

RESONANCE

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*Inspiring Futures
Nurturing Possibilities*



**Tuanku Muhriz
Conferred Hon Doctorate
of Laws by
University of Glamorgan**



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Message from the Vice-Chancellor

As we enter the new year, a lot would be going through our minds as to what had been going on at UKM.

I see a lot of landmarks which put us at the vanguard of higher education in Malaysia. We strived to go the extra mile, and further. It paid off and we were all together in making the mark at home and abroad.

UKM proved that we can excel in non-traditional high technology fields as well as proving time and time again our achievements in more familiar areas.

Our students did quite well in the Micro-Robot World Cup Championship in Bristol, UK – an indication that the undergraduate engineers appreciated the fact that we are a research university.

UKM was one of the first universities to implement key performance indicators (KPIs), with three main areas evaluated: education, research and services. The weightage for university-level KPIs are education (30%), research (50%) and services (20%). This will take us to 2018 when we envision being a world-class university.



Whatever we did in the past, we do not rest on our laurels. This is why we rose 18 notches in the QS World University Rankings to number 261 from 279, the best since 2008. We improved markedly in two areas that had set us back – citation and employer reputation. Citation of our researchers is at the core of UKM as a research university.

Our intense effort to achieve excellence in research is beginning to show results in the citations. However this is only the beginning and everyone must continue to embrace the research university culture by demonstrating academic excellence on academic platforms such as publications in reputable journals.

Nevertheless, UKM is still very much rooted in imparting knowledge to the younger generation. As UKM is also a teaching university, I am reminded of the proverb:

In teaching others we teach ourselves. Perhaps we learn something of ourselves when we see the landmark achievements while striving to deal with future challenges.

Professor Tan Sri Dato' Seri Dr. Sharifah Hapsah Syed Hasan Shahabudin

RESONANCE

UKM International Bulletin

RESONANCE connotes dynamism and vibrancy. Resonance reflects our vision and philosophy, and it is also in tandem with our sister publication SENADA. As one of the research universities of Malaysia, dynamism is a virtue much prized by us for it ensures our pre-eminence in the field. Other aspects of campus life are not neglected. After all we are a community of scholars, support staff and students. The pulse and vibrancy of the whole community can be felt as you read through the pages of RESONANCE. Happy Reading.

Editorial Team

Photo from
UKM Press

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Please forward your articles to:
pkk@ukm.my

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Tuanku Muhriz Conferred Hon Doctorate of Laws by University of Glamorgan

By Saiful Bahri Kamaruddin, Centre for Corporate Communications

The University of Glamorgan in Wales, Britain has conferred the award of an Honorary Doctorate of Laws on the Chancellor of The National University of Malaysia (UKM), Tuanku Muhriz Ibni Almarhum Tuanku Munawir at a Royal Convocation ceremony. Tuanku Muhriz who is the Yang Di Pertuan Besar of Negeri Sembilan received the award from the University of Glamorgan Vice-Chancellor, Professor Julia Lydon. The Royal Convocation was held jointly by UKM and the University of Glamorgan.

The Pro Vice-Chancellor of the University of Glamorgan, Vassilis Konstantinou said the Honorary Doctorate of Laws is awarded only to the most distinguished people in the world, of the Law and government and public affairs. Reading the citation at the award ceremony, Konstantinou said the conferment was in recognition of Tuanku Muhriz's achievements, of his statesmanship and of the ties that bind the two universities.

Konstantinou explained that the University of Glamorgan gave out such honours only to those who have made distinguished contributions to a specific field or to a whole society. Tuanku Muhriz, he explained, overwhelmingly satisfied both the criteria. He said ties of fellowship and community between Malaysia and Wales were evident judging by the number of Malaysian Welsh alumni present at the ceremony. They are graduates from the universities of Bangor, Aberystwyth, Cardiff, Swansea and Lampeter.

He cited the principal tie between Tuanku Muhriz and Glamorgan through its Chairman, Emeritus Professor John Andrews as an example. Prof Andrew's relationship with Tuanku Muhriz goes back to University College of Wales, Aberystwyth in 1967 when he entered the Law School as a young undergraduate and Professor Andrews began his first year as a newly appointed Professor of Law there. Tuanku Muhriz graduated in Laws with a Second Class Upper in 1970.

Professor Andrews has very agreeable memories of those three years they were together between 1967 and 1970. One a new Professor, the other a student, they were both laying the foundations for their future careers. Professor Andrews was to become Head of the Law School and Dean of Law in 1970 and in that year he presented Tuanku Muhriz with his first degree. Upon returning to Malaysia, Tuanku Muhriz began his diverse career in international financial services and the advertising industry. At the same time, he contributed to a variety of charitable causes through his active membership of the Rotary Club of Kuala Lumpur. His passion for providing educational opportunities is widely acknowledged.

The Sofa Foundation for which Tuanku Muhriz was a member of the Board of Trustees and the Munarah Foundation which he founded, granted many scholarships to outstanding and deserving poor students. In 2011, he was honoured by the Lions Clubs International for services to humanity in improving the lives of the less fortunate with the "Head of State Medal" which is ordinarily only reserved for kings, queens and leaders of nations. He was the second recipient of the prestigious medal, after Sultan Azlan Shah when he was then the Yang Di-Pertuan Agong of Malaysia.

Editor's Note: This article first appeared in UKM News Portal



UKM Scientist Produced Innovative Fetal Heart-rate Detector

By Abdul Ghani Nasir, Centre for Corporate Communications

A UKM “PhD Through Industry” programme student has successfully developed an innovative fetal heart-rate detector, a combination of optics, tissue, instrumentation and signal processing based on his thesis.

Dr. Gan Kok Beng, 32, who had previously worked with US multinational Hewlett Packard and was awarded his doctorate by UKM in 2009, said:

“In obstetrics, fetal heart rate (FHR) detection remains the standard for intrapartum assessment of fetal well-being. The expected outcome of this early detection is a reduced risk of fetal morbidity and mortality.” Based on his research which centered on Medical Electronics, Biomedical Signal Processing & Optical Engineering and Bio-photonics, Dr Gan had already produced a prototype of the product.

The detector known as the Optical Fetal Heart Rate Detecting System (OFHR) monitors the fetal heart rate via the mother’s abdomen.

Explaining the mechanics of OFHR, Dr. Gan said: “A beam of NIR light source propagates through the maternal tissue, amniotic fluid and finally reaches the fetal tissue. The back scatter light will be detected by the photo-detector at the fetal probe and the Fetal Heart Rate (FHR) will be extracted by using advanced signal processing technique.”

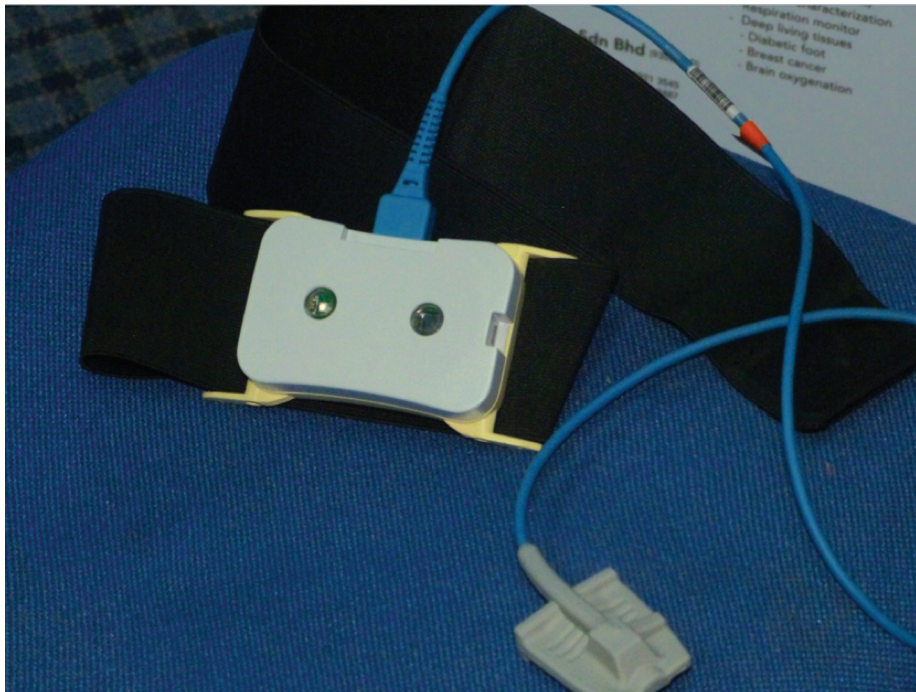
Dr Gan received a RM91,000 grant from the Centre for Innovation and Collaboration in January last year to develop a commercial prototype of the detector. He was assisted by Prof Dr Mohd Alauddin Mohd Ali, Assoc Prof Dr Edmond Zahedi from the Department of Electrical, Electronic & Systems Engineering, Faculty of Engineering and Built Environment and Prof Dr Muhd Abd Jamil Muhd Yassin and Assoc



Dr. Gan Kok Beng

Prof Dr Shuhaila Ahmad from UKM Medical Centre. Dr Gan explained that in his project, a low-power (<68 mW) optical technique is proposed for transabdominal FHR detection using near-infrared photoplethysmography (PPG).

A beam of IR-LED (890 nm) propagates through the maternal abdomen and fetal tissues, resulting in a mixed signal detected by a low-noise detector situated at a distance of 4 cm. After synchronous detection, the mixed signal is processed by an adaptive filter to extract the fetal signal, whereas the PPG from the mother’s index finger is the reference input. The graphical user interface will produce a user-friendly interface for medical doctors.



Optical Fetal Heart Rate Detecting System (OFHR)

The OFHR hardware consists of fetal and finger probes while the digitised data will be transmitted wirelessly using Bluetooth technology (Version 4) to a computer for processing. The FHR and MHR will be extracted using already developed proprietary software. Currently FHR can be detected by using Doppler ultrasound, where the standard pre-delivery test of fetal health is the fetal non-stress test (NST).

Although current ultrasonic FHR detectors are becoming less expensive and bulky, accurate sensor alignment and some degree of expertise are still required to correctly operate them.

Moreover, they are sensitive to motion artefacts and complete safety of long-term exposure of the foetus to ultrasound waves has yet to be established, therefore only short-term testing is actually practised.

An alternative to ultrasound is using the fetal electrocardiogram (FECG). Invasive FECG uses a scalp electrode and remains reserved to pre-delivery conditions. On the other hand, non-invasive FECG generally needs 3-4 leads, which renders the procedure more complex from a practical perspective where many electrodes needed to retain perfect ohmic contact with the foetus body. For these reasons, the FECG is generally utilised later in pregnancy, i.e. between the 28th and 30th week of gestation. Commercial devices using FECG are not available at this moment.

OFHR system non-invasively measures heart rate via the mother's abdomen. It offers short term and long term monitoring for high risk pregnancies. Recalling the events which led him to apply to UKM, Dr Gan who got his BSc. (Hons) in Material Physics from Universiti Teknologi Malaysia in 2001 said he then joined HP and worked in its research division (scanner innovation) in KL, but was later sent to Taiwan.

"But after six months in Taiwan I came back due to some family commitments," he said. However his two years stint as an Optics Design Engineer, Product Development at HPI Innovation Sdn Bhd gave him the experience and skills in optics, electronic and product design.

"I had to work on the HP Scanner specifically on Transparent Media Adapter (scan negative, slide & X-ray). I was also involved in technology transfer from Malaysia to Taiwan and China for mass production,' said Dr Gan. While in Taiwan, he scrolled various websites to find out if any university is interested in his research on scanners. "At that time I came to know that Dr Edmond Zahedi and Prof Dr Alauddin from UKM were working on medical devices. Actually I planned to use my skills and the technology I learned in the industry for my postgraduate study. After discussing with Dr Edmond & Prof. Alauddin, I decided to pursue my research on Fetal Heart Rate Detection Using Photoplethysmograph. Fortunately Prof. Dr. Alauddin gave a very positive answer and I immediately came to Bangi."

With the help of O&G specialists, Prof. Dr. Muhd. Abd. Jamil and Dr Shuhaila, Dr Gan managed to get valuable data at UKMMC. The project received approval from the Ethical Committee to be used at the medical centre. Comintel Corp has been chosen to co-develop the prototype product. "We signed the Non Disclosure Agreement in 2011 and Co-development Agreement 2012 with Comintel to work together in this project," said Dr. Gan. The project appeared in EETimes Design, one of the foremost magazine on industrial design.

Editor's Note: This article first appeared in UKM News Portal



UKM Scientist Developed RFID System Using Wireless Network Card

By: Saiful Bahri Kamaruddin, Centre for Corporate Communications

A researcher at The National University of Malaysia (UKM) has developed a radio-frequency identification (RFID) system that uses Wi-Fi technology to replace a critical and costly component of conventional systems – the scanner reader.



Prof. Dr. Mohamad Mamun Bin Ibne Reaz

Prof. Dr. Mohamad Mamun Bin Ibne Reaz of the Department of Electrical, Electronic and Systems Engineering at the Faculty of Engineering and Built Environment said radio frequency identification or RFID is a generic term for technologies that use radio waves to automatically identify people or objects through tags embedded in them.

Prof. Dr. Mamun told that instead of proprietary expensive RFID reader, the system uses a Wireless Network Card which is a more common and cheaper technology. Prof. Dr. Mamun, who is leading a six-man team at the department, said Wi-Fi

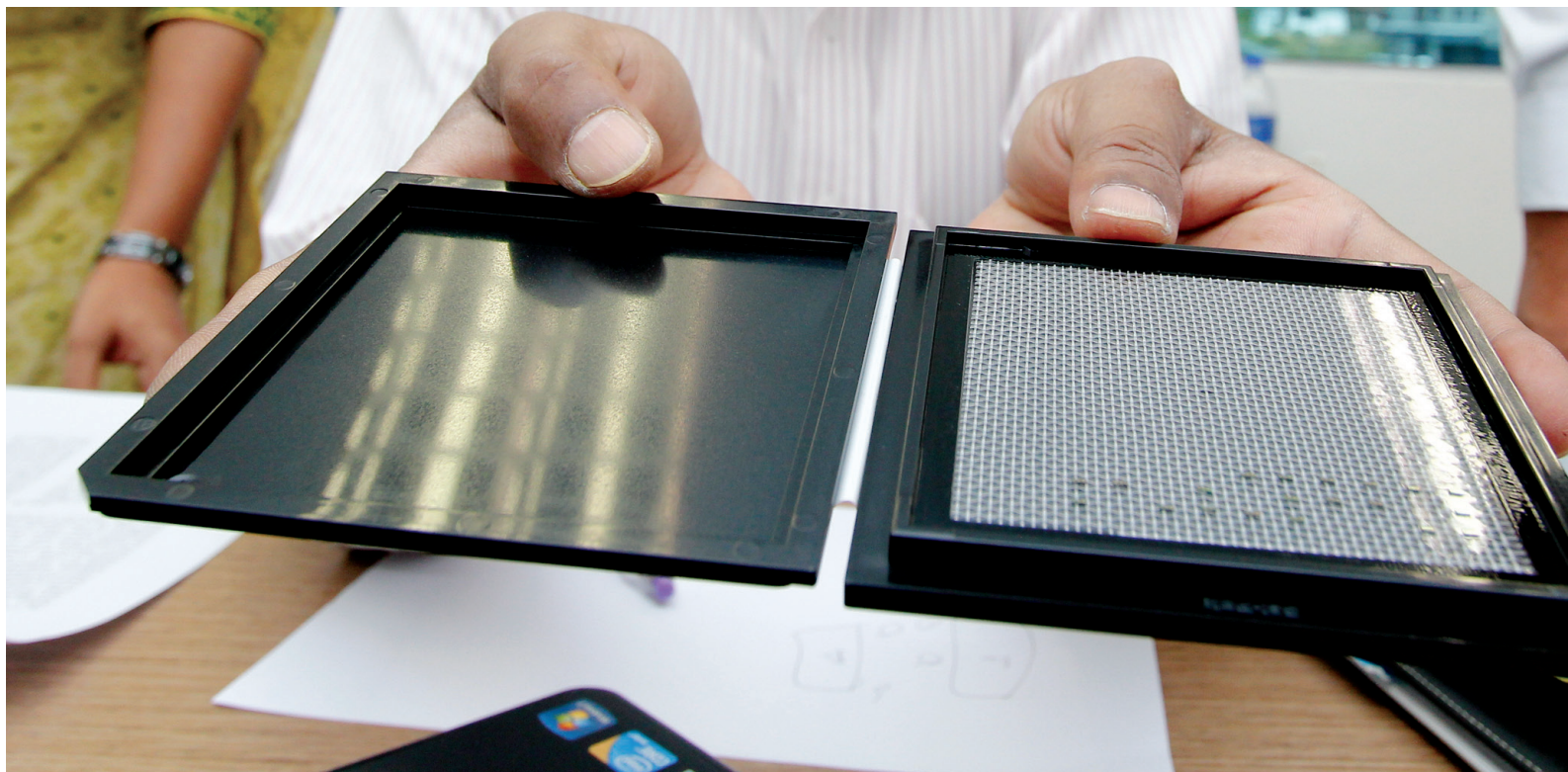
technology is popular and allows an electronic device to exchange data using radio waves over a computer network including high-speed internet connections which is adopted for the RFID system instead of using wireless devices.

Following his research, applications employing RFID system related to e-government, e-health, e-commerce and others will benefit with significant cost reduction, physical location detection and globally unique address facility.

In existing systems the most common method of identification is to store a serial number that identifies a person or object and perhaps other information, on a microchip that is attached to an antenna. The chip and the antenna together are called an RFID transponder or an RFID tag. The antenna enables the chip to transmit the identification information to a scanner or reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it.

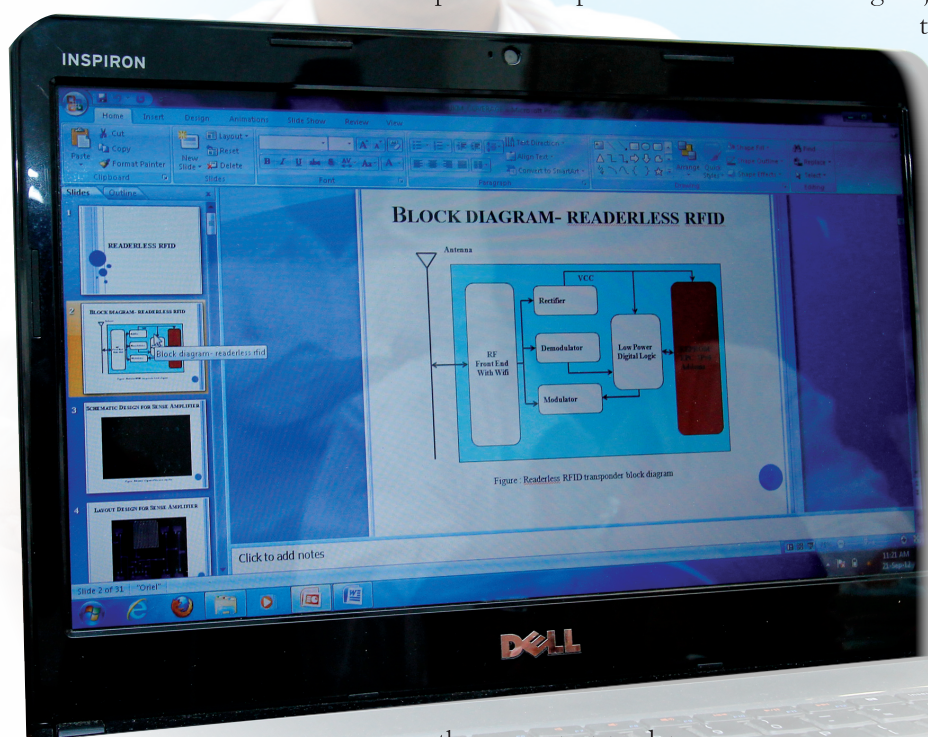
Prof. Dr. Mamun's system will not need a separate scanner since the function is integrated in any PC or computer using Wi-Fi to save costs. With his system, physicians and healthcare professionals will be able to automatically identify their patient's whereabouts in a hospital. Moreover, hospital management will find it quicker to contact manufacturers of equipment worldwide.

He estimates the cost of mass-producing each set of Wi-Fi enabled tag and chip to be just 50 cents locally and probably even cheaper if made in China. The data sent by the tag to the Wi-Fi enabled computer is read by installed software and not a special scanner.



He said that commercially-available RFID systems are specific to the company that produces them, especially in the important component of

than with swipe cards. Medicine and drugs can be tracked through warehouses. Livestock and pets may have tags injected, allowing positive identification of the animals.



A RFID chip can be very tiny – smaller than a grain of rice in many cases, or even the size of a dust particle.

Another advantage of Prof. Dr. Mamun's invention is that the tag contains electronically stored information which can be read from up to several metres away. Unlike most other systems which use a bar code, the tag does not need to be within line of sight of the reader and may be embedded in the tracked object. He is looking for entrepreneurs who are willing to invest in the RFID innovation and negotiating with several companies to use this identification system.

the scanner or reader. Currently a user needing to replace the scanner must go back to the same company which charges high prices for spare parts.

RFID tags are currently already in use in many industries. A RFID tag attached to a car during production can be used to track its progress through the assembly line. Employees with their chip-enabled ID cards can walk through automatic security doors faster without swiping. Such tags are also used for toll collection in which cars pass through toll gates faster

Prof. Dr. Mamun received his Bachelor of Science and Master of Science degrees in applied physics and electronics from the University of Rajshahi, Bangladesh, in 1985 and 1986 respectively. He obtained his PhD (Science and Engineering) from Ibaraki University, Hitachi, Ibaraki, Japan in 2007.

Editor's Note: This article first appeared in UKM News Portal



Forest Degradation in Selangor

By: Saiful Bahri Kamaruddin, Centre for Corporate Communications

Selangor which had experienced a loss of up to 10% of its forests in the 22 years between 1990 and 2012 continues to face forest degradation, a study by UKM scientists found.

The deforestation was found to be due to economic and development factors including increased farming and urbanisation arising from a growing population. Director of UKM's Institute of Climate Change (IKP), Prof. Dr. Sharifah Mastura Syed Abdullah said the continued degradation of the remaining forests is of a major concern. Speaking after a seminar on Space Sciences, Prof Sharifah Mastura said knowledge on deforestation and its driving forces in Selangor is very important as it provides the basis for the calculation of the total amount of carbon stock remaining above ground.

Carbon stock is the supply of carbon, especially carbon dioxide, kept in trees and other plants. She said the study provided an insight into appropriate measures that could be taken to increase the area of trees to reduce the release of carbon dioxide emission into the atmosphere. Photographs taken by satellites and land use maps from the Ministry of Agriculture and Agro-based Industry Malaysia showed the deforestation in Selangor had complex causes.

She said the reduction in forest cover in the state must be understood because for decades perceptions and controversies of deforestation had persisted in public debate. Prof. Dr. Sharifah Mastura said the degradation was due to economic, institutional and cultural practices and policies with just over half related to population dynamics and the rest due to agriculture, economic factors, public policy and road networks.

Overall forest loss in the 22 years was 2% from dipterocarp forests made up of the largest trees and 8.6% from peat swamp forests. While the statistics may not appear to be alarming, detailed analysis using

the Normalised Difference Vegetation Index (NDVI) showed the quality of the forest had degraded widely.

Most researchers agree that forest cover is an important and critical feature as it plays a major role in maintaining the regional hydro-climate-ecological balance as well as life sustainability and well-being on earth. In Malaysia forest and grassland conversion was fourth in the source of carbon dioxide emission in the country, contributing 14%. Continuous conversion of forest to other land use is responsible in the releasing of carbon dioxide to the atmosphere. Global annual data on emission of carbon dioxide from deforestation amounted to 25% of the total carbon emission.

She gave the following data:

Factors Causing Deforestation in Selangor	Percentage
Population Dynamics	54.4
Agriculture Intensification	18.2
Economic	13.6
Public Policies	9.1
Road Networks	4.5

Prof. Dr. Sharifah Mastura urged more case studies be done on the deforestation process – not only in Selangor, but all over the country. Only then can the regional level be considered. She said case study results from Selangor contain valuable ground truth that helps to build up

the bigger picture of the actual deforestation issue in Malaysia.

Any policy aimed at sustaining the forest in Selangor would be futile if underlying causes of deforestation are not properly known or poorly understood.

Many countries have policies favouring economic growth over forest protection. Consequently, these countries have to bear long term downstream and irreversible impacts of environmental degradation among which is an unsustainable forest resource. Ensuring carbon stock in the soil and vegetation above ground, provides the critical information required for policy makers to access the feasibility of projects based on land acquisition, Prof. Dr. Sharifah Mastura said.

Editor's Note: This article first appeared in UKM News Portal



ANGKASA built Anechoic Chamber And Invented Multi-band RFID Reader Antenna

By: Abdul Ghani Nasir , Centre for Corporate Communications

Researchers at the Institute of Space Science (ANGKASA) have constructed an Anechoic Chamber in the Microwave Laboratory of the Faculty of Engineering and Built Environment Building, UKM. The RM1.2 million facility completed in 2010, consists of an enclosed area designed to completely absorb sound and radio waves, thereby allowing researchers to test characteristics of different radio-frequency devices with no interference from reflected radio waves.

The anechoic chamber can facilitate empirical measurements of antenna parameters such as radiation patterns and gain, and to characterise the RF performance of antenna systems, said a fellow of ANGKASA, Prof. Dr. Mohammad Tariqul Islam. The ANGKASA anechoic chamber constructed with research support from Prof. Dr. Yoshihide Yamada of the Japanese National Defence Academy will benefit students and researchers. Prof Tariqul Islam said the chamber was set up in a controlled environment. "The contemporary antenna chambers are designed to accommodate a broad range of antennas of different sizes and operating frequencies. This chamber was also designed taking into consideration the limited space in the microwave laboratory of UKM as well as measurement-hardware limitations and microwave-absorber specifications. These considerations are usually limited by wavelength and force most ranges to be designed based on the operating frequencies of the antennas under test. This chamber is designed to accommodate the antennas at the lowest operating frequencies. The chamber system is capable of covering the frequency range from 500 MHz to 18 GHz and far-field measurements can be performed," he said.

The chamber is equipped with antenna position controller, standard horn antenna and software to set-up the measurement and process the data after the measurement is completed.

The support structures are designed by considering the effects of the measurement by blocking radiation, by adding perturbations in the chamber and increasing the likelihood of reflection and diffraction of radiation. The antenna under test (AUT) structure is hollow and allows cables to pass through and hide from the rest of the chamber. It has a footprint of only 4.5m by 3.5m and 4m in height. The standard antenna and AUT are placed 3m apart. The main equipment is the Agilent vector network analyser (Agilent E8362C), cable, and RF adapters. With the unique compact design of the system, it became possible to place it in the Microwave lab, Department of Electrical, Electronic and Systems Engineering, Faculty of Engineering & Built Environment.

Prof. Dr. Tariqul Islam in collaboration with Prof Dr Mohd Alauddin Mohd Ali, Dr. Mandeep Singh, Ahmad Toaha Mohashsher and Prof. Dr. Norbahiah Misran successfully invented a prototype Novel Multi-band RFID Reader Antenna, recently. The multi-band RFID reader antenna operates well at 870 MHz UHF and 2.45 GHz microwave band. The reader has two operating frequencies which can function simultaneously at both frequencies using one antenna. It is a multipurpose gadget which can be used for tracking and identification purposes. There is no restriction on its use. Usually it can be used to track missing vehicles, tracking of pilgrims during haj, tracking of assets, documents and inventory. Its high gain features enable the antenna to increase its range to read and write RFID tags. The novel feeding technique opens new doors for the interest of antenna researchers as almost the same radiation pattern is exhibited in both the bands. Its self-resonant features help to simplify the feeding network.

Editor's Note: This article first appeared in UKM News Portal



Visits by Friends



29 January 2013, University of East Anglia, United Kingdom



13 February 2013, Loi signing ceremony



19 February 2013, Asean-European University Network (ASEA-UNINET) Delegation

Visits by Friends



1 March 2013, Kazakh Ablai Khan University of International Relations and World Languages (Kaz UIR & WL)



4-13 March 2013, Educational Visit by Afghanistan Professors



20 March 2013, The Royal Institute of Thailand

Call For Research On Space Weather

By: Saiful Bahri Kamaruddin, Centre for Corporate Communication

Space Weather should be recognised as a major research field and given its due just as climatic changes are studied with daily weather forecasts made by meteorologists and announced to the public over the media.

A science officer from the National Space Agency, Mohd Fairos Assilam said a National Space Weather Programme should be formulated because such a study on space weather will have long term benefits for the country's development.

He said space weather happens when a solar storm from the Sun travels through space and impacts the Earth's magnetosphere. Energy and radiation from solar flares and coronal mass ejections (CMEs) can:

- Create blackouts on Earth when they cause surges in power grids,
- Disturbances to radio communications systems,
- Damage sensitive electronics on orbiting spacecrafts and cause colourful auroras, often seen in the higher latitudes.

He said that studying space weather is important to the national economy because solar storms can affect various advanced technology based gadgets and devices that people are so accustomed to and dependent upon in their everyday lives.

The most immediate risk is to the electricity power distribution, which can break down if massive solar flares occur. So far Malaysia has not faced any serious breakdowns triggered by solar flares.

Nonetheless Malaysia should not wait until power breakdowns and radio disturbances occur like those in



Mohd Fairos Assilam

the United States and Canada before taking action.

He said space weather can have an impact not just on the earth but also on satellites in orbit, where Malaysia also has its own functioning satellites.

He was concerned with indications that some of the satellites were not working as well as expected, but declined to elaborate.

Understanding the changing Sun and its effects on the solar system and life in Malaysia should be given some attention by the Ministry of

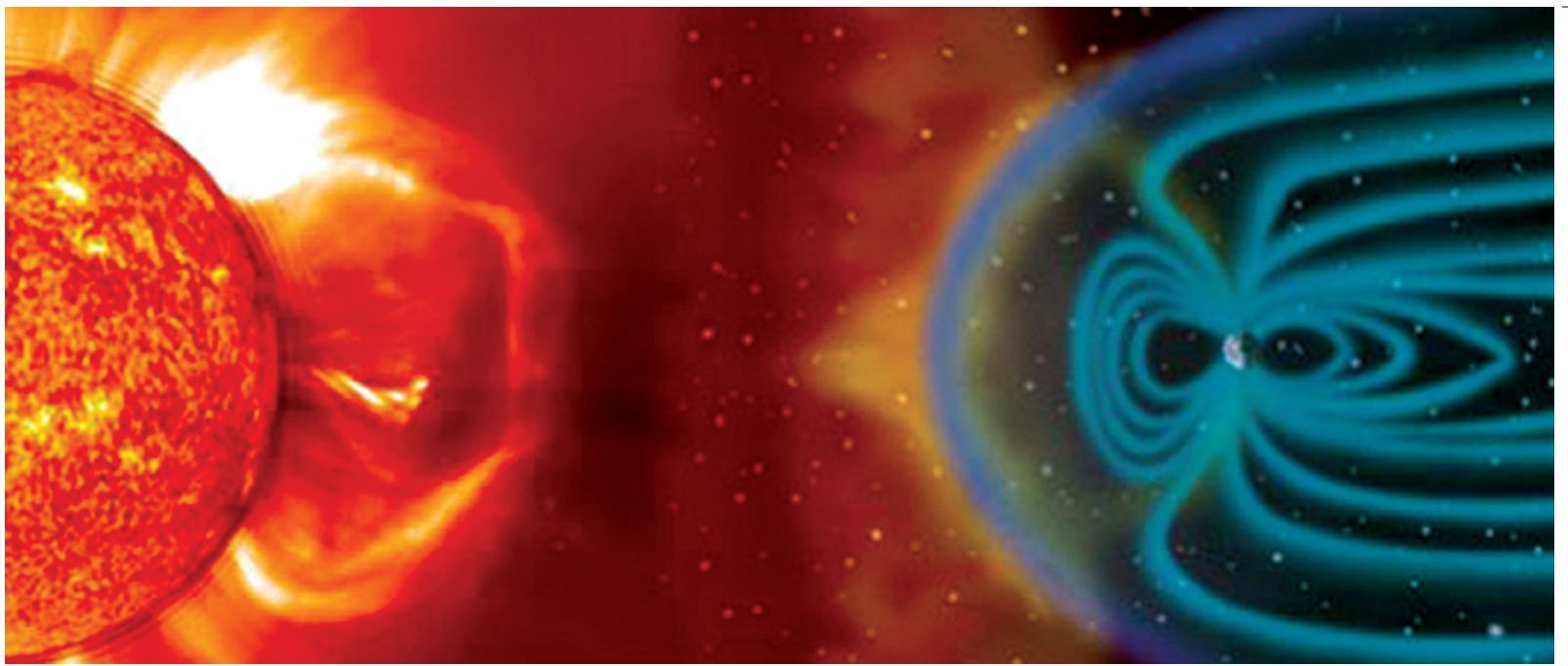
Science, Technology and Innovation (MOSTI), Fairos proposed that an allocation be made by The National Space Agency through MOSTI for ANGKASA to do more in-depth studies on the Sun and its interactions with the Earth.

He revealed that at least one telecommunication company here had reported receiving many complaints of dropped calls in its mobile network saying such reports should be studied more closely.

The flares can also affect the accuracy of radio frequency calibration such as those being used by broadcast stations. There should be researches on the phenomena but unfortunately it had barely been studied.

The changing Sun produces sunspots and solar storms over an 11-year cycle of activity, which is driven by the reversal of its magnetic poles over the time period. Solar storms occur most often and more powerfully during its period of solar maximum, which is expected to ease off this year.

Mohd Fairos said the Langkawi National Observatory do carry out studies on the phenomena by scientists



from local universities. However, observing from the ground can be difficult because for half the year the skies are obscured by clouds.

Whenever the skies are clear, researchers measure the geomagnetic field, which also has an effect on the weather. The earth's magnetic field or geomagnetic field extends from the Earth's inner core to where it meets the solar wind, a stream of energetic particles spewed out from the Sun. However, unlike the field of a bar magnet, Earth's field changes over time because it is generated by the motion of molten iron alloys in the Earth's core.

The UKM Institute of Space Science (ANGKASA) was established in August 2003 as a multidisciplinary research centre that offers graduate level education and research in the fields of Space Science, Space Technology, Space Technology Applications and Space Governance.

Editor's Note: This article first appeared in UKM News Portal



Paddy Farmers In Sabak Bernam Exposed To Effects Of Pesticides

By: Abdul Ghani Nasir, Centre for Corporate Communications

A team of UKM researchers suggested that specific trainings on safe use and handling of pesticides should be given on a regular basis to paddy farmers to ensure they are protected from the hazardous effects of pesticides exposure. The team found 75 per cent of the farmers checked in Sabak Bernam, Selangor experienced at least one pesticide exposure symptoms.

Dr Rozita Hod who headed the team said: “We also detected chlorpyrifos in farmers’ blood in 7 percent of the 100 respondents selected, with a mean of 7.29 nanogram per millilitre blood (sd 5.84 nanogram per millilitre). “The presence of pesticide exposure symptoms proved that most of the farmers were exposed to hazardous effects of pesticides.”

Other members of the team were Dr Azimatun Noor Aizuddin, Associate Professor Dr Shamsul Azhar Shah, Dr Mohd Rohaizat Hassan, Dr Nazarudin Safian and Associate Professor Dr Mohd Hasni Jaafar from the Department of Community Health, UKM Medical Centre, Cheras Kuala Lumpur.

Suggestion for the safe use and handling of pesticides for paddy farmers was made in their report: “Chlorpyrifos Blood Level and Exposure Symptoms among Paddy Farmers in Sabak Bernam, Malaysia”. Dr Rozita said various studies indicated that the unsafe use of pesticides is still a dominant issue especially in developing countries with a large number of the farmers exposed to their unsafe use. There are still high rates of acute poisoning due to chlorpyrifos exposure.

“Intervention studies are few but demonstrate the need for evaluation of current preventive measures as well as policies related to pesticide usage,” she said. The objective of the cross-sectional study was to gather baseline information on chlorpyrifos blood level and its relationship with pesticides exposure symptoms. Respondents were asked what symptoms

they had experienced within 24 hours after a pesticide application session.

The most common was giddiness (41 percent), redness of eyes (40%) and headache (25%). Their findings on habits at pesticide application sites showed that 83% of the farmers admitted they mixed more than 2 pesticides, 99% said they used the empty containers for other purposes and 54% threw the empty containers in open dumping sites.

Blood samples were taken from the farmers and out of these, 7% were detected to have chlorpyrifos with mean chlorpyrifos level of 7.29ng/ml and standard deviation of 5.84ng/ml. She said the farmers had low scores on safe practice of pesticide use even though they have high marks on knowledge and attitude. It was also found that there is no significant association between the scores on knowledge, attitude and practice on pesticide use and the chlorpyrifos blood level.

Sabak Bernam district was chosen as it has 10,213 of the 19,665 paddy farmers registered in Selangor. Some 90% of the paddy farmers there used chlorpyrifos as insecticide on the paddy stalks. It is popular because of its availability and reasonable price. Preventive treatment with insecticides such as chlorpyrifos at high dose before the planting season of a new crop (soil drenching) is a common practice in some tropical intensive cropping systems. Chlorpyrifos is a broad-spectrum organophosphate insecticide. It is effective in controlling cutworms, corn rootworms, cockroaches, grubs, flea beetles, flies, termites, fire ants and lice.

Some farmers use it as an insecticide on grain, fruit, nut and vegetable crops, cottonfield as well as on lawns and ornamental plants.

Others use it on sheep and turkeys, for horse site treatment, dog kennels, domestic homes, farm buildings, storage bins and commercial establishments. Chlorpyrifos acts on pests mainly as a contact poison, with some action as a stomach poison. It is available

as granules, wettable powder, dustable powder and emulsifiable concentrate.

In Sabak Bernam, farmers plant the paddy every 8 to 10 months because of the availability of modern farming methods. For example, they use tractors to plant the paddy plant, unlike the traditional manual method that use a special handheld tool, the *kuku kambing*. Modern techniques were used to increase their rice production.

She said as this was a cross sectional study, they used multistage random sampling on six sub-districts selected from a list of all the subdistricts there. A total of 100 respondents made up of farmers from various villages in Sabak Bernam especially residents of Kg Tebuk Pulai, Kg Parit 1, Kg Parit 2 (Timur) and Kg Parit 2 (Barat) were recruited for the study. The inclusion criteria were farmers using chlorpyrifos for the past six months, did not have any medical problem and agreed to give blood samples.

Practically all of the respondents (99 percent) were males with 90% of them married. All were Malays. Most of the respondents (52 percent) had secondary education with only 4 percent having no formal schooling at all. The mean duration for having worked in the agricultural sector was 21.4 years and standard deviation was 13.5 years. The mean duration of having and are still using Chlorpyrifos was 5.5 years with standard deviation of 4.9 years.

The study tool consisted of questionnaires which the respondents filled up. The questionnaires contain information on sociodemography, use of pesticides as well as symptoms of exposure to pesticides. Chlorpyrifos is moderately toxic to human beings. Various studies have reported adverse effects of chlorpyrifos on human body such as the central nervous system, the cardiovascular system, the respiratory system as well as skin and eye irritant. Those studies also show that skin absorption in human is limited. The exposure symptoms include numbness, tingling sensation, incoordination, headache, dizziness, tremour, nausea, abdominal cramps, sweating and blurring of vision. Vulnerable groups would include people with respiratory problems recent exposure to cholinesterase inhibitors, having cholinesterase impairment, or liver function disruption.

Chronic toxicity because of prolonged or repeated exposure may cause impaired memory and

concentration, disorientation, severe depression, irritability, confusion, headache, speech difficulties, delayed reaction times, nightmares, sleepwalking, drowsiness or insomnia.

They can also experience influenza-like condition with headache, nausea, weakness, loss of appetite and malaise. There are many overseas studies that estimate and measure the exposure routes and biological monitoring of chlorpyrifos. Exposure symptoms varied depending on properties of the chemical compound. A study found that 95 percent of the farmers experienced body pain while 82 percent had eye redness after pesticide application activities.

Our study found that the percentage of farmers experiencing giddiness and redness of eyes were 41 percent and 40 percent respectively. Organophosphorus compounds have been widely established as chemicals which have potent neurotoxic effects. They are widely used in both the industrial as well as the agricultural sectors.

The neurotoxic effects can be divided into few actions. One primary action is the irreversible inhibition of acetylcholinesterase, resulting in acetylcholine accumulation and overstimulation of nicotinic and muscarinic receptors. This results in cholinergic effects.

A delayed onset of ataxia, with axon and myelin degeneration is another form of organophosphorus (OP) neurotoxic action. It is known as OP ester-induced delayed neurotoxicity (OPIDN). Large toxic doses of OP cause acute neuronal cell death in the brain, but sublethal dose produces neuronal cell death and involve oxidative stress. The exact mechanism has yet to be explored.

In this study, the exposure opportunity of farmers and their family members to the hazards of pesticides are high, as most of the farmers store the pesticides either in their houses or in sheds behind their houses. Since their houses are located adjacent to the paddy fields some less than 50 metres from the pesticide mixing areas the potential of the houses getting pesticide mists are high especially when the wind blows across the area.

Editor's Note: This article first appeared in UKM News Portal





Removing Brain Tumours While Conscious

By: Shahfizal Musa, Centre for Corporate Communications

The National University of Malaysia (UKM) achieved yet another milestone when a patient was made to wake up during a brain surgery last February. It was UKM Medical Centre first Awake Craniotomy, a procedure to remove brain tumour with minimal or no brain damage to the patient. Some might think that waking up during surgery is terrifying but in this case it was intentional. The patient needed to be conscious to monitor and preserve his brain functions.

The procedure was performed by UKM Neurosurgeon, Associate Prof. Dr. Ramesh Kumar assisted by three other surgeons, Dr. Toh Charng Jeng, Dr. Sanmugarajah Paramasvaran and Dr. Ainul Jaffar. Dr. Esa Kamuruzaman was the anaesthetist responsible in sedating the patient before his skull was opened up and then brought back to consciousness during the surgery, just before the tumour is cut out. The complex surgery is commonly done to remove tumours that grow in the eloquent brain. These are areas of the brain that allow us to communicate, perceive, interact and have movement. They regulate our senses, movement and speech, a very important part of living a normal life.

What is fascinating about the unique procedure is the patient participated in his surgery by giving feedback to the surgeon, who in turn will react accordingly. It is quite a scene when the patient wakes up during the operation and starts responding to questions. When asked why a patient needed to be awake during the surgery, Dr Ramesh explained: "This technique was developed to allow maximum excision of the lesion while causing minimum or no injury to the surrounding normal brain tissue so that the patient has minimal or no functional loss.

"The best way to know that the patient has his functions intact is from his response. You cannot know this when the patient is unconscious". Dr. Ramesh said the patient will be asked to perform simple tasks related to the critical area, while the

tumour is removed. Any changes in function are monitored and the surgeon stops further dissections in the related area if any adverse effect is detected. Though current scanning technology like MRI can pin point where the tumour is but it is not accurate enough.

"By resorting only to the MRI scan, the surgery will be very much like walking in a mine field. Any damage to eloquent areas even by a millimetre can mean living with a disability for the rest of the patient's life. It might harm the ability to speak or move or even think. "Although functional MRI can show the motor and speech areas, it may not accurately pin point the most important areas and therefore the brain mapping done with direct electrical stimulation on the brain while the patient is awake remains as the most reliable avenue for neurological preservation," Dr Ramesh said.

The brain is not very good at healing itself and if any nerve is damaged it is not going to regenerate. The patient is given general anaesthesia before commencing surgery to render him unconscious. Then the surgeon will get to work and start drilling his skull to gain access to the patient's brain. Dr Ramesh said sedation is given at the start because the scalp and pericranium (tissue overlying the bone) is pain sensitive while the brain is not.

"Once the skull is opened the anaesthesia is reversed and the patient is awakened. Upon completion of the excision of the lesion, the patient is put to sleep again and the skull opening is then closed". It is no secret that Awake Craniotomy is a very scary option to the patient so before the patient undergo the procedure he is counselled and guided every step of the way. The patient is now recovering splendidly

Editor's Note: This article first appeared in UKM News Portal



UKM's SERI Won IDB Science And Technology Award

By: Saiful Bahri Kamaruddin, Centre for Corporate Communications

The Solar Energy Research Institute (SERI) of The National University of Malaysia (UKM) has won the Science and Technology Award of the Islamic Development Bank (IDB).

The eleventh edition of the award in the category of alternative energy sources, carries a prize of USD 100,000, a trophy and a certificate.

SERI Director, Prof. Dato' Dr. Kamaruzzaman Sopian is due to receive the award at a ceremony in Dushanbe, Tajikistan during the IDB's 38th Board of Governors Meeting on May 21.

The IDB is an agency of the Organisation of Islamic Conference (OIC) of which Malaysia is one of its 56 member states. Prof. Dr. Kamaruzzaman said the IDB wrote to SERI acknowledging the institute's role in promoting sound and fruitful competition among science and technology education and research institutions of IDB member states.

IDB's criteria for the award is stringent and included close scrutiny of SERI's projects and the types of collaborations it has. IDB supports solar energy schemes because it recognises the importance of long lasting, sustainable and environment friendly renewable energy resources.

He said the use of non-renewable fuels, such as fossil fuels have many side effects since their combustion produces pollution, acid rain and global warming.

Conversion to clean energy sources such as solar energy would enable the world to improve the quality of life not just for humans but also for its flora and fauna. There is a need to develop an ingenious method of solar energy conversion systems as a substitute especially where applications of fossil fuels are most vulnerable, Prof. Dr. Kamaruzzaman said.

Thus extensive research and development in solar energy utilisation technologies needed to be carried out.

SERI was established in July 2005 aimed at finding alternatives to fossil fuel which has contributed to global warming and environmental degradation. SERI undertakes research and development to develop renewable energy technology and expertise in the challenging field.

SERI's mission is to conduct world-class research in solar energy and renewable energy technology and management for economic and environmental sustainability.

SERI's contributions in renewable energy research has won recognition from various sources including winning the gold medal in the Green Tech Awards 2012 in the "Greentech University" category.

In 2012, a solar-powered car built and designed by UKM students including those from SERI was judged the most energy efficient car in the urban concept solar category at the Shell Asia Eco Marathon at the Sepang race circuit.

It also won the Autodesk Malaysia Design Competition 2011 (AMDC) in Shah Alam for a three dimensional design of a solar-powered wheel chair car. Its researchers had also developed a hybrid renewable energy system combining windmill and solar-powered cells. SERI scientists devised the hybrid system to replace diesel-powered generators currently being used in police outposts in some 40 remote islands.

Editor's Note: This article first appeared in UKM News Portal



UKMMC Part of World Largest Stroke Study

By Shahfizal Musa, Centre for Corporate Communication

UKM Medical Centre (UKMMC) is the only hospital in Malaysia to be selected as part of the world largest stroke study known as AVERT (A Very Early Rehabilitation Trial). This study is being conducted in over 50 hospitals across the globe including New Zealand, Australia, Singapore, Scotland, Wales and England.

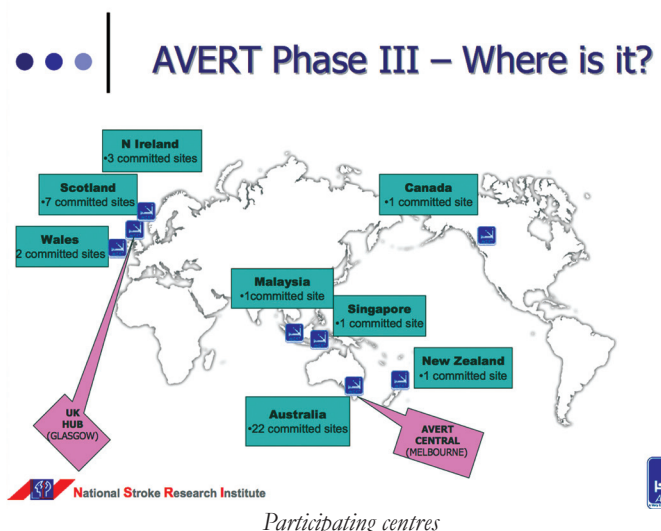
Pro Chancellor of UKM, Tun Ahmad Sarji made this announcement when launching UKMMC's high dependency ward designed exclusively to care for acute stroke patients and administer thrombolytic treatment to reverse stroke attacks on March 6, 2013.

Tun Ahmad Sarji was gratified that UKMMC has become a reference point for stroke treatment. He said that the stroke reversal treatment introduced by KRISIS (Kuala Lumpur Regionalised Intergrated Stroke Intervention Systems) known in the medical community as thrombolytic had saved many lives and reduced incidence of disability.

One common cause of stroke is when blood clot develops in the brain preventing certain parts of it from receiving oxygen. Because the brain do not have its own healing system, areas in the brain deprived of oxygen will die and along with that the bodily functions controlled by those areas. Thus those getting stroke attacks are often left with permanent disability even when they survived the attack.

Thrombolytic treatment can stop that from happening by neutralising the blood clot thereby enabling the resumption of blood flow.

What it means is that instead of leaving the hospital bed-ridden and permanently disabled, the patient can walk out of the hospital with minimal or with no damage at all.



He said the 2011 WHO report estimated the economic impact of non communicable diseases such as cancer, heart disease, stroke, diabetes and lung disease can reach US\$7 trillion over the period 2011-2025.

AVERT is a randomised controlled trial of very early rehabilitation (intervention) versus standard care (control) with blinded assessment of outcome and intention-to-treat analysis.

Early mobilisation of patients in addition to standard care will reduce death and disability at 3 months, reduce the number and severity of stroke complications experienced by patients, results in a better quality of life and is cost effective.

Dean of the Medical Faculty, Prof. Dato' Dr. Raymond Azman Ali; Chairman of KRISIS, Datin Dr. Norlinah Mohamed Ibrahim; Heads of Department, medical specialists, nurses and students attended the function.

Editor's Note: This article first appeared in UKM News Portal



UKM To Be Hub Of Modern Surgical Training

By: Shahfizal Musa, Centre for Corporate Communications

Aspiring surgeons in Malaysia and neighbouring countries can now sit for Membership to Royal College of Surgeons OSCE Exams at The National University of Malaysia Medical Centre (UKMMC) from January 2014.

UKMMC will conduct the MRCS Examiners training and candidates' preparation course in August this year. This was announced at the launch of the International School of Surgery (ISS) established by the Royal College of Surgeons of Edinburgh (RCSEd), in Edinburgh.

Prior to this those wanting to sit for the course and exam have to do so in the United Kingdom or India. Speaking on the launch of the ISS, RCSEd President, Mr Ian Ritchie said, "The International School of Surgery will allow us to work even more closely with that membership and provide them with unrivalled access to all that the College can offer."

The Royal College of Surgeons of Edinburgh has represented the surgical and dental workforce for over 500 years. Membership to the RCSEd means a surgeon is highly competent and a specialist in his field. To be a member, a medical practitioner has to sit for the preparatory course and sit for the OSCE (Objective Structured Clinical Exams).

UKM has been selected to be not only a centre for the preparatory course but also the exam itself. To conduct the exam a centre has to meet the

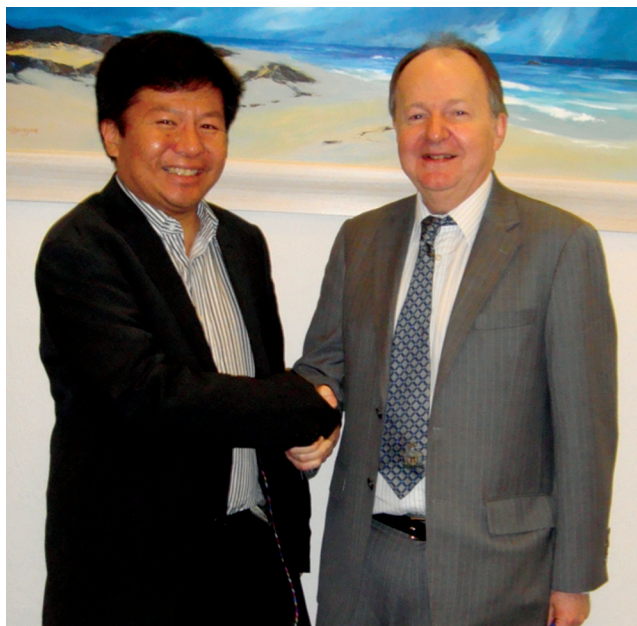
stringent requirements of the RCSEd to ensure its high standards are maintained. The ISS will work to develop and deliver new international opportunities for the College's Fellows and Members and strengthen links with international partners.

Head of the Advanced Surgical Skills Centre UKM, Prof. Dr. Hanafiah Harunarashid (FRCSEd), the representative of the RCSEd in Malaysia and Honorary Secretary of the College of Surgeons Malaysia speaking at the ceremony described it as an

exciting new development, particularly the additional support that the ISS will bring to surgeons in Malaysia throughout their training and career.

Prof. Dr. Hanafiah said the setting up of the ISS will further strengthen the relationship between RCSEd and the Academy of Medicine of Malaysia. UKM was selected to conduct the exams because it has the expertise as well as top notch facilities while making great strides in education, he said.

Surgeons from neighbouring countries including Thailand and Singapore can now come to Malaysia to take the preparatory course and exams. The ultimate benefit of the exams is more highly competent surgeons to serve patients in the country, Prof. Dr. Hanafiah said.



Prof. Dr. Hanafiah Harunarashid (left) with Mr. Ian Ritchie

Editor's Note: This article first appeared in UKM News Portal



Facts & Figures (as at 31 March 2013)

UKM's Major Milestones

• Date of Establishment	18 May 1970
• Granted Research University Status	11 October 2006
• Awarded Prime Minister's Quality Award	26 November 2006
• Granted Self Accreditation Status	29 April 2010
• Awarded SETARA 2011 Tier 5 (Excellent)	1 November 2012
• Awarded MyRA 2011 (6 Stars) for Research, Development and Commercialisation in Higher Education	1 November 2012
• Granted Autonomy Status	25 January 2012

UKM in Asian and World University Rankings

• Ranked 31st	QS Top 50 World Universities Under 50 years	2012
• Ranked 58th	QS Asian University Rankings	2012
• Ranked 261st	QS World University Rankings	2012
• Ranked 98th	Times Higher Education (THE) 100 World Universities Under 50 years	2012
• Ranked 87th	Times Higher Education Top 100 Asia University Rankings 2013	2013

Campus Size

• Bangi Main Campus	1,100 hectares
• Kuala Lumpur Campus	20 hectares
• UKM Medical Centre	22 hectares

Staff

• Academic	2,271
• Administration	7,752
Total	10,023

* As of March, 2013

Malaysian Students

• Undergraduates	12,449
• Masters	5,179
• Ph D	3,644
• Graduate Diploma	134
Total	21,406

* As of March, 2013

International Students

• Undergraduates	404
• Masters	659
• Ph D	1,400
• Graduate Diploma	5
Total	2,468

Graduates (1973-2012)

• Bachelors	129,534
• Masters	24,876
• Ph D	2,269
Total	156,679

* As of March, 2013

Faculties

Islamic Studies	18 May 1970
Science & Technology	18 May 1970
Social Sciences & Humanities	18 May 1970
Medicine	18 May 1972
Economics & Management	1 January 1974
Law	1 February 1984
Engineering & Built Environment	1 November 1984
Education	16 October 1986
Health Sciences	1 September 1992
Information Science & Technology	1 October 1994
Dentistry	26 June 1996
Graduate School of Business	10 October 2007
Pharmacy	1 June 2008

Research Institutes

Institute of The Malay World and Civilisation (ATMA)	1 December 1972
Institute for Environment and Development (LESTARI)	1 October 1994
Institute of Malaysian and International Studies (IKMAS)	1 April 1995
Institute of Microengineering and Nanoelectronics (IMEN)	1 November 2002
UKM Medical Molecular Biology Institute (UMBI)	1 July 2003
Institute of Space Science (ANGKASA)	1 August 2003
Institute of Occidental Studies (IKON)	20 August 2003
Institute of Systems Biology (INBIOSIS)	1 July 2005
Solar Energy Research Institute (SERI)	1 July 2005
Fuel Cell Institute (SELFUEL)	1 July 2006
Institute of Islam Hadhari (HADHARI)	1 May 2007
Institute of Ethnic Studies (KITA)	8 October 2007
Institute of West Asian Studies (IKRAB)	8 October 2007
Southeast Asia Disaster Prevention Research Institute (SEADPRI-UKM)	1 June 2008
Institute of Climate Change (IKP)	1 April 2011
Institute of Visual Informatics (IVI)	1 May 2011

Centres

Centre for General Studies
Centre for Graduate Management
Centre for Academic Advancement
Centre for Research and Instrumentation Management
Centre for Educational Extension
Co-Curriculum Accreditation Centre
Centre for Corporate Planning and Leadership
PERMATApintar National Gifted Centre
Centre for Collaborative Innovation
Centre for Youth Empowerment
Centre for Information Technology



Resonance connotes dynamism and vibrancy. Resonance reflects our vision and philosophy, and it is also in tandem with our sister publication SENADA. As one of the research universities of Malaysia, dynamism is a virtue much prized by us for it ensures our pre-eminence in the field. Other aspects of campus life are not neglected. After all we are a community of scholars, support staff and students. The pulse and vibrancy of the whole community can be felt as you read through the pages of RESONANCE. Happy Reading.

Editorial Team