

Advertorial from New Straits Times 1 (16-08-2009)



Engineering with a human touch

By R. Zeeneeshri

ENGINEERING education today is about creating a professional who possesses technical skills with a "humanistic" approach.

We are witnessing a radical change in direction and the education is about responding to the complex challenges posed by "technoscience".

In response to these challenges, engineering schools are introducing subjects such as ethics, anthropology, literature, history, psychology and even music, which can be called humanities in engineering.

Studies show that the inclusion of humanities in engineering education is considered indispensable when it comes to resolving the "human factor" in technological questions.

According to Universiti Teknologi PETRONAS Department of Management and Humanities senior lecturer Dr Alan Giffin Downie, people are often surprised to see a focus on humanities in a technical university.

"Increasingly, people are becoming aware that humanities is an important component in the education of professional engineers," he says.

Traditionally, humanities covers a range of subjects from social science, literature, history, psychology, anthropology, to music, arts and sociology.

"For engineers to be truly effective, they have to learn to look at not only the engineering function but how it interacts with the other domains of human existence," he says.

"UTP's vision is to be a leader in



Dr Alan Giffin Downie

technology education and centre for creativity and innovation. However, earlier this year, the university organised a national conference on humanities. A lot of people were surprised that an engineering school was hosting a conference on humanities.

"We had about 70 papers presented over three days with authors coming from as far as Korea and India. Their ideas were inspiring".

Downie says one example is wastewater treatment.

"Wastewater treatment is common in engineering. Initially, no one could see the connection with humanity. But then they realised, many communities are built around a water source. Many tribes and villages are isolated by it."

"Some of the great shifts throughout history has happened because of water. Wars are fought over water. Some of the greatest inventions have involved water, for example, the steam engine.

"When you start thinking of it that

way, you realise that something straightforward and mundane as water management affects humans a great deal. And the human condition effects how people engineer water."

At UTP, humanities and social sciences are closely aligned.

"The technical components are essential but you don't want an engineer who is clueless about the impact of his work on humanity."

Award of advice on this sentiment comes from UTP Chancellor and former Prime Minister Tun Dr Mahathir Mohamad, who says: "Showing appreciation can come in many forms but the underlying intention is obligation; the obligation to return (the benefits from) the knowledge obtained from the university which has contributed to one's success in life. This attitude is lauded because it demonstrates accountability, gratitude and as restitution for everything acquired from UTP."

Sharing this sentiment is Rector Dato Dr Zainal Abidin Kasim, who stresses that there is always an opportunity for UTP graduates to contribute towards sustaining the university's role in academic and research excellence.

"In this context, UTP alumni is very much involved in providing career and motivational talks to current students. As of now, we have international alumni chapters in Sudan, Turkmenistan, South Africa, Indonesia, Cambodia and



Tun Dr Mahathir Mohamad
Chancellor

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UTP makes dream come true

A PLACE where dreams turn into reality, Universiti Teknologi PETRONAS places utmost importance on providing the best for its students.

A recipient of UTP's goodwill is Wong Han Sze, 22, (picture) who was selected to undergo a student exchange programme at Missouri University of Science and Technology in Rolla, Missouri, United States.



The purpose of the exchange programme is to allow students to gain overseas experience and enjoy cross-culture experiences.

Wong, a third-year petroleum engineering student on the Dean's List, never expected the good fortune.

The student exchange programme lasted for six months.

According to Wong, besides the weather, it was easy to adapt to his life in US. "I was excited to start experiencing a new life abroad."

But after two weeks, I settled in with the chill," he says.

"Students were more outspoken, too. The lecturers would invite students out for ice-cream or lunch. The relationship was more like friends."

While at Missouri, Wong participated in a leadership conference.

"I joined the Society of Petroleum Engineers (SPE) and attended the SPE banquet, where I met experts from the oil and gas industry."

The exchange programme enabled me to become more independent and build my network at such a young age. Now I have friends from many countries."



Whitney Kay Metcalf, a student in Petroleum Engineering from Missouri University of Science and Technology, Rolla was sent to UTP in the student exchange programme.



'Eye'-ful discovery to fight blindness

By P. Sharmini

UNIVERSITI Teknologi PETRONAS professor in the Electrical and Electronic Engineering Department, Professor Ir Dr Ahmad Fadzil M. Han, and his researchers have come up with Balino, or computerised diabetic retinopathy monitoring and grading system.

This is a non-invasive way to diagnose, monitor and grade diabetic retinopathy (DR) using a special computer vision software.

DR is damage to the retina caused by complications of diabetes mellitus, which can eventually lead to blindness. Research indicates that new cases can be reduced if there is proper and vigilant treatment and monitoring of the eyes.

"More than 10 per cent of Malaysians suffer from diabetes, and of this number, some 36.8 per cent, or an estimated 1.5 million Malaysians suffer from diabetic retinopathy. Early detection of DR and the monitoring of its severity is important to prevent the damage to sight that ultimately leads to blindness," Ahmad Fadzil says.

Many patients in the early stages of the disease are unaware as their eyesight is fine.

At present, ophthalmologists diagnose DR by first injecting a contrast dye into a patient's bloodstream to obtain high contrast retinal images of patients' retina and then by looking for pathologies in the retina.

They then study the retina for deposits formed on the retina through microaneurysms, or micro-bleeding of the blood vessels on the retina.

Depending on the deposits and other observations, the severity of the disease is then graded.

This current method of detection requires trained personnel as they have to observe the pathologies of the retina, takes more time and is invasive.

In the course of their research, which began in 2004, Ahmad Fadzil and his team found that a specific region of the eye, called the macular region, would grow larger as the disease progressed.

"This area, called the foveal avascular zone (FAZ), would get larger as the blood vessels surrounding it appear to pull back and recede," he says.

Following this discovery, which the team has patented, they received funding from the Ministry of Science, Technology and Innovation to develop a prototype system together with R & D company Vitroa Technologies Sdn Bhd, which would help physicians diagnose the severity of the disease based on this fact.

Their system is a digital imaging system, a computer attached to the Fundus camera which can measure the enlargement of the FAZ and diagnose its severity within a few minutes. This procedure is non-invasive. The team has also applied for patent on the developed system.

Working in collaboration with Selangor Hospital, Ahmad Fadzil and his researchers,



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Hanung Nugroho and Hermawan Nugroho, are conducting clinical trials using the system.

Their invention also received the ITEX gold medal at the International Invention, Innovation and Technical Exhibition recently.

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MENT TO A VISION

Engineering the future

SCIENCE is the back of decisions and research. Both this in mind, Universiti Teknologi PETRONAS (UTP) aims to lead the way in breakthrough research and development with a unique approach that is focused on society.

Determined mission-oriented research (MOE), is determined by scientific and socio-economic issues and contributes to society knowledge, creating innovations for the good of society and providing insights to develop nations, both in the public and private sectors.

Researchers are evaluated to strengthen and optimise the utilisation of facilities, services and resources as well as provide a more focused framework for UTP's research and development endeavours.

Agreement, the university advanced its studies in CO₂ management, deepwater technology, enhanced oil recovery, green technology and nanotechnology.

"These areas are important as it supports the future of the energy business, which is vital for the nation," says Associate Professor Dr Abdul Karim Abu Aziz, director, Research Enterprise Office.

"This is also in line with demands from the oil and gas industry and, at the same time, it caters UTP's expertise. This is a unique link between UTP and the parent company," said Rashid, explaining the unique benefits of studying at UTP.

UTP has sufficient research facilities to conduct research activities but in keeping with its objective of becoming a centre of research excellence, it is also working on improving and acquiring state-of-the-art facilities. Financially, it obtains funds for research work from public and industry grants, thereby allowing it to grow.

"We aim to attain the research university (RU) status awarded by the Higher Education Ministry in the next few years. Therefore, UTP is moving towards adding more postgraduate students in the coming academic sessions, where 20 per cent of its student population will comprise postgraduate candidates. In the long run, we are looking



Energy conversion reduces pollution

UNIVERSITI Teknologi PETRONAS (UTP) has set its sight on becoming a leader in research and development and consultancy, and recognised internationally as a partner of choice for industries, a respected member of scientific communities, and an innovation platform for the research fraternity.

R & D is expected to be an integral component of UTP that adds social and economic value and enhances industrial competitiveness.

"Global warming is a big issue these days," says Associate Professor Dr Husain H. Al-Kayen from the Mechanical Engineering Department.

"It requires the attention of all researchers from around the world to contribute their findings on how to reduce its effects."

"Under the green technology R & D, we are working on energy recovery from wasted thermal energy on flare gases."

According to Husain, flare gases exhausted from thermal power plants consist more than 50 per cent of fuel thermal energy.

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Such collaborations will enable

Learning from the experts in quest for continuous improvement

IN its quest for continuous improvement, Universiti Teknologi PETRONAS (UTP) has appointed a number of international external examiners to review and provide feedback on the curriculum and delivery systems, academic processes, programme development, R & D as well as consultancy and quality assurance.

In addition, it has formed an industry Advisory Panel, which provides industry feedback on its graduate employment and curriculum design based on the stakeholder requirements and university collaboration.

"UTP is always prepared to listen," says external examiner Professor Cornelis Johan Peters from Delft University of Technology, the Netherlands.

"And for the three years I have been examining here, I've come to realise that our roles have a value."

"They [UTP Management] are quick to respond to changes, based on our feedback."

According to Peters, it is vital for UTP to continuously improve itself and to be at the forefront as an institution of higher learning that produces technically qualified and innovative graduates with the potential to become leaders of industries and the nation.

"UTP education programme is a very good state. They push the curriculum every four years to make it better."

"At the moment, UTP is in a crucial period as it strives to become a research university. The staff are young and ambitious, but they are well aware that it will require time, investment and plenty of change to achieve their dreams," adds Peters.

"I believe UTP will make it but it will need the help and support from qualified people who are willing to grow with it."

Peters also reveals that UTP is now training local industries and staff internationally for global exposure and networking. — By K. Zameerul

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Beyond the academic walls



By R. Zeeneeshri

IT'S not just about work at Universiti Teknologi PETRONAS (UTP) as students excel in both academics and co-curricular activities. For instance, who would have imagined a hardcore engineering university like UTP producing award-winning theatre productions and actors?

Spearheaded by Civil Engineering Department head Associate Professor Dr Shamsul Bahman Mohamed Katty, both Tronoh Theatre Shop (TTS) and The Qum Actors (UTP Alumni) have won their fair share of trophies.

Last year, TTS came out tops in an inter-university human values drama competition, grabbing both best actor and best actress awards.

Last month, Qum emerged third at the Festival Theatre Kuala Lumpur while 24-year-old UTP graduate Lufti Othman bagged the most promising award.

"The students' involvement in theatre has made them well-rounded graduates. It is part of the seven attributes every student should have

upon graduation."

The attributes are technical competency, solution synthesis ability, communication and behaviour skills, business acumen, critical thinking, practical aptitude and lifetime learning capacity.

"Everything in the production is done by students. They organise themselves and handle the director, acting and stage and light management."

"I have noticed that students who are active in theatre become good presenters, especially for their final-year presentation," adds Shamsul.

Qum is now a registered theatre company based in Kuala Lumpur.

In line with this excellence in the arts, the university organised the second Festival of Colours of the World (FESCO) in February with PETRONAS Performing Arts Group (PPAG), Ministry of Higher Education (MOHE) and "Sekretariat Hal Ehwal Pelajar Institut Progresif Tunjati Swasta" (SEC HEP IPTS).

The festival attracted more than 300 participants from 20 universities, including Universitas Gadjah Mada, Indonesia and Oberlin Shani of the US, showcasing a variety of folk, classical

and traditional cultural performances.

Also excelling were UTP's Mandarin debate team, which emerged as first runner-up among 20 teams in the national varsity Chinese debating competition 2008, organised by the Chinese Society of Universiti Malaysia.

UTP's Lee Kok Hock won the best speaker award.

Aho, UTP Symbium, one of the two UTP teams among 64 which took part in National Robocup 2009 competition, emerged as second runner-up in the competition in May. The participants were required to create robots using their creativity and technological ability.

A career summit for future Malaysian leaders (CASUMAL 2009), themed "Career Through Leadership" was organised to provide 300 student leaders from 20 institutions with fresh perspectives on leadership values through the sharing of experiences from top-notch industry leaders.

Organised by the Career Advisory Services, Student Services in collaboration with the Higher Education Ministry, CASUMAL reinforced leadership values among student leaders.

Thumbs-up from trio

UNIVERSITI Teknologi PETRONAS (UTP) is internationally known for providing opportunities for in-depth study in specialised areas of engineering or to conduct cutting-edge research in emerging technologies.

Its philosophy emphasises the development of professionals trained to solve real-world engineering problems.

This was what attracted Leong Siew Young, 26, from Ipoh, to continue her postgraduate studies in chemical engineering at UTP.

"After completing my undergraduate studies in industrial chemistry, my only intention was to further my studies in catalysis."

"My biggest worry was finding a university with the latest equipment and facilities that could support my field of choice. When I found out about UTP and its reputation for providing the best, I immediately applied.

The facilities here are top-notch."



Leong Siew Young



Tadese Weldu



Ayyaz Muhammad

Leong will be graduating today, and joining her is petroleum engineering student Tadese Weldu, 29, from Ethiopia.

"My country is a developing one and we lack many facilities. There is only one university back home that offers postgraduate studies, and petroleum engineering is not among its programmes," he says.

Tadese followed the advice of a friend (a UTP alumni) and enrolled here.

"I did my undergraduate studies in electrical and computer engineering."

"Initially, I was not offered a place but when I convinced the university of the link between petroleum engineering, electrical engineering and computer engineering, I was accepted."

It is a big deal for Tadese, as he wants to help his country in petroleum exploration.

For Ayyaz Muhammad, a lecturer at University of the Punjab, completing his postgraduate studies in chemical engineering at UTP has opened his eyes to a more cultural and ethnically diverse environment.

"This is a real international university. It celebrates the fact that it is multicultural, and even organises the different festivals and independence days of the different countries," he says, adding that since he was President of the Postgraduate Representative Committee, he was asked to organise Pakistan Day. — By R. Zeeneeshri

Working on squeezing every last drop of oil

THE field of Enhanced Oil Recovery (EOR) refers to techniques for increasing the amount of crude oil that can be extracted from an oil field by injecting materials not normally found in the reservoir. These materials may be liquids (water, steam, surfactant and polymer solutions) or gases (nitrogen, carbon dioxide or light hydrocarbons).

Using these techniques, researchers believe that more than half of a reservoir's original oil reserve can be extracted, as compared with the 35 to 40 per cent of oil which is usually extracted from a reservoir.

Universiti Teknologi PETRONAS Fundamental and Applied Sciences Department Associate Professor Dr Mohd Isa Tan says when an oil field is

newly discovered, intrinsically the oil has its own pressure, or energy, which pushes it out of the reservoir.

"Over the years, the rate the oil is pumped diminishes and there is a need to artificially 'lift' the oil out. As time goes by, there are more and more challenges and constraints on production. The oil is stubborn and clings to the pores of the rocks, needing much more than water to dislodge."

Prof Isa's research in Enhanced Oil Recovery is in finding a suitable chemical which will dislodge the remaining oil which remained stuck to the rocks. By successfully mobilising the oil and pushing it out, producers will gain an increase in oil production rates.

"Operationally, throughout the world, only 35 to 40 per cent of

the original oil is produced. There is plenty of oil trapped in the fields and it would make sense to find a low-cost and efficient method of pumping this remaining oil out."

Using EOR techniques, it is expected that an additional 15 to 20 per cent of the oil can be extracted.

There are several existing techniques of EOR and optimal application of each type depends on factors such as reservoir temperature, pressure, depth and permeability, amongst others.

Isa is working on using a combination of surfactants, polymers and alkali to come up with a compound which will assist in mobilising the oil out of the reservoir.

"What I have achieved is to graft a surfactant molecule along a polymer

and this combination will provide operator a great savings in cost, and is more effective than the existing method of using the surfactant and polymer separately," he said.

He is also working on tackling challenges such as high pressures, high temperatures and high salinity in oil fields with his new chemicals.

His research won gold awards at the 24th Invention & New Product Exposition 2008 (INPEX 2008) in Pittsburgh, the US and 37th International Exhibition of Invention, New Techniques and Products in held on 1-5 April, 2009 in Geneva.

At present, he is working on using jatropha seeds to make a surfactant, which is cheaper and readily available.



Associate Professor Dr Isa Tan is working on a chemical to extract 'stubborn' oil. UTP is also working closely with PETRONAS in EOR. — By P. Sharmila

