MILESTONE@UM NEWSLETTER

Vol. 5, No. 3, 2017

BOOK DONATION BY TAIPEI ECONOMIC AND CULTURAL OFFICE (TECO) , MALAYSIA

The Head of Mission from TECO, Mr. James Chang Chi-Ping, and Deputy Vice-Chancellor (Research and Innovation), University of Malaya, Prof. Dr. Noorsaadah Abd. Rahman at the Book Donation ceremony

A book donation ceremony was co-hosted by Taipei Economic and Cultural Office (TECO) Malaysia and the Institute of China Studies (ICS), University of Malaya on August 9, 2017. TECO was represented by it's Head of Mission, Mr. James Chang Chi-Ping while Deputy Vice Chancellor (Research and Innovation) Prof Dr. Noorsaadah Abd. Rahman represented the ICS. Also in attendance were Madam Chow Pei-Chi (Head of the Cultural Division of TECO), Prof. Dr. Danny Wong Tze Ken (Director, ICS), Dr. Ngeow Chow Bing (Deputy Director, ICS), and the staff members of ICS.

ICS is the main research center for China and China-Taiwan relations studies in Malaysia. Over the years, ICS has maintained strong ties with TECO, focusing on cultural exchange programs and academic cooperation. During the book donation ceremony, TECO also donated RM 5,000.00 for purchasing published academic books to be housed in the resource center of ICS. It is hoped that these books will enhance the institute's research output. Mr. James Chang expressed his confidence for future collaborations between the two parties.

Prof. Danny Wong thanked TECO for the support, and hoped that this partnership will be long lasting and successful.

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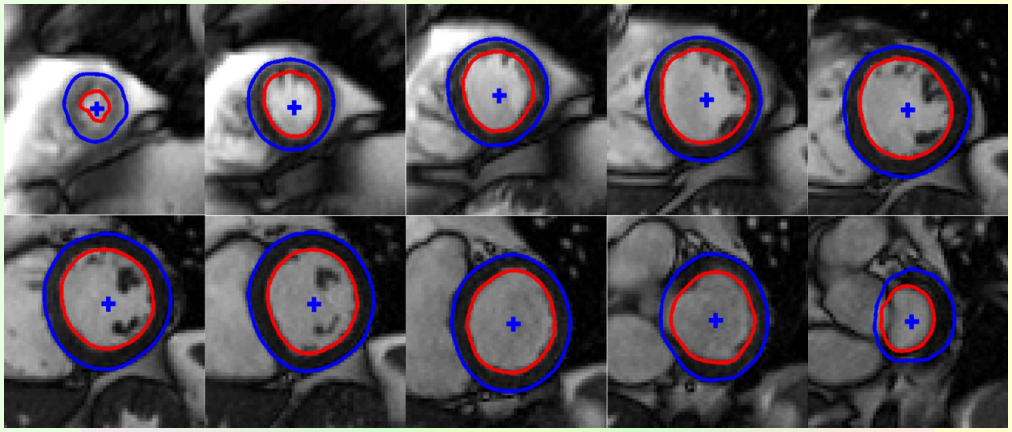
EARLY DIAGNOSIS OF HEART DISEASE FOR A HEALTHIER SOCIETY

Heart attack or myocardial infarction (MI) is characterized by localized injury or death of heart muscle due to prolonged lack of oxygen caused by the constriction of blood vessel. This disease affects more than 7 million people worldwide annually. In Malaysia alone, heart attack accounts for approximately a quarter of deaths reported yearly, and stays at the top ten principal death causes in local hospitals.

The Asian Cardiac Group, University of Malaya (led by Ir. Dr. Lim Einly and Ir. Dr. Liew Yih Miin from the Department of Biomedical Engineering, and Dr. Chiam Yin Kia from the Department of Software Engineering) is currently developing an automated software for early diagnosis of cardiac diseases, in particular myocardial infarction. The group explores image processing, machine learning and computational modelling techniques to bring quantitative analysis close to clinical experts. The group works closely with clinical specialists from Faculty of Medicine, including Prof. Dr. Yang Faridah Abdul Aziz, Assoc. Prof. Dr. Chee Kok Han and Dr. Ganiga Srinivasaiah Sridhar.

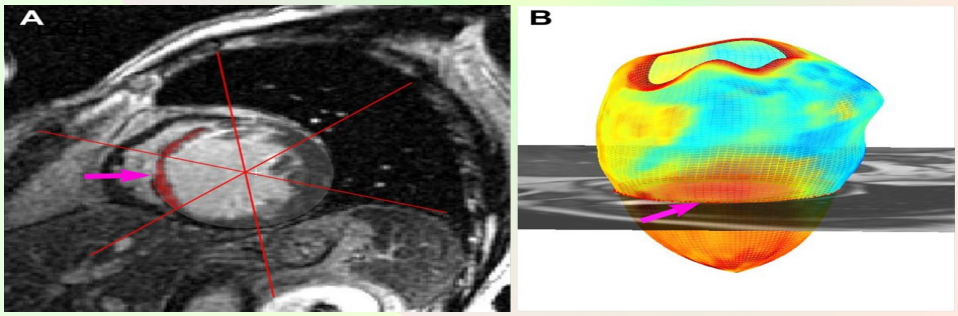
Recent highlights by the group includes a publication by Mr. Tan Li Kuo in "Medical Image Analysis" which is a top-notched journal in the field of medical and biological image analysis. The publication entitled "Convolutional neural network regression for short-axis left ventricle segmentation in cardiac cine MR sequences" signifies the pioneering work in automated cardiac segmentation using convolutional neural network regression technique. The automated cardiac delineation is crucial for efficient quantification of cardiac function and morphology to aid diagnosis and management of cardiac diseases. This proposed technique has been tested against publically-available datasets from international segmentation challenges and has shown great potential for clinical application. In addition, the group has also produced other significant research outputs including reconstruction of a 3D patient-specific cardiac model for regional cardiac dysfunction assessment and a patent under UMCIC on a method to diagnose cardiac wall motion abnormality due to myocardial disease.

The Asian Cardiac group maintains a strong international collaboration with various prestigious institutions around the world, among which are University of New South Wales, The University of Queensland, University of Adelaide, Curtin University, Texas Heart Institute, and Pennsylvania State University to keep abreast with cutting edge technology. It is hoped that the clinical research output from this group can be translated for real clinical usage in the near future.



Sample images with good wall delineation using the CNN regression technique developed by the group. The red line indicates the inner wall of the left ventricle, whereas the blue line indicates the outer wall

From left to right : Mr Tan Li Kuo, Ir. Dr. Liew Yih Miin and Ir. Dr. Lim Einly posed in front of the Asian Cardiac Research Lab, UM



Late gadolinium enhancement MRI image indicates a full thickness infarct and the three-dimensional patient-specific cardiac model color-coded with wall thickness measures (Red indicates thin wall and blue indicates thick wall). The arrows in both images point at the same location, correlating the location of muscle injury in [A] to cardiac wall thinning in [B]. The 3D visual in [B] was developed by the group to aid clinician in identifying the disease/affected region

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COMPACT SOLAR WATER HEATER WITH THERMAL BATTERY

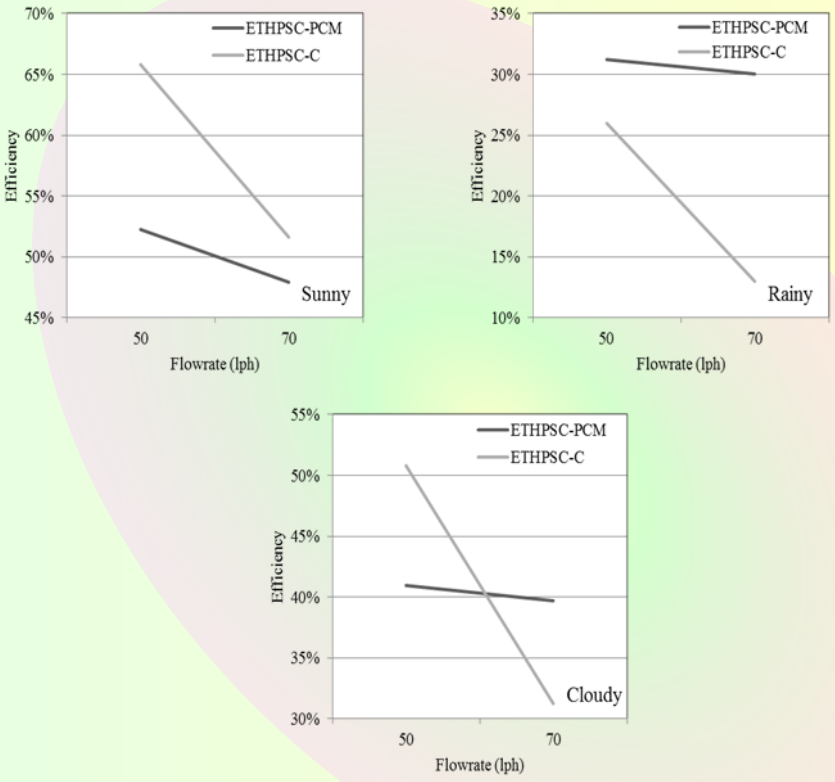
The 4th generation solar water heater (SWH) has recently won a silver medal in the ITEX 2017 competition. This innovation introduces a compact heat pipe solar collector with connected rechargeable heat storage battery. It helps to reduce the problems pertaining to heat loss, stratification effect, energy collection ratio, maintenance and health. SWH was first introduced in the 1900's with a black-painted tank mounted on a roof.

The thermal battery uses Phase Change Materials (PCMs) to store solar heat and heat up cold water, providing 100 – 150 liters/day of hot water for domestic applications. The improved system performs better (i) by extending the performing time and (ii) with less than 1% daily heat dissipation. Thermal battery also removes all the stratification effects, increases the absorbed energy portion and prevents overheating of supplied water with strong solar radiation.

Experimental setup of SWH system and the structure of thermal battery

In addition, the system is 20% cheaper in terms of system components and maintenance due to its compact design and stationary structure. It is flexible for domestic and industrial applications. The indirect heating does not mix any contaminants or odor with water, and also can prevent the growth of legionella bacteria inside the conventional hot water tank.

This invention has been discussed widely in scholarly publications. Apart from that, two patents have been filed, namely; (1) Solar Water Heater Regulator (2) An Improved Solar Water Heating.



Comparison of efficiency in conventional model (ETHPSC-C) and new design (ETHPSC-PCM)

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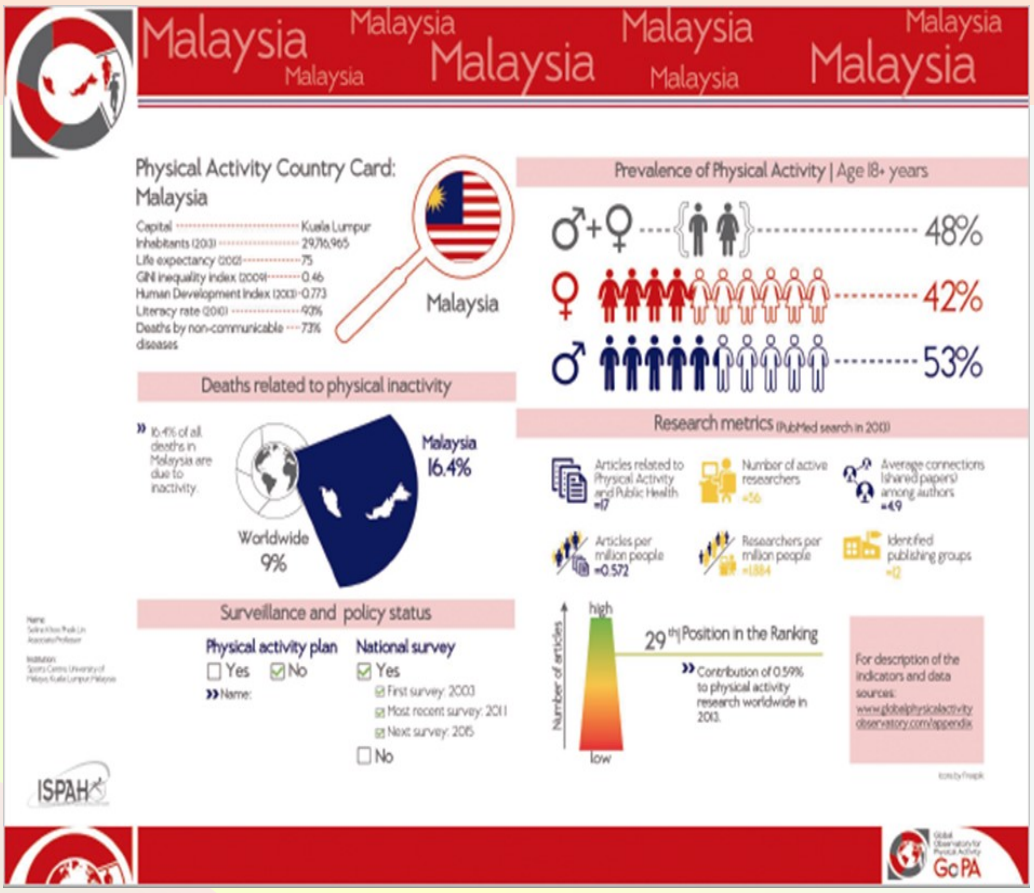
PHYSICAL ACTIVITY FOR HEALTH

Research has shown that physical activity is essential for a healthy life. Individuals of all ages can benefit from an array of physical, psychological, social, and emotional benefits from physical activity. The most important benefits of regular physical activity include reduced incidence of diseases (e.g. coronary heart disease, high blood pressure, diabetes, breast cancer and colon cancer) and decreased mortality. Even moderate amount of physical activity can lead to improvements in functional and cognitive health as well as to cardiovascular fitness.

Although there is abundance evidence of physically active lifestyle recommendations, a large proportion of the population does not participate in adequate physical activity to gain health benefits. According to the World Health Organization (WHO), physical inactivity is the fourth leading risk factor for global mortality and has been described as a pandemic.

The 2012 Lancet Physical Activity Series launched a call to action to address this pandemic, including *Global Observatory for Physical Activity* to assess and monitor physical activity research, surveillance, and policy worldwide.



Malaysia's Physical Activity Country Card

Photo credit: Global Observatory for Physical Activity (GoPA) [http://www.globalphysicalactivityobservatory.com/card/?country=MY]

Assoc. Prof. Dr. Khoo is the main contact person for the development and revision of the physical activity card for Malaysia. The card from Malaysia was included in the first set of 139 country cards developed by the Global Observatory for Physical Activity in 2015. The five indicators on the country card are demographic, health burden due to physical inactivity, surveillance and policy status, physical activity prevalence, and research metrics.

The country card for Malaysia showed that physical inactivity is responsible for 16.4% of deaths. This is higher than the global average of 9%. There was also a gender difference, with women being less active than men. The country card also reported the physical activity research conducted. Based on PubMed database search in 2013, there were 56 physical activity researchers in Malaysia contributing to 0.59% worldwide research in physical activity, placing Malaysia in 29th position.

Assoc. Prof. Dr. Khoo's research focuses on understanding motivation for physical activity and finding ways to promote physical activity in population with low physical activity (e.g. women, older adults, and persons with disabilities). She was invited to contribute a background paper on "Promoting good health through physical activity: Addressing inequality in physical activity" for the 8th Commonwealth Sports Ministers Meeting in 2016. In the meeting, ministers from Commonwealth countries addressed the contribution which sport can make to the Sustainable Development Goals, with an emphasis on promoting healthy lives and well-being for all. The meeting also considered threats to sport integrity on sustainable development, and options for government responses.

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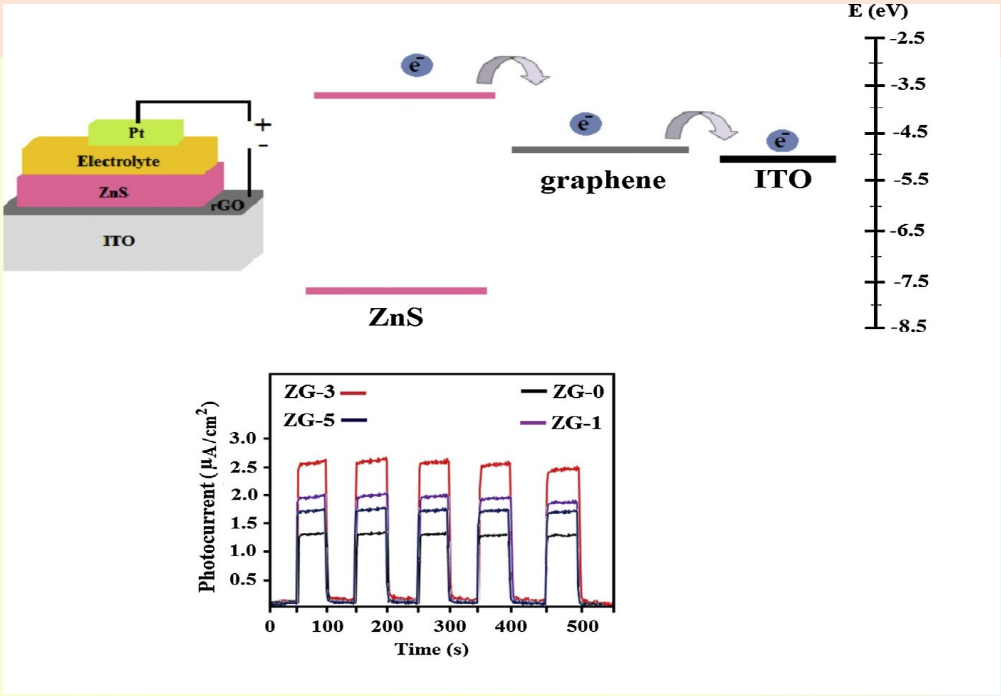
HYDROGEN PRODUCTION AS AN ENERGY SOURCE FOR THE BENEFIT OF THE PLANET

The industrial output of hydrogen production is valued at USD 100 billion worldwide, and the global consumption of hydrogen gas is estimated at 53 million metric tons in 2004. Hydrogen is the energy source for future as its combustion releases only water but not greenhouse gases as compared to fossil-based fuels (i.e. petroleum, natural gases and coal), and it can be re-utilized to produce more hydrogen gas.

Although lesser energy is produced compared to the original form due to excessive heat loss, more than 90% of hydrogen production is by steam reforming of methane gas. Hydrogen is also generated through water electrolysis (5% of the global hydrogen production). Hence, cost-efficient method is needed to reduce the global power consumption of hydrogen production.



Photocurrent versus time (I–t) curves of the solar cell device based on pure ZnS and ZnS–rGO composite with different mass ratios of rGO (1, 3 and 5 wt%)

Researchers mimicked photosynthesis process in plants and microorganisms for hydrogen generation using a semiconductor electrode (photoanode) to absorb sunlight from a solar simulator, and electrons are released upon excitation to the external circuit for the reduction of hydrogen ions to hydrogen gas at the cathode. This process is known as photochemical water splitting and the photoanode is known as photo-catalyst. Quite often, the absorption of sunlight by the semiconductor can be very inefficient, hence a potential bias to the positive regions is needed to accelerate the release of electrons from water to the semiconductor, a process known as photo-electrochemical water splitting. The semiconductor electrode which absorbs sunlight responds to the potential bias to release electrons (photo-electrocatalyst). The researchers adopt the photo-catalyst and photo-electrocatalyst processes, involving the use of:

i) Zinc Sulfide in photochemical process
ii) Zinc doped Cadmium Oxide, Cobalt Oxide, Copper

Titanium Dioxide was first used by Honda and Fujishima in the 1970's as the photo-catalysts for water splitting to release hydrogen gas from water using light energy. This was followed by doped titanium dioxide works to increase the efficiency of hydrogen gas release. The researchers have shifted from traditional use of utilizing titanium dioxide for water splitting process to other semiconductors such as doped or composites of Cadmium Oxide Copper Oxide, Zinc Sulfide and Cobalt Oxide. *(All these related works can be referred at https://umexpert.um.edu.my/jeff.html)*

This project received financial support from Ministry of Higher Education (FP033 2013A - Enhanced photocatalytic Properties of Nitrogen Doped Graphene-Metal Sulphide Nanocomposite for Hydrogen Production).

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COPYRIGHT LAW AND DIGITIZATION OF LIBRARY COLLECTIONS IN ACADEMIC LIBRARIES

The advancements in digital technology have paved the way for libraries to modernize and improve their services, such as replacing the old card cataloguing with computerized library system. Searching for specific books or materials with the card catalogue used to be tiresome and time-consuming, but the computerized library system has enabled search results to be obtained in a faster, more comprehensive and accurate manner. With the growing trend for digital publications globally, library users expect traditional materials such as monographs, research papers, manuscripts, theses, governmental documents and others to be made available online. As such, academic libraries need to improve their services to support teaching, learning and research.

In September 2015, Assoc. Prof. Dr. Tay thought about the issue of copyright implications of digitizing library materials, which was raised during a UM Library Committee meeting. Subsequently, a paper entitled "The Impact of Copyright Law on the Digitization of Library Collections in Academic Libraries in Malaysia" was published in the Malaysian Journal of Library and Information Science (http://majlis.fsktm.um.edu.my/document.aspx FileName=1672.pdf).

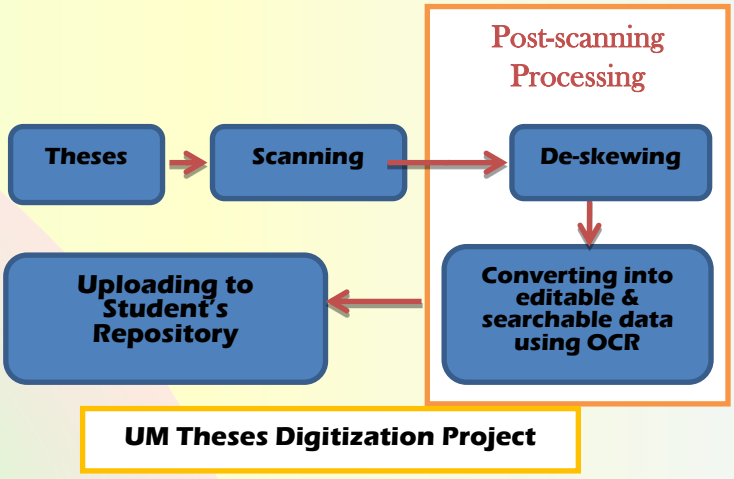
Digitizing library collections ensures multiple access to information at the same time as compared to the limited hard copies available in libraries. Users need not be present physically in the library for the information they require. Besides easy access, digitization also helps to preserve library materials by reducing demand for tangible items, thus lowering the risks of damage, loss and deterioration.

Digitizing a piece of work involves scanning or photography from page to page, and an identical copy of the work is replicated. Copyright law grants the copyright owner the exclusive right to control the reproduction of the work in any format. For instance, the copyright owner of a book can control the reproduction of its contents, not only for the whole work but also a substantial part of it which is to be determined qualitatively and quantitatively.

As such, digitization of library materials can only be carried out after prior permission from the respective copyright owners. The Copyright Act 1987, which governs copyright law in Malaysia, lists a number of activities in which permission is not needed from the copyright owner. The two most relevant activities where copyright permission is not required are as follows:

- Digitization by designated educational institutions for public interest and with fair practice. No profit is to be derived from the digitization and no admission fee is to be charged if the work is shown to the public. It is fair practice if the digitization does not conflict with a normal exploitation of the work and does not prejudice the legitimate interests of the copyright owner. Under this rule, digitization for the purpose of preserving library materials against deterioration is permitted. Similarly, digitizing out-of-print books is also permitted, as well as those library collections with expired copyright.
- Digitization for the benefit of those who are visually or auditory impaired. Copyright law allows the digitization of library materials by non-profit bodies to convert the analogue work to cater for the special needs of these people.

Apart from the two activities above, digitization of library collections requires the consent of the copyright owner through a written license or assignment of copyright. A license is the permission granted to another entity to carry out acts within the control of the copyright owner, but copyright of the work remains with the copyright owner. However, for an assignment, the copyright is transferred to the other entity and the original copyright owner can no longer control how his / her work is used. For instance, UM postgraduate students are required to sign a declaration assigning their theses to the university by the end of their study. Thus, the university may digitize the theses or dissertations at its own discretion.



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FOSTERING COLLABORATION BETWEEN INDUSTRY AND UNIVERSITY MALAYA

The collaboration was initiated when Dr. Adeeb Hayyan and Prof. Dato' Dr. Mohd Yakub @ Zulkifli Bin Mohd Yusoff, Director of Academy of Islamic Studies invited Kinetic Chemicals (M) Sdn Bhd to visit University of Malaya for potential development of new research collaborations in early 2017.

A number of issues and projects were identified as potentials for research collaboration. It was also beneficial for both parties to accelerate the transfer of knowledge between experts from Kinetic Chemicals (M) Sdn Bhd and University of Malaya for practical applications in commercial, economic and social sectors. One of the identified researches is the halal project whereby University of Malaya assists in the development of halal products and promote Malaysia as the hub of halal products hub in South East-Asia.

All awardees of sponsorship, guest and lecturers of Academy of Islamic Studies during the appreciation ceremony.;
From left to right: Mira Edora binti Zaharudin, Associate Prof. Dr. Mohd Roslan Bin Mohd Nor, Dr Maan Hayyan, Dr. Adeeb Hayyan, Prof Elwathig Saeed Mirghani, Profesor Dato' Dr. Mohd Yakub @ Zulkifli Bin Mohd Yusoff , Dean of Academy of Islamic Studies, Mr Osman Yacob, Director of Kinetic Chemical (M) Sdn Bhd, Dr Issa Khan, Mr Mohd Faizal Abu Bakar, Ainul Bashirah Marzuke and Shahidah Nusailah Rashid. Thursday, May 25, 2017

Kinetic Chemicals (M) Sdn Bhd is a chemical manufacturing and trading company. It produces chemicals related items such as cleaning detergent. More details about Kinetic Chemicals (M) Sdn Bhd can be found from the company's website at www.kinetic-corp.com.my.

Kinetic Chemicals (M) Sdn Bhd has offered sponsorship for four local UM research students. With that, it is hoped that this collaboration can motivate other companies to promote a deeper level of collaboration between UM and the industry.

Token of appreciation from Academy of Islamic Studies by Profesor Dato' Dr. Mohd Yakub @ Zulkifli Bin Mohd Yusoff to Director of Kinetic Chemical (M) Sdn Bhd, Mr Osman Yacob during the appreciation ceremony. Thursday, May 25, 2017

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UNIVERSITY OF MALAYA'S RESEARCHERS AND PUBLICATIONS HONOURED AT MALAYSIA'S RESEARCH STAR AWARD & CREAM STATUS RECOGNITION 2017

The Malaysia's Research Star Award (previously known as Malaysia's Rising Star Award), MRSA, is a joint collaboration between Ministry of Higher Education Malaysia (MOHE) and two prestigious indexing agencies, i.e. Clarivate Analytics and Elsevier. The award recognises Malaysian researchers with outstanding performance in scholarly publication. The award was presented on the 5th October 2017 by YB Dato' Seri Idris Jusoh, the Minister for Higher Education Malaysia, at Putrajaya International Convention Centre (PICC).

The Malaysia's Research Star Award & Cream Status Award 2017 by Ministry of Higher Education

Datuk Prof. Dr. Awang Bulgiba Awang Mahmud (eighth from right), Acting Vice-Chancellor, with the award recipients from University of Malaya

Five researchers from University of Malaya (UM) were among the 25 most promising Malaysian researchers whose researches have been cited and recognised worldwide. The five researchers and their award categories are: Prof. Dr. Goh Khean Jin (Citation Classic), Prof. Dr. Sazaly Abu Bakar (Outstanding National Research in Infectious Diseases), Prof. Datin Dr. Indra Vythilingam (Outstanding National Research in Tropical Diseases), Assoc. Prof. Dr. Juan Joon Ching (Hot Review Paper) and Dr. Ong Hwai Chyuan (Frontier Researcher).

Recipients for the awards were nominated and selected by Clarivate Analytics and Elsevier based on their merits and distinctions. Clarivate Analytics awarded researchers in *Frontier Researcher, Economic Impact Research, Young Researcher, Women in Science, Hot Review Paper* and *Highly Cited Researcher*; while Elsevier awarded researchers in *Knowledge Transfer*, *International Collaboration, Citation Classic* and *Outstanding National Research.*

In addition, five journals from University of Malaya received the CREAM status award. The journals are: The Malaysian Journal of Computer Science and Malaysian Journal of Library & Information Science (recipients for High Performance Journals Indexed in Web of Science), the International Journal of Mechanical and Material Engineering (for the High Performance Journals Indexed in Scopus), Malaysian Journal of Economic Studies and Journal of the University of Malaya Medical Centre (Potential CREAM status award).

Congratulations to all the winners!

CREAM AWARD WINNERS

Malaysian Journal of Computer Science (MJCS)

Award: **HIGH PERFORMANCE JOURNALS IN WEB OF SCIENCE (WOS)**

Impact Factor (IF):

1. [JCR 2016] IF = 0.60 (Q4)
   Ranked 119 out of 133 journals in the category Computer Science, Artificial Intelligence
2. [JCR 2016] IF = 0.60 (Q4)
   Ranked 94 out of 104 journals in the category Computer Science, Theory & Methods
3. [SJR 2016] SJR 0.240 (Q2)Ranked 159 out 415 journals in the category of Computer Science

CiteScore: 0.71

Aim & Scope:
The Malaysian Journal of Computer Science (MJCS) is published four times a year in March, June, September and December by the Faculty of Computer Science and Information Technology, University of Malaya, since 1985. The objectives are to promote exchange of information and knowledge in research work, new inventions/developments of Computer Science and on the use of Information Technology towards the structuring of an information-rich society and to assist the academic staff from local and foreign universities, business and industrial sectors, government departments and academic institutions on publishing research results and studies in Computer Science and Information Technology through a scholarly publication.

Website:https://ejournal.um.edu.my/index.php/MJCS

Malaysian Journal of Library & Information Science (MJLIS)

Award: **HIGH PERFORMANCE JOURNALS IN WEB OF SCIENCE (WOS)**

Impact Factor (IF):

1. [JCR 2016] IF = 0.65 (Q3)
   Ranked 55 out of 85 journals in the category Information Science, Library Science
2. [SJR 2016] SJR 0.399 (Q2)
   Ranked 61 out 211 journals in the category of Library & Information Sciences

CiteScore: 0.71

Aim & Scope:
The Malaysian Journal of Library and Information Science (MJLIS) is published three times a year in April, August and December by the Faculty of Computer Science and Information Technology, University of Malaya. The journal publishes original research articles in the field of library and information science (LIS) as well related domains that encapsulate information and knowledge. It also encourages contribution about professional policies, practices, principles and progress in the LIS fields. The journal aims to provide a forum for communications amongst LIS professionals especially within the Asia Pacific region, to introduce new concepts, methodologies, systems and technology.

Website:https://ejournal.um.edu.my/index.php/MJLIS

International Journal of Mechanical and Materials Engineering

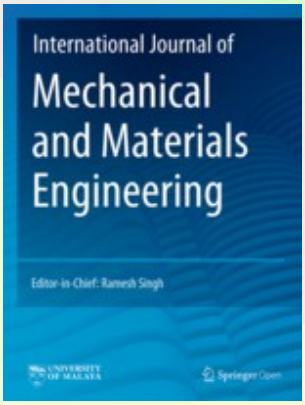
Award: **HIGH PERFORMANCE JOURNALS INDEXED IN SCOPUS**

Impact Factor (IF):

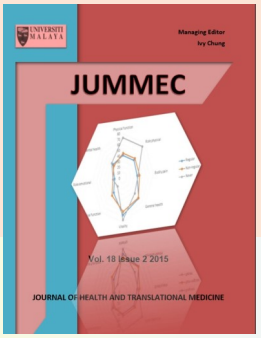
1. [SJR 2016] SJR 0.235 (Q3)
   Ranked 363 out 689 journals in the category of Mechanical Engineering
2. [SJR 2016] SJR 0.235 (Q3)
   Ranked 232 out 387 journals in the category of Mechanics of Materials
3. [SJR 2016] SJR 0.235 (Q3)
   Ranked 297 out 546 journals in the category of Material Science

Aim & Scope:
The International Journal of Mechanical and Materials Engineering is a peer-reviewed, international and interdisciplinary journal that provides a forum for cross-disciplinary research contributions covering a broad spectrum of issues pertaining to the mechanical and machining properties of materials as well as materials science, and how they apply to materials used in equipment and structures. Important topics include: nanomaterial, material synthesis and characterization, principles of the micro-macro transition; elastic behavior; plastic behavior; high-temperature creep, fatigue, and fracture; as well as metals, polymers, ceramics, intermetallics, and their composites. Other areas of interest are: tribology, joining; mechanical behavior; environmental effects, machining; nonconventional machining, materials processing; constitutive relations; and microstructure property relationships. The journal also deals with problems of kinematics and dynamics of rigid bodies, theory of machines and mechanisms, vibration and balancing of machine parts, stability of mechanical systems, mechanics of continuum, strength of materials, fatigue of materials, hydromechanics, aerodynamics, thermodynamics, heat transfer, thermo fluids, nanofluids, energy systems, renewable and alternative energy, engine, fuels, and experimental methods in dynamics.

Website:http://www.springer.com/engineering/mechanics/journal/40712



Journal of Health and Translational Medicine (JUMMEC)



Award: **POTENTIAL CREAM STATUS AWARD**

Impact Factor (IF):

1. [SJR 2016] SJR 0.101 (Q4)
   Ranked 235 out of 252 journals in category of Medicine(Miscellaneous)

CiteScore: 0.07

Aim & Scope:
The Journal of Health and Translational Medicine (JUMMEC) was founded in 1996 and is an international journal dealing with all aspects of research in health and translational medicine. Topics covered include: All aspect of medicine, medical systems and management; surgical and medicinal procedures; epidemiological studies; surgery and procedures (of all tissues); resuscitation; biomechanics; rehabilitation; basic science of local and systemic response related to the medical sciences; fundamental research of all types provided it is related to medical sciences; cell, proteins and gene related research; all branches of medicine which may include (but not limited to) anaesthesia, radiology, surgery, orthopaedics, ortholaryngiology etc.

Website:https://ejournal.um.edu.my/index.php/

Malaysian Journal of Economic Studies

Award: **POTENTIAL CREAM STATUS AWARD**

Impact Factor (IF):

1. [SJR 2016] SJR = 0.203 (Q3)
   Ranked 617 out of 919 journals in category of Economics, Econometrics and Finance
2. [SJR 2016] SJR 0.203 (Q3)
   Ranked 144 out of 282 journals in category of Economics, Econometrics and Finance (miscellaneous)

CiteScore: 0.43

Aim & Scope:
The primary purpose of the journal is to promote publications of original research related to the Malaysian economy. It is also designed to serve as an outlet for studies on the South-east Asian countries and the Asian region. The journal also considers high-quality works related to other regions that provide relevant policy lessons to Malaysia. The journal is receptive to papers in all areas of economics. We encourage specifically contributions on all range of economic topics of an applied or policy nature. At the same time, submissions of methodological or theoretical studies with results that are of practical use are welcome. Works that are interdisciplinary will be considered provided that they contain substantial economic contents.

Website:https://mjes.um.edu.my/

PECIPTA'17 AWARD WINNERS

SPECIAL AWARD

Researchers : Dr. Amirrudin Kamsin (PI), Mr. Saqib Hakak, Dr. Mohd Yamani Idna Idris, Prof. Abdullah Gani
Project Title : System and Method for Authenticating Quranic content and Hadith

GOLD AWARD

Researchers	Project Title
Dr. Amirrudin Kamsin (PI),Mr. Saqib Hakak, Dr. Mohd Yamani Idna Idris, Prof. Abdullah Gani	System and Method for Authenticating Quranic content and Hadith
Prof. Dr. Sulaiman Wadi Harun (PI), Distinguished Prof. Datuk Dr. Harith Ahmad, Mohd Fauzi Abdul Rahman, Anas Abdul Latif, Mohammad Badrol Hisyam, Mahyuddin, Ahmad Haziq Aiman Rosol	Holmium Pulsed Laser Converter
Dr. Mohd Sayuti Bin Ab Karim (PI), Prof. Dr. Hamdi Bin Abd Shukor, Dr. Rusdi Bin Abd Rashid, Assoc. Prof Dr. Bushroa binti Abd Razak, Dr. Farazila Binti Yusof, Mohd Fadzil Bin Jamaluddin, Ms. Nor Amirah Binti Mohd Amran	Automated Methadone Dispenser For Drug Addiction Treatment Program
Prof. Dr. Mohd Hamdi Bin Abdul Shukor (PI), Dr. Mohd Sayuti Ab Karim, Prof. Madya Dr. Farazila Yusof, Dr. Aoday Hashim Mohammad, Assoc. Prof. Dr. Rishya A/L Manikam	Heart Public Access to Defibrillation (PAD) Mobile Automated External Defibrillator(AED)
Ir. Dr. Lai Khin Wee (PI),Low June Weng, Yong Ching Wai, Dr. Chiu Chee Kidd (UMMC), Prof. Dr. Kwan Mun Keong (UMMC), Prof. Chris chan Yin Wei (UMMC)	ScolioS2- Portable device for preliminary diagnosis of scoliosis and shoulder symmetricity assessment
Assoc. Prof. Dr. Chong Wen Tong (PI),Prof. Dr. Masjuki Bin Haji Hassan, Assoc. Prof. Ir. Dr. Ngoh Ngek Cheng, Mr. Wong Kok Hoe, Mr. Wang Xiao Hang, Ms. Izdihar Zahirah Ibrahim,Distinguished Prof. Dr. Wang Chin Tsan	Cross-Axis-Wind-Turbine: Crossing over into the Future
Assoc.Prof. Dr. Subha Bhassu (PI), Prof. Dr. Yasmin Othman, Dr. Goh Zee Hong,Dr. Khoo Li Teng	Prawn Checkertm Multiplex Molecular Diagnostic Detection For Shrimp Viruses

SILVER AWARD

Researchers	Project Title
Dr. Raja Jamilah Raja Yusof (PI), Prof. Dato' Dr. Mohd Yakub @ Zulkifli Bin Mohd Yusoff, Nurul 'Adila Nazri, Sahida Che Sidek, Muhamad Syafriz Mohd Nazer	An Arabic Language And Qur'an Learning and Visualization System (Ainul Quran)
Assoc. Prof. Ir. Dr. Ching Yern Chee (PI), Dr. Mahar Diana Binti Hamid, Dr. Shaifulazuar Razali, Dr. Kuan Yong Ching, Dr. Nur Awanis Hashim, Prof. Dr. Ir. Ramesh Singh, Assoc. Prof. Dr. Tan Chao Yang	PLCE : A Novel Breathable Packaging Film
Dr. Farazila Yusof (PI),Lai Kwong Yih, Tan Ai Ting, Mohammad Badrol Hisyam, Prof. Dr. Sulaiman Wadi Harun	Modular Fiber Laser Soldering Machine
Dr. Azuddin Mamat (PI), Prof. Dr. Imtiaz ahmed Choudhury, Prof. Dr. Zahari Taha, AP. Dr. Yap Hwa Jen, Aznijar Ahmad Yazid, Muhammad Basril Muhammad Asri, Nurizaz Nadia ,Mohammad Jambri, Muhammad Aiman Bin Mahadi	Portable modular Electrical Discharge Machine (PEDM) for green manufacturing
Prof. Dr. Loo Chu Kiong (PI),Kee Seow Hian, Lim Ken Sian, Chin Wei Chai, Hor Weng Liang,Teh Lee Jie	Intelligent Hypertension Monitoring System

BRONZE AWARD

Researchers	Project Title
Assoc. Prof. Ir. Dr. Siti Zawiah Md Dawal (PI), Nurul Izzah Abdul Rahman, Atikah Aman	Portable Wudu' Workstation for people with disability
Dr. Asmak Ab Rahman (PI),Assoc. Prof. Dr. Siti Mashitoh Mahmood,Assoc. Prof. Dr. Zaharah Hussin, Azizi Che Seman, Dr. Wan Marhaini Wan Ahmad, Dr. Akhtar Zaite Abdul Aziz, Dr. Norwati Mansor, Dr. Zaharah Hussin,Dr. Nor Azzah Kamri, Dr. Suhaili Sarif,Dr. Zaidi Daud, Muhammad Nazmul Haque	Models of WAQF Financing Of Higher Educational Institutions: A Study In Malaysia And Selected Countries (LR001C-2013B)
Prof. Dr. Sulaiman Wadi Harun (PI),Dr. Hazli Rafis Abdul Rahim,Ahmad Razif bin MuhammadMuhammad Taufiq Ahmad, Adi Izhar bin Che Ani,Haziezol Helmi bin Mohd Yusof	Structured Growth of Zinc Oxide Nanorods On Plastic Optical Fiber & Light Side Coupling Towards Sensing Application
Prof. Madya. Dr. Bushroa Binti Abdul Razak (PI), Prof. Dr. Mohd Hamdi Abdul Shukor, Dr. Reza Mahmoodian, Prof. Dr. Kiyotaka Wasa	Novel Powder-based Physical Vapor Deposition (PPVD) magnetron sputtering
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