UNIMAS Scientist Receives “Top Research Scientist Award”
UNIMAS Sweeps 11 Golds At Bis 2012, London
Antifungal Activities of Dichloromethane-Soluble Eusideroxylon Zwageri and Potoxylon Melangangai Crude
Fabrication of Flexible Thin-Film Electrochemical Capacitor Prototypes via a Novel Rapid Prototyping Process
Fast Facts on UNIMAS

Date established (incorporated) 24 December 1992
Campus Site Kota Samarahan, Sarawak, Malaysia (about 25 km from the city of Kuching, the capital city of Sarawak)

Present Vice Chancellor Prof Datuk Dr Khairuddin Ab Hamid

Student Enrolment
(Academic Session 2011/2012)
Undergraduate 9,820
Postgraduate 1,107
Total 10,927

Full time staff
Academic 767
Management 182
Support 1,233
Total 2,182

Faculties
Faculty of Applied and Creative Arts (FACA)
Faculty of Cognitive Sciences and Human Development (FCSHD)
Faculty of Computer Science and Information Technology (FCSIT)
Faculty of Economics and Business (FEB)
Faculty of Engineering (FE)
Faculty of Medicine and Health Sciences (FMHS)
Faculty of Resource Science and Technology (FRST)
Faculty of Social Sciences (FSS)

Institutes
Institute of Biodiversity and Environmental Conservation (IBEC)
Institute of East Asian Studies (IEAS)
Institute of Health and Community Medicine (IHCM)
Institute of Social Informatics and Technological Innovations (ISITI)
Institute of Design and Innovation (InDI)

Centres
Centre for Language Studies (CLS)
Centre for Academic Information Services (CAIS)
Centre for Student Development (CSD)
Centre for Technology Transfer and Consultancy (CTTC)
Centre for Information and Communication Technology Services (CICTS)
Centre for Applied Learning and Multimedia (CALM)
Research and Innovation Management Centre (RIMC)
Centre for Graduate Studies (CGS)

Centres of Excellence
Malaria Research Centre
Centre for Water Research
Centre for Rural Informatics
Centre for Image Analysis and Spatial Technologies
Centre for Renewable Energy
Centre for Semantic Technology and Augmented Reality
Centre for Sago Research
Centre for Disability Studies

International Linkages
73 International Partners Worldwide (Active)

Centre for Academic Information Services
Volume of Books 216,937
Sets of Media Materials 10,946
Journal Titles (Print and Electronic) 48,377
Happy New Year! 2012 was a big year for UNIMAS, with many new exciting enhancements to our research, development and commercialisation activities. I would like to take this opportunity to thank all our dedicated researchers for their hard work in making 2012 a remarkable year for UNIMAS.

As we begin with 2013, it is always good to reflect on what have been achieved by UNIMAS researchers in 2012. To name a few, our researchers who participated in British Invention Show 2012 (BIS 2012) and the Asia Pacific ICT Awards (APICTA 2012), had made UNIMAS proud by winning various awards. Also, a special commendation to Professor Balbir Singh on his conferment as one of the Top Research Scientists in Malaysia. Congratulations to all!

The University also continues its effort to make a major contribution to improving the quality of life of communities in the country through its research-led engagement in sago research, environmental and green technologies advancement, and a host of other modern-day challenges. Some of these on-going research collaborations with international institutions of higher learning were strengthened with the signing of MoUs. 2012 saw the inking of MoUs with universities from Korea, Indonesia, the United States of America, Australia and Namibia, paving the way for greater involvement from key stakeholders in supporting research collaborations at the regional and international level. In this issue, we hear from a stakeholder, Dr Gianna Minton, our former research fellow at the Institute of Biodiversity and Environmental Conservation (IBEC), on her experiences of collaborating with UNIMAS, particularly in the dolphin conservation project.

With that, it is my hope that the beginning of the new year is a time for researchers to set new targets, plan for achievement of pre-set milestones and aim for better outcomes. Your achievements are UNIMAS’s achievements! I would like to take this opportunity to wish everyone continuous success and all the best in everything that you undertake.

Prof Dr Peter Songan
UNIMAS SCIENTIST RECEIVES “TOP RESEARCH SCIENTIST AWARD”

Prof Dr Balbir Singh, Director of Malaria Research Centre, Universiti Malaysia Sarawak (UNIMAS) was recently selected as one of the 27 scientists for the “Top Research Scientist Malaysia” award for the year 2012 by the Academy of Sciences Malaysia. This was in recognition of his active involvement in research and contribution to the progress of science, technology and innovation. Dr Balbir Singh’s research on knowlesi malaria received extensive international press attention and impacted on the way patients with the potentially fatal infection are treated and managed, particularly in Sarawak and Sabah where knowlesi malaria accounts for between 50 to 90% of malaria patients at certain hospitals.

UNIMAS SWEEPS 11 GOLDS AT BIS 2012, LONDON

Universiti Malaysia Sarawak (UNIMAS) continued to mark its strong presence in research exposition by winning 11 gold medals and 5 special awards at the British Invention Show (BIS) 2012. The event was held in London from 24-27 October 2012. UNIMAS, led by Vice-Chancellor Prof. Datuk Dr. Khairuddin Abdul Hamid showcased eleven inventions and attained 5 special awards, whereby a project entitled “Wearable Sleeping Bag” led by Miss Norhayati Suleiman won one Diamond Award, one Double Gold, and a Romania Diploma Certificate Award. The other two Double Gold Awards were won by projects led by Dr. Edmund Ng Giap Weng and Assoc Prof Dr. Nazlina Shaari through their research entitled ‘Mobile ARUT Android Browser™ Version 1.0’ and ‘Eco-Modarnt: Utilizing Sago Effluent for Natural Dye Process’ respectively. In addition to that, the UNIMAS inventions that won gold were led by Prof. Dr. Khairul Aidil Azlin Abdul Rahman, Assoc. Prof. Dr.

NGERABIT ELAMAI RECEIVED MERIT AWARD AT MSC MALAYSIA APICTA AWARDS 2012

ISITI-CoERI’s collaborative ICT project with Long Lamai community, ‘Ngerabit eLamai: Penans Employing ICT for Rural Socio-Economic Transformation’, received the Merit Award at MSC Malaysia APICTA Awards 2012 in the category of “Best of e-Inclusion & e-Community”. The MSC Malaysia APICTA Awards was jointly organized by Multimedia Development Corporation (MDeC) and National ICT Association of Malaysia (Pikom) on 16 October 2012. The Merit Award was given in recognition of Ngerabit eLamai’s contribution as a catalyst of socio-economic development of Penans community of Long Lamai.

Lo May Chiun, Assoc. Prof. Dr. Nazlina Shaari, Assoc. Prof. Dr. Zainab Ngaini, Dr. Edmund Ng Giap Weng, Dr. Azham Zulkharnain, Cik Norhayati Suleiman and Mr. Mohd. Razali Othman.

First row from left to right: Assoc. Prof. Dr. Lo May Chiun, Miss Noorhaslina Senin, Assoc. Prof. Dr. Zainab Ngaini, Assoc.Prof. Dr. Nazlina Shaari.

Second row from left to right: Dr. Azham Zulkharnain, Prof Dr. Khairul Aidil Azlin Abdul Rahman, Prof Dr. Peter Songan, Prof Dr. Mustafa Abdul Rahman, Dr. Edmund Ng Giap Weng, and Mr. Mohd. Razali Othman.

Assoc Prof Dr. Alvin Yeo (left) with Mr. Ezra Uda and Dr. John Phoa (right) showing their award.
RECIPIENT OF DR MONROE BIRDSEY MEMORIAL AWARD 2012

Mr. Hoe Yin Chen, a M.Sc. student from the Department of Plant Science and Environmental Ecology, Faculty of Resource Science and Technology, UNIMAS has received the Dr Monroe Birdsey Memorial Award from the International Aroid Society (IAS). This prestigious annual award was presented at the 35th IAS Show and Sale held at the Fairchild Tropical Garden, Miami, Florida on 15-16 September 2012. Mr. Hoe received USD1000 and an engraved crystal token. The award was given in recognition of Hoe’s M.Sc. work on taxonomy, phylogeny, pollination and floral odor of six endemic Homalomena species (Homalomenaceae: Araceae) in Sarawak. Mr. Hoe, who was supervised by Dr. Wong Sin Yeng and Mr. Peter Boyce, has successfully published his research findings in two international indexed journals.

DO MORE RESEARCH ON SAGO, SAYS CM

Chief Minister Pehin Sri Haji Abdul Taib Mahmud has called for more research to be done on sago as it has potential to become an important additional source of food material in the future. In an opening address during 2nd ASEAN Sago Symposium 2012 in UNIMAS on 30 October 2012, the Chief Minister emphasized on the production of the crop that should be intensified. The symposium with the theme “Advances in Sago Research and Development” was hosted by UNIMAS in collaboration with CRAUN Research Sdn. Bhd., Bogor Agriculture University (IPB), Indonesia and Food and Agriculture Organisation (FAO) Regional of Asia Pacific (FAORAP), Thailand. In his statement, the Chief Minister agreed with FAO, which forecasted that the world will face food shortage in the future if efforts are not made to prevent it from happening. He commented on the competition among materials which earlier allocated for foods were used as materials for biodiesel. Hence, he argued that the methods of improving labour and sago productivity in Sarawak should also be seriously looked into and improve on as the State produces more than 90 per cent of the sago starch in Malaysia, with an annual export of around 60,000 to 70,000 tonnes and a total revenues exceeding USD10 million annually.

MUSICACOUSTICA 2012 AWARD

Assoc. Prof. Dr. Hanizam Abd Wahid received an award at the Musicacoustica 2012 competition held at the Central Conservatory of Music, Beijing on 26-30 October 2012. His masterpiece entitled “Mikro” was produced from the sounds of frogs recorded by Dr. Ramlah Zainudin from Faculty of Resource Science and Technology and awarded the third place in the competition.

UNIMAS SECURED RM455,661 KTP AND RM427,964 RACE GRANTS

UNIMAS secured RM455,661 worth of Knowledge Transfer Programme (KPT) research grant from the Ministry of Higher Education (MOHE) to fund its community and industry related projects in Sarawak for a period of two years. The proud recipients of this grant were: Professor Dr. Lau Seng who collaborate with Pro-Auto Care Centre Sdn. Bhd. to develop fuel cell for vehicles so as to improve fuel economy and carbon footprint in the country; Associate Professor Dr. Alvin Yeo to develop E-Commerce Capacity Building for the Penan community in Long Lamai, Baram: and last but not least, Dr. Wan Azlan Wan Zainal Abidin to develop the Micro-Hydro in Kampung Semulong Ulu, Sri Aman.

In addition to the KPT grant, Unimas also secured the RACE grant worth RM427,964 under the Research Acculturation Collaborative Effort program (RACE) for nine of its research projects from MOHE. The aim of this grant is to enhance the university’s research culture through collaborative research with research university(s) in the country. The proud recipients of this award were Assoc Prof. Dr. Edmund Sim Ui Hang, Assoc Prof. Dr. Alexander Kiew Sayok, Assoc Prof. Dr. Siti Raudzah Ghazali, Assoc Prof. Dr. Abdul Halim Busari, Assoc Prof. Dr. Khaireuddin Sanaullah, Dr. Ho Wai Seng, Dr. Leaw Chui Pin, Dr. Syafiq Fikri Abdullah @ Lee Nung Kion, and Mr. Mohd Nasarudin Harith @ Abdul Nasir.
Effects of Habitat Features and Fragmentation on Herpetofaunal Communities in Western Sarawak

Researcher: Indraneil Das¹ and Charlie J. M. Laman²
¹Institute of Biodiversity and Environmental Conservation, UNIMAS
²Faculty of Resource Science & Technology, UNIMAS

Western Sarawak (comprising the divisions of Kuching and Samarahan), has a land area of 9,527 sq km, and is home to several endemic lineages of plants and animals. Its landscape has been heavily modified since the early 1900s, and presently comprises a mosaic of remnant habitats—forests and flood plains, sometimes widely separated by urban and agricultural areas. Within forested fragments are areas protected as National Parks, although knowledge of critical habitat features required for target organisms are often absent. In such landscapes, the capacity to detect early change in assemblages and populations makes it possible to take proactive conservation and management measures.

In this study, we attempt to test responses of herpetofaunal communities of lowland forests and midhills to environmental/landscape features, fragmentation and isolation, through field sampling, and analysis of existing information (museum specimens and published records). Logistic regression and linear multiple and/or multivariate regression models will be used to relate species presence in forest patches, to specific forest patch features and isolation. Morpho-measurements taken of our herpetofauna, morphometric analyses will also be used to detect preliminary differences in taxonomic classifications. We also studied habitat loss and fragmentation (that will potentially lead to isolation and stochastic extinction), through investigations of microhabitat use of selected groups of amphibians and reptiles. Our herpetofaunal data will also be analysed for their species diversity, species richness and species similarity characteristics, especially on the different microhabitats. Species accumulation curves, standardized via rarefaction methods, will yield information of species richness predictions.

Together with our graduate research assistant, Samuel Shonleben (Figure 1), we have been involved in field sampling in a number of localities representing different habitat types (peat swamps, lowland mixed dipterocarp forests, lower montane forests). Apart from gathering information on the specific study objectives, we have collected hitherto unknown species of frogs of the genera Limnonectes and Rhacophorus (Figure 2 & Figure 3).

Anticipated benefits of the project would be answering the question whether the protected areas system protect representative herpetofaunal communities, the creation of specimen-based herpetofaunal inventories in protected areas and in the rest of western Sarawak. We also hope to identify key habitat features for species, improving habitat connectivity for long-term survival of populations, acquisition of species specific ecological knowledge and understanding the effect of highways and vehicular traffic on communities, in order to make recommendations for the survival of herpetological populations for posterity.

This project is supported by a Fundamental Research Grant, FRGS/07(04)787/2010(68), from the Ministry of Higher Education, Government of Malaysia.

Figure 1: Samuel Shonleben, postgraduate research assistant, sampling for herpetofauna.

Figure 2: An unknown species of terrestrial species of the genus Limnonectes from Gunung Serembu, which is near one of Alfred Wallace’s former collection sites. The pale star-like pattern on the flanks are unique for the genus.

Figure 3: Another unknown species of tree frog of the genus Rhacophorus from the campus of UNIMAS, Kota Samarahan, an intensively studied site.
Antifungal Activities of Dichloromethane-soluble *Eusideroxylon zwageri* and *Potoxylon melagangai* Crude Extracts against Wood-Decaying Fungi

Researcher: Ismail Jusoh, Sim Shiang Ping, Zaini Bin Assim and Fasihuddin Badruddin Ahmad
Faculty of Resource Science and Technology, UNIMAS

*Eusideroxylon zwageri* Teijsm & Binnend and *Potoxylon melagangai* (Symington) Kosterm locally known as belian and melagangai respectively, are among the heaviest and most durable timbers in Borneo. Durability or decay resistance of wood are known to be associated with the presence of toxic extractives. The main aim of this study was to determine the chemical compounds responsible for the natural durability of these woods.

Antifungal assays were performed to determine the toxicity of dichloromethane extracts of *E. Zwageri* and *P. melagangai* against wood-decaying fungi namely *Trametes versicolor* (white rot), *Gloeophyllum trabeum* (brown rot and *Chaetomium globosum* (soft rot). The assays were carried out using agar dilution method. Crude dichloromethane extracts of *E. Zwageri* and *P. melagangai* were added to malt extract agar to obtain the concentration of 2.5 mg ml\(^{-1}\), 5 mg ml\(^{-1}\) and 10 mg ml\(^{-1}\).

Concentration of 2.5 mg ml\(^{-1}\) *E. zwageri* and *P. melagangai* dichloromethane crude extracts recorded antifungal index against *Trametes versicolor* of 57 % and 74 %, respectively. At the same concentration, lower antifungal index were observed against *Chaetomium globosum* suggesting that dichloromethane crude extracts were more effective against *Trametes versicolor* than *Chaetomium globosum*.

It was observed that the concentration of 10 mg ml\(^{-1}\) dichloromethane crude extract of both woods inhibited the growth of *Trametes versicolor*, *Gloeophyllum trabeum* and *Chaetomium globosum*.

Gas chromatography–mass spectrometry analyses showed that the main compounds in dichloromethane extract of *E. zwageri* included 1,2,3-trimethoxy-5-[(1E)-1-propenyl]benzene, 4-methoxy-6-(2-propenyl)-1,3-benzodioxole, *α*-panasinsen and cadina-3,9-diene. The major compounds in dichloromethane crude extract of *P. melagangai* were cadalene and n-dotriacontane. One compound, *α*-cadinol was detected in dichloromethane extract of *E. zwageri* which is notable for being reportedly active against human tumor cell, HT-29 colon adenocarcinoma.

Antifungal effects of different concentrations (from left to right): 5 mg ml\(^{-1}\), 5 mg ml\(^{-1}\) and 10 mg ml\(^{-1}\). (a) *T. versicolor* with *E. zwageri* dichloromethane extract. (b) *T. versicolor* with *P. melagangai* dichloromethane extract.
Low Cost and Sustainable Technology Ffr Harvesting Humic Acids

Researcher: Siong Fong Sim, Nurul Aida Lu Mohd Irwan Lu, Terri Zhuan Een Lee and Murtedza Mohamed
Faculty of Resource Science and Technology, UNIMAS

13% of the land area in Sarawak is peat, therefore numerous rivers are tainted with peat swamp runoffs that are typically yellowish to brownish in colour. The water is acidic in nature and is rich with humic substances that are collectively referred to as humic acid, fulvic acid and humin. They are categorised according to their solubility in acid and alkali. Humic substances have been widely used in agricultural application as fertilizer, nevertheless their presence is undesirable in water treatment system as humic residues could potentially react with chlorine during the disinfection process to produce carcinogenic compounds.

The extraction of humic substances using agricultural wastes has gained considerable attention due to its low operational cost and environmental friendliness. Essentially, a low cost and sustainable technology to harvest humic substances would benefit from two aspects: 1) to convert agricultural wastes into value-added products as biosorbents and fertilizer; 2) to provide a low cost alternative to water treatment processes for removal of humic substances. Agricultural wastes are potential biosorbents due to their availability of functional groups such as hydroxy, methoxy, phenolic and carboxyl.

In this research, we examined various indigenous agricultural wastes i.e., coconut husk, banana trunk, sago hampas, oil palm fruit bunch, rice husk, prawn shell and saw dust for their potential to absorb humic substances. Among these, rice husk showed the greatest potential although the adsorption performance was poor; under extreme acidic condition (pH < 2), it can be marginally improved. Chemical modifications were therefore incorporated to improve the adsorption ability. This involved pretreatment with NaOH followed by citric acid to remove lignin and hemicellulose and to incorporate carboxyl groups that enhanced the binding potential of rice husk. Figure 1 shows the scanning electron micrographs of (a) untreated rice husk and (b) NaOH treated rice husk that indicated the removal of lignin.

In this study, the removal of humic substances was evaluated based on the spectrophotometric method. Fundamentally, lower absorbance suggested lower humic content. Figure 2 showed the absorbance of raw water and water treated with modified rice husk at 465 nm. The absorbance of the treated water has greatly reduced suggesting removal of humic substances. This can be observed visually where water treated with modified rice husk becomes clear after treatment as shown in Figure 3.

In conclusion, the modified rice husk showed better adsorption capability for removal of humic substances from water.

![Figure 1: Scanning electron micrographs of (a) untreated rice husk (b) NaOH treated rice husk](image1.png)

![Figure 2: Mean absorbance of raw water and treated water at 465 nm.](image2.png)

![Figure 3: Photos of humic rich water and water treated with modified rice husk.](image3.png)
Why Does Malaysia Need Foreign Workers

Researchers: Fariastuti Djaraf and Mohd Khairul Hisyam Hassan
Faculty of Economics and Business, UNIMAS

There is a rapid growth of international migrants to Malaysia. Malaysia ranked 28 in 1995 in the world’s top destination countries for migration and it moved up to 20 in 2010. International migrants include foreign workers who have a monthly salary of less than RM 3,000. Foreign workers in Malaysia mainly come from Indonesia and Bangladesh and usually work in low-paid jobs in manufacturing, construction, plantation and household service sectors.

Our study is based on secondary data published by the Department of Immigration and the Asian Development Bank. The quarterly time series data are analyzed using modern econometric tools (Vector Autoregressive/V AR framework). The study compares demand for foreign workers from Indonesia, Bangladesh and the Philippines since their characteristics are generally different.

The study proves that income, unemployment and trade openness in Malaysia significantly determine demand for foreign workers. The increase in income is followed by increasing demand for Bangladeshi and Filipino workers; the increase in unemployment rate is accompanied by increasing demand for Indonesian and Filipino workers; and the greater trade openness value increases demand for Indonesian workers.

We conclude that only demand for the Bangladeshi workers follows the general pattern of migration. The higher income and the lower unemployment in Malaysia will be followed by an increasing demand for Bangladeshi workers. This might be due to the long distance between Bangladesh and Malaysia which substantially increases migration cost and requires job guarantees in Malaysia before migrants leave Bangladesh. A high demand for Bangladeshi workers also reflects the rapid development of Malaysia especially in the construction sector where Bangladeshi workers tend to concentrate.

Increasing income also induces demand for Filipino workers such as skilled maids with relatively high salary. On the other hand, increasing income is followed by declining demand for Indonesian workers. Increasing income implies a changing job structure where low-paid employment that Indonesian workers tend to concentrate drops and medium- and high-paid employment preferred by the local workers rises.

Indonesian and Filipino workers are highly competitive in certain jobs. Though unemployment in Malaysia is increasing, demand for Filipino and Indonesian workers is also increasing. Expatriates and rich Malaysian Chinese and Indians prefer to employ Filipino domestic workers as they have a professional image and are able to speak English. Indonesian workers on the other hand compete with the local workers in the low skilled job market. Preference for Indonesian workers in low-skilled jobs imply that employers are adverse to the high turn-over among local workers who are least likely to work in low-paid job. This might also be the reason for the increasing demand for Indonesian workers along with increasing trade openness in Malaysia.

If a minimum wage policy is applied for foreign workers it will increase hiring cost which is expected to reduce demand for foreign workers. This policy however requires close monitoring by the authorities as it can create disadvantages for local workers because employers prefer foreign workers.

The minimum wage policy will only be effective if the current wage of the foreign workers is below the minimum wage (RM 900 per month in the Peninsula and RM 800 per month in Sabah and Sarawak). The Malaysian government should implement other alternative policies such as increasing competency of the local workers especially for the jobs dominated by foreign workers. This policy is better in the long-run than increasing hiring cost of foreign workers which may lead to an increase in illegal foreign workers.
Mechanics of Clean Water Production by using Green Technology: A Sustainable Water Treatment Process

Researchers: M. Shahidul Islam  
Faculty of Engineering, UNIMAS

Clean water production by the aid of Green Technology (CWPT) is a mechanical process and application of chemicals is insignificant level. Atomic separation spectrum and Nano-particle membrane techniques have used to develop water treatment process (Figure 1, 2 & 3). CWPT is medium level energy intensive and low pressure driven system. This research has two phases; firstly, the development of a laboratory scale machine based on simulation results; and secondly, fabrication of a prototype unit. A series of performance tests of this machine were conducted with water samples from sea, river and canal. The results indicate that the invented process is quite good to separate approximately 96% dissolved salts and pollutants from the feed water with fresh water production performance about 90% (Figure 2 & Table 1).

Fabrication of Flexible Thin-Film Electrochemical Capacitor Prototypes via a Novel Rapid Prototyping Process

Researchers: Pang Suh Cem, Chin Suk Fun and Wee Boon Hong  
Faculty of Resource Science and Technology, UNIMAS

Flexible thin-film electrochemical capacitor proof-of-concept prototypes on flexible polyethylene terephthalate (PET) supporting substrate have been fabricated using a novel rapid prototyping process. These proof-of-concept prototypes consist of either a single or multiple layers of interdigitated array electrodes (IDA) of manganese dioxide and a polysaccharides-based gel electrolyte layer being deposited directly onto flexible PET supporting substrate under controlled ambient conditions (Figure 1). Environmentally benign precursor materials such as nanoparticulate manganese dioxide thin films and plasticized polysaccharide-based gel electrolyte films are used as the electroactive and ionic conductive electrolyte layers, respectively.

The prototyping process developed by the Advanced Materials Research Group at UNIMAS is versatile, cost-effective and does not require any sophisticated and
Prototypes of various electrode configurations are subsequently generated using a computer interfaced cutting plotter (Figure 3). These prototypes are then packaged as either compact vertical stacks or cylindrical spiral rolls of multiple layers based on desired device applications. The overall dual-planar prototype device configuration is highly amendable to rapid modification and optimization necessary for enhanced performance in any specific applications. 

The electrochemical performances of flexible MnO2 thin-film electrochemical capacitor prototypes are evaluated with cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) based on the standard 2-electrode configuration (Figure 4). Prototypes of optimized electrode configuration are observed to exhibit cyclic voltammogram of almost perfect rectangular shape which is indicative of excellent capacitive behavior. Besides, these prototypes exhibit excellent cycling stability and reversibility as evidenced by their constant specific capacitance values for up to 1,000 cycles, and the Qa/Qc ratio being close to unity (Figure 5).

The performance of electrochemical capacitor prototypes can be further enhanced by the optimization of electrode configurations (Figure 6). Prototype of electrode configurations 2 & 3 exhibit substantially larger charge capacity and higher cycling reversibility as compared with that of configuration 1 (Figure 1). 

Among potential applications of thin-film electrochemical capacitors include as built-in high power density and pulsed power sources in electronic devices, “on-chip” localized and distributed power sources in miniaturized devices, load-leveling function in electronic devices and electric vehicles, and external back-up power sources.
**MoU on Wood Science Research**

7 August 2012 saw the signing of an MoU with Chonnam National University, South Korea which was represented by Prof Dr Yoon Soo Kim, the President of the university, and Prof Dr Gyonggu Shin, the Dean & Vice-President of International Affairs. Prof Datuk Dr Khairuddin Ab Hamid signed the MOU for UNIMAS. Initiated by Assoc. Prof Dr Andrew Wong Han Hoy from the Faculty of Resource Science and Technology, this MoU will pave the way for more student and staff exchange between the two universities for the next five years.

**MoU with Indonesian University on Malaria Studies**

On 15 July 2012, Prof Datuk Dr Khairuddin Ab Hamid (UNIMAS Vice-Chancellor) signed an MoU with Prof Dr Med Tri Hanggono Achmad (Dean, Fakultas Kedoktoran, on behalf of Unit Penelitian Kesehatan, Universitas Padjadjaran, Bandung, Indonesia). Under the agreement, the Malaria Research Centre, UNIMAS will provide PCR primers, DNA controls and detailed working protocols for the molecular detection of malaria parasites, including Plasmodium knowlesi. These will be used by the Health Research Unit to study the prevalence of Plasmodium knowlesi in humans in Indonesia. Prof Balbir Singh visited the Faculty of Medicine, Padjadjaran University in Bandung, Indonesia, in October 2012, where he gave a talk on P. knowlesi at a workshop on molecular identification of malaria parasites. There are plans to host two members of staff from Padjadjaran University at the Malaria Research Centre, UNIMAS where they will obtain hands-on training in molecular detection of malaria.

**Meliodsisis Study moving forward with MoA**

An MoA was signed between Charles Darwin University (CDU) and UNIMAS on 21 May 2012. The signatories of the 3-year MoA were Prof Datuk Dr Khairuddin Ab Hamid (UNIMAS Vice-Chancellor) and Mr David Blair, Chief Operating Officer, Menzies School of Health Research, CDU. The MoA facilitates the work of Yuwana Podin, a lecturer at Institute of Health and Community Medicine (UNIMAS), who is conducting her PhD research on meliodsis under the supervision of a senior Menzies scientist at CDU.

**Collaboration on Network Monitoring**

On 15 August 2012, Stanford University acting through its Stanford Linear Accelerator Centre (SLAC) signed an MoU with UNIMAS. The MoU was signed by Prof Datuk Dr Khairuddin Ab Hamid (UNIMAS Vice-Chancellor) and Mr Persis S. Drel (Laboratory Director, SLAC). The five-year MoU was initiated by Associate Professor Dr Tan Chong Eng from Faculty of Computer Science and Information Technology. Besides staff and student exchange, UNIMAS will be able to benefit from the exchange of scientific and technological research materials and information in the form of guest lectures and joint conferences and workshops.

**MoU with Polytechnic of Namibia (PON)**

An exchange of MoU documents between Polytechnic of Namibia (PON) represented by Prof Dr Heike Wünschierts-Theophilus, Director in School of Information Technology, PON and Universiti Malaysia Sarawak (UNIMAS) represented by Prof Datuk Dr Khairuddin Ab Hamid, Vice Chancellor of UNIMAS has taken place at Pullman Hotel, Kuching, on 30 November 2012. This also marks the first step for the five-year collaboration between PON and UNIMAS in educational cooperation and exchanges for the purpose of deepening the understanding of scientific, technological, historical, social, economic and political issues as well as the traditions of each respective culture. PON and UNIMAS also hope to strengthen the bonds between the two academic communities through the development of curricula and the exchange of faculty, staff and students at both institutions.

**Active Staff and Student Exchange with Charles Darwin University**

Since the signing of the MoU with Charles Darwin University (CDU) on 22 March 2010, there has been an active exchange of staff and students between the two universities. Collaboration between the two universities dated back to 18 September 2006 when the then Vice-Chancellor, Prof Dr Rashid Abdullah, visited CDU. Following this, an MoA for student exchange programme was signed on 18 July 2007. Two students from the Faculty of Resource Science and Technology spent one semester in CDU (July-November 2008), followed by another three students who went there for the July 2009 semester. In the same year, CDU and UNIMAS jointly organised the Rimba Conference which was held in Bali in 2009. Currently, a lecturer from the faculty is pursuing his PhD study at CDU. In exchange, Kerstin Katharina Zander from CDU has been appointed as an honorary research fellow at IBEC in October 2010.
It was October 2007. I had been living in Sarawak since July 2005, and had been desperately looking for a way to apply my experience in the field of marine mammal research to conservation efforts in Sarawak. Various leads with local and international NGO’s had fallen flat, and I was wondering if I would ever find the right combination of funding, an organisation to work with, and dolphins to study. Finally, I had an opportunity to present some project ideas to Shell Malaysia, Sarawak Forestry Corporation, and the director of the Institute of Biodiversity and Environmental Conservation (IBEC) at UNIMAS, Dr. Andrew Alek Tuen. All parties were enthusiastic, and six months later I was attending the well-publicised MoU signing and launch of a project that was to become the focus of my professional life for the next four years.

Over the next four years, the project developed and grew in many positive ways. Our funding expanded from the initial one-year grant from Sarawak Shell Berhad to include funding from the International Whaling Commission, the Ocean Park Conservation Foundation Hong Kong, and the Ministry of Science, Technology and Innovation (MOSTI). With this funding, we were able to take on two new RA’s in 2010. With their extra input, we were able to take on a more rigorous schedule of fieldwork and address a wider range of research questions – moving on from simple studies of the distribution of our target species, to population estimates, habitat parameters, niche partitioning, threat assessments, and interactions with fisheries. All this was possible with the constant and unconditional support from Dr. Alek and Prof. Peter Songan, Deputy Vice Chancellor for Research and Innovation. They allowed our team the freedom to shape and develop the project as we saw fit, offering helpful suggestions and gentle guidance along the way. Although the somewhat complex UNIMAS accounting and purchasing systems sometimes slowed our progress a little, it was a small price to pay for having the support of such a large and prestigious organisation behind us.

In July 2012, it was time for our family to move on and leave Sarawak. With a heavy heart, I had to bid farewell to Cindy, Jenny, Anna, Dr. Alek and the rest of the team at IBEC. This was so much more difficult than I had expected. Although I had secured a job at WWF in Gabon, I wondered whether I would again ever find a professional setting where I felt so fulfilled and supported. In the meantime, I would like to extend my heartfelt thanks to everyone at UNIMAS who helped to make my four years there as rewarding as they were. THANK YOU!
Environmental Impact Assessment for Lingga-Banting Paddy Granary Area

Researchers: Law Puong Ling, Siti Noor Linda Taib and Oon Yin Wee
Faculty of Cognitive Sciences and Human Development, Universiti Malaysia Sarawak

The Ministry of Agricultural and Agro-Based Industry Malaysia and Irrigation and Agricultural Drainage Sarawak Division have appointed CTTC, UNIMAS to carry out an Environmental Impact Assessment (EIA) study to provide information on the nature and extent of the environmental impacts arising from the construction and operation of the Lingga-Banting Paddy Granary and related activities which are taking place concurrently.

In Peninsular Malaysia, about 76% of the total rice-growing land of roughly 400,000 ha are provided with extensive irrigation and drainage facilities, while in Sabah and Sarawak, only about 15% of the 250,000 ha are given such facilities. In Sarawak, hill paddy cultivation forms the bulk of paddy cultivation whilst wet paddy area is normally small and irrigated either by pump irrigation scheme, gravity irrigation scheme or control drainage scheme which solely depends on rainwater. Only about 3,350 ha of the wet paddy land are currently operating under irrigation and drainage system. Therefore, this project aims to increase the present 3,350 ha to 30,000 ha for double cropping by the year 2015 to meet the State Government’s target of 70% self-sufficiency in rice production by the year 2020 and to 112,000 ha by the year 2050. The Federal Government has announced that Sarawak will be the next rice bowl of Malaysia. It is reported that more than 800,000 ha of land that are suitable for rice and other crops have been designated by the government to achieve self-sufficiency in agricultural products. In the year 2007, the State produced about 124,500 tonnes of rice from both wet paddy and hill paddy cultivations and the rice production needs to increase many fold for it to be the rice-bowl of Malaysia.

The State Government of Sarawak is currently achieving only 53% self-sufficiency level in rice production and is targeting to achieve an additional 33,000 hectares for single crop and 18,000 hectares for double cropping. With the increase in land area for cultivation, the production is estimated to achieve 132,000 tonnes of paddy or 80,000 tonnes of rice per year. The government has allocated a funding of more than RM250,000 million for infrastructural development in Sarawak’s rice production. With the incorporation of modern farming technologies and methods, the net revenue is projected to be RM50 million based on a production of 4 tonnes per hectares.

Environmental Management Plan for A Micro Hydro Dam System in Long Banga

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Sarawak Energy Berhad (SEB) is embarking on the development and construction of a Micro Hydro Electric Project in Long Banga, Sarawak. The project initiator, Kementerian Kemajuan Luar Bandar Dan Wilayah (KKLW) and the project contractor, EPC Synergy Sdn Bhd, have appointed UNIMAS Holdings Sdn Bhd to carry out the Environmental Management Plan to fulfill the environmental legislative requirements of Natural Resources and Environment Board (NREB) and also to integrate environmental considerations into the decision-making process during the implementation of the Project. The main purpose of the project is to provide electricity to the rural areas in Long Banga and nearby townships.

The Micro Hydro Electric catchment area is approximately 23 km² or 2300 ha, located southeast of Miri Division at the Malaysia-Indonesia border. The Micro Hydro Dam System consists of a Tyrolean Weir Intake and penstock structures for generating 15MW of hydro-electricity.
Impact Study on Broadband in Sarawak

Researchers: Shazali Abu Mansor, Puah Chin Hong, Kartinah Ayupp, Rohaya Mohd Nor, Tan Kock Wah and Jee Teck Weng

As of the first quarter of 2012, the broadband penetration rate in Sarawak was only 48%, and this situation gave Sarawak the third lowest household broadband penetration rate in Malaysia. This penetration rate is far below the national average of 63%. The relatively low broadband penetration rate in Sarawak as compared to West Malaysia has raised the questions of why Sarawakians are slow in adopting broadband and how Malaysian Communications and Multimedia Commission (MCMC) can help step up broadband demand in Sarawak. This study focused on the perceptions of Sarawakians on broadband services in 10 divisions in Sarawak and how their perceptions can act as a constraining or positive factor influencing broadband demand. This is important to ensure that broadband access is not available only to affluent urban areas such as Kuching, Miri, and Sibu, but also to the wider Sarawak population, including folks in remote rural areas. The results of the study provide insights into the general satisfaction outcome level of different categories of broadband users in Sarawak. The findings on user satisfaction highlight the importance of quality and price as part of the promotional efforts of broadband providers in the state. Furthermore, the study will enable government bodies and various broadband service providers to identify and evaluate the factors that hinder broadband market demand, such as awareness, affordability, attractiveness, and product quality. This information can be used to strategise and chart the best way forward for MCMC to achieve the aim of reaching the national internet broadband penetration target of 75.0% by the end of 2015.

“The Kampung without wayar” initiatives in Lubok Antu, Sri Aman
Conference on Media and Society

The Department of Communication, Faculty of Social Sciences, UNIMAS hosted the Conference on Media and Society (C-MAS2012) on the 24 – 26 September 2012. C-MAS2012 was jointly organised by the Faculty of Social Sciences, UNIMAS and Film Censorship Control and Enforcement Division, Ministry of Home Affairs Malaysia with the theme ‘Media, Censorship, and Society: Crossroads Between Global and Local Realities’. C-MAS2012 provides a platform for debates on various current issues in media and censorship that are affecting the society.

1st International Conference on Design and Innovation

The 1st International Conference on Design and Innovation 2012 (1st ICDI 2012) was organised by the Institute of Design and Innovation (InDI), UNIMAS on 7-8 November 2012 at DeTAR Putra, UNIMAS. The theme for the conference was ‘Sustainable Ground’, which focused on the relationships between human and the global environment, and bares resemblance to terminologies such as green, eco-friendly, ecology, ecosystem and renewable. The conference emphasised on the practical aspects of sustainability in design and innovation that leads towards a better future globally. The conference provided a platform for discussion, interaction and exchange between researchers, designers, scientists, engineers, and innovators from industries, research laboratories, academia and students. The event provided opportunity for conference delegates to network and improve their knowledge in an attractive, friendly and historical environment of Borneo Island. The symposium attracted 120 participants comprising academicians, researchers, students and professionals from the industry.

2nd ASEAN Sago Symposium

The 2nd ASEAN Sago Symposium (ASAS2012) which was held on 29-31 October 2012 was organised by the Faculty of Resource Science and Technology, UNIMAS in association with CRAUN Research Sdn Bhd, Bogor Agriculture University (IPB), Indonesia, and Food and Agriculture Organisation (FAO) Regional of Asia Pacific (FAORAP), Thailand. The opening ceremony was graciously officiated by the Chief Minister of Sarawak, Pehin Seri Dato Taib Mahmud at DeTAR Putra, UNIMAS. The scopes of the symposium include agronomy and agriculture sciences, microbiology and molecular biology, waste management and starch utilisation, biotechnology, economy and social studies, sago starch chemistry and others. The symposium with the theme ‘Advances in Sago research and development’ featured prominent keynote speakers from Philippines, Japan and Indonesia.

Graduate Colloquium and Language Carnival (CLS)

The Centre for Language Studies, UNIMAS has successfully organised its first Graduate Colloquium and Language Carnival on 21-22 November 2012. Yang Berbahagia Prof Datuk Dr Khairuddin Ab Hamid officiated at the conference and witnessed the launching of CLS’s first journal publication on ‘Issues in Language Studies’ and its Academic Guidebook. The event was open to everyone particularly students from schools, colleges, universities around Kuching and Samarahan. This colloquium highlighted graduate students oral and posters presentation, exhibitions, competitions and quizzes, reader’s theatre competition, language games, video presentation, public talk bloggers awareness session and others.


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