve complex problems more effectively and creatively; some problems are better solved in groups.
- d) Build essential social skills such as resolving conflicts, collaborating with people, developing accountability, among others.

Regardless on how the teams are first formed, either self-initiated or pre-fixed, some teams are bound to achieve much more than the others. Worst still, some teams are not able to maintain coherence throughout and may lead to blaming or shaming among team members, definitely not a desirable moment to have. What is therefore the secret “ingredients” behind a successful team? I have given it a thought and listed herein are the “spices” required to produce one:

**Respect others** – every team member is unique and has a different way of learning and communicating; it is important to have all opinions heard and considered in a team discussion. Do not ignore anyone just because his or her opinion is different from yours.

**Pro-activeness** – successful teams consist of members who are enthusiastic, collaborative and task-finishers. Do not distance yourself from the team, it is simply disruptive and will not work-out well for your grades.

**Meets regularly** – meeting face-to-face frequently allows progress to be updated and effective feedback on the quality of the work. Using social-media or group-chat apps solely simply do not work. We are human and therefore “seeing” each other is essential.

**Be positive** – the problems given are complex hence solutions do not come easily. Don’t be despair if the solutions are not great. Do consult your lecturers regularly to get his/her feedback. Positive mind-set will also boost the team morale; great things do not come from sad minds.

**Have a structure** – the team may want to elect a leader who then will assigns tasks and roles. The key success factor here is the willingness of everyone to take on tasks assigned and work on it diligently. Whoever is the Team Leader does not get the easiest task at all! Rather, he or she has to be mindful of the timeline and arrange regular meet-ups to track progress.

Although working on Group Assignments is straining, largely due to the need to work with people and the frustration of not able to control everything by yourself. However, once you have mastered the skills of team-working, the benefits are long-lasting and it will help you to adapt to Engineering working culture in the long-run and a better grades in your assignment definitely!

## INNOVATIVE DESIGNS TOWARDS SUSTAINABLE PRODUCTS – SERIES 6

### 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 sixth series of Innovative Design toward Sustainable Product is the “Fog-Net. Let’s walk through the need for the sustainable idea development behind this product.

Firstly what is a “Fog”? It is something like clouds and fog is made up of condensed water droplets which are the result of the air being cooled to the point (actually, the dew-point) where it can no longer hold all of the water vapour it contains.

Therefore, fogs have the potential to provide an alternative source of fresh water in dry regions and can be harvested through the use of simple and low-cost collection systems. Captured water can then be used for agricultural irrigation and domestic use.

Many research suggest, that fog collectors work best in locations with frequent fog periods, such as coastal areas where water can be harvested as fog moves inland driven by the wind. However, the technology could also potentially supply water in mountainous areas if the water is present in stratocumulus clouds, at altitudes of approximately 400 m to 1,200 m (UNEP, 1997b).

According to the International Development Research Centre (1995), in addition to Chile, Peru, and Ecuador, the areas with the most potential to benefit include the Atlantic coast of southern Africa (Angola, Namibia), South Africa, Cape Verde, China, Eastern Yemen, Oman, Mexico, Kenya, and Sri Lanka.

Isn’t this an amazing sustainable idea? It basically get “FREE” water from the air! What a great invention that has contributed to our life’s. Let me take you through the journey of how this development came into reality.

The designed a fog-harvesting material was mimics the fog-harvesting strategy of the Namibian desert beetle as shown on Figure 1. The beetle moves to a spot where the fog rolls in, raises its wings, and the fog condenses on the wings and rolls to the mouth. The wings have bumps that attract water and troughs that repel it; this way, drops collect on the bumps, then run off through the troughs without being absorbed, so that the water reaches the beetle’s mouth which can be clearly seen from Figure 2.



Figure 1: Namibian desert beetle

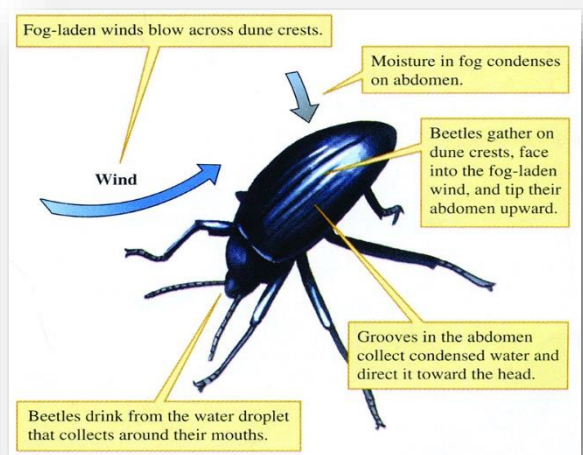


Figure 2

The design started with a mesh, rather than a solid surface like the beetle's. This is one improvement over nature for the purpose of capturing more water than the beetle would need. The design boosted water output by refining the materials that the mesh is made from, attempting to strike a balance between hydrophilic materials that attract water droplets, and hydrophobic materials that then send them on their way down into the collection container. In some field tests, fog harvesters have captured one litre of water (roughly a quart) per one square meter of mesh, per day.

Since we now know how the Namibia beetle drinks water from the fog. Let's now see how this bio-inspired fog net catches water from the air. Condensation is process that involves drawing water from the atmosphere. It happens as a result of moist air coming into contact with a cold and dry surface, forming water droplets that flow down the surface once. This is how water collection is done in desert regions where the temperatures drop drastically at night making it easier to collect water via condensation.

After spending a considerable amount of time studying the water collecting mechanism of the Namib Beetle, researchers have imitated this astounding method by creating water collection nets and even bottles. Few of the examples as following:

**Water Collection Net;** the net is hung between two poles in a vertical position as shown in Figure 3. It has a large surface area to maximise the amount of fog it traps. Fog goes through it whilst leaving behind droplets of water which flow down and are collected as shown in Figure 4. This method has been adopted in countries like Chile where they have a lot of fog.



Figure 3: Fog net



Figure 4: Fog net Mesh, Water collection

**Liquid Collecting Permeable Structure;** a net is however not the only surface that is used to collect water. A research from Harvard, created a surface replicating the beetle's shell. The surface is made up of hundreds of grooves that grow wider at the bottom of the collecting net to permit easier runoff. Its slick waxy surface made from a pitcher plant further aids in the runoff. This invention has resulted in increased efficiency in industries that rely on condensation not to mention provision of water to areas that have it in short supply.



**Figure 5: Dew Bank Bottle**

Dew Bank Bottle; another fantastic invention is the Dew Bank Bottle as shown in Figure 5 that is placed outside at night to collect water. It is made of stainless steel because of its cold property. Since it gets really cold during nights in the desert, the bottle gets colder than the air so water droplets condense on the surface. The droplets immediately collect into the bottle through openings only wide enough for water to penetrate to prevent contamination. It also has an uneven surface to increase the surface area for water collection. In the morning, water collected can be drunk as it's free from germs. Its inventor claims that it can collect as much as a full glass water, so if each person had their own bottle this would definitely make a difference. It could provide water to the thousands of children living in deserts.

Water harvested from fog is quite clean, lacking microorganisms and bacteria so it's not only perfect for drinking but also for irrigating plants. Additionally, installation and maintenance of fog-harvesting technology has little to no impact to the environment. No energy is required in this process so toxic gases are not released to the atmosphere. It's absolutely environmentally friendly.

Water is critical to life. It's really sad when there are people in the world who are dying due to lack of water yet there such ingenious ways of tapping water! These methods, if implemented, are bound to give water security to millions all across the globe.

**Figures adapted from:**

<https://asknature.org/strategy/water-vapor-harvesting/#.WJ8itvI97IU>

<http://inhabitat.com/beetle-inspired-bottle-harvests-drinking-water-from-thin-air/>

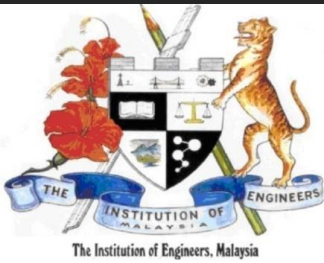
<http://www.mnn.com/earth-matters/wilderness-resources/photos/7-amazing-examples-of-biomimicry/bug-water-collection>

<http://earthtechling.com/2016/03/new-water-collection-method-inspired-by-bugs/>

**For more information watch the video at:**

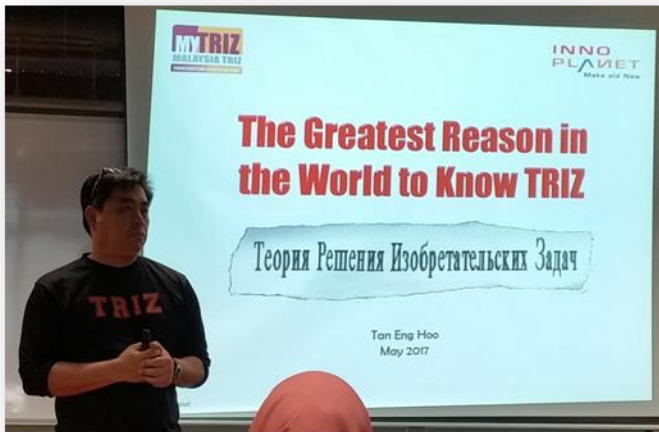
[https://www.youtube.com/watch?v=ewkR0\\_x0sPY](https://www.youtube.com/watch?v=ewkR0_x0sPY)

<https://www.youtube.com/watch?v=6MqfdXzPJP4>



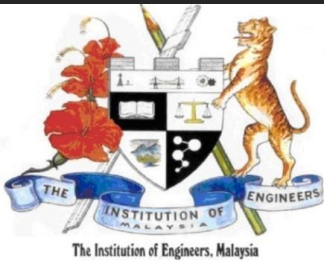
# SEMINARS & WORKSHOPS

## THE GREATEST REASON IN THE WORLD TO KNOW TRIZ



“TRIZ” the (Russian) acronym for the “Theory of Inventive Problem Solving”, is a problem solving method based on logic and data, not intuition, which accelerates the project team’s ability to solve these problems creatively. TRIZ also provides repeatability, predictability, and reliability due to its structure and algorithmic approach. An invited talk on ‘GREATEST Reason in the World to Know TRIZ’ by Mr Tan Eng Hoo, MyTRIZ Vice President & Inno Planet Consultant was conducted on May 22, 2017 for the academic staff members of SoE.





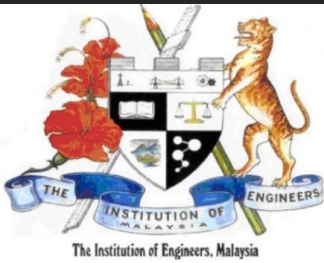
# SEMINARS & WORKSHOPS

## PROBLEM SOLVING USING TRIZ



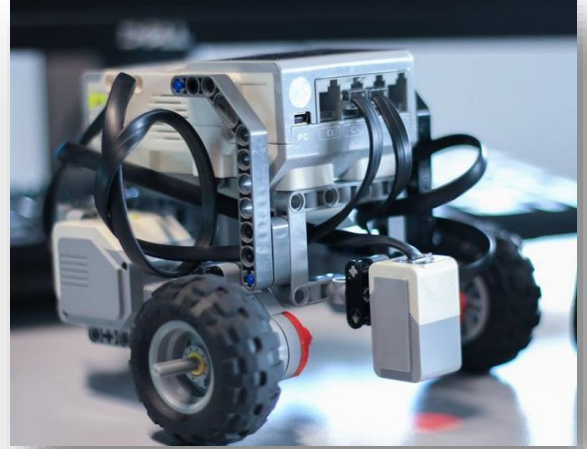
TRIZ is a catalytic program for employees to upgrade the problem solving and innovation skills to international certification standards. TRIZ is recognized as one of the powerful methods for innovation. It is embraced by many corporations namely Siemens, Samsung, Intel, Whirlpool, LG, Christian Dior, Boeing, Procter & Gamble, L'Oreal, KIA, Hyundai, etc. As a continuation to the invited talk on TRIZ by ' by Mr Tan Eng Hoo, MyTRIZ Vice President & Inno Planet Consultant, on June 6 & 19, 2017 a workshop on 'Problem Solving with TRIZ' was conducted by Mr Kumaresan Magaswaran, our School of Engineering lecturer who is a TRIZ certified Trainer. 14 academic staff of SoE attended the two days training.





# SEMINARS & WORKSHOPS

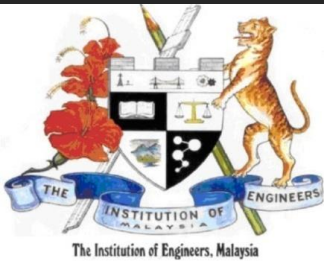
## LEGO WORKSHOP



On May 19 & 26, 2017, Lego Mindstorm Experts conducted the two days workshop on Robotics. The two days workshop covered the fundamentals of Lego programming and interfacing on the first day and the complex design process on the second day. 36 students and 3 students attended the three days workshop.

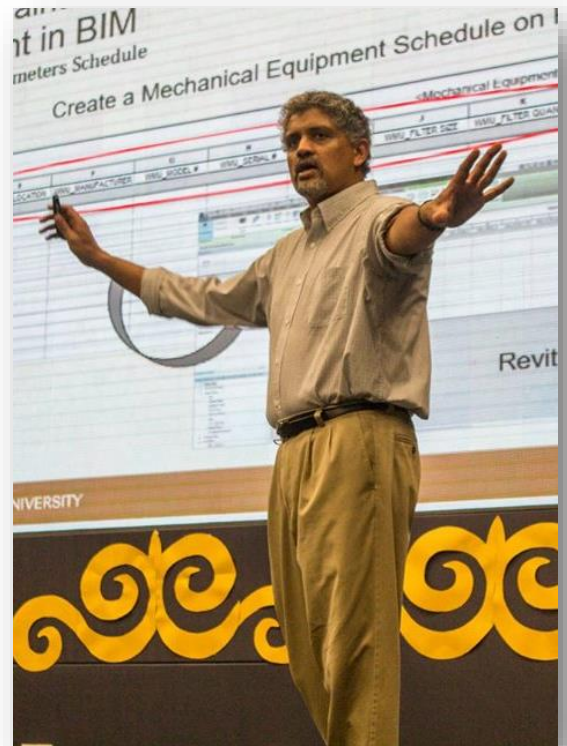






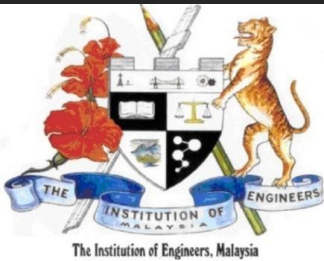
# SEMINARS & WORKSHOPS

## BUILDING INFORMATION MODELLING



Building Information Modelling (BIM) is a digital representation of physical and functional characteristics of a facility or building. BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition. On June 23, 2017, Mr Anand Sankey, Director of Engineering, Western Michigan University, USA gave a talk on BIM which was well received by 76 students and 6 staff of school of engineering.





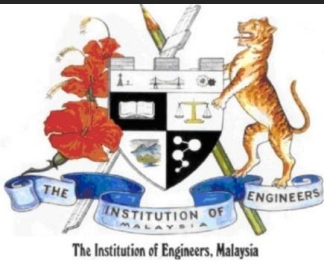
# SEMINARS & WORKSHOPS

## POWER SYSTEM ANALYSIS USING MATLAB



On June 29 2017 a workshop on Power System Analysis using Matlab & Simulink was conducted by Dr. Freddy Tan Kheng Suan. The workshop was aimed to train the students on the usage of Simulink toolbox for electrical engineering problem solving. 11 students and 3 staff attended the workshop.



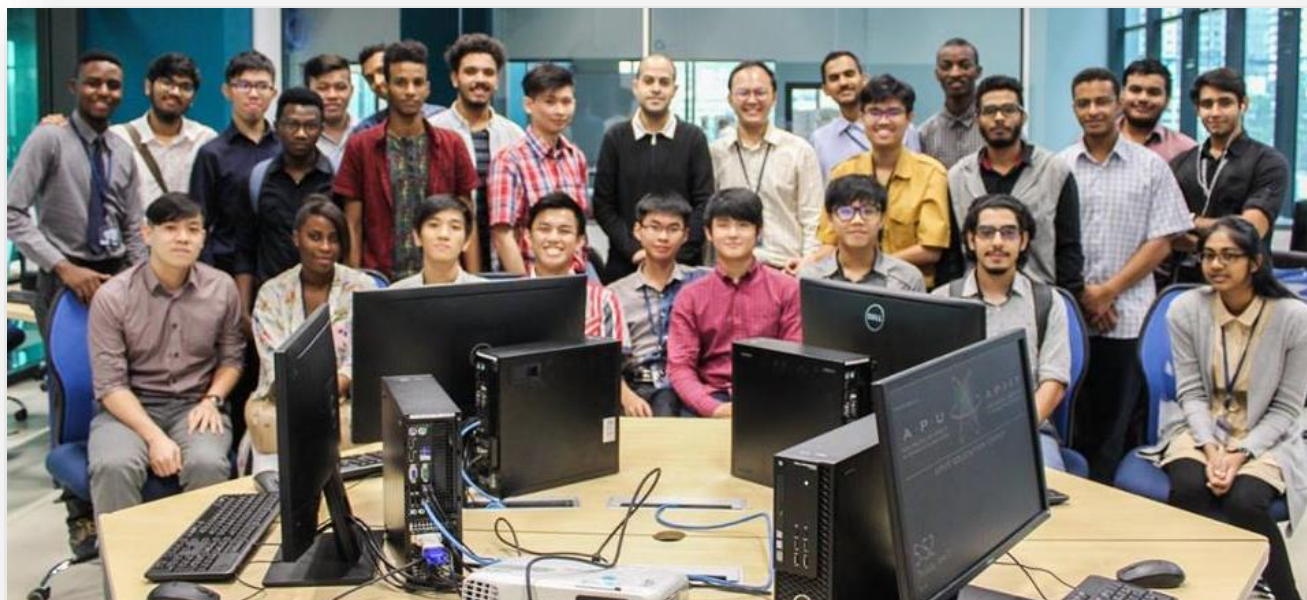


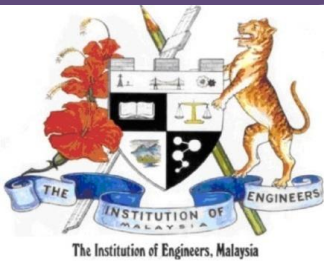
# SEMINARS & WORKSHOPS

## WORKSHOP ON LTSPICE



LTspice is freeware computer software implementing a SPICE simulator of electronic circuits, produced by semiconductor manufacturer Linear Technology. On June 22, 2017 a workshop on LTSpice was conducted by Dr Lai Nai Shyan. 27 students attended the workshop





# INDUSTRIAL VISITS

## SymmId Corporation Sdn Bhd

SymmId Corporation Sdn Bhd is Malaysia's premier IC design company. SymmId's core business is ASIC development and supply and custom IC design services. SymmId has the largest fab-independent Malaysian design group with world-class expertise in analog, digital, mixed-signal and high-voltage IC design. The company develops and supplies customer exclusive ASIC solutions for the automotive, industrial and consumer market. SymmId is ISO-9001 certified. On July 3, 2017 twenty three engineering students accompanied by two staff visited SymmId in Petaling Jaya.



## APROC 2017

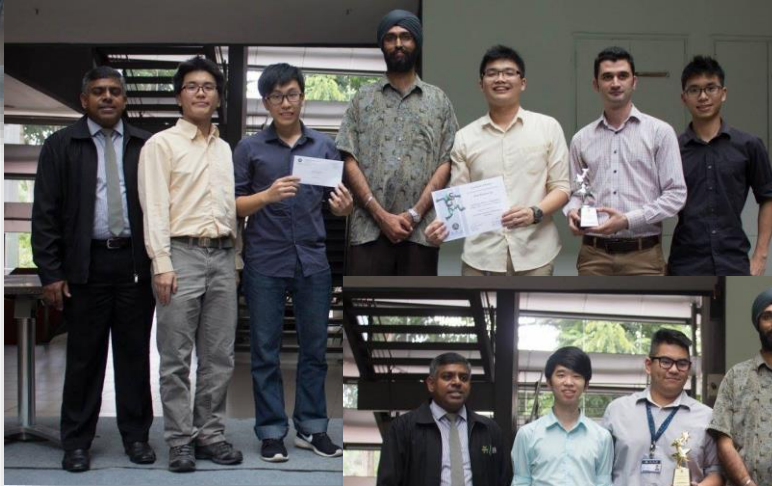


APROC 2017 the premier robotic competition of School of Engineering, Asia Pacific University was conducted on April 25-27, 2017 in association with Cytron Technologies. The competition was categorized into primary level, secondary level and university level. The primary level was named as Rero Survivor which was for the school children. Eight teams participated in the competition. Digital Maker Home, Cyberjaya won the championship. Sekolah Rendah Islam Al-Amin, Gombak and Sekolah Kebangsaan USJ 20, Subang Jaya were the first and the second runner-up respectively.





The secondary category named as Robot Triathlon was tasked to build a robot to walk through rocky roads, climb stairs and over a see saw. The competition was won by Kolej Vokasional Batu Pahat and SMK Seri Gombak were the first runner-up.



The University category competition named as Robot Maneuver had 4 teams including 2 teams from APU participated in the competition. The teams were required to build a robot to move an object from one place to another place in stipulated time. APU teams won the championship and the second runner-up. First City University College were the first runner-up.



Prof Mandeep Singh, Chair of IEM-E2TD distributed the prizes to the winners of APROC 2017



## Materials Lecture Competition 2017

Materials Lecture Competition (MLC) 2017 was hosted by Asia Pacific University of Technology & Innovation (APU), alongside the Institute of Materials, Malaysia (IMM) and the Institute of Materials, Minerals and Mining (IOM3-UK). The aim of the event is to provide a platform for young talents to exhibit effective and impressive presentation skills in delivering topics in the field of Material Science and Engineering. The MLC 2017 was officiated by Prof Dr. Ir. Vinesh Thiruchelvam, Dean of Faculty of Computing, Engineering & Technology, APU. The panel of judges consisted of two academicians and two industrial experts.



Twelve universities took part in the event, among which seven of them were public universities (UM, UKM, UTM, USM, UniMAP, UTeM and UiTM) while the rest were private universities (APU, MMU, Nottingham University, Taylor's University and UNITEN).



Mr. Ng Zheng Yu (Nottingham University), Mr. Mohd Haziq Dzul kifli (UTM), Ms. Tinesha a/p Selvaraj (UniMAP), Mr. Muhammad Johan Iskandar bin Zahari (UKM) and Mr. Soo Kuan Lim (USM) were the five finalists selected by the panel of judges led by the moderator, Professor Dr. Luqman Chuah bin Abdullah (UPM)



The final competition of MLC 2017 was also held at APU on 16 May 2017. The event was officiated by the IMM president, Mr. Mohd. Azmi Mohd. Noor. The five finalists from USM, UTM, Nottingham University, UniMAP and UKM competed to vie for the top place and represent Malaysia in the Young Persons' World Lecture Competition 2017 in Perth, Australia. The event showcased a stiff competition among the contestants and the judges, led by the moderator, Professor Dr. Mohd Kamal bin Harun took an hour to discuss and conclude the results. Mr. Ng Zheng Yu won the finals, Mr. Mohd Haziq Dzul kifli and Mr. Muhammad Johan Iskandar bin Zahari won the second and the third prize.





The winner of MLC 2017, Mr. Ng Zheng Yu from Nottingham University will be representing Malaysia to participate in Young Persons' World Lecture Competition (YPWLC) 2017 which will be held in October 2017 at Perth, Australia and Mr. Brian Lim has been selected as the accompanying lecturer.



The success of MLC 2017 greatly relied on the support and contribution of IMM, IOM3, APU, sponsors from various industries (Top Gloves, Hamac Food Industries and Globaltech Hygiene) and APU MLC 2017 committee members (Dr. Lai Nai Shyan, Ir. Jacqueline Lukose, Dr. Lau Chee Yong, Ir. Dr. Dhakshyani Ratnadurai & Dr. Yvette Shaan-Li Susiapan). MLC 2018 will be held in Kuala Lumpur and Universiti Teknologi Malaysia (UTM) will host the event.





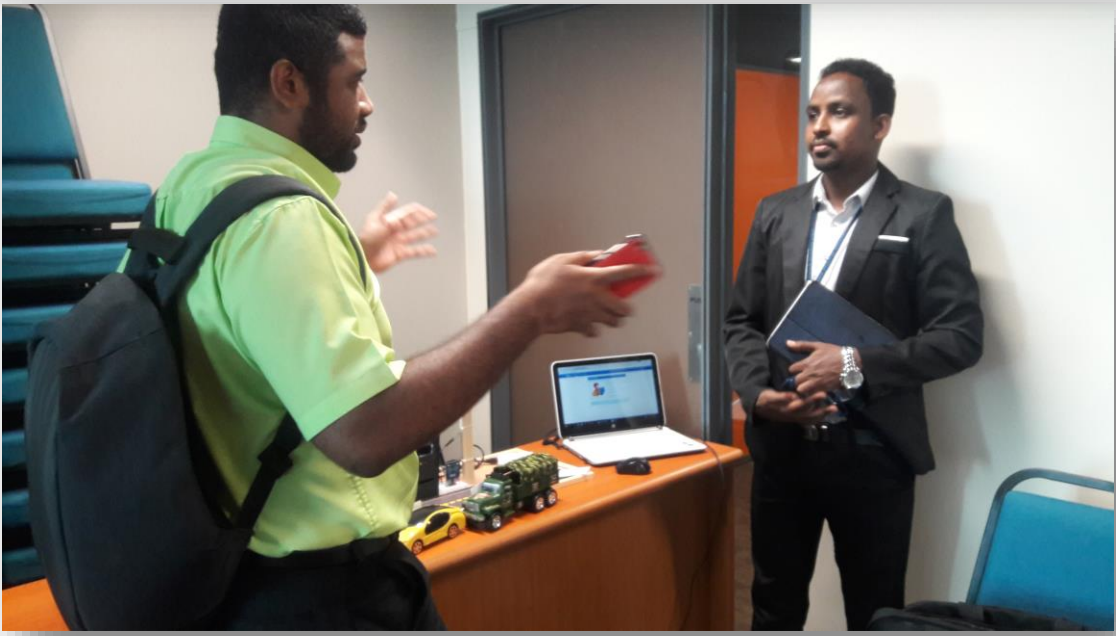
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# SOE FINAL YEAR PROJECTS

## Poster Presentation UC4F1610ME-TE-EEIT-EEE







Competitions Develops Competence