BULLETIN @ RICE UTeM

ISSUE 03 JAN-JUNE 2016

Research, Innovation, Commercialisation and Entrepreneurship

MoU UTeM-PERKESO

RESEARCH AND INNOVATION

Research Success Story

Conducting High Impact Research

INNOVATION SUCCESS STORY

Malaysia Technology Expo 2016 (MTE 2016)

The International Engineering Invention Innovation Exhibition (i-ENVEX 2016)

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I am honoured to introduce the third edition of RICE semi-annual Bulletin. The goal of this bulletin is to provide our partners, stakeholders as well as industries and community with a concise and comprehensive information on UTeM's research and innovation activities throughout the first half of 2016. I would like to take this opportunity to thank everyone who have contributed to this edition.

Congratulations to all researchers who have received awards since the last edition of the bulletin. As the members of UTeM, we all share and benefit from your achievements, and we hope to hear more good news along these lines. In this edition, we share the results of our industrial engagement with PERKESO, the best results of MTE 2016 and I-Envex 2016, the FRGS grant's received in 2016 as well as the new structure of the Center of Excellences (CoEs).

I hope all of you will enjoy reading and please feel free to bring any comments, suggestions or new stories to my attention for future editions.

Best regards and easy reading,

Associate Professor Dr. Massila Kamalrudin

Chief Editor

EDITORIAL BOARD

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Conducting **High Impact** Research

As we are aiming to become high income developed nation, it is about time for researchers at UTeM to start conducting high impact research. High impact means research that produces not only findings of theory or framework but also research product that is able to be commercialised or used by the industry. In this case, we need to focus on producing research output that contributes significantly to the wealth creation of a nation as well as the betterment of our society. Further, the impact of the research should not only be limited within our country, but it has to be expanded across the nation globally. Therefore, it is timely to start thinking of doing research that is able to make our world a better place.

The question is how to do a high impact research? 1) Think of real world problem- problem that exists in the industry or in the community. 2) You must have sufficient skills and expertise – The specific skill you hold may not be sufficient as you may need a range of skills to solve the real world problem. Multidiciplinary skill is the best as it could help you to solve both the soft and hard problems, hence you need to work collaboratively with a group of researchers that has different but complementary skills; 3) Commitment and Determination- To start and end the journey well definitely requires commitment and determination. The more effort you put to it, the more successful it will be made.

Thus, let's all start with high impact research as we are now competing in a challenging environment and situation where less grants are provided by the ministry and university. It's about time we change our game play to an impactful research which is in demand of the industries, community as well as international and NGO's grants providers. The results produced by the impactful research will also countribute to the writing of high impact publication,that somehow contributes to our citation and reputation as a Good Researcher.

Good Luck and All the Best!

Prof Ir Dr Mohd Jailani Mohd Nor

DVC Research and Innovation UTeM

Winning article in University Academic Award 2015

Assoc. Prof. Dr. Mohd Fadzli Abdollah

Biographical notes: Mohd Fadzli Bin Abdollah is an Associate Professor in the Faculty of Mechanical Engineering at Universiti Teknikal Malaysia Melaka (UTeM). He received his B.Eng. (Hons.) and M.Eng. in Mechanical Engineering from Universiti Kebangsaan Malaysia in 2004 and 2005, respectively. Later in 2011, he completed his Dr.Eng. in Mechanical Science and Engineering from Nagoya University, Japan. He has authored or co-authored more than 100 journal and conference papers, and obtained 2 Intellectual Properties. His current interests involve Tribology of waste materials and surface engineering. Fadzli has served the Tribology community in various capacities including, Associate Editor-in-Chief for Journal Tribologi and appointed as Guest Editor for several journals, including Industrial Lubrication and Tribology, Journal of Materials Research, Transactions of the IMF, Tribology - Materials, Surfaces & Interfaces, Composite Interfaces and International Journal of Materials and Product Technology. He has won more than 10 academic and research awards. Recently, he held the position of Deputy Dean (Research and Postgraduate Studies) at the Faculty of Mechanical Engineering, UTeM. Since 2013, he has been appointed as a Secretary of Malaysian Tribology Society (MYTRIBOS). His other past administrative duties included Head of Department (Diploma Studies), Manager and Co-ordinator of CoE.

Selection and Verification of Kenaf Fibres as an Alternative Friction Material Using Weighted Decision Matrix Method

Nowadays, natural fibres composites, in comparison to glass fibres composites, are widely investigated and acknowledged as materials which minimise carbon dioxide produced in all phases of their interaction with environment. However, the fibres selection is still based on economic factors and local availability rather than depending on a systematic approach. Therefore, this paper suggests a study on how kenaf fibres is verified compared to other natural fibres that could potentially be used as an alternative source of friction material (FMs) using the Weighted Decision Matrix (WDM) approach. The method of selection is to consider the impact on the environment and human health. An exhaustive review of potential natural fibres and friction materials is presented and suggested for future development direction. The result shows that WDM approach verifies the suggested suitability of kenaf fibres.

Introduction to the new CoE Structure

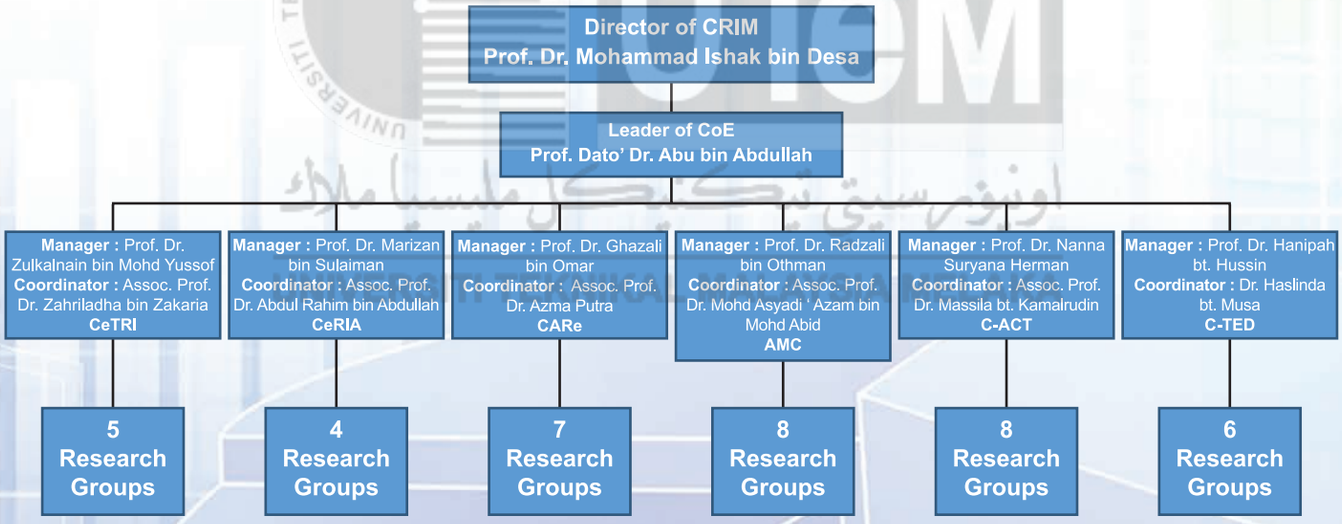
Vision

To be the world leader for research development and innovation in the field of Advanced Manufacturing and Computing Technologies (AMCT)

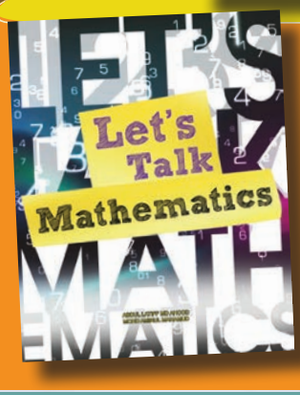
Mission

To lead research and innovation in Advanced Manufacturing and Computing Technologies (AMCT) by actively incorporating the multidiscipline experts in engineering and technology to create strategic knowledge and innovation of the future with smart university-industry partnerships for wealth creation in line with university aspirations.

Organisation Chart of CoE



Keluaran Terbaru Penerbit UTeM

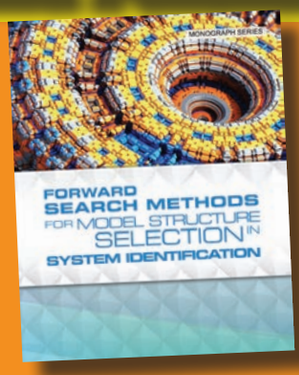


Let's Talk Mathematics

978-967-0257-74-7

860 m.s :: RM 52.80

Abdul Latiff Md Ahood, Mohd Amirul Mahamud



Forward Search Methods for Model Structure Selection in System Identification

978-967-0257-68-6

115 m.s :: RM 24.00

Md Fahmi Bin Abd Samad @ Mahmood

Industry Engagement

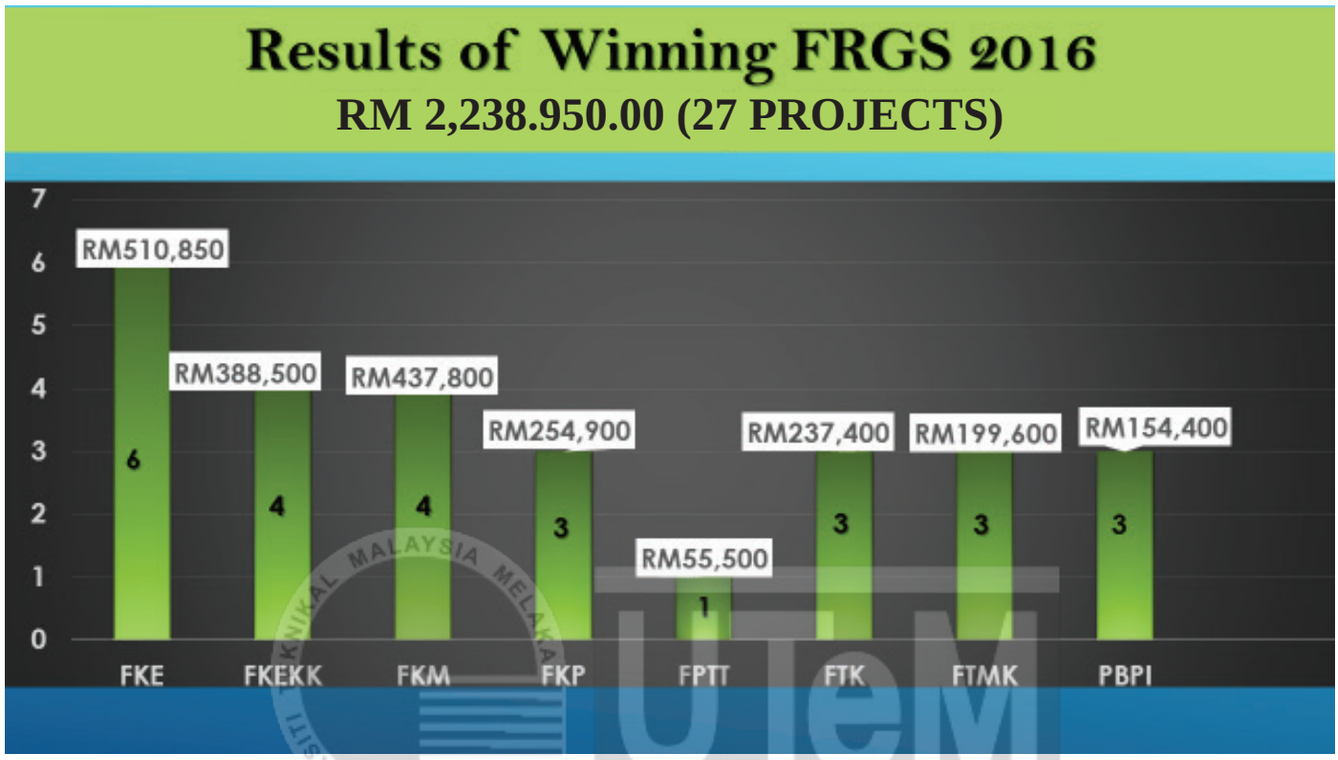
MoU UTeM-PERKESO

UTeM and PERKESO Malaysia have recently signed a Memorandum of Understanding (MOU) on Research and Academic Initiative cooperation between UTeM, represented by REAT research group, and PERKESO Malaysia at UTeM's main campus, Melaka. Witnessed by representatives from both institutions, handshakes were exchanged between Mr. Mamsor B. Abdul Manaf, the Director of PERKESO Melaka and YBhg. Datuk Prof Dr Shahrin Sahib, the Vice Chancellor of UTeM. This ceremony marks the collaborative partnership between UTeM and PERKESO in research and innovation that has been innitiated since the last three years. To ensure a sustainable research and innovation , UTeM needs to expand the existing research environment through relationships with strategic partners with either the industry or government agencies. PERKESO is among the government agencies that have the potential to work together to produce innovative technologies and products as they have opened a rehabilitation center in Malacca, known as the Rehabilitation Center PERKESO Melaka. This center was built to help the insured workers' compensation insurance or workers to use technology tools for rehabilitation and vocational physical recovery so that they can return to the working world.

In UTeM, the Research Group Rehabilitation Engineering & Assisstive Technology (REAT) under the Centre of Excellence in Robotics and Industrial Automation (CeRIA), has taken the move to initiate the collaboration by organising a series of visits and discussions directly with Dr. Hafez Bin Hussain, the director of the Rehabilitation Center PERKESO Melaka since March 4, 2015. With in a series of visits , there are a number of potential projects to be carried out with the next Memorandum of Agreement (MoA). Among them are the upgrading system rehabilitation equipment and the prosthetic manufacturing projects. These projects require expertise from various fields, thus providing opportunities to bring together researchers in UTeM to participate in the research project. This cooperation can also provide technical expertise to the community, particularly patients who are undergoing rehabilitation treatment at the PERKESO rehabilitation center in Melaka. It can also boost the ability, competitiveness and sustainability as well as recognition in research universities. In addition, this cooperation network is an approach that will bridge UTeM with the industry in Malaysia because PERKESO Melaka Rehabilitation Center is the only center recognised by the workers' compensation insurance and it has received patients from every industry in Malaysia. The MOU ceremony marks an important milestone of strengthening the collaboration between UTeM and PERKESO. With a strong commitment from both parties, this partnership is expected to inspire more joint academic and research activities in future and drive the innovation and technology development of UTeM and PERKESO to even greater heights.

Research SUCCESS story

Congratulations to all FRGS Grant's Winners! 27 researchers of UTeM's have won the FRGS grant with the total of RM 2238,950.00. Although the number is comparatively small to other research universities, this is an excellent job to all winners in this competitive year.



No	Project Leader	Faculty	Title of the Project
1	Zulkifli Mohd Rosli	FKP	Synthesis and characterization study on brookite thin film coatings via sol-gel dipping method for photocatalytic application.
2	Massila binti Kamalrudin	FTMK	A New Approach to Enhance the Analysis of IoT Security Requirements for Secure IoT Application
3	Hidayat Bin Zainuddin	FKE	Parametric Investigation of SF6 Gas Mixtures for Ring Main Unit (RMU) Switchgear Application
4	Noor Azwan Bin Shairi	FKEKK	A New Technique of Switchable Matched Bandstop to Bandpass Filter Response Using Lossy Resonators
5	Zahriladha Zakaria	FKEKK	A Novel Millimeter-Wave Filter with High Selectivity Characteristic Based on Reconfigurable Transmission Zeros for Next Generation RF Front-End Wireless Transceiver (5G)
6	Irma Wani Binti Jamaludin	FKE	A high-speed switching approach using customize signals for a linear reluctance motor
7	Ahmad Yusuf Ismail	FTK	New model of reverberation time using Statistical Energy Analysis (SEA)
8	Rosli Bin Omar	FKE	Fundamental Approach Of Newton-Raphson Optimization Controller For Cascaded H-Bridge Multilevel Inverter Based On Super-Capacitor.
9	Mohd Fadzli bin Abdollah	FKM	Synthesis of graphene film from palm kernel activated carbon using chemical vapor deposition for durability control
10	Zanariah Jano	PBPI	A model of cyberterrorists' rhetorical structure towards protecting critical infrastructure
11	Rafidah Binti Hasan	FKM	Investigation on process-properties relationship with load-bearing performance of lattice-structured cellular material for lightweight applications
12	Ismi Rajiani	FPTT	Conceptualizing Management Innovation as Complementary of Technology Innovation in Boosting Sustainable Dynamic Capability of Manufacturing Industry
13	Ab Rahim Bin Ibrahim	PBPI	Analisis Kritikal Terhadap Produk Kewangan Islam Berdasarkan Pendekatan Al-Hilah Al-Syar'Iyyah Ke Arah Memperkasa Sistem Perbankan Islam Malaysia
14	Sazelin binti Arif	PBPI	A New Model based on Actor-Network Theory to Enhance the Usage of Online Halal Certification
15	Lokman Abdullah	FKP	A New Formulation of Adaptive Control Algorithm for Precise Positioning of Machine Tools.
16	Ahmad Anas Bin Yusof	FKM	Novel study of fluid hammer effect in water-based electro-hydraulic actuator using modified Joukowsky approach.
17	Syamimi Binti Shamsuddin	FKP	Investigation of Epigenetic Robotics Protocol with Therapeutic Animal Robot for Patients with Depression
18	Azziddin Mohamad Razali	FKE	A New Optimal Switching Strategy for Virtual Flux Direct Power Control of Front-End Multilevel AC-DC Converter under Distorted and Unbalanced Grid Voltages.
19	Kenneth Sundaraj	FKEKK	Investigation on Parametric and Non-Parametric Features of Wheeze Signals for the Classification of Asthma Severity using Respiratory Acoustic Sounds and Machine Learning Algorithms
20	Haziezol Helmi Bin Mohd Yusof	FKEKK	A Novel Method of Designing Self-Tuning Capacitive Power Transfer for Rotary Applications.
21	Faaizah Shahbodin	FTMK	A New assistive technology model for constructive skill-based curriculum to assist learners with learning disability.
22	Wan Hasrulnizzam Bin Wan Mahmood	FTK	Formulating The Framework In Managing Manufacturing Complexity Using Hybrid Lean Bio-Inspired Computing Method For Sustainability
23	Chong Shin Horng	FKE	A novel practical synchronization control approach for a twin-axes table driven system in industrial transportation.
24	Nor Hidayah Rahim	FKE	A Fundamental Study of Oxidation Stability Behavior on Natural Ester Oil Mixed with Optimum Antioxidants for Power Transformer Applications
25	Izadora Binti Mustaffa	FTK	Investigation on Directional Coherence Diffusion Filtering Techniques for Neurite Segmentation
26	Siti Nurul Mahfuzah Mohamad	FTMK	A New Learning Approach Through Gamification of Learning for Enhancing Learning Engagement
27	Roszaidi Bin Ramlan	FKM	Characterisation of a wideband nonlinear dynamic vibration absorber (DVA) for suppressing structural vibration using a cantilever beam constrained by curved blocks.

Innovation Success Story

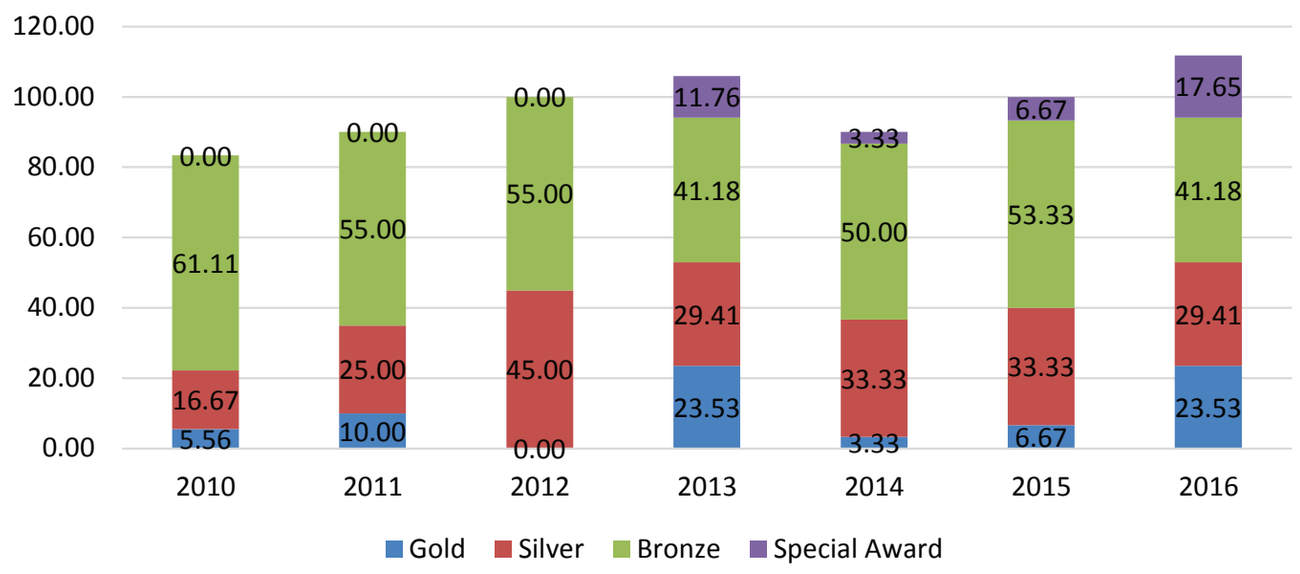
Malaysia Technology Expo 2016 (MTE 2016)

Malaysia Technology Expo (MTE) is also supported by the Ministry of Education and Ministry of International Trade and Industry. Approximately 500 products, research and innovation from within and outside the country will be showcased in 2016. It is expected to be visited by scientists, industrialists, entrepreneurs, businessmen, experts and consultants in the business which will open up more opportunities for researchers to explore commercialisation opportunities. MTE 2016 competition entries is open to scientists, research institutions, university researchers, NGOs and private sectors involved in research and innovation. A total of 42 product categories from various fields is contested. Among these fields are such as the, Aeronautical & Aerospace, Advance Material, Agricultural, Audio Visual Equipment, Bio-Diagnostics, Bio-Information, Biotechnology, Building & Construction, Computer Engineering, Computer Networking, Computer Science & Programming, Data Management & Storage, Environmental Health, Finance and Human Resource Solution, Fire Science, Food Science, Green Technology, Household Electronics, Information & Communication Technology (ICT) & Information Security, Information Technology, Medicine & Pharmaceutical, Office Appliances, Robotic Technology & Innovation, Supply Chain System & Technology, System & Software Integration, System Automation & Robotics and Technology Engineering. UTeM has joined the MTE since 2006 and the number of researchers who have won awards is growing throughout the year. In 2016, UTeM contested a total of 17 products and has won 3 Special Awards, 4 Gold Awards, 5 Silver Awards and 7 Bronze Award.

Table 1: UTeM's Participation UTeM in the MTE

Year	Number of entries	Gold	Silver	Bronze	Special Award
2010	18	1	3	11	0
2011	20	2	5	11	0
2012	20	0	9	11	0
2013	17	4	5	7	2
2014	30	1	10	15	1
2015	15	1	5	8	1
2016	17	4	5	7	3
Overall Total		13	42	70	7

Percentage of Medal Won by Researchers



Product Selection

The selection of products to be contested in MTE is based on the recepients of UTeMEX medalists in 2015, which are the winners of 36 gold, 14 silver and 5 bronze medals. Product screening sessions were held on January 7, 2016. A total of 34 researchers presented their products during the screening session. Based on the presentations, UCC proposed 20 products to be contested in the MTE, although 3 of them have withdrawn.

Table 2: List of products to MTE 2016

No.	Product Title	Principal Reseacher	Faculty
1.	Advanced Prototype Of Graphene Supercapacitor	Prof. Madya Dr Mohd Asyadi' Azam Bin Mohd Abid	FKP
2.	High Torque-Power Density Permanent Magnet Machine	Dr. Raja Nor Firdaus Kashfi Bin Raja Othman	FKE
3.	Mind X Gyro Wheelchair System (Mind Controlled Gyro Assisted Wheelchair System)	Tarmizi Bin Ahmad Izzudin	FKE
4.	Performance Benchmarking Through LEMIS For ISO14001 Practitioner	Prof. Madya Ir. Dr. Puvanasvaran A.Perumal	FKP
5.	Bioelectricity: Microbial Fuel Cell At Sewage Treatment Plant (STP)	Zul Hasrizal Bin Bohari	FKE
6.	Waste Kinetic Energy Recovery System	Mahasan bin Mat Ali	FKP
7.	E-Sense Pathway	Dr. Kok Swee Long	FKEKK
8.	Rakan Keselamatan Universiti (RKU)	Nor Haslinda Binti Ismail	FTMK
9.	MobiMEReq: An Automated Security Requirements Validation Tools For Mobile Application Development	Prof Madya Dr Massila Binti Kamalrudin	FTMK
10.	Home Demand Response Automation(HDRAS)	Prof. Madya Dr. Gan Chin Kim	FKE
11.	A Novel Microwave Sensor With High-Q Resonator For High-Sensitivity Material Characterization	Prof Madya Dr Zahriladha bin Zakaria	FKEKK
12.	Blind Spot Detector For Deaf And Inert Drivers (BiS-DID)	Mohamad Fani Bin Sulaima	FKE
13.	Dahlia Biscuits Machine Using Water Hydraulic Technology	Dr. Ahmad Anas Bin Yusof	FKM
14.	Shockwave Guard	Dr. Mohd Shahir Bin Kasim	FKP
15.	EyeNAVI-Blind Navigation System	Khairun Nisa Binti Khamil	FKEKK
16.	eyeBANTU:Safe Community	Prof Madya Dr. Massila Binti Kamalrudin	FTMK
17.	UTeM Electric Bicycle	Prof. Dr Mohamad Rom Bin Tamjis	FKE

Achievements

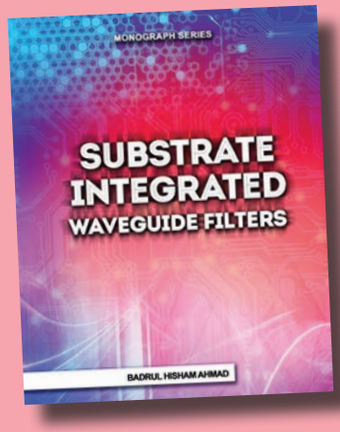
No.	Product Title	Principal Reseacher	Faculty	Medal	Award
1.	Advanced Prototype Of Graphene Supercapacitor	Prof. Madya Dr Mohd Asyadi' Azam Bin Mohd Abid	FKP	GOLD	SPECIAL AWARD - THE BEST AWARD
2.	High Torque-Power Density Permanent Magnet Machine	Dr. Raja Nor Firdaus Kashfi Bin Raja Othman	FKE	GOLD	SPECIAL AWARD – GOLD MEDAL WITH COMPLIMENT FROM JURY
3.	Mind X Gyro Wheelchair System (Mind Controlled Gyro Assisted Wheelchair System)	Tarmizi Bin Ahmad Izzudin	FKE	GOLD	-
4.	Performance Benchmarking Through LEMIS For ISO14001 Practitioner	Prof. Madya Ir. Dr. Puvanasvaran A.Perumal	FKP	GOLD	-
5.	Bioelectricity: Microbial Fuel Cell At Sewage Treatment Plant (STP)	Zul Hasrizal Bin Bohari	FKE	SILVER	FOREIGN SPECIAL AWARD –JAPAN INTELLECTUAL PROPERTY ASSOCIATION (JIPA) –JIPA SPECIAL AWARD
6.	Waste Kinetic Energy Recovery System	Mahasan bin Mat Ali	FKP	SILVER	-
7.	E-Sense Pathway	Dr. Kok Swee Long	FKEKK	SILVER	-
8.	Rakan Keselamatan Universiti (RKU)	Nor Haslinda Binti Ismail	FTMK	SILVER	-
9.	MobiMEReq: An Automated Security Requirements Validation Tools For Mobile Application Development	Prof Madya Dr Massila Binti Kamalrudin	FTMK	SILVER	-
10.	Home Demand Response Automation(HDRAS)	Prof. Madya Dr. Gan Chin Kim	FKE	BRONZE	-
11.	A Novel Microwave Sensor With High-Q Resonator For High-Sensitivity Material Characterization	Prof Madya Dr Zahriladha bin Zakaria	FKEKK	BRONZE	-
12.	Blind Spot Detector For Deaf And Inert Drivers (BiS-DID)	Mohamad Fani Bin Sulaima	FKE	BRONZE	-
13.	Dahlia Biscuits Machine Using Water Hydraulic Technology	Dr. Ahmad Anas Bin Yusof	FKM	BRONZE	-
14.	Shockwave Guard	Dr. Mohd Shahir Bin Kasim	FKP	BRONZE	-
15.	EyeNAVI-Blind Navigation System	Khairun Nisa Binti Khamil	FKEKK	BRONZE	-
16.	eyeBANTU:Safe Community	Prof Madya Dr. Massila Binti Kamalrudin	FTMK	BRONZE	-

International Engineering Invention Innovation Exhibition I-ENVEX

Title	Principal Researcher	Abstract	Award
LEAD FREE KNN IMPACT INDUCED VIBRATION ENERGY HARVESTER	 Dr. Umar Al-Amani bin Haji Azlan	Vibration-based energy harvesters have become significantly popular due to the growing demand of electronic devices and wireless sensor which demand miniature, portable, long lasting and easily recharged source of power. The use of conventional batteries is an unacceptable solution to power up the densely populated nodes of devices due to their bulky sizes and high battery replacement cost. This work reports the design and analysis of piezoelectric energy harvester which can be harvested using the ambient vibration in kHz range. The health and environmental concerns on the toxicity of PZT drive great interests of scientists and engineers in finding a new replacement to lead-based materials which have dominated the vast majority of piezoelectric devices. KNN has been reported to be an excellent choice for lead-free piezoelectric application (i.e: energy harvesters, sensors and non-volatile memories) due to its high electromechanical coupling factor, piezoelectric coefficient and highest dielectric properties. Output voltage of the system will be optimized when it is operated at resonant frequency.	Gold
A DUAL MODE TEMPERATURE-CONTROLLED PORTABLE SYSTEM	 Mohamad Haniff bin Harun	A Dual Mode Temperature-Controlled Portable System is proposed to the application of thermoelectric effect, especially the Peltier and Seebeck Effect which enables this product to operate in dual temperature (hot & cold) and functions as a power generated for recharging batteries. It serves as an alternative approach for indoor and outdoor consuming demands, such as buildings, picnic and in the car without ignoring the needs to meet the eco-friendly innovation.	Silver
VOICE-ASSISTED WHEELCHAIR SYSTEM	 Ahmad Fauzan bin Kadmin	Voice-assisted wheelchair system consists of an Android device and a control system that controls the movement of wheelchair using a DC motor. This project is aimed to ease the burden of wheelchair users, especially for elderly to move around. The control system is built using the (IOIO) platform that controls the DC motor, communicates with the Android phone application using RF receiver through a Bluetooth communication protocol and RF signal. The Android application is developed using Basic-4-Android (B4A) rapid development tool connected with one main control interface using voice command, D-pad and joystick to control the motor driver MD30C direction and speed through IOIO platform based on four conditions; forward, backward, right and left. The speed movement is controlled by Pulse Width Modulation (PWM) signal while the direction movement for Qibla' is generated by the control interface and guided by an electronic compass in the Android device.	Silver
IMPROVING MECHANICAL&CORROSION PROPERTIES OF SPONSON SPAR USING COLD SPRAY TECHNIQUE	 Noor Irinah binti Omar	Corrosion treatment is one of the best maintenance, repair and overhaul (MRO) services that has been the utmost concern in the aircraft industry. Available techniques used to control corrosion in aviation industry have many drawbacks such as the thermal spray technology will create internal stress and lead to fatigue failure due to application of heat on aircraft part. Cold spray is a solid-state coating process that uses a high-speed gas jet to accelerate powder particles toward a substrate whereby metal particles plastically deform and consolidate upon impact. Bonding in cold	Silver

SMART CLOTHES DRYING SYSTEM	 Syahrul Azwan bin Sundi@Suandi	The technology of the efficient clothes dryer nowadays is rarely used in Malaysia. It is routine for one to wash and dry their denim and clothes throughout the year. As a conventional method, the sun energy is used as a major source to dry clothes. Unfortunately, nature wilnever be the same every day as we may encounter rainy days and various seasons. Besides, human now are really busy with their job and most of the family are now working parents. Hence, a "Smart Clothes Drying System" is proposed to encounter these problems. A specially designed of mini movable cupboard/closet with a complete system has been developed to utilize the waste heat dissipated by the condensing unit of residential air conditioner. It is desinged for clothes drying purpose during the night time. The system can also be used during the day as it is easily pushable to sun-lighting areas to utilize the sunlight from the sun. Users do not need to worry if there is a sudden change of weather from a sunny day to a rainy day. Thanks to the smart integrated system that integrates the cupboard/closet design. It can automatically close and secure the clothes inside the closet design once the water sensors triggered few droplets of rains. Ultimately, drying clothes can now be made more flexible and the heats dissipated from the air conditioners condensing unit is now well utilized.	Silver
CAR THEFT PROTECTION SYSTEM	 Intan Mastura Saadon	Today, many changes and improvements have been made in line with the development of technology. At present transportation is one of the most important requirements in the daily life of human beings. Within the context of advanced development of technology, there is a high percentage of transportation theft, especially car theft. Car safety has been given less attention compared to car shape and other features during the design stage. Security system that is normally used on a car is the alarm system only. The common car alarms used at present is the radio controlled alarm system, where it is used to lock, unlock and activate the alarm. The concept of this alarm system is that when an intruder illegally opens the door, a siren will be activated. Based on the weakness of the existing alarm system, improvements have been made in car safety system, in which it can be detected and controlled over long distance. The development in telecommunication technology has been increasing very rapidly. The mobile phone technology was created in 1980 and used only in the European country back then. Mobile phone is a device that works without wires, in which the signal is sent from a tower. At present, the Global System Communication for mobile phones has been used widely in mobile phones communication systems (GSM) worldwide. The GSM system can transfer data fast on long distance through short messaging service (SMS). Therefore, SMS technology is applied to upgraded the car alarm system that allows car owners to detect theft and remotely control cars. In conclusion, this project will develop an alarm system that combines with GSM system. This new system called the Car Safety System via SMS can control the system without distance limitation .	Silver
REMOTE MONITORING OF ENERGY METER VIA SMS	 Win Adiyansyah Indra	The project is about smart energy meter development that uses the latest technology to monitor the meter reading at residential houses. Unlike other conventional meter, this project uses GSM module as telecommunications equipment to enable user to get their meter reading and total bill consumption at any time. This Remote Monitoring of Meter Energy system gives information to user through SMS regarding meter reading and also the total cost of bill in Ringgit Malaysia. With a setting on the limit of consumption, user will be more alert about electric consumption.	Silver

Keluaran Terbaru Penerbit UTeM



Substrate Integrated Waveguide Filters

978-967-0257-24.2

RM 22.40

Badrul Hisham Ahmad

Get our latest monograph series publication entitled SUBSTRATE INTEGRATED WAVEGUIDE FILTERS by Badrul Hisham Ahmad.

The first chapter of this book provides an introduction and examples of microwave application filters and further explanation on theory of rectangular waveguides and Substrate Integrated Waveguide in chapter two. It includes formulae to calculate the relative width and size of via holes of SIW.

Chapter three elaborates on the theory, design and manufacture of the preliminary part of the hybrid reflection mode and the hybrid notch filter, which is the SIW bandpass filter.

There are five chapters in this book which explains in detail relevant information regarding the topic.

Research Activities

1) PRiSME 2016

The 1st Postgraduate Research Symposium on Mechanical Engineering 2016 (PRiSME2016) is jointly organised by the Faculty of Mechanical Engineering (FKM) and the Centre for Advanced Research on Energy (CARe), Universiti Teknikal Malaysia Melaka (UTeM). The event was held at the Mechanical Engineering Laboratory Complex on 5th January 2016.

PRiSME provides an opportunity for graduate students to explore and share their research interests, under the guidance of a panel of distinguished experts in the respective field. The symposium has three primary objectives:

1. To provide a platform for postgraduate students to share their research progress in a friendly environment.
2. To provide opportunities for postgraduate students and participants to receive informal in-depth feedback through discussions, and to strengthen research network among themselves.
3. To help students strategize on their research and dissertation, as well as publication in peer-reviewed journals.

In accordance with the university regulations for Annual Review of Postgraduate Research Students, 76 postgraduate students from FKM have presented their research work in this symposium. Besides, the Best Oral Presentation Award for each technical session was given to 13 outstanding presenters.

The group group photo of students, panels and organizing committee

Some of the awardees for the Best Presentation Award

PRiSME2016 BEST PRESENTATION AWARD

AWARDEE	MAIN SUPERVISOR	CO-SUPERVISOR
FAIRUZ FAZILLAH BINTI SHUHIMI	DR. MOHD FADZLI BIN ABDOLLAH	DR. MD ABUL KALAM (UM)
MOHAMMAD NAZRY BIN ROSLEY	ASSOC. PROF. DR. NOREFFENDY BIN TAMALDIN	DR. AHMAD KAMAL BIN MAT YAMIN
MUHAMMAD TARMIZI BIN ADAM	DR. ABD RAHMAN BIN DULLAH	DR. AHMAD KAMAL BIN MAT YAMIN
HUSNA BINTI A. HAMID	DR. NOR AZMMI BIN MASRIPAN	DR. RAFIDAH BINTI HASAN
AYU NATASYA BINTI KASIM	DR. MOHD AHADLIN BIN MOHD DAUD	DR. MOHD ZULKEFLI BIN SELAMAT
YEW WANSIN	DR. MOHD JUZAILA BIN ABD. LATIF	NORHASHIMAH BINTI MOHD SAAD (FKE)
JAZLI FIRDAUS BIN JAMIL	DR. MOHD AZMAN BIN ABDULLAH	DR. NOR SALIM BIN MUHAMMAD
HAMDAN BIN SULAIMAN	DR. AHMAD ANAS BIN YUSOF	MOHD NOOR ASRIL BIN SAADUN
ANINORBANIYAH BINTI BAIRAN	DR. MOHD ZULKEFLI BIN SELAMAT	SITI NORBAYA BINTI SAHADAN
HIKMAH BINTI ZAINUDDIN	DR. MOHD BASRI BIN ALI	-
LOW PEI SING	DR. ROSZAIDI BIN RAMLAN	DR. NOR SALIM BIN MUHAMMAD
FAZLIN BINTI ABD KHAIR	ASSOC. PROF. DR. AZMA PUTRA	DR. MOHD ZULKEFLI BIN SELAMAT
OR KHAI HEE	ASSOC. PROF. DR. AZMA PUTRA	DR. ROSZAIDI BIN RAMLAN

2) Ceramic Materials Processing and Characterization Course by Sustainable Materials for Green Technology (SM4GT) Group, Advanced Manufacturing Centre (AMC)

Ceramic Materials Processing and Characterization Course was held on 21st-22nd April 2016 at the Materials Selection Laboratory, Faculty of Manufacturing Engineering, UTeM. It was the first consultation programme organised by SM4GT, one of the research groups under the Centre of Excellence of Advanced Manufacturing Centre (AMC). The two-day course involved nine staff of *Pusat Penyelidikan Mineral (PPM), Jabatan Mineral dan Geosains (JMG), Malaysia*; including senior researchers, researchers and laboratory technicians. The objective of the course is to update participants' understanding of technical issues and recent advancement related to ceramic processing, characterization and analyses. The contents emphasise the utilisation of local minerals in ceramic industry and ways to contribute towards resource efficiency in ceramic industry. The course was delivered by SMGT group members; Prof Radzali Othman, Assoc. Prof. Dr. Azizah bt Shaaban, Assoc. Prof Dr. Zulkifli Mohd Rosli, Dr. Zaleha bt Mustafa, Dr Zurina bt Shamsudin, led by Assoc. Prof. Dr Jariah Mohamad Juoi. The course had also served as a platform for discussion on further collaboration in research and exchanging technical expertise among SM4GT researchers and PPM, JMG staff.

3) Android Native Application Development Workshop (ANADW)

The rich and diverse usage of android phones has not only changed people's lives but has also enabled it to position itself as a worldwide leader in the smartphone market. Its open ecosystem has provided increased opportunities for the creation of application programs and new games for the mobile world. In sync with this existing scenario, the Communications, Multimedia, Networks, Systems and Social Sciences (CoMNetSys) research group under the patronage of Centre for Advance Computing Technology also known as C-ACT and in collaboration with UTeM Holdings Sdn Bhd, conducted a full day workshop on 2nd March 2016 from 9 am till 5 pm at the Executive Lab in the Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka (UTeM).

The aim of the workshop was to provide students and researchers with knowledge in relation to the concepts and techniques in the development of android applications. This workshop was attended by 25 lecturers and students from public and private institutions of higher learning. The workshop was facilitated by Mr. Farizshah Gaskin, an expert in android and IOS development for Malaysian Commission of Multimedia Communications (MCMC), Multimedia Development Coporation (MDeC) and the National Institute of Public Administration (INTAN). Currently being the CEO of Tracdisk Technogreen Sdn Bhd and Fariz Gaskin technologies, the facilitator provided the participants with good source of knowledge, in the form of theoretical as well as practical exposure in Android application development. The participants took this opportunity as a challenge and developed apps during the participatory design session. All the participants were given participation certificates during the closing at 5 pm.

Coordinated by Mr Mohd Fairuz Iskandar, the head of CoMNetSys Research Group under C-ACT as well as the working committee, this workshop was a success as the participants felt that this value added session besides having a social impact, had been very informative and meaningful to them.

Reported by :
S. Indra Devi

4) CARe Research Visits to Leading Industries

The Centre for Advanced Research on Energy (CARe) has embarked on a series of research visits to various industries between 12th to 15th April 2016. The delegates are led by the CARe COE Manager himself, Professor Dr. Ghazali bin Omar and several researchers including Dr. Siti Hajar bt. Sheikh Md.Fadzullah, Dr. Mohd Nur Azmi bin Nordin, Mr. Mohd Syahrin Amri bin Mohd Noh and Dr. Zaleha bt. Mustafa from Advanced Manufacturing Centre (AMC).

The four-day research visit started with a meeting with our PPRN project partner, ZFH Industries Sdn. Bhd., a manufacturing, construction and trading company, with specialisation in design and build projects utilising timber based product, wood plastic composite (WPC) and plastics based products. The research meeting took place in KL Convention Centre in conjunction with Ecobuild Southeast Asia 2016. Our next research visit was to Silterra Malaysia Sdn.Bhd. in Kulim Technology Park, with expertise in CMOS wafer technology serving in the semiconductor market worldwide. The research visit was led by CRIM's own Head of Center of Excellent, Professor Dato' Dr. Abu bin Abdullah, with the main agenda to initiate enhanced research collaborations between the two parties through possible Visiting Professorship scheme between Silterra Sdn. Bhd. and UTeM.

In addition, during the third day of our visit, we managed to visit EFGO Scientific Sdn. Bhd., which is a consultation firm with expertise in advanced materials characterisation for endowment of laboratory equipments to Faculty of Mechanical Engineering-CARe research lab in the near future. It is estimated that a total of more than RM200, 000 worth of equipments are to be transferred to our laboratory for this noble notion.

Later in the afternoon, we were also called upon for a short research visit to Automotive Lighting (AL Lighting), which is an international company, leading in the area of automotive exterior lighting. Their core business is on professional project and process expertise, efficient and innovative lighting technology as well as in the delivery of reliable quality products. To-date, we have initiated some consultation work in advanced materials characterisation, led by Professor Dr. Ghazali bin Omar as their consultant.

On the last day, we were welcomed and warmly greeted by our industrial partner for the High Impact PJP grant, which is Jabil Circuits (Engineering & Technology Services), located in Bayan Lepas, Penang, a multinational company funded 50 years ago, with total human resources exceeding 150,000 workers worldwide. The three-hour research visit was dedicated to provide us with an introduction to the company, factory visit and further discussion with the R&D team, led by Mr. Zambri Samsudin, the Advanced Technology Manager for Asia. One of the main agenda for this research visit is to spell out the details of our research agenda and to come out with specific proposed projects to serve both parties. Another important aspect to consider is to establish a memorandum of agreement for this research partnership.

Reported by :
Dr. Siti Hajar binti Sheikh Md. Fadzullah.

Electrical Vehicle: How Long Should One Wait

Mohd Firdaus bin Abdul Halim
Faculty of Engineering Technology

Electrical vehicle (EV) has been around for more than a decade. Unlike combustion engine vehicle, EV uses electrical motor to move the vehicle. EV is considered as environmental friendly technology because it does not release carbon footprint into the air. Nevertheless, to produce the electricity that eventually charge EV battery requires generators powered largely by fossils source and small percentage of alternative source (wind, solar, hydro and biomass). So how could EV being classified as environmental friendly technology? The answer is that the combustion engine produces greater air pollution compared to the mass production of electricity in a controlled power plant facility. U.S. General Accounting Office (GAO) reported that the mandatory regulation towards the power plant regarding air pollution should keep the pollution lower that the combustion engine regardless of the power plant energy source. EV concept is mostly used in public transport such train and bus that is usually managed by the public sector. Unlike combustion engine train, the electrical train offers better control, efficient and lower operating cost. Unfortunately private vehicle (car and motorcycle) is far from competing with the conventional combustion engine car. It seems that this segment of EV is not sought in the market. If EV public transport is preferred against the later, why does private EV receiving opposite response from the vehicle market?

According to the report released by Bloomberg Energy Finance, there is only 0.1% Electrical Car (EC) on the road in the end of year 2015. Identifying the factor of the slow growth in EC and tackling it head on could help this industry to move further in the future. The cost of EC has been the repulsive factor of its growth. The public EV is not facing this problem because regardless of the high initial cost, the project is usually funded by the public agency. Many incentives were offered by the government agency around the world to make electrical car affordable to the masses. 33% of EV cost comes from its battery. The lithium-ion battery price has reduced about 70% from year 2010 to 2015. If the battery price downtrend continues, we might see the EC price to follow suit. Price comparison between combustion cars versus EC is not applicable because of the incompatible specification between these two technologies. The features of EC specifically the millage it can cover per battery charge are the greatest challenge on EV. A decade ago, standard EC model can only cover 40 to 60 km per battery charge. Standard recharging time of the EC battery is more than 6 hours. After lithium-ion replaced nickel cadmium and lithium acid for EV, it has achieved the most important milestone, that is a highway capable Modern EC model where it can travel more than 200 km in a single charge. This new technology development is very encouraging and eliminates the needs of stopping the vehicle every hour to charge the battery for six hours.

Both price and distance per battery charge of EC is a known issue and gradually being eliminated by the manufacturer and government agency. Other technical issue such as motor control, speed and driving experience are the important features the manufacturer should look into but the priority should be at reducing the EC cost and increasing the millage per battery charge. Citizen in modern countries are starting to shift their mindset towards the important of supporting the environmental friendly technology while paying higher cost. Manufacturers and government agencies have played their role to ensure that this type of technology is affordable and reachable to middle income earner. Even though facilities such as the number of charging station and workshop is hardly available, it should not stop the consumers from supporting the product. Just like other products, the facilities will be improved as the demand for the product increases. EC certainly is the future for private transportation as the oil becoming scarce each decade. One thing is for sure: Whenever the oil industry crisis comes, it will be only the first chapter. Every following years will strengthen electrical car market shares, and less demand for oil. Don't be someone left holding the barrel.

DIGITAL IMAGE CORRELATION (DIC) TECHNIQUE IN COMPUTING MECHANICAL PROPERTIES OF MATERIAL

Ahmad Fuad bin Ab Ghani
Faculty of Mechanical Engineering

Introduction to Digital Imaging Correlation (DIC)

Measuring strain has always been an important part of experimental mechanics, and is used extensively in analysing the properties of composite materials. The use of a digital camera that seperate DIC from other experimental techniques was employed to measure strain deformation. DIC has the ability to record images of deformed surfaces, allowing for accurate analysis of the material being stressed under load. The qualities of the results are mainly dependant on two factors: resolution of the camera, and quality of the speckle pattern on the specimen.

How it works

Specimen Preparation

When DIC is carried out on the macro scale, the specimen is coated with a thin layer of pain, and then sprayed on top with another mist of paint in a different colour.

Set-up

Different experiments involving DIC that use different rigs and set ups were adopted to carry out the experiment. Different resolutions are also needed depending on the types of speckle pattern on the sample. It simply uses a magnified zoom lens attached to a video camera to take images of the samples. The loading frame in this example is in tension, but it can also be in compression, shear, or other loading systems.

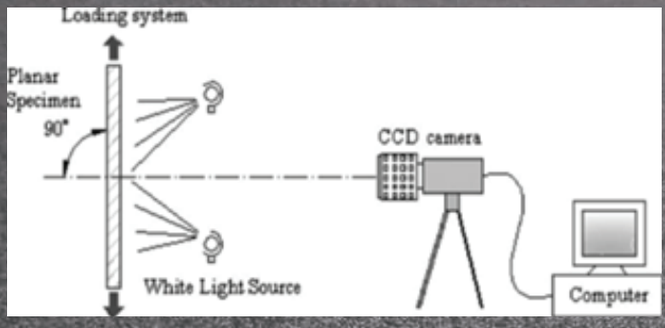


Figure 1 shows a typical 2D DIC setup

A typical setup uses a CCD (Charge Couple Device) camera to record the images. More than one camera can be used to obtain images if 3D DIC or Volume based DIC is needed

Basic Principles behind DIC

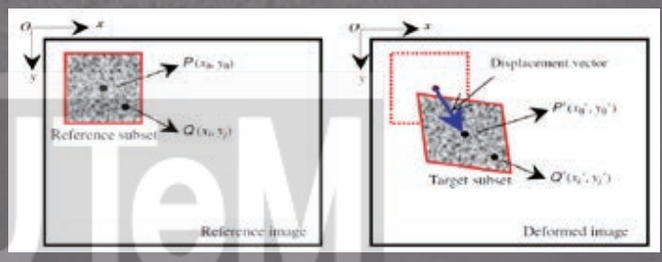


Figure 2 shows the reference subset before deformation and the target subset after loading. It can be seen that (xp, yp) is the subset centre from which other points such as (xq, yq) can be referenced to. The deformed image shows the position of these coordinates after loading, and using subset matching can be correlated back to the undeformed image.

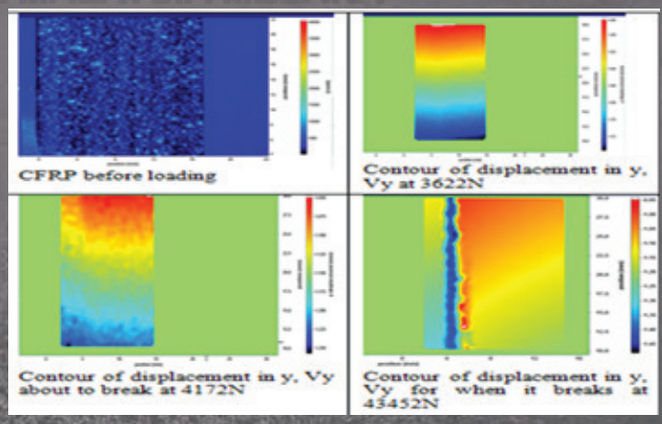


Figure 3 shows the sequence of displacement contour obtained from DIC from before loading until stage of material failure

SMALL SCALE UNMANNED UNDERWATER REMOTELY OPERATED VEHICLE (ROV)

By: Syamimi Shamsuddin, PhD

Remotely Operated Vehicles (ROVs) are unoccupied, highly manoeuvrable and operated by a person on an underwater platform. They are linked to the platform by a tether, sometimes referred to as an umbilical cable, a group of cables that carries electrical power, video, and data signals back and forth between the operator and the ROV. Modern ROV systems can be categorized based on size, depth capability, inboard horsepower, and whether they are all-electric or electro-hydraulic. Small scale ROVs include the majority of low-cost ROVs, most of which are typically all electric and nominally operated in water depths up to 300 meters. The term low cost refers to the pricing range class of RM 10,000 to over RM 100,000. These ROVs are used primarily for monitoring, inspection, observation tasks, surveying, and bottom profiling such as piping or ship inspection. Some of the advantages of the ROVs are as follows:

- No time constraints because power is supplied from underwater platform;
- Able to cover wide areas relative to the capability of human divers;
- Mobility allows close-up inspection of the sea bed;
- Deployment areas are less controlled than towed video, and can be used in areas with obstacles.

The control system of an ROV is an interesting and challenging problem. This is primarily due to the difficult and unpredictable environmental conditions that exist underwater. Designing a suitable controlling method of the ROV is challenging due to the unpredictable nature of underwater dynamics and the difficulty in measuring ROV parameters. Furthermore, the ROV dynamics can change considerably with the changes in surrounding conditions and external disturbances (e.g. wind velocity, ocean currents and waves). The hydrodynamic coefficients are difficult to measure or predict accurately. Maintaining the position of the small scale ROV within the working area is a difficult task, especially in the presence of underwater currents, wave and wind even for experienced pilots.

Underwater Technology Research Group (UTeRG) of the Center for Robotics and Industrial Automation (CeRIA) will focus on the research based on issues addressed above. A lot of research areas can be explored based on ROV design and most of the manuscripts have been published in the local and international journals. The UTeRG has developed three types of the ROV. The three underwater platforms were used intensively for the underwater research. The research covers on the development and analysis the ROV using Solidworks software and fabrication process, design of a control algorithm technique, such as intelligent controller, system identification to infer a model based on actual ROV, and sensor design for underwater application.

As shown in Figure 1, the first ROV was developed by UTeRG in 2012. The design of the first ROV was based on the open frame body with aluminium. It has 4 Degree of Freedom (DOF), 3 fixed ballast tank, a pressure hull and a vision camera. The application of this ROV was mainly on monitoring and observation application. This ROV has entered several exhibitions at the international and local level and has won GOLD medal in UTEMEX 2012, GOLD medal in i-ENVEX 2012 and BRONZE medal in ITEX 2013. The second ROV developed from the collaboration between UTeRG and Faculty of Manufacturing Engineering is shown in Figure 2. This design was based on a closed frame concept. This ROV also has 4 DOF, a fixed ballast tank inside a pressure hull and alighting system. The weight of this ROV is about 50 kg including loads. This ROV has also won SILVER medal in ITEX 2013. The third ROV inspired by the second ROV, was designed with a reduced size because of the application it has to perform. This ROV was designed to monitor pipeline inspection and pick and place application. This ROV has also won SILVER medal in UTEMEX 2013 and SILVER medal in MTE 2014.

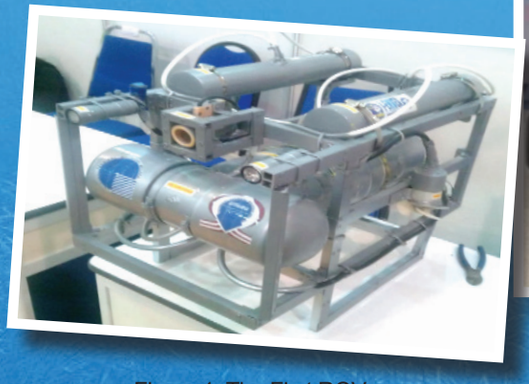
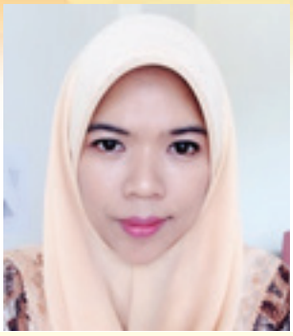


Figure 1: The First ROV

Figure 2: The Second ROV

Figure 3: The Third ROV



The use of ICTs in Enhancing Student Engagement

Datin Nurazlina binti Md. Sanusi

It has been widely accepted that the usage of information, communication and technologies (ICTs) plays an important role in teaching practices in many higher institutions, including Universiti Teknikal Malaysia Melaka (UTeM). In relation to this, UTeM has responded to accept the open source software learning management system called Moodle to be part of their everyday experience of campus-based teaching and learning. With this type of learning called blended learning, it results in a renewed approach of teaching and learning at UTeM. Lecturers teaching Computer Science courses at the Faculty of Information Technology and Communication (FTMK) have been using this system to manage the course contents, thus creating a new way of interaction with their students.

However, concerns regarding effective usage of ICTs for the improvement of students' learning remain as central issues for both lecturers and educators. Scholars have studied this topic under different terms which include: changing the instructional delivery in a classroom; developing new educational tools; teaching, learning and assessment alignment and flipped learning (Abrami et al 2006; Gilbert et al 2007; Hubert and Wright 2008; Paechter et al 2010; Dawson et al 2010; Biggs 2013; O'Flaherty and Phillips 2015). They have struggled to tackle the issue of linking students' learning performance with the use of educational technologies in the classroom. In spite of the growing evidence of the success of re-engineering the courses offered within the blended teaching, they argued that students need to have better learning engagement in order to have better learning performance.

Based on the literature review of computer science education research, the linkages between the learning engagement and the learning performance have been demonstrated primarily by studies of approaches and techniques involving innovative educational technology incorporated into teaching pedagogy such as gaming and pedagogic methods; (Alexander 2001; Govindasamy 2001; Rovai 2003; Joy et al. 2009). The primary drawback of these approaches was the way the teaching delivery and students' learning was assessed. In the early years, the students' performance was only assessed by the usage of learning tools such as uploading lecture slides onto LMSs, using clickers in a classroom, online assessment and many others.

The adoption of education technology in the classroom has influenced the overall students' performance and the inconsistent results on the impact of learning tools reveal that there is a need for greater understanding and effective use of ICTs. Specifically, research that to assesses the potential of educational technology for the improvement of student's learning in the classroom need to be carried out (Abrami et al 2006; Gilbert et al 2007; Hubert and Wright 2008; Paechter et al 2010; Dawson et al 2010). Researchers also stated that engagement has become an indicator of teaching and learning qualities in university education implying the importance of investigating the relationship between learning engagement and learning productivity.

Our research group has taken the initiative to conduct a research to investigate the linkage between the instructional delivery pedagogy and the student learning engagement during a lesson in the classroom. The main objective of our research is to develop a new blended pedagogy approach that utilises ICTs in classroom-based practices. The research also aims to provide evidence of effective ways to adopt blended learning practices. This research will develop a scale or scales that measure(s) students' engagement, and their learning experiences in classroom-based practices. The need of developing scales that measure students' engagement in the area of Computer Science education calls for a theory generation through inductive data analysis, such as grounded theory. With grounded theory approach, this research will develop theories related to blended learning engagement.

In this article, we share some of the results obtained from the research project which is still in progress. The research work started at the beginning of the second semester of 2015/16 session. It was participated by students from Software Engineering course in FTMK. Two subjects were chosen: 1) BITP 2223 – Software Requirement and Design (BITD) 2) BITP 3253 – Software Verification and Validation. During the first phase of our research methodology, we distributed online questionnaires through Moodle from week one of the semester. The purpose of distributing the questionnaires at the beginning of the semester is to seek the student learning preferences in learning the subject. The results derived from the analysis of the questionnaires will be used by the lecturers to design the instructional delivery related to the profile of students enrolled in the course.

In the second week of the semester, we used a negotiation style to create an introduction of the course. In designing and developing the new approach, we selected and filtered the information suitable for students to participate in discussions and ask questions. This approach is to create a better interaction between students and instructor. In this case study, we gave students to vote for their preferred learning approaches in the course. The assessment of the learning approaches was given using Moodle in the multiple choice question formats.

The literature suggests that students might have their own preferred approach based on the situations in learning (Scouller K 1998). In this case, students were given a deadline to submit their preferences. The results were received in time and the number of students attempted to answer was the same as those attended the classroom. With this information, we analyzed the preference student learning approach and aligned the delivery instruction to fit the context. The results were then presented to students so that they have a clearer picture of the next steps in the learning processes that take place in the course. These were done to determine the lecturer's engagement by sharing their perceptions with the students. The evidence of student engagement were obtained from the responses given on the assessment of approaches to learning questions. As at to date, the collection of evidence is still on-going. There are also some issues on type of approaches that needs to be further studied before it is adopted in the classroom.

It is widely acknowledged that any proposed approach in teaching and learning methodology becomes acceptable only if it is validated. As in this research, we can only validate the proposed blended pedagogy by doing the interview session from the respondents at the end of the semester. Since this research is still on-going, full results can only be published and shared once the research process is fulfilled and concluded.

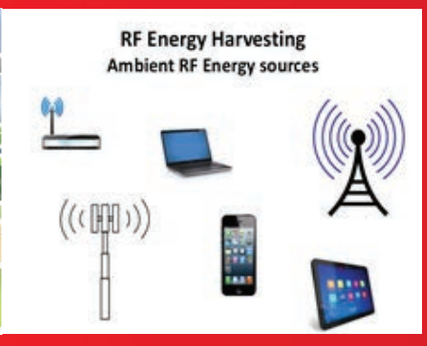
*The author would like to acknowledge the Ministry of Higher education as this research is fully funded under selected grant: RAGS/1/2015/ICT05/UTEM/03/1

Potential Products for Commercialisation

A NEW CLASS OF RECTIFYING CIRCUIT WITH IMPROVED EFFICIENCY FOR RF/ MICROWAVE ENERGY HARVESTING

Assoc. Prof Dr. Zahriladha Zakaria

This invention presents the design of antenna with matching and rectifying circuit for RF energy harvesting. This new class of design provides excellent performance and contributes to the significant reduction in the costs associated with replacing batteries periodically as well as to provide wireless communication between electronic devices. This invention is useful to receive power in milliwatts and produce an output voltage in the range of 0.5 – 7.5V, that are useful to be implemented in any wireless sensor networks (WSNs).



HeXi-Ciency Drive

Principal Researcher:
Siti Azura Binti Ahmad Tarusan

Hexi-Ciency provides a comprehensive solution for developing intelligent and high-performance electric drive systems, e.g. electric vehicles, elevator and various adjustable speed drive applications. It is formulated using a hexagonal flux control strategy which produces optimal switching, hence it offers superior torque dynamic control, high-efficiency and high-torque capability for wide speed range of operations. Its user friendly drive system allows researchers or engineers to optimally fine-tune control parameters to achieve excellent performances and dramatically reduce development times and costs, while systematically increase productivity.

Mind-X-Gyro

(MIND CONTROLLED GYRO ASSISTED) WHEELCHAIR SYSTEM

Principal Researcher:
TARMIZI BIN AHMAD IZZUDDIN

Electric wheelchairs in the market were designed for a person who is paralyzed but can still move his/her arm. However, it is not suitable for person who is suffering from quadriplegia, who is paralyzed from neck and below. The aim of our product and system is to assist the movement of a quadriplegic patient utilizing patient's brain electroencephalogram (EEG) signal and head movement. By using single channel electrode as a sensor to receive the EEG signal and a gyro sensor to detect the movement of the head, the patient's movement intention and its directional intention can be detected for the purpose of moving the wheelchair. A machine learning algorithm (patent pending) developed for this project was to fuse both EEG and gyro information in order to move the motorized wheelchair. This system aims to improve the life of a quadriplegic patient and give them the freedom to move unassisted.

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