



UNIMAS

UNIVERSITI MALAYSIA SARAWAK

SILVER JUBILEE CONFERENCE 2017

**TRANSFORMING COMMUNITIES TOWARDS
A SUSTAINABLE AND GLOBALISED SOCIETY**

ABSTRACT



18-20 | **PULLMAN HOTEL**
OCTOBER 2017 | **KUCHING**



**UNIVERSITI MALAYSIA SARAWAK
SILVER JUBILEE CONFERENCE 2017
(USJC'17)**

**TRANSFORMING COMMUNITY
TOWARDS A SUSTAINABLE AND
GLOBALISED SOCIETY**

Abstracts

18-20 October 2017

Pullman Hotel,

Kuching, Sarawak.

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**TERTIARY EDUCATION AND BUILDING PATHWAYS FOR SKILL
FORMATION: GROUNDING SUSTAINABLE COMMUNITY
TRANSFORMATION**

Morshidi Sirat

*Founding Director, Commonwealth Tertiary Education Facility (CTEF),
Institut Penyelidikan Pendidikan Tinggi Negara (IPPTN), Universiti Sains
Malaysia, Pulau Pinang*

Corresponding author email: morshidi@usm.my

From Transforming our world: the 2030 Agenda for Sustainable Development, the Sustainable Development Goals, 2015-2030 was generated. This is an agenda for people, planet and prosperity. The plan recognises that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. Subsequently, the 17 Sustainable Development Goals (SDG) revolves around the need to eradicate poverty. In the context of the SDG, Quality of Education (SDG 4) is normally considered as the primary thrust to eradicate poverty, and the other 16 SDG are connected to this goal. The paper builds on the emerging literature and current research on Quality of Education (SDG 4), specifically in relation to the role of tertiary education (especially life long learning) in creating pathways for sustainable transformation through skill formation at the community level.

TURNING DIGITAL DIVIDE INTO DIGITAL DIVIDENDS FOR RURAL COMMUNITIES

Khairuddin Ab Hamid

*University Malaysia of Computer Science and Engineering (UniMy),
Putrajaya, Malaysia*

Corresponding author email: khair@unimy.edu.my

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Bridging the digital divide is about providing access, contents, services and socio-economic opportunities for communities that have very limited digital infrastructure, especially information and communication technology (ICT). There have been significant efforts and initiatives to narrow the gaps between urban and rural communities in order to provide equal opportunities, especially in the new era of digital economy. Industrial revolution 4.0, which is the backbone for digital economy will change dramatically the way we communicate, do businesses and lead our everyday lives. Therefore, our approaches to bridging the digital divide have to change and transform. Based on the current challenges, bridging the digital divide is not just about providing ICT infrastructure and services to rural communities, but more importantly is how to turn the success of bridging the digital divide into digital dividends. Digital dividends can be considered as the broader development benefits that the community can achieve from the use of the digital technology. After bridging the digital divide, subsequent efforts should focus on enhancing the overall socio-economic growth of the community by expanding opportunities and making digital dividends sustainable. Therefore, this presentation is looking at the various bridging the digital divide projects carried out by research groups from ASEAN countries and technology partners from Japan. The so-called "SHARE" Project is a collection of collaborative research activities focusing on providing the relevant digital dividends to the rural communities. Some of the opportunities identified are in education, health, agriculture, environment and disaster management. These projects have successfully demonstrated the concept of turning digital divide into digital dividends and brought tremendous improvement to the livelihood of those remote communities by using innovative and sustainable ICT solutions.

BORNEAN BIODIVERSITY AND ITS CONSERVATION IMPORTANCE TO SUSTAINABLE DEVELOPMENT

Abdul Latiff Mohamad

Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia

Corresponding author email: pakteh48@yahoo.com

Borneo in general and Sarawak in particular are richly endowed with one of the richest tropical biodiversity in the world which is represented by various ecosystems and habitats, species of flora and fauna and the genetic materials contained within them. Ecosystem or community diversity is represented by the spectrum of aquatic and the terrestrial ecosystems of the lowlands to the montane forests. As the Bornean states are pursuing socio-economic development conflicts occur between biodiversity conservation for sustainable development and physical development that promises short and medium term economic benefits, unless sustainable development is adopted at all levels of governments. Today millions of hectares of the forest have been set aside for biodiversity conservation but more are deforested for agriculture and forest plantations. However, a framework for managing biodiversity in protected and unprotected areas is inadequate as strategic planning and management programmes are not in place. Measures for sustainable use in agriculture, forestry, fisheries resources are in place but those in biodiversity prospecting, eco-tourism and impacts of urbanisation on biodiversity are yet to be established. In the absence of concrete data of biodiversity loss in all the states and provinces, the custodian of biodiversity it is difficult to ascertain the lists of endangered or otherwise threatened ecosystems and species as the various ecosystems are prone to continuous changes and species to loss. However, efforts to assess and monitor this have been initiated in the minds of all stake-holders. Many factors have contributed to biodiversity loss; among them is the rapid socio-economic development that transformed vast forested lands through logging, land openings for agriculture and resettlement and subsequently creating new townships and industrial areas. These changing land-use patterns are affecting not only the existing biodiversity but the environment at large. Other factors such as over-harvesting of wildlife resources and pollution have also contributed in small parts. These activities had led to significant ecosystem and habitat losses, land degradation and forest fragmentation. What are needed are frameworks and strategies for biodiversity conservation, some socio-economic strategies for sustainable use and benefit sharing of biodiversity and also some legal measures for protection and conservation of biodiversity and assessment of land-use patterns.

BIODIVERSITY AND ENVIRONMENTAL CONSERVATION

**IN VITRO PROPAGATION OF SELECTED MALAYSIA CASSAVA
(*Manihot esculenta* Crantz) VARIETIES BY USING NODAL
EXPLANTS**

Huzaimah Mahdi and Rebicca Edward

*Department of Plant Science, Faculty of Resource Science
and Technology,*

Universiti Malaysia Sarawak

Corresponding email: huzaimah.mahdi@gmail.com

Cassava (*Manihot esculenta* Crantz) is one of the perennial shrub belongs to Euphorbiaceae family. It is native to Central and South America and is widely found in Africa and Asia. In Malaysia, Cassava is an important industrial crop for starch processing and other common industrial products such as animal pellets and for food industries. Hence, a technique to conserve and propagate the Cassava varieties in Malaysia by using rapid shoot multiplication technique is needed to produce these highly demand industrial crop. This study aims to compare the growth parameters on shoot multiplication of three local Malaysia Cassava varieties which were Putih, Sawah and Baloi varieties by using Murashige and Skoog (MS) media supplemented with different plant growth regulators of 6-Benzylaminopurine (BAP) at 0.5, 1, 2, and 3 mg/L with or without combination of 1-Naphthaleneacetic acid (NAA) at 0.01 mg/L. The experiment results showed that the best media for the induction of shoot multiplication and induction of leaves was from MS media supplemented with 1.0 mg/L BAP + 0.01 mg/L NAA Putih, Sawah and Baloi varieties. The best media for induction of shoot height was MS media free of BAP and NAA. The results also revealed that the shoot multiplication, induction of shoot height and induction of leaves were inhibited by supplementing high concentration of BAP with or without combination of NAA for each Cassava varieties.

SELECTIVE DIFFERENTIAL EXPRESSION OF THE RIBOSOMAL PROTEIN GENES eL14 AND uS19 IN A WELL-DIFFERENTIATED EPITHELIAL CELL LINE OF NASOPHARYNGEAL CARCINOMA

Edmund Ui-Hang Sim¹, Cassandra Sheau-Mei Chee¹, Lisha Vasudevan¹,
Kher-Lee Ng¹, and Stella Li-Li Chan²

¹*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak;*

²*National Cancer Centre, 11 Hospital Drive, 169610 Singapore*

*Corresponding author email: uhsim@unimas.my

Other than a canonical role in ribosome biogenesis and cellular protein synthesis, ribosomal proteins have been known to be associated with congenital diseases and cancers. A small subset of ribosomal protein genes for the large ribosomal subunit has shown expression pattern indicative of their association with nasopharyngeal carcinoma (NPC). Nevertheless, the list of ribosomal protein genes that are NPC-associated factors is largely incomplete. Here we investigated expression patterns of eL14 and uS19 in cell line models of NPC and normal nasopharyngeal epithelium. Their expression in well-differentiated carcinoma cells of NPC has never been studied before this. Expression levels of eL14 and uS19 in the NPC cell line of HK1 (NPC/HK1) was analysed using Reverse Transcription – Polymerase Chain Reaction (RT-PCR). A comparative analysis was done between HK1 and the normal nasopharyngeal epithelial cell line, NP69. Significance of differential expression was verified using Student's t-Test. We reveal that eL14, but not uS19 to be significantly differentially expressed in an HK1 when compared to NP69. More precisely, eL14 showed greatly down-regulated transcript level in NPC/HK1 compared to NP69, hence demonstrating for the first time its behaviour in the NPC context. In contrast, the transcript level of uS19 was up-regulated in NPC/HK1 compared to NP69, but not to a statistically significant extent. This study provides new evidence of differential expression of the ribosomal protein gene, eL14 in an NPC cell line derived from well-differentiated squamous cell carcinoma of human nasopharynx. It adds to the list of NPC-associated ribosomal protein genes amenable for development of biomarkers for improved molecular diagnosis of nasopharyngeal cancer.

**SUBMICROSCOPIC *Plasmodium knowlesi* AND *Plasmodium vivax*
HUMAN INFECTIONS IN THE BETONG DIVISION OF SARAWAK,
MALAYSIAN BORNEO**

Angela Siner, Liew Sze Tze, Khamisah Abdul Kadir, Dayang Shuaisah
Awang Mohamad, Felicia Kavita Thomas, Mohammad Zulkarnaen Ahmad
Narihan and Balbir Singh

*Malaria Research Centre, Faculty of Medicine and Health Sciences,
Universiti Malaysia Sarawak.*

Corresponding authors: sangela@unimas.my; bsingh@unimas.my

Plasmodium knowlesi, a simian malaria parasite, is the main cause of malaria in Sarawak, Malaysian Borneo. Since malaria epidemiological data for Sarawak has been derived solely from hospitalised patients, and more accurate epidemiological data on malaria is necessary, a longitudinal study of communities affected by knowlesi malaria was undertaken. A total of 3,002 blood samples on filter papers were collected from 555 inhabitants during ten visits to each of 8 longhouses over a 21-month period. DNA extracted from these samples were examined by genus-specific nested PCR assay. Samples positive for Plasmodium were then examined by nested PCR assays for *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, *Plasmodium ovale*, *Plasmodium knowlesi*, *Plasmodium cynomolgi* and *Plasmodium inui*. Real time PCR assay for *P. knowlesi* was used to examine samples from 168 genus-positive by nested PCR and 48 samples from *P. knowlesi*-infected individuals. Blood films of samples positive by PCR were also examined by microscopy. Genus-specific PCR assay detected Plasmodium DNA in 9 out of 3,002 samples. Species-specific PCR identified 7 *P. knowlesi* and one *P. vivax*. Real time PCR detected 21 *P. knowlesi* out of 216 samples tested. Malaria parasites were observed in 5 thick blood films of the PCR positive samples. No parasites were observed in blood films from one knowlesi-, one vivax- and the genus-positive samples. Parasites were only observed in 2 out of the 13 real time PCR positive samples. Only one of 7 *P. knowlesi*-infected individuals was febrile during sampling and had sought medical treatment at Betong Hospital the day after sampling. The 6 knowlesi-, one vivax- and one Plasmodium-infected individual did not seek any medical treatment. Asymptomatic human knowlesi and vivax malaria infections that are submicroscopic or with low parasitaemia, are occurring within communities affected with malaria and could possibly be a source for human-to-human transmission of malaria.

**FIELD PERFORMANCE OF SELECTED MALAYSIAN COCOA CLONES
REGENERATED THROUGH SOMATIC EMBRYOGENESIS CULTURES**

Gibson Entunji, Rebicca Edward, Hollena Nori and Ahmad Kamil
Mohd. Jaafar

¹*Plant Science and Environmental Ecology, Faculty of Resource Science
and Technology, Universiti Malaysia Sarawak;* ²*Malaysian Cocoa Board,
Cocoa Research and Development Centre, Biotechnology Park,
Kota Samarahan*

Corresponding email: gib5181@gmail.com

Somatic embryogenesis is one of an efficient in vitro clonal propagation technology with potential to be used to propagate cocoa clones for the improvement of cocoa varieties in Malaysia. To ensure this technology for commercial production of cocoa across Malaysia can be applied, the somatic embryogenesis-derived cocoa plants were evaluated based on field performance. The evaluation was conducted in Malaysian Cocoa Board, Cocoa Research and Development Centre, Kota Samarahan, Sarawak, Malaysia (MCB). The cocoa plants from Trinitario varieties were propagated in vitro from immature zygotic embryo and staminode explants by somatic embryogenesis. Twenty-five cocoa plants from immature zygotic embryo-derived explants and 25 cocoa plants from staminode-derived explants were acclimatized in a greenhouse condition in Universiti Malaysia Sarawak before planted in a field condition in MCB. The mother plants from the same varieties propagated through grafting were also planted for a total of 25 trees and used as the control plants. The growth parameters were collected every one month for one year including: stem diameter, stem height, length of the longest jorquette branch and the date of first flowering. At one year after planting, there were no major differences in all growth parameters among the somatic embryogenesis-derived plants with mother plants. Cocoa trees from the immature zygotic embryo cultures were slightly taller (998.1 mm), exhibit larger average stem diameters (34.6 mm) and taller jorquette branches (850.5 mm) than cocoa trees propagated through staminode cultures and grafting. The early flowering age and the ability to sustain fruit growth during first year of field planting showed that somatic embryogenesis-derived trees had superior physiological vigor than grafted trees. After one year of field test, it can be concluded that somatic embryo-derived cocoa plants showed normal phenotypes in field condition and have growth parameters similar to the cocoa plants propagated through conventional method of grafting.

ORAL 005 BEC

ANTIBIOTICS SUSCEPTIBILITY OF BURKHOLDERIA SPECIES OF SARAWAK ORIGIN

Lua Viana Pangau, Flowrence Vianney Sylvester, Yuwana Podin
Institute of Health and Community Medicine, Universiti Malaysia Sarawak
Corresponding author: pyuwana@unimas.my

The Burkholderia species is comprised of more than 70 members which co-exist in the same ecological niche including *Burkholderia pseudomallei*, which causes fatal melioidosis infections in humans and animals. Many of the members of the Burkholderia species share similarities in their biochemical and morphological profiles. *B. pseudomallei* is intrinsically resistant to a myriad of antibiotics and hence, the treatment of melioidosis involves various types of antibiotics with prolonged prescription. Apart from *B. pseudomallei* which has been widely described due to its clinical importance, little is known about the antibiotics mechanisms and susceptibility profile of Burkholderia species. This leads to the question of whether the antibiotics susceptibility profile of the Burkholderia species is similar to that of *B. pseudomallei*. In this study, Burkholderia species isolated from environmental samples were tested for their susceptibility against gentamicin, ceftazidime, cotrimoxazole (trimethoprim/sulfamethoxazole) and azithromycin using the disk diffusion test method. The antibiogram profiles Burkholderia species isolates tested in this study suggested that the antibiogram profile of *Burkholderia* spp. resembles that of *B. pseudomallei* for some antibiotics while totally different for other antibiotics. The actual mechanisms which render these observations and whether the interactions of these subspecies within the same ecological niche attribute to these observations warrant further investigation.

ORAL 006 BEC

MOLECULAR CHARACTERISATION OF RICE TUNGRO BACILLIFORM VIRUS ISOLATED FROM BARIO, SARAWAK

Magdline Sia Henry Sum¹ and Yee Siew Fung^{1,2}

¹*Institute of Health and Community Medicine, Universiti Malaysia Sarawak;*

²*Agriculture Research Centre, Semongok, Department of Agriculture, Sarawak,*

Corresponding author: shsmag@unimas.my

Rice tungro disease is one of the most damaging and destructive diseases of rice in South and Southeast Asia. The disease is caused by the co-infection of two viruses, the Rice tungro bacilliform virus (RTBV) and Rice tungro spherical virus (RTSV). The symptoms and severity of the disease depend on these two viral agents, if rice is co-infected by both viruses, it will show the typical severe symptoms of yellow-orange leaf discoloration, plant stunting and reduced in yield. On the other hand, if rice is infected only with RTBV, it shows milder symptoms and in contrast, rice plants will show no symptoms if

they are infected only with RTSV. The disease had been detected in Malaysia since the 1930s. However, the first incursion of the disease was only reported in Sarawak in 2012. Since the disease was not seen in the Sarawak until recently, very little information on local virus isolate is available. This study was conducted to obtain and record the nucleotide sequence of partial coat protein gene of two primary isolates of RTBV collected from Bario, Sarawak in 2012 and 2013. Based on the phylogenetic analysis, the isolates cluster with the Southeast Asia group with sequence identity at nucleotide and amino acid level of 91.1 to 95.1% and 98.6 to 99.5% respectively. Genetic analysis of RTBV genome from East Malaysia is important to understand the diversity of the virus populations in order to formulate ways to prevent and manage RTD outbreak in Sarawak.

ORAL 007 BEC

INTEGRATING INFILTRATION FACILITY TO URBAN ROAD DRAINAGE

Darrien Yau Seng Mah¹, Tze Chiat Ng¹ and Frederik Josep Putuhena²

¹ *Faculty of Engineering, Universiti Malaysia Sarawak*

² *Program Teknik Sipil, Fakultas Teknik, Universitas Pancasila, Jakarta Selatan 12640, Indonesia*

Corresponding author: ysmah@unimas.my

It is proposed to merge an infiltration facility to the conventional road curb system. Towards this end, a Storm Water Management Model (SWMM) is developed to explore the effectiveness of the proposed component at Riveria housing estate, Kota Samarahan, Sarawak. The findings show that the integration is effective in reducing peak runoff. The results indicate that a scenario of hollow infiltration trench achieves zero runoff, and a scenario of filled infiltration trench has a 43.6% reduction in runoff compared with existing road drainage condition. Furthermore, the hollow infiltration trench is found to be the best among all the given scenarios. The SWMM modelling results provide a tool to quantitatively measure the probable use of the proposed measures to improve the existing road drainage system.

ORAL 008 BEC

THERMO PROPERTIES OF FURFURYL ALCOHOL/GLYCIDYL METHACRYLATE/HALLOYSITE NANOCLAY WOOD POLYMER NANOCOMPOSITES (WPNCs)

Md. Rezaur Rahman, Josephine Lai Chang Hui and Sinin Hamdan
Faculty of Engineering, Universiti Malaysia Sarawak
Correspondence email: rmrezaur@unimas.my

In this study, thermal and mechanical properties of furfuryl alcohol/glycidyl methacrylate/halloysite nanoclay wood polymer nanocomposites (FA-co-GMA-HNC WPNCs) were investigated. FA-co-GMA-HNC WPNCs were prepared via impregnation method and the effect of different ratio between the polymers was subsequently investigated. The properties of nanocomposites were characterized using differential scanning calorimetry (DSC) analysis and thermogravimetric analysis (TGA). FA-co-GMA-HNC WPNCs exhibited the higher thermal stability through TGA and DSC analysis. From the analysis, 50:50 FA-co-GMA showed the best compatibility with raw wood (RW) among all the compositions.

ORAL 009 BEC

LIGHTNING PROTECTION OF AIRCRAFT, POWER SYSTEMS AND HOUSES CONTAINING IT NETWORK ELECTRONICS

P.R.P Hoole¹, M.R.M. Sharip¹, J. Fisher², K. Pirapaharan², Al Khalid Hj Othman¹, Norhuzaimin Julai¹, Shirley Anak Rufus¹, Shafrida Sahrani¹, and S.R.H. Hoole³

¹ *Faculty of Engineering, Universiti Malaysia Sarawak;*

² *Department of Electrical and Communications Engineering, PNG University of Technology, Lae 411, Papua New Guinea;*

³ *ECE Dept., Michigan State University, East Lansing, MI, United States of America*

Corresponding email: msmridhuan@unimas.my

Over the past decade there has been an increasing interest in lightning and lightning protection for several reasons, including the proliferation of microelectronic equipment and IT systems in mission critical systems as well as in everyday use in banks to homes. Lightning strikes to power lines produce large fast transient voltage and current surges which trickle down to IT systems, military command and control systems as well as to several other microelectronic equipment and control systems. Moreover, aircraft are struck by lightning when it is parked on ground, landing and taking off or in military operations where the aircraft has to keep close to ground even when the atmosphere is electrified by thunderclouds. In this paper we explore the protection of electronic equipment, structures and in house systems from lightning. The paper will also explore lightning related Electrostatic Discharge

(ESD) threat to aerospace vehicles and microelectronic systems. This is especially so with the increased use of non-metallic, composite material for the aircraft body. Moreover the paper will report on the important lightning techniques used in the protection of electric power systems and houses.

ORAL 010 BEC

DEVELOPMENT OF AUTOMATIC SOLAR TRACKING SYSTEM FOR SMALL SOLAR ENERGY SYSTEM

Musse Mohamud Ahmed, Mohammad Shafiq and Mohammad Rashid
Mohammad Kamrul Hasan

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: mamusse@unimas.my

The main purpose of this paper is to present a novel idea that is based on design and development of an automatic solar tracker system that tracks the Sun's energy for maximum energy output achievement. In this paper, a novel automatic solar tracking system has been developed for small scale solar energy system. The hardware part and programming part have been concurrently developed in order for solar tracking system to be possible for it to operate accurately. Arduino Uno R3, Sensor Shield V4 Digital Analog Module, LDR (Light Dependent Resistor), MPU-6050 6DOF 3 Axis Gyroscope has been used for tracking the angular sun movement as shown in Fig. 1. Accelerometer, High Efficiency Solar Panel and Tower Pro MG90S Servo Motor have been used for the hardware part. High level programming language has been embedded to the hardware to operate the tracking system effectively. The tracking system has shown significant improvement of energy delivery to solar panel comparing to the conventional method. All the results will be shown in the full paper. There are three contributions the research presented in this paper which are, i.e. perfect tracking system, comparison between the static and tracking system and the development of Gyroscope angular movement system which tracks the angular movement of the sun along with other tracking system.

ORAL 011 BEC

AUGMENTING DRAINAGE SYSTEM IN THE OLD TOWN OF KUCHING

Darrien Yau Seng Mah, Johnny Ong King Ngu, Vernon Liew and Wan Hashim Wan Ibrahim

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: ysmah@unimas.my

Padungan, one of the busiest business districts within Kuching City has been facing difficulties due to its age and inability to manage urban runoff. To sustain its historical heritage value without compromising the beauty and ability to discharge urban runoff, environmental needs have called for a change in urban stormwater management. The main objective of this study is to incorporate StormPav Green Pavement along the backstreet of Padungan and to investigate the effectiveness of the permeable road. The methodology used in this study is by means of computer modelling using Storm Water Management Model (SWMM). There are two models built, simulating conditions as (a) current drainage system facility; (b) implementing StormPav Green Pavement along the back of Padungan Street for the purpose of accommodating runoff from the whole two rows of buildings. From the analysis of modelling scenes, implementing the permeable road is a preferable solution as it encompasses both the present and future needs into the design consideration.

ORAL 012 BEC

A REVIEW OF A SINGLE NEURON WEIGHT OPTIMIZATION MODEL FOR ADAPTIVE BEAM FORMING

K.S. Senthilkumar¹, Lorothy Singkang², P.R.P Hoole³, Norhuzaimin Julai³, S. Ang³, Shafrida Sahrani³, Kismet Anak Hong Ping³, K. Pirapaharan⁴, and S.R.H. Hoole⁵

¹*Department of Computers and Technology, St. George's University, Grenada, WI*

²*Department of Mathematics, Science and Computer, Polytechnic Kuching;*

³*Faculty of Engineering, Universiti Malaysia Sarawak,*

⁴*College of Engineering, Institute of Engineers Sri Lanka, Sri Lanka*

⁵*Department of Electrical and Computer Engineering, Michigan State University, Michigan, USA*

Corresponding author: prhoole@unimas.my; prphoole@gmail.com

In this paper we review our recent, reported work on using artificial intelligence based software technique to control electronic sensor or wireless communication equipment in narrow and diverging paths such as in underground tunnels and at traffic junctions. In order to make the systems fast as well as needing minimal computational calculations and memory –

thus to extend the battery life and minimize cost – we used the single layer Perceptron to successfully accomplish the formation of beams which may be changed according to the nature of the junctions and diverging paths the mobile or stationary system is to handle. Moreover the beams that survey the scenario around (e.g. in case of guiding a driverless vehicle) or communicating along tunnels (e.g. underground mines) need to be kept narrow and focused to avoid reflections from buildings or rough surfaced walls which will tend to significantly degrade the reliability and accuracy of the sensor or communicator. These requirements were successfully achieved by the artificial intelligence system we developed and tested on software, awaiting prototype development in the near future.

ORAL 013 BEC

BIOFILM FORMING ABILITY OF INTERMEDIATE AND SAPROPHYTIC *Leptospira* ON ABIOTIC AND BIOTIC SURFACES

Kasing Apun, Jennifer Jalan, Chai Fung Pui, Lesley Maurice Bilung, Hashimatul Fatma binti Hashim, Anisa Aina Nadiyah binti Md Ahsan and Rennielyn Rupert

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak,
Corresponding author: kasing@unimas.my

Leptospira spp. has the ability to develop biofilm communities and this attribute is an essential factor to leptospiral pathogenesis. This study aims to assess and quantify the biofilm forming ability of intermediate and saprophytic *Leptospira* strains. The biofilm assay was quantified on microtitre polystyrene plates (abiotic) and wood chips (*Jelutong Paya* hardwood) over a duration of 11 days. Phase contrast light microscope was used to assess the structure of the on the surface. The biofilm production on wood chips surface were approximately one times higher than on polystyrene plate surface indicating *Leptospira* strains were capable of forming higher quantity of biofilm on biotic surface compared to abiotic surface by both intermediate and saprophytic *Leptospira*. A significant difference ($p < 0.05$) exists in biofilms produced by *Leptospira* on wood surface which formed more biofilm than on polystyrene surface. The strongest biofilm producer is intermediate strain G14 with OD_{600} of 2.283 ± 0.180 and OD_{600} of 2.333 ± 0.037 , on polystyrene and wood surface, respectively. Visualisation of biofilm by phase-contrast microscopy of two representative strains correlated with the OD values and the colour intensity of stained microtitre plates and wood surfaces. The biofilm formed comprises of a three-step process are adherence (1th to 24th hours), maturation (6th to 7th day) and detachment (9th to 11th day) of biofilms. The contact time of intermediate pathogenic strains was faster compared to saprophytic strain, indicating the biofilm forming ability is related to the level of pathogenicity of *Leptospira* strains.

**CAMERA TRAPPING WILDLIFE ON MOUNT PENRISSEN AREA IN
WESTERN SARAWAK**

Sally Soo Kaicheen and Jayasilan Mohd-Azlan

*Animal Resource Science and Management, Faculty Resource Science and
Technology, Universiti Malaysia Sarawak*

Corresponding author: azlan@unimas.my

Camera trapping is a useful technique to study larger terrestrial mammals. These animals are classified according to body mass which weight more than 1kg made up by ten families (Cervidae, Cercopithecidae, Felidae, Hystricidae, Manidae, Mustelidae, Suidae, Tragulidae, Ursidae and Viverridae). An intensive camera trap surveys were done in Mount Penrissen (1350 asl.) area with high habitat heterogeneity in order to understand the distribution of many elusive and cryptic species along the elevation gradient. This survey mount up a total of 45,145 photographs throughout 7,382 camera trap days from April 2015 to March 2017 (24 months) and recorded 33 species included 11 species of Aves, 2 small mammals and 20 species of medium to large mammals. Generally most of the medium to large mammals recorded within elevation range from 900 – 1100m a.s.l. where mixed dipterocarp forest transit into lower montane forest in Mount Penrissen. Conservation importance mammals recorded in this forest patch included Sunda Pangolin (*Manis javanica*) (Critically Endangered; IUCN 2017); Binturong (*Arctictis binturong*), Pig-tailed Macaque (*Macaca nemestrina*), and Bearded Pig (*Sus barbatus*) (Vulnerable; IUCN 2017). Nearly 15% of the recorded species are totally protected in Sarawak under the Wild Life Protection Ordinance (SWLPO) 1998 and over 45% are listed as protected. The occurrence of these species in this area suggest that this continuous forest that extend into Kalimantan, Indonesia, which may support the long-term persistence and landscape-scale movement of threatened, sensitive and species of conservation importance.

**VEGETATIVE PROPAGATION OF CACAO (*Theobroma cacao* L.):
COMPARISON OF A LIQUID HORMONE PREPARATION AGAINST A
COMMERCIAL ROOTING HORMONE POWDER**

Rebecca Edward¹, Joel Michael Ponniah^{1, 2} and Samuel Lihan¹

¹*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

²*Bioeconomy Transformation Programme, Bioeconomy Programme &
Delivery Management Division, Malaysian Bioeconomy Development
Corporation Sdn Bhd, Kuala Lumpur, Malaysia*

Corresponding author: erebecca@unimas.my

Cacao cultivation is a lucrative trade backed by strong international demand over the past decade. While seed-derived planting materials are the norm, such materials tend to diverge on important agronomic traits. Vegetative propagation methods are thus often used to fix the agronomic traits of interest among all the trees in production. However, studies that consistently and systematically compared seedling production through rooted stem cuttings are scarce, and even less studies focused on production using young parts of the stem. In this study, a liquid hormone (NAA-IBA rooting solution) composition in ethanol was compared with a commercially available rooting hormone preparation in talc, for the ability to induce root and shoot formation in cacao orthotropic young softwood stem cuttings. Analysis of variance (ANOVA) and Least Significant Difference (LSD) were then used to analyze the outcome. Results indicated that the liquid hormone composition was significantly ($p \leq 0.05$) better at rooting (70.3%) and shooting (63.0%). The liquid hormone also promoting overall survival (52.7%) of planting materials derived from orthotropic young softwood stem-cuttings. Whereas stem cuttings treated with commercial rooting hormone in talc showed 43.5% of rooting, 31.0% of shooting and 7.5% of overall survival. The control, however showed only 17.0% of rooting, 9.0% of shooting and 2.0% of overall survival. Thus, it is concluded that treatments using a combination of two auxin hormones in ethanol produces better propagation efficiencies when using orthotropic young softwood parts of the stem material compared to talc-based commercial hormone powders.

ORAL 016 BEC

PRELIMINARY ANALYSIS ON THE HUNTING ACTIVITIES IN SELECTED AREAS IN INTERIOR SARAWAK

Melynda Cheok Ka Yi and Mohd-Azlan-Jayasilan

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding email: azlan@unimas.my

Archaeological records showed that human have lived in Borneo for at least 40000 and evidence of wildlife hunting for at least 35000 years. Wildlife is used for a variety of reasons, including subsistence, economy, pest control, and traditional needs. Technology has fuelled the course of human cultural evolution but the use of wildlife is still prevalent throughout the world especially in tropical forest. In Sarawak, local communities are allowed to hunt non protected species outside protected areas. This study was focused on the effects of hunting on the distribution and diversity of terrestrial medium to large mammals in interior parts of Sarawak. By undertaking interview surveys with the local communities, information on hunting pressure and dependency of the communities towards these mammals were obtained. A total of 170 respondents were interviewed from three study sites: Ulu Baram, Ulu Baleh, and Pelagus. In general, the local communities are dependent of wildlife in Sarawak where the access to commercially available poultry and meat sources are scarce in these areas. A long term multi-prong approaches need to be considered to reduce the dependency on wild meat and prevent hunting of the endangered and protected species.

ORAL 017 BEC

PHYLOGENETIC RELATIONSHIPS OF THE SARAWAK *Microhyla* (AMPHIBIAN: ANURA: MICROHYLIDAE)

Ramlah Zainudin and Nooraina Atira Alaudin

Faculty of Resources Sciences and Technology, Universiti Malaysia Sarawak,

Corresponding author: zramlah@frst.unimas.my

The genus *Microhyla* comprised of diminutive frog species with chaotic taxonomic status especially those form Sarawak populations. This study attempts to re-construct the relationships of the *Microhyla* in Sarawak consisting of *M. borneensis*, *M. berdmorei*, *M. malang*, *M. nephenticola*, *M. petrigena* and *M. perparva* with *Chaperina fusca* as the outgroup via 16S rRNA gene marker. Samples were collected from nine study areas in Northeastern and Southwestern region of Sarawak via forest and stream transects. Total of 498bp of 16S rRNA gene were successfully sequenced from 29 individuals. All the phylogenetic topologies revealed two major clades strongly supported by high bootstrap value (100%, 99%, 100% and 1.0 support in NJ, MP, ML and BI respectively) with slightly different topologies

and groupings. Presumed the differences between these major groups were relative of finger I length and numbers of metatarsal tubercles. Clade A consisting of *M. berdmorei* and *M. borneensis* due to their relative of finger I is less than half of II, and also present of two metatarsals tubercles. Per contra, *M. petrigena* and *M. perparva* formed Clade B which have finger I present as a snub or pronounced bulge, and single number of metatarsal tubercle. This study also suggests that *M. borneensis* and *M. nephenticola* were synonymous species with low genetic divergence. More study is needed to validate this relationship.

ORAL 018 BEC

THE DENSITY OF INVASIVE URBAN BIRDS IN SELECTED AREAS OF WESTERN SARAWAK.

Frances Hii Dai Sze¹, Nurul Ashikeen Ab Razak² and Mohd-Azlan Jayasilan¹

¹Faculty of Resource Science and Technology, ²Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak.

Corresponding author: franceshii.d.s@gmail.com

Non-native species or invasive species have been a threat to the global biodiversity. Avian communities are widely spread from the forest to the urban areas. Impacts of invasive avian communities in the urban areas have not been greatly explored in Sarawak. This study attempts to investigate the effect of invasive birds towards the native species within the urban avian community. The birds were surveyed using transects from October 2015 until September 2016 (12 months). The common species recorded were Asian glossy starling, Common myna, Eurasian tree sparrow, Intermediate egret, Javan myna, Long-tailed shrike, Little egret, Pink-necked green pigeon, Rock pigeon, Spotted dove, White-breasted waterhen, White-breasted woodswallow, Yellow-vented bulbul and Zebra Dove. The invasive species consist of the Eurasian tree sparrow, Rock pigeon, Zebra dove, Common myna. In general, these species became a threat to the native hollow-nesting species. Here we estimate the relative density of exotic species in urban bird assemblage. Proper and careful management of this invasive species is much needed in order to prevent the native species being pushed out or eliminated from the urban bird communities.

MANAGEMENT OF WATER SUPPLY DAM IN THE TROPICS – A CASE STUDY OF ASYIKIRIN DAM IN BINTULU, SARAWAK, MALAYSIA

Lau Seng

Centre for Water Research, Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak
Corresponding author: lauseng@unimas.my

Until the early 1980s, water is abstracted from rivers of streams and undergone primary water treatment processes and distributed to its consumers in various part of Sarawak. With rapid economic growths, some townships in Sarawak has grown several folds in their populations and hence the demands for treated water began to escalate in tandem with the economic growth. The water treatment plants were upgraded and their capacities were increased to meet the demands. However, availability of water from the existing rivers or streams were limited due to a range of factors. Moving the abstraction points to larger rivers was an option but it was too costly. The Sarawak government has decided to keep the existing treatment plants and build water supply dams/reservoirs to boost their capacities. In later half of 1990s, two water supply reservoirs were built, which are the Assyikirin Dam (formerly known as Kelalong Dam) in Bintulu and the Gerugu Dam in Sarikei. These are small dams with maximum depth of less than 20 m. Despite having the dam in Bintulu, the Water Board was unable to meet the demands during droughts due to very poor water quality from the dam. Our study was conducted to determine the amount of treatable water available from the reservoir and to provide management strategies to overcome the poor water quality in the reservoir. The study showed that the reservoir is thermally stratified at between 2 – 4 m depths. The quality of the top 4 m water is of decent quality and treatable by the Nyabau Water Treatment Plant. The water below 4 m depth is classified as hypolimnion water of which it contained elevated level of dissolved organics, high coloration, almost depleted of oxygen and have marginally elevated levels of ammoniacal nitrogen and phosphate. The hypolimnion water was not suitable for primary treatment and required more extensive treatment processes. The potential issues faced by the reservoir are the agricultural activities within the reservoir catchment and there is no buffer zone between the farms and the reservoir. Management options suggested includes negotiation with the landowners to establish a buffer strip surrounding the reservoir and upgrade the treatment facilities that can treat water with high dissolved organics and introduce the air floatation system. Setting up an aeration system in the reservoir may be of help to improve the hypolimnion water prior to discharge into the river for abstraction.

**BIRD DIVERSITY, DENSITY AND FORAGING ACTIVITIES IN
FRAGMENTED FORESTS AND OIL PALM PLANTATION IN BINTULU,
SARAWAK**

Audrey Voon Mei Fang and Mohd-Azlan Jayasilan

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author email: azlan@unimas.my

Most forest fragments in the oil palm plantation are remnants of unsuitable area for planting oil palm. These areas are often poor in bird population because of the small area and isolated from large areas of forest to sustain viable population. The study of avian ecology is important for understanding the complexity of ecosystem structure and utilization of microhabitat and food resources can segregate bird species based on their diet selection and foraging behavior. This study was conducted at PPB oil palm area, Bintulu for 13 months to examine the species diversity and foraging ecology in forest fragments and oil palm plantation by using point count census method. A total of 1954 observations consisted of 32 families and 103 species were observed by using point count method. The highest number of bird species recorded is Rufous-tailed Tailorbird (*Orthotomus sericeus*) with 152 observations (7.78%) followed by Yellow-vented Bulbul (*Pycnonotus goiavier*) with 129 observations (6.6%) and Barn Swallow (*Hirundo rustica*) with 107 observations (5.48%). Overall density of bird was estimated to 33.779 individual/hectare (SE= 2.06, D CV=0.061, effective detection radius= 19.48m). Interspecific interaction of bird was further investigated by using bipartite analysis with 47 species (174 observations) for foraging behavior and niche overlap. The results showed the highest niche overlap is food-handling techniques (0.478), followed by substrate (0.46), type of food (0.311), attack of maneuver (0.283) and least is foraging height (0.2691) which suggest that bird exploit similar habitat with spatial partitioning. This information can be used for understanding avian ecology within the fragmented forest complex within in the oil palm plantation.

**THE DISTRIBUTION AND AVERAGE SIZE OF GRANULAR GLAND IN
POISONOUS ROCK FROG, *Odorrana hosii***

Ahmad Hata Rasit¹, Nur Amirah Md Sungif³, Ramlah Zainudin³ and
Mohammad Zulkarnaen Ahmad Narihan²

¹*Department of Orthopaedics,*

²*Department of Pathology Faculty of Medicine and Health Science;*

³*Department of Zoology, Faculty of Resources Science and Technology,
Universiti Malaysia Sarawak*

Corresponding author: rahata@unimas.my

Frog skin reported to have potential in medical application especially on the skin secretion with potential number of beneficial peptides. The objectives of this paper were to examine the distribution and average size of granular glands in *Odorrana hosii*, skin. The skin histology stained with Haematoxylin-Eosin to identify granular gland. Results revealed that the granular glands were significantly abundant in this species. The dorsal central region of skin has a highest mean number of granular gland (2.22 ± 1.69), whereas ventral thigh region has a least mean of number of granular gland (1.02 ± 1.23). The distributions of granular glands were statistically significant difference between the six region of the frog skin ($F(5,234) = 3.47, p = 0.005$). The dorsal central region contained the biggest granular gland size ($11.95 \times 10^3 \mu\text{m}^2$) and ventral thigh region contained the smallest gland size ($2.95 \times 10^3 \mu\text{m}^2$). The average size of the granular glands was statistically significant difference between the six skin region ($F(5,234) = 4.04, p = 0.012$). This study shows that the granular glands in *O. hosii*, significantly abundant in dorsal head and have biggest size in the dorsal central region compare to other region of the skin. This implicate that the dorsal head and central skin region can be used for peptides extraction as this region has abundant and largest size of granular gland.

PULSED-FIELD GEL ELECTROPHORESIS (PFGE) AND ANTIBIOTIC RESISTANCE OF *Bacillus cereus* ASSOCIATED WITH SAGO PROCESSING IN SARAWAK.

Jasmin Jaraee¹, Lesley Maurice Bilung¹, Cirilo Hipolito Nolasco² and Micky Vincent¹

¹*Faculty of Resource Science and Technology,*

²*Faculty of Engineering,*

Universiti Malaysia Sarawak

Corresponding author: mblesley@unimas.my

Bacillus cereus is a Gram-positive, rod-shaped and spore-forming bacterium. It is a ubiquitous bacterium, which is widely distributed in several environments such as soil and plants and is commonly isolated from food and its processing environment. This study was aimed to determine the genetic diversity and antibiotic resistance of *Bacillus cereus* isolated from sago processing in Sarawak. Out of 120 samples, 42 *Bacillus cereus* isolates were detected with the presence of hly gene of *Bacillus cereus* by using specific polymerase chain reaction (PCR). Twenty *Bacillus cereus* isolates were randomly selected and further characterized by pulsed-field gel electrophoresis (PFGE) of chromosomal DNA digested with NotI to examine the genetic diversity. The result of the PFGE analysis confirmed that the *Bacillus cereus* strains in sago processing were genetically diverse. Based on the dendrogram generated, *Bacillus cereus* strains were grouped into two major clusters and these clusters were grouped together based on sources of isolation. The investigation on the antibiotic resistance of *Bacillus cereus* strains revealed that the *Bacillus cereus* strains were uniformly highly resistant to penicillin and ampicillin and highly susceptible to imipenem and norfloxacin. The results of this study suggest that the *Bacillus cereus* isolated from sago processing derived from a mixture of sensitive and resistant strains with diverse genetic contents.

ORAL 023 BEC

BANDWIDTH ENHANCEMENT TECHNIQUE WITH LOW GROUP DELAY VARIATION CMOS POWER AMPLIFIER FOR UWB SYSTEM

Rohana Sapawi¹, Siti Kudnie Sahari¹, Dayang Nur Salmi Dharmiza Awang Salleh¹, Dayang Azra Awang Mat¹, Sohiful Anuar Zainol Murad²,

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*School of Microelectronic Engineering, Universiti Malaysia Perlis (UniMAP), Malaysia.*

Corresponding author: srohana@unimas.my

This paper introduced a bandwidth enhancement technique for ultra-wideband (UWB) transmitter design with low group delay variation for CMOS power amplifier (PA). Three stages of cascade common source topology are implemented to provide high gain with good gain flatness. Shunt peaking inductor is introduced at every stage of the introduced PA to improve the bandwidth and to achieve low group delay variation simultaneously. A resistive shunt feedback method is implemented at the first stage to acquire good input matching. The first and second stages attain gain at lower corner and upper end frequency respectively, whilst the third stage smoothed the gain flatness curve. In addition, the theoretical analysis on group delay is investigated to determine the important design factor for low group delay variation in 3.1 to 10.6 GHz CMOS PA for UWB transmitters. The outcome of the research shows that a gain about 11.48 ± 0.6 dB at average, S11 less than -10 dB, and S22 less than -14 dB is achieved. Moreover, excellent group delay variation is acquired throughout the entire band, measuring about ± 85.8 ps.

ORAL 024 BEC

ESTIMATING NON-CONFORMANCE USING THE MODIFIED TOLERANCE REGION METHOD AND THE TARGET DISTANCE METHOD

Shirley J. Tanjong¹, Raafat N. Ibrahim², Mali Abdollahian³ and Magdalene Andrew-Munot¹

¹*Faculty of Engineering, Universiti Malaysia Sarawak, Malaysia;*

²*Department of Mechanical and Aerospace Engineering, Monash University, Australia*

³*School of Mathematical and Geospatial Sciences, RMIT University, Australia*

Corresponding author: ajtshirley@unimas.my,

In many cases, the quality of a manufactured product is determined by more than one characteristic and often, these quality characteristics are correlated. A number of methods for dealing with quality evaluation of multivariate processes have been proposed in the literature. However, some of these

studies do not consider correlation among quality characteristics. In this paper, two new approaches for estimating the proportion of non-conformance for correlated multivariate quality characteristics with nominal specifications are proposed: (i) the modified tolerance region approach and (ii) the target distance approach. In the first approach, the p number of correlated variables are analysed based on the projected shadow of the p -dimensional hyper ellipsoid so that the ability to visualise the tolerance region and the process region for $p > 2$ is preserved. In the second approach, the correlated variables are combined and a new variable called the target distance is introduced. The proportion of non-conformance results estimated using both methods were used to compute the multivariate capability index and the total expected quality cost. This study also suggest modification to the NMCp index as proposed in Pan and Lee (2010) such that the process capability for $p > 2$ can be measured correctly. The application of both approaches are demonstrated using two examples and it is shown that both methods i.e. the modified tolerance region and the target distance methods are capable of estimating the capability of multivariate processes.

ORAL 025 BEC

APPLICATION OF FREUNDLICH AND TEMKIN ISOTHERM TO STUDY THE REMOVAL OF PB(II) VIA ADSORPTION ON ACTIVATED CARBON EQUIPPED POLYSULFONE MEMBRANE

Khairul Anwar Mohamad Said, Ramizah Liyana Jama'in, Corneelia Tedong, Siti Nur Shafina Sabaruddin, Norsuzailina Mohamed Sutan and Rubiyah Bains

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: mskanwar@unimas.my

The aim of this study was to investigate the application of membrane equipped activated carbon for heavy metal removal. An adsorption capacity of the activated carbon inside membrane matrix was performed against environmentally problematic ions specifically Pb^{2+} , in aqueous solution. The adsorption process was examined by Temkin and Freundlich isotherm.

ORAL 026 BEC

SENSITIZATION OF TiO₂ THIN FILM WITH DIFFERENT DYE FOR SOLAR CELL APPLICATION

Siti Kudnie Sahari, Marini Sawawi Afiqah Baharin, Muhammad Kashif and Rafidah Kemat

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: sskudnie@unimas.my

Titanium Dioxide (TiO₂) solution having different concentration were synthesized and deposited on glass substrate by using sol-gel and spin coating method. The effects of structural and electrical properties in Dye-Sensitized Solar Cell (DSSC) application is studied. Recently, TiO₂ was study because it has a major role in enhancement of electrical properties in DSSC. The starting materials are ethanol, titanium isopropoxide (TTIP), glacial acetic acid (GAA), Triton X-100 and distilled water. The effects of different molarity of TiO₂ solution is studied. The solution is then deposited on the substrates by spin coating method to form a transparent TiO₂ thin film. The TiO₂ thin film is fabricated for DSSC application. The performance of the thin film is characterized by scanning electron microscope (SEM) for structural properties while I-V measurements to analyze the electrical properties of the thin film. It was notified that 0.25 M film have more porous structure. By integrating different dyes with TiO₂ thin films it was notified that the turn on voltage increases from 0.2V to 1.2 for TiO₂ and for turmeric, respectively.

ORAL 027 BEC

DEVELOPMENT OF A VIRTUAL REALITY PLATFORM AS A TRAINING TOOL USING GAMING SOFTWARE

Shahrol Mohamaddan¹, Ting Sing Hong¹, Syed Tarmizi Syed Shazali¹ and Keith Case²

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Mechanical, Electrical and Manufacturing Engineering, Loughborough University, Leicestershire, UK*

Corresponding authors: mshahrol@unimas.my

Virtual Reality (VR) is a well-known technology that is applied in many areas including education, medical, manufacturing etc. In the engineering field, VR is commonly used as a toolkit to train humans to perform complex tasks such as aircraft piloting, chemical handling etc. However, the practicality of using gaming software as a VR platform for training purposes needs to be investigated. In this paper, the DarkBASIC Professional (DBPro) gaming software was applied as a VR platform to train humans' adaptability towards new environments. The design of the structure of the VR platform using DBPro is described together with the main elements including 3D modeling,

mapping, lighting and sound effects, and player's control. A comparison between the real world and the VR platform was evaluated. Ten selected subjects conveyed positive feedback on the realism of the VR platform through the survey. The results show that the time taken to complete a task was reduced up to 60% after the subjects performed the VR training in advance. It is hoped that the VR platform will support VR training with low development costs and an open source concept.

ORAL 028 BEC

CHARACTERISTICS ANALYSIS OF BIO-BASED SILICA EXTRACTED FROM SARAWAK PALM OIL WASTE

Siti Aishah Zulkafly, Nur Amalina Shairah Abdul Samat, Ummie Zulaikha Kamarul Jaman, Nur Syuhada Ahmad Zauzi, Md Rezaur Rahman, Rubiyah Bani

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: asnamalina@unimas.my

Due to high production of palm oil, surplus quantities of palm oil wastes such as empty fruit bunches (EFB) and palm kernel shell (PKS) are generated. This study aims to analyze the characteristics of EFB and PKS ashes and their respective bio-silica content when combusted at three different temperatures; 400°C, 600°C and 800°C. Several tests are conducted which include the weight loss, colour and Fourier Transform Infrared (FTIR) analysis. EFB records higher weight loss of samples as compared to PKS at all combustion temperatures, thus implying that it contains less silica compared to the later. Both EFB and PKS wastes also show the highest weight loss at 99.20% and 98.51% respectively, when they are burnt at 800°C than those combusted at lower temperatures of 400°C and 600°C. This happens because more impurities evaporate at 800°C, thus resulting in greater relative amount of silica in the ash. Colour analysis also shows that the whiteness of both EFB and PKS ashes are the highest when combustion occurs completely at 800°C, particularly at 71.56 and 42.40 respectively. FTIR analysis, on the other hand, depicts distinct presence of Si-O and Si-O-Si functional groups in both EFB and PKS sample ashes for all combustion temperatures. However, impurities like hydroxyl groups, CH₂ components and organic compounds, are found present in EFB and PKS ashes burnt at 400°C.

ORAL 029 BEC

THE EFFECT OF SILANE TREATMENT ON RICE HUSK/ PHENOL FORMALDEHYDE PARTICLE BOARD MECHANICAL PROPERTIES

Marini Sawawi, Nor Umirah Sudirman, Siti Kudnie Sahari, Mahshuri Yusof, Magdalene Andrew, Nur Tahirah Razali, Rohana Sapawi and Kuryati Kipli,
Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding author: smarini@unimas.my

The effects of silane (*3-aminopropyl triethoxy silane* aqueous solution) treatment on the mechanical properties on rice husk particle board were investigated. Using phenol formaldehyde as the binder, the rice husk were treated at three different concentration of silane (0.5 wt%, 2 wt%, 5 wt%) and untreated rice husk was set as control. The samples were characterized using Scanning Electron Microscope (SEM), 3 point bending test and water absorption behavior in accordance to ASTM1037. FTIR analysis was performed to verify the presence of the characteristic functional groups of untreated rice husk and silane treated husk. The results show that the mechanical properties were increased with silane treatment concentration. The swelling characteristics also improved as the concentration of silane increases less water were absorbed. Surface morphology of rice husk shows that the surface of the composites become rougher as the concentration of treatment was increased for better adhesion between fibers and the matrix.

ORAL 030 BEC

THE EFFECTIVENESS OF A FABRICATED BIO-FILTRATION SYSTEM IN TREATING THE DOMESTIC GREYWATER

Winnie Anak Renang, Nur Amalina Shairah Abdul Samat, Rubiyah Baini, Md Rezaur Rahman and Onni Suhaiza Selaman
Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding author: asnamalina@unimas.my

In many developing countries, domestic greywater remains as the large contributor of organic pollution in the river. Considering the significant role of river as the main source of freshwater, the level of river pollution needs to be minimized by treating the domestic wastewater, specifically the greywater from the residential areas prior to its release into the drains and rivers. Considering the need of domestic wastewater pre-treatment and the economic burden to install the current technology, it is hence necessary to develop a more low cost wastewater treatment system. Utilizing agriculture wastes as bio-filter media for domestic greywater treatment is a possible option to reduce the cost of wastewater treatment system and accumulation of agricultural wastes. Hence, this study focuses on the performance of

agricultural wastes, namely, coconut coir and rice husk, as low cost packing media and biofilm material carrier for domestic greywater treatment. The performance of these media are evaluated based on the removal efficiencies of the BOD5 and COD from the wastewater samples. It is observed that there are insignificant differences in the performance of both coconut coir and rice husk packing media in removing BOD5 and COD, in which the removal efficiencies achieved by the coconut coir media are 43.93% and 38.19% respectively, while the later recorded removal efficiencies of 42.42% and 34.85% respectively.

ORAL 031 BEC

ASSESSMENT OF CUTTING PROFILE OF AISI 1095 BY USING INFRARED RADIATION APPROACH

Mohammad Ashaari Kiprawi, Abdullah Yassin, Syed Tarmizi Syed Shazali,
M. Shahidul Islam and Mohd Azrin Mohd Said
Faculty of Engineering, Universiti Malaysia Sarawak.
Corresponding author: yabdulla@unimas.my

This research paper determines the relationship between cutting edge temperature, depth of cut, cutting speed, cutting forces and flank wear. The cutting edge temperature is determined by using a pyrometer consists of Indium Arsenide (InAs) and Indium Antimonide (InSb) photocells to detect infrared radiation that are released from cutting tool's edge and cutting forces is measured by using a dynamometer. The machining process experiment is done by end milling the outer surface of AISI 1095 carbon steel. The output signal from the photocell and dynamometer is processed and recorded in the digital oscilloscope. Based on the results, the cutting edge temperature and cutting force increases as the depth of cut increases. Meanwhile, increasing cutting speed resulting in cutting edge temperature increases but decreasing in cutting force due to thermal deformation. In addition, existence of progressive flank wear at cutting tool causes an increment in cutting edge temperature and cutting force proportionally.

ORAL 032 BEC

DESIGN AND IMPLEMENTATION OF A VOLTAGE TRACKING WITH ARTIFICIAL NEURAL NETWORK CONTROLLER FOR A DOUBLE-INPUT BUCK-BOOST CONVERTER

Yonis. M. Buswig¹, Al-Khalid bin Hj Othman¹, Norhuzaimin bin Julai¹ and Sim Sy Yi²

¹ Faculty of Engineering, Universiti Malaysia Sarawak;

² Department of Electrical Engineering Technology, Faculty of Engineering Technology, Universiti Tun Hussien Onn

Corresponding author: byonis@unimas.my

This paper proposes an Artificial Neural Network (ANN) control voltage tracking scheme of a double-input buck-boost DC-DC converter. In this topology, a back-propagation algorithm topology is implemented. The controller is developed to improve performance of the double-input converter during transient and steady state operations. The neural network controller design, which is developed against output voltage command tracking is proposed. The proposed concept has been investigated and validated experimentally on a laboratory prototype using DSP TMS320F28335 real time digital controller to verify the dynamic response of the proposed controller. The experimental results confirm the validity of the proposed neural network control technique, which be a promising an efficient control topology that ensure double-input converter suitable for electric vehicle and renewable energy applications.

ORAL 033 BEC

SCREENING AND CHARACTERISATION OF TWO STRAINS OF *Pseudomonas aeruginosa* FROM AQUACULTURE AND WATER ENVIRONMENT

Toh Seng Chiew¹, Samuel Lihan¹, Soh Khar Mun¹, Natalia Uyub¹, Chai Lay Ching² and Moritz Müller³

¹ Faculty of Resource Science and Technology, Universiti Malaysia Sarawak;

² Institute of Biological Sciences, Faculty of Science, Universiti Malaya;

³ Faculty of Engineering, Computing and Science; Swinburne University of Technology of Sarawak,

Corresponding author: 15020196@siswa.unimas.my

Pseudomonas has been associated with diseases occurring in people with weakened or compromised immune system after exposure to contaminated water. The diseases are commonly treated with antibiotics; however, the bacteria had developed resistances to commonly used antibiotics making treatment a difficult task. Therefore, the continuous surveillance of susceptibility *Pseudomonas* especially for the human pathogen *P. aeruginosa*

to commonly clinical and aquaculture farming used antibiotics is important to ensure that serious infections remain susceptible to those antibiotics. In this study, the bacteria were screened from water, sediment and fish from rivers and aquaculture farms around Kuching, Sarawak, Malaysia. A total number of 38 presumptive *P. aeruginosa* were isolated using CHROMagar™ Pseudomonas and then subjected to a series of biochemical tests followed by DNA sequencing for further confirmation. Out of all the isolates tested, only two isolates designated as AS-R10(S) and BK2-OLT2(S) fulfilled the biochemical characteristics of *P. aeruginosa*. 16S rRNA gene sequencing confirmed these two isolates as *P. aeruginosa* based on their 100% similarity with *P. aeruginosa* strain GD1 and *P. aeruginosa* strain PA1201 in the NCBI database. These two isolates were tested for their susceptibilities against nine common antibiotics used in both clinical and aquaculture farming nowadays: imipenem (10 µg), piperacillin (75µg), meropenem (10µg), amikacin (30µg), gentamicin (10µg), ciprofloxacin (5µg), ceftazidime (30µg), tobramycin (10µg) and norfloxacin (10µg) according to CLSI standard using disk diffusion method. The two isolates exhibited total susceptibility to all the antibiotics analysed, suggesting the effectiveness of the antimicrobial agents towards *P. aeruginosa* isolated from aquaculture and water environment in the study area.

ORAL 034 BEC

FAUNISTIC COMPOSITION AND ECOLOGICAL DISTRIBUTION OF SWALLOWTAIL BUTTERFLIES (PAPILIONIDAE: LEPIDOPTERA) IN WESTERN SARAWAK

Nur Azizuhamizah Idris, Fatimah Abang, Ratnawati Hazali and Nuha Loling Othman

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak
Corresponding authors: inazizuhamizah@gmail.com

The faunistic composition and ecological distribution of the swallowtail butterflies in western Sarawak were studied using both voucher specimens deposited in the UNIMAS Insect Reference Collection (UIRC) and the Research Development and Innovation Division (RDID) of the Forest Department Sarawak, and specimens obtained from field sampling in western Sarawak. A total of 649 specimens were examined, representing three tribes, namely Troidini, Papilionini and Leptocircini. These specimens represent thirty-one species documented in western Sarawak and their most favourable ecological habitat is the lowland mixed-dipterocarp forest. The most abundant species is *Menelaides memnon* followed by *Papilio demoleus*. The least abundant species is *Chilasa slateri*, which is represented by a singleton, followed by *Papilio karna* and *Graphium procles*, each represented by a doubleton. The lowland mixed-dipterocarp forest supports the highest number of the Papilionidae species and individuals in Sarawak, probably due to the

favourable habitats and high abundance of larval host plants and food sources.

ORAL 035 BEC

INFLUENCES OF HUMAN ACTIVITIES ON MALAY CIVET'S (*Viverra zibellina*) OCCUPANCY IN SARAWAK

Thaqifah Syaza Jailan, Melynda Cheok Ka Yi, Sally Soo Kaicheen, Floriane Bouard and Mohd-Azlan Jayasilan
*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak*
Corresponding author: azlan@unimas.my

Malay Civet, *Viverra zibellina* is one of the most commonly recorded carnivores by camera trapping surveys that occupies a diverse range of habitat types. In view of this, the IUCN Red List classifies this species as Least Concern. Primarily a ground-dwelling species that has a wide distribution in Borneo, the Malay Civet enables a progressed perspective in understanding the effects of human activities towards a highly adaptable species. In the study six protected areas were categorized as low, medium and high volume of human activities were compared in the intensity of human activities that corresponds to Malay Civet's occupancy. Camera traps were placed in six selected protected areas, however the results showed extreme fluctuations between both protected areas under the high classifications of human activities as Gunung Gading National Park (GGNP) has high detection rate of Malay Civet whereas none were detected in SNP. This suggest that high human activities may have influence the Malay Civet's presence in a protected area, other factors such as habitat preferences and geographical distribution may have higher influence on Malay Civet's occupancy and dispersal in Sarawak.

ORAL 036 BEC

BATS ROOST SITE PREFERENCES IN WIND CAVE NATURE RESERVE, BAU, SARAWAK

Muhd Amsyari Morni¹, Faisal Ali Anwarali Khan¹, Qhairil Shyamri Rosli¹, Julius William Dee¹, Roberta Chaya Tawie Tingga² and Mohd Ridwan²
¹*Faculty of Resource Science and Technology,*
²*Center for Pre-University, Universiti Malaysia Sarawak,*
Corresponding authors: ridwanrahman2@gmail.com; akfali@unimas.my

Roosting site plays a vital role in bats existence as it provides protection from predator, bad weather and a place for entering torpor and hibernation. Unfortunately, little is known about the bats roost preferences in Malaysia due to inadequate data collections. Therefore, this study was conducted to

determine and gain information about the roosting preferences of cave dwelling bats in Wind Cave Nature Reserve (Wind Cave NR). The cave microclimate and physiological parameters that were analysed in this study were roost temperature, humidity, distance of the roosting site from the nearest cave entrance and the sound intensity at the bat's roosting site. HOBO data logger was used for taking the temperature and humidity level. Leica Disto D3 range finder was used to measure the roost distance whereas sound intensity were recorded using Decibel Meter Version 1.6 application. There are ten species of bats from five families found roosting in Wind Cave NR. The Canonical Corresponding Analysis showed four groupings with p -value <0.0001 . We also present the relationship between bats natural diet with its ability to cope with fluctuations in roost's microclimate. The cave physical parameters appears to influence bats roost selection in respect to its body size and echolocation ability. Knowing these parameters helps in better understanding of the roosting preferences that is important for the conservation of cave bats in Malaysia.

ORAL 037 BEC

ELEVATIONAL DISTRIBUTION PATTERNS OF UNDERSTOREY FOREST BIRD IN WESTERN SARAWAK, MALAYSIAN BORNEO

Hanis Damia Elyna Lit and Jayasilan Mohd-Azlan

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author: azlan@unimas.my

The elevational distribution pattern of understorey avian communities of mountainous region in western Sarawak was studied between March 2016 and April 2017 using mist-nets with total effort of 2,800 net-days. The study resulted in 1,039 individuals from 28 families and 112 species, which includes four Bornean endemic and two montane endemic species. Species accumulation curve shows that there is no additional species recorded which suggest sampling saturation. Number of bird species recorded at the four elevations ranges were 82 (<300 m), 78 (300 – 599 m), 40 (600 – 899 m), 30 (900 – 1200 m), of which 17 species were recorded exclusively at elevation <300 m, 11 at 300 – 599 m, five at 600 – 899 m, and seven at 900 – 1200 m. The highest bird species diversity and richness occurred between of 300 – 599 m asl. Of the 112 species recorded, two (1.8%) of the species are listed as Vulnerable, 30 (26.8%) species as Near Threatened and 80 (71.4%) species as Least Concern by IUCN (2017). A total of 15 species (13.4%) are protected under the Sarawak Wildlife Protection Ordinance 1998. This study also revealed some differences in terms of species composition between elevations. This highlights the need to conserve intact habitat in this montane biodiversity hotspot.

**PREVALENCE OF MICROALBUMINURIA AMONG
COMMUNITY PEOPLE
IN SAMARAHAN DISTRICT, SARAWAK**

Than Than Aye, Mohammad Zulkarnaen Ahmad Narihan, Razitasham Safii,
Md Mizanur Rahman, Madzlifah Ahadon, Arlizan Baizura Ariffin and
Dayangku Norlida Awang Ojep
Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak
Corresponding author: atthan@unimas.my

Microalbuminuria (MA) is associated with adverse health outcome in diabetic and hypertensive adults. It is an indicator of glomerular injury and is associated with increased risk of progressive renal deterioration, cardiovascular disease and mortality. Objectives: To estimate the prevalence of microalbuminuria using single spot urine sample in the general population of the Samarahan District, Sarawak, and to determine the relationship between microalbuminuria and selected risk factors in this population. A cross-sectional study was carried out among 610 community people using a pre-tested questionnaire and measured their Body Mass Index (BMI), waist circumference (WC) and blood pressure (BP). Dipstick urinalysis and blood tests were proceed for the determination of microalbuminuria, proteinuria, random blood sugar, cholesterol and haemoglobin level. Participants with abnormal laboratory findings were referred to the Klinik Kesihatan Kota Samarahan for further investigation. Microalbuminuria and proteinuria were present in 26.9% and 11.0% of the population, respectively. Hypertension, diabetes mellitus, BMI, WC, high blood sugar level, high urea level, high creatinine and high uric acid level were significantly associated with microalbuminuria in this study. The eGFR was less than 60 mL/min/1.73 m² in 5.7% of participants and only one participants had stage 5 chronic kidney disease (eGFR <15mL/min/1.73m²). This study provided information on the prevalence of microalbuminuria and its possible associated factors in the Samarahan District. Microalbuminuria is present in majority of this population particularly those with diabetes, hypertension and obesity.

ORAL 039 BEC

DIVERSITY AND FUNCTIONAL GUILD OF UNDERSTOREY BIRDS IN DIFFERENT TYPES OF FOREST IN ULU BARAM, SARAWAK

Attiqqah FS¹, Jayasilan Mohd-Azlan², Khatijah I¹, Sing-Tyan P¹, Rahah MY¹,
Md. Hasri Al HH¹ Isa, S² and Tuen, AA¹

¹*Institute of Biodiversity and Environmental Conservation, Universiti
Malaysia Sarawak*

²*Faculty of Resource Science and Technology, Universiti Malaysia
Sarawak*

Corresponding author: attiqqahfadz@gmail.com

The difference on diversity of understory and functional guild of understory birds were examined in three types of forest relatively undisturbed primary, secondary and agro forest in Ulu Baram, Sarawak. A total number of 64 mist nets were set up in each forest type for four days. A total number of 140 individuals representing 38 species were caught in primary forest, 201 individuals (50 species) in secondary forest and 216 individuals (47 species) in agro forest. Shannon-Wiener Diversity Index shows that secondary forest has the highest bird diversity ($H' = 3.518$) followed by agro (3.312) and primary forest (3.249). The relative abundance of the insectivores was the highest in primary forest, frugivores, granivores and nectarivores were highest in the agro forest while the omnivore guild dominates the secondary forest. The granivores, frugivores and nectarivores were higher in agro forest suggesting that this forest provide resources for the persistence of these species. The results of this study show that the habitat type influenced the feeding guild and diversity of understory birds.

ORAL 040 BEC

ISOLATION AND CHARACTERISATION OF ARBUSCULAR MYCORRHIZAL (AM) FUNGI SPORES FROM SELECTED PLANT ROOTS AND THEIR RHIZOSPHERE SOIL ENVIRONMENT.

Toh Seng Chiew, Bryan Yong Chuan Wang, Tiang Bi Ren, Rakiya
Abdullahi, Samuel Lihan, Rebicca Edward
*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak*

Corresponding author: 15020196@siswa.unimas.my

Arbuscular mycorrhizal (AM) fungi or previously known as the vesicular-arbuscular mycorrhizal (VAM) fungi, is a type of endomycorrhiza that closely associates with most species of plants. Meanwhile, they can significantly improve the nutrients uptake in exchange of photosynthetates and decrease the stress caused by both biotic and abiotic factors through symbiosis relationship. However, the understanding of indigenous AM fungi species present in its host plants are comparatively inadequate, hence this research

study concentrated on indigenous AM fungi population in some selected plants that contribute to agricultural sector in Malaysia and phytochemical properties of soil that affect the colonization rate of AM fungi. Bamboo, banana, coconut, sugarcane, papaya, lemongrass, pandan and tapioca plant were selected in this study. The soil and plant roots were sampled and the fungi spores were extracted by applying wet sieves and decantation techniques then further purified by sucrose density centrifugation. Genera *Glomus*, *Funneliformis*, *Rhizophagus*, *Acaulospora* and *Denticutata* were isolated and *Glomus* was determined as the dominant genera followed by *Acaulospora* in these selected plants. The soil pH were found to be significantly affect the AM fungi population as well as the root colonization percentage of AM fungi in the plants analysed. From this study, tapioca recorded the highest percentage of AM fungi root colonization rate with 20.00% in root while banana recorded the lowest rate of 3.33% only. Therefore, tapioca is the most suitable plant to be used to propagate the AM fungi for biofertilizer usage in agricultural sector in future.

ORAL 041 BEC

THE ADVANCEMENT OF CAMERA TRAPPING TECHNIQUE IN UNDERSTANDING WILDLIFE ECOLOGY IN SARAWAK

Marius Joscha Maiwald and Mohd-Azlan Jayasilan

Faculty of Resource and Technology, Universiti Malaysia Sarawak

Corresponding author: azlan@unimas.my

Since its first employment in 1913, camera trapping (CT) has been recognized as one of the best and least invasive methods to detect cryptic species and create species inventory lists. The dense rainforests limit surveys using conventional techniques and CT studies have known to yield better results. In Malaysia camera trapping has been used at least since the late 1990's, although available literature makes it hard to determine when the very first camera traps were set up, while in Sarawak this technique was introduced in early 2000. Most study sites in Sarawak include Totally Protected Areas (TPA) such as Maludam, Loagan Bunut, Lambir Hills, Kubah, Pelagus, Lanjak Entimau and Samunsam Wildlife Sanctuary, etc. and some managed timber production forests have also been the target of CT studies, in order to compare different habitats and stages of forest succession and its implications on their inhabitants. Most of the camera trapping studies in Sarawak involved species distribution and inventories, while a few papers address wildlife ecology near salt licks and density estimations. In this paper, we reviewed published papers on wildlife research in Sarawak that used camera trapping as at least one of their methods to obtain data. Furthermore we analyzed locations, number of species detected, research objective and findings. With increase in the software development, this technique is

expected to provide insight to many species of conservation importance and its use in wildlife surveys is likely to increase.

ORAL 042 BEC

GENETIC VARIATION OF THE BORNEAN FANGED FROG, *Limnometes kuhlii* COMPLEX IN WESTERN BORNEO (AMPHIBIA: ANURA: DICROGLOSSIDAE)

Ramlah Zainudin^{1,2} and Najmi Naim¹

¹Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

²Centre for Pre University Studies, Universiti Malaysia Sarawak

Corresponding author: zramlah@unimas.my

The fanged frog *Limnometes kuhlii* is known to be cryptic as seen in the dynamic of species delineation among the complexes. Yet no historical demographic and genetic structure has been fully documented for this species. We investigate historical events, diversification and dispersal of the Bornean *Limnometes kuhlii* Complex via Mitochondrial DNA of partial 16S rRNA. Haplotype graphical network, demographic history, neutrality test and population subdivision analysis were used to assess in population genetic of the species. Two haplogroups were detected distinct within population and panmictic from East and West of Lupar gap (Batang Ai). The Lupar gap has become the geographical barrier that restricts gene flow from western and eastern populations. Ragged multimodal mismatch distribution, long terminal branches and high mutational site of network showing population in Sarawak and Sabah were rarely migrate and low gene flow. Surprisingly, most of *L. kuhlii* population showed population constriction and presence of two or more mixed subpopulations. It can be concluded that high levels of sequence divergence suggesting ancient DNA (lineage) and cryptic species hidden within the species. This study should be extended in future with more samples and validate their true species status with morphological data.

ORAL 043 BEC

BEHAVIOUR OF POWER SYSTEM EQUILIBRIUM POINTS IN DYNAMIC AVAILABLE TRANSFER CAPABILITY CALCULATION

Mohamed Shaaban

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: mshaaban@unimas.my

Available Transfer Capability (ATC) is of fundamental importance in power system planning and operation. The calculation of firm ATC in a power market environment is carried out based on day-ahead market dispatch with a set of security constraints. Incorporating dynamic security constraints into the ATC calculation not only renders a heavier burden on the computational approach

but also manifests complex behaviour of the system in the neighbourhood of its equilibrium points. This paper specifically highlights exotic system characteristics encountered during dynamic ATC calculation. The problem of the ATC calculation is modelled as a nonlinear mathematical programming problem to maximise the power transfer subject to system technical and operating constraints. The dynamic ATC constraints are represented via the quadratic approximation of the stable manifold of the controlling unstable equilibrium point (UEP). A numerical example on the IEEE WECC 3-machine, 9-bus power system is presented and analysed.

ORAL 044 BEC

DIAGNOSTIC CONSIDERATION IN CASES OF PULMONARY EMBOLISM MIMICKING ACUTE CORONARY SYNDROME: IS ELECTROCARDIOGRAPHY A FRIEND OR A FOE?

Chew Keng Sheng¹, Elise Chui King Wong², Nariman Singmamae¹, Aaron KH Lai², Seri Diana Mahmud Affandi²,

¹*Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak,*

²*Emergency Medicine and Trauma Department, Sarawak General Hospital.*

Corresponding author: kschew@unimas.my

The diagnosis of PE can be rather challenging as its clinical presentations of pulmonary embolism (PE) can closely mimic that of an acute coronary syndrome (ACS). While clinical prediction rules are helpful, the onus of diagnosing PE ultimately is on the clinician to even think about this possibility. If the diagnosis of PE is not thought of in the beginning of the diagnosis generation process, performing an ECG may not only be unhelpful, but may even act as a deterrent to the consideration of PE. The primary objective of this research is to study the effect of adding an ECG with features suggestive of ACS on the diagnostic consideration of PE in patients with chest pain presentation. A group of final year medical students and house officers responded to either one of two cases of PE patients presented with clinical and electrocardiographic features suggestive of ACS. Each of these two cases was divided further into two case scenarios, i.e., one with and the other, without ECG attached. A total of 20 out of 40 (50%) final year medical students and 31 out of 38 house officers (82%) responded. In general, more participants given case scenarios without ECG attached had considered PE either as the provisional diagnosis or differential diagnosis vs those given with case scenarios with ECG attached (8 out of 25 or 32% vs. 6 out of 26 or 23% respectively, $p=0.48$). In particular for the first case, the consideration of PE as a differential diagnosis was significantly higher when ECG was not given compared to when ECG was given (4 out of 13 or 30.8% vs. 0 out of 14, $p = 0.04$). In cases where the clinical signs and symptoms mimic that of an ACS, performing an ECG with features mimicking ACS may not only be unhelpful, but may paradoxically act as a deterrent to the consideration of PE.

ORAL 045 BEC

EVALUATION OF MICROFINE PALM OIL FUEL ASH (POFA) AS CEMENT REPLACEMENT MATERIAL FOR MITIGATION OF CHLORIDE ATTACK

Raudhah Ahmadi¹, Mohamad Syukry Saiful¹, Dzul Fahmi Zawawi¹, Shahrul Zaman Abdul Rahman¹, Idawati Ismail¹, Mohamad Abdul Mannan¹, Ana Sakura Zainal Abidin² and Fadzli Mohamed Nazri³

¹*Department of Civil Engineering,*

²*Department of Mechanical and Manufacturing Engineering,
Universiti Malaysia Sarawak,*

³*School of Civil Engineering, Engineering Campus,
Universiti Sains Malaysia.*

Corresponding author: araudhah@unimas.my

This paper investigates the effect of microfine palm oil fuel ash (POFA) as cement replacement material for mitigation of chloride attack in concrete. The raw POFA obtained from a local palm oil mill is initially grinded using Los Angeles abrasion machine, and then sieved using 150 μ m sieve before it is burned in a furnace at 500°C. The burned POFA is then grinded using electric powder grinder to obtain the targeted microfine size ranging between 1-10 μ m. Treated microfine POFA is used in the production of concrete samples for experimental tests; compressive strength test, sorptivity test and chloride penetration test to determine its physical properties and the chloride resistance parameter for the mitigation of chloride attack in concrete. Results showed that 20% of microfine POFA replacement in concrete gives the highest compressive strength at 56th day and reduces the rate of absorption of water and chloride penetration.

ORAL 046 BEC

INTELLIGENT GREENHOUSE MONITORING AND CONTROL SYSTEM BASED ARDUINO UNO MICROCONTROLLER

Hikma Shabani, Norhuzaimin Julai, Musse Mohamud Ahmed and Ahmad Helmi Che Rose

Universiti Malaysia Sarawak

Corresponding author: hikmash@hotmail.com

Nowadays, there is a significant diminution in agricultural production due to the unpredictable control of crop climate conditions. Thus, to alleviate the crops exposure from excess cold or heat and unwanted pests, an intelligent environment monitoring and control system based Arduino UNO board consisting of ATmega 328P microcontroller has been developed for a small-scale agriculture namely greenhouse. The system user can monitor and control the greenhouse climate conditions remotely via web interface/mobile applications and GSM in real-time manner. To deliver the environment

conditions in a timely manner, low-cost wireless sensor network (WSN) is used to monitor the temperature, humidity, soil moisture and light of the greenhouse. The sensor network constitutes a multi-hop network structure for large coverage. The developed system is implemented and tested in laboratory conditions using Proteus toolkit. Arduino Integrated Development Environment (IDE) tool is used to develop necessary software. The results show that the proposed system can closely monitor and evaluate greenhouse farming field conditions accurately. Finally, the user can send control decisions instantly to boost the yield growth conditions and thus, increase the crop production considerably.

ORAL 047 BEC

RESILIENT IEEE802.15.4MAC PROTOCOL FOR MULTI-HOP MESH WIRELESS SENSOR NETWORK

Hikma Shabani¹, Norhuzaimin Julai¹, Musse Mohamud Ahmed¹, Sheroz Khan², Shihab Ahmed Hameed² and Mohamed Hadi Habaebi²

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Department of Electrical and Computer Engineering, Faculty of Engineering, International Islamic University Malaysia.*

Corresponding author: hikmash@hotmail.com

The success of a modern power grid system is inevitably based on the integration of a smart data exchange amid several devices in power production, transportation, dispatching and loads. For large coverage data exchange, a distributed multi-hop mesh is structured from low voltage distribution boards to the substations. Thus, being cheap, less power intake, easy set-up and operating in a free licensed spectrum, ZigBee/IEEE802.15.4 makes the most suitable wireless protocol for communicating in power grid systems. Nevertheless, IEEE802.15.4MAC protocol lacks a mechanism to enable a multi-hop mesh network with efficient energy and quality of service (QoS). Hence, in this paper, a Multi-Hop Mesh IEEE802.15.4MAC protocol is designed for a large coverage data exchange. This developed model provides a resilient network with energy efficiency and QoS. Hence, the IEEE802.15.4 super_frame standard_structure is modified by swapping the contention_free period (CFP) and contention_access period (CAP) for time sensitive applications. For network resilience, a Reserved_Broadcast Duration_Slot (RB_DS) is introduced in the active super_frame standard_structure as beacon_offset reference time computation. Finally, for the network performance analysis, the developed Markov chain_Model with retry and saturated traffic regime without feedback is run on NS-2 simulator. Here, the hidden terminal problem is not considered since it is assumed that all nodes can “hear” each other. The simulation results are encouraging as the developed IEEE802.15.4MAC protocol is capable of improving the time delivery delay up to 35.7%.

**EFFECT OF SPRAYING PARAMETERS ON THE MORPHOLOGY OF
SPRAY-COATED ACTIVE LAYERS FOR ORGANIC SOLAR CELLS**

Nur Tahirah Razali¹, Khairunisa Kamarudin¹, Shusei Inaba², Mahshuri
Yusof¹, Leong Yeng Weng³ and Varun Vohra².

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Department of Engineering Science,*

University of Electro-Communications, Tokyo, Japan;

³*Department of Electronics & Communication Engineering, Universiti
Tenaga Nasional, Malaysia*

Corresponding author: ntahirah@unimas.my

Over the past decade, organic solar cells (OSCs) have demonstrated their great potential for the low-cost mass production of renewable energy. However, the conventional active layer deposition technique (spin-coating) is not suitable for mass production due to its incompatibility with the roll-to-roll process. Spray-coating is a promising candidate for in-line production of OSCs but parameters such as distance between the spray nozzle and substrate, applied pressure and number of sprays should be optimized to produce adequate film thickness and morphology. Here, we verified how these processing parameters influence the thin film properties and observed that film thickness increases with decreasing nozzle-substrate distance, increasing number of sprays or applied pressure. The processing parameters were adjusted to produce spray-coated films with similar properties to the spin-coated ones thus confirming that spray-coating could replace spin-coating for mass production of OSC devices.

ORAL 049 BEC

INVESTIGATING THE MERAKA HARDWOOD FAILURE IN BOLTED CONNECTIONS PARALLEL TO THE TIMBER GRAIN

Abdul Razak Abdul Karim¹, Pierre Quenneville², Norazzlina M.Sa'don¹ and Mahshuri Yusof¹

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand*

Corresponding author email: akarazak@unimas.my

The present study was performed to investigate the ductile failure mode of timber bolted connections, specifically in Meraka hardwood. This was done to initiate an effort in developing a comprehensive guideline in designing the timber bolted connections for the purpose of strengthening the wall-diaphragm connections of the Malaysia unreinforced masonry buildings. A series of experimental tests was conducted on the steel-wood-steel (SWS) with a single row connection type. A total of eight different bolted connection configurations or groups with ten replicates for each group was tested. The Meraka hardwood was selected in this study as it was found to be one of the most hardwood species that are commonly used in the construction of floor and roof diaphragms in the existing Malaysia unreinforced masonry buildings. From the experimental results obtained, the effectiveness of the Malaysian timber code of MS544 and European Yield Model (EYM) in predicting the bolted connection strength was verified. It was determined that the MS544 is too conservative in estimating the bolted connection strength with an average ratio of 0.38 compared to the test results. Thus, the use of the EYM is recommended to complement the timber code as the average ratio of 0.81 was identified in comparison to the test data.

ORAL 050 BEC

REVIEW ON LATERAL STABILITY OF PILED RIVERINE STRUCTURES IN THE ESTUARIES OF SARAWAK

Lee Lin Jye, Shenbaga R. Kaniraj, Siti Noor Linda Taib and Fauzan Sahdi
Faculty of Engineering, Universiti Malaysia Sarawak.

Corresponding author: tlinda@unimas.my

Soft soil conditions with very soft and deep silty clay have constantly endangered the stability of the riverine and estuarine structures in Sarawak. There have been many failures of jetties, wharves and bridges in Sarawak. In many cases of failures, the piles were not designed to resist the lateral movement, unless they were included to stabilize unstable slopes or potential landslides. This practice may be due to reasons such as erroneously judging the riverbank as stable in slope stability analysis or simply due to the inexperience of designers. In addition, when the riverbank approaches the

limiting stability in its natural state any construction activity on the riverbank could result in lateral soil movement. This paper highlights this important geotechnical problem in Sarawak. Then it presents the details of a few failures of estuarine structures. A review of situations causing lateral loading of piles is then presented. The results of the in-soil and in-pile displacement measurements are shown in this paper and it is found that the computation made to compare between field and 3D modeling is agreeable.

ORAL 051 BEC

STRENGTH PROPERTIES OF REINFORCED PEAT USING FIBER-POLYESTER AND SHREDDED RUBBER-CRUMB AS REINFORCEMENT MATERIAL

Norazzlina M.Sa'don, Abdul Razak Abdul Karim, Siti Noor Linda Taib and Mahshuri Yusof

Faculty of Engineering, Universiti Malaysia Sarawak.

Corresponding author: msazzlin@unimas.my

This paper presents an investigation of the strength improvement of reinforced peat by using the fiber reinforcement techniques of the lightweight waste material, i.e., tire-waste disposal. The fiber-polyester and shredded rubber crumb are extracted and process for the collected tire-waste disposal. In this study, the fiber-polyester and shredded rubber-crumb are mixed with peat (Pt), with undrained shear strength, c_u of <10 kPa and 5 % cement content, which act as a binder. The peat samples are mixed at various percentages of fiber-polyester and shredded rubber-crumb. The compacted fiber-reinforced peat samples were prepared at optimum moisture content, mixes thoroughly to a uniform condition by laboratory mixer and air cured for 7 and 28 days in a single batch. The strength improvement of undrained shear strength, c_u of >100 kPa is targeted at minimal percentages of cement added. The Unconfined Compression Strength (UCS) and California Bearing Ratio (CBR) tests are performed for determination of the engineering properties of fiber-reinforced peat. Based on the results obtained, one can be seen that both fiber-polyester and shredded rubber crumb shows an increment in unconfined compressive strength value of 214 kPa and 55 kPa, respectively. In summary, the study shown that, the inclusion of fiber-polyester and shredded rubber-crumb from tire-waste disposal increased the effective contact area between reinforced material and peat, which then improved the strength significantly, and the used of tire-waste disposal for the construction may not only provide the alternative mean of recycling and reusing, however, it also addressed economic and environmental concerns and reduce construction cost by making the best use of locally available materials.

ORAL 052 BEC

THE IMPACT OF SOFT ERROR ON C-ELEMENT WITH DIFFERENT TECHNOLOGY

Norhuzaimin Julai, Lakshmanan A/L Gurusamy and Shamsiah Suhaili
Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding author: jnorhuza@unimas.my

This paper presents current injection resemble single event upset (SEU) current at the vulnerable nodes on C-elements in particular Single Inverter with Inverter Latch (SIL) under two different technology 90nm and 180nm. C-element mainly uses in asynchronous circuits as the demand of consuming low power continue to become more important compared with synchronous circuits. However, one of the problems of asynchronous circuits is that they stay sensitive to SEU continuously for the whole cycle of operation. For asynchronous circuits, an acknowledgement signal is sent to the preceding register after the current operation is finished, indicating it is ready for the next operation. In the event of SEU hitting one of the registers, no acknowledgement signal is sent and therefore the preceding register does not assign the next operation to the current computational block. It is observed that the size of the transistor is the most important factors of critical charge variation since it has the highest standard deviation compared with temperature. This is due to the increasing the size of the transistors increase the gate capacitance from the output and therefore the collected charge needed to flip the output is also larger. However, as the size of the circuit is bigger, the probability of hitting by SEU is also increased even though the circuit is more resistant against SEU. The least significant factor is the temperature. As the temperature increased, the mobility of the carrier is reduced and degrades the performance of the transistor.

ORAL 053 BEC

REMOVAL OF CONGO RED DYE FROM AQUEOUS SOLUTION USING BRANCHES OF *Ficus religiosa*

Syed Salman Shafqat¹, Maria Nosheen², Amir Azam Khan³, Syed Rizwan Shafqat⁴, Shahzad Murtaza¹, Muhammad Nadeem Zafar¹ and Muhammad Zubair¹

¹*Department of Chemistry, University of Gujrat, Gujrat, Pakistan;*

²*Institute of Chemistry, University of the Punjab, Lahore, Pakistan;*

³*Faculty of Engineering, Universiti Malaysia Sarawak;*

⁴*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

Corresponding email: syedsaloo5@gmail.com

Present study focused on indigenous *Ficus religiosa* branches as a low cost agricultural by-product employed as biosorbent for the removal of Congo red (CR) dye from aquatic environment. Adsorption behavior with special

characteristics was evaluated using established and effective process. Effect of various established parameters tested was pH, adsorbent dosage, temperature, initial dye concentration and contact time. The efficient uptake of CR was observed at pH 4.0, adsorbent dose 0.7g/50mL and dynamic equilibrium at 25 min. Research reveals that Langmuir model found fit than the Freundlich model. So far research carried out gives results that *Ficus religiosa* branches can be used as cost effective biosorbent for the removal of CR dye from polluted aqueous solution.

ORAL 054 BEC

MORPHOLOGICAL AND OTSU THRESHOLDING-BASED RETINAL BLOOD VESSEL SEGMENTATION FOR DETECTION OF RETINOPATHY

Kuryati Kipli, Cripem Jiris, Siti Kudnie Sahari, Rohana Sapawi, Nazreen Junaidi, Marini Sawawi, Kismet Hong Ping, and Tengku Mohd Afendi Zulcaffle

Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding email: kkuryati@unimas.my

Retinal blood vessel segmentation is crucial as it is the earliest process in measuring various indicators of retinopathy sign such as arterial-venous nicking, and focal arteriolar and generalized arteriolar narrowing. The segmentation can be clinically used if its accuracy is close to 100%. In this study, a new method of segmentation is developed for extraction of retinal blood vessel. In this paper, we present a new automated method to extract blood vessels in retinal fundus images. The proposed method comprises of two main parts and a few subcomponents which include pre-processing and segmentation. The main focus for the segmentation part is two morphological reconstructions which are the morphological reconstructions followed by the morphological top-hat transform. Then the technique to classify the vessel pixels and background pixels is Otsu's thresholding. The image database used in this study is the High Resolution Fundus Image Database (HRFID). The developed segmentation method accuracy are 95.17%, 92.06% and 94.71% when tested on dataset of healthy, diabetic retinopathy (DR) and glaucoma patients respectively. Overall, the performance of the proposed method is comparable with existing methods with overall accuracies were more than 90 % for all three different categories: healthy, DR and glaucoma.

ORAL 055 BEC

***Cryptosporidium*, *Ascaris* AND HOOKWORM CONTAMINATION OF VEGETABLES IN DIFFERENT FARMING PRACTICES**

Ahmad Syatir Tahar¹, Lesley Maurice Bilung¹, Tunku Syed Izzuddin Al-Qadry Tunku Syed Azhar¹, Kasing Apun¹, Hashimatul Fatma Hashim¹, Elexson Nillian¹ and Yvonne Ai-Lian Lim²

¹*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak;*

²*Department of Parasitology, Faculty of Medicine, University of Malaya.*
Corresponding author: syatirtahar@gmail.com

Parasites are one of the many causative agents of foodborne illnesses worldwide, including in vegetables eaten raw or undercooked. This study was conducted to determine the occurrence of *Cryptosporidium* oocysts, *Ascaris*, *Trichuris*, hookworm, *Taenia* and *Toxocara* ova from vegetable samples such as chilli, ginger, lemon grass, and water spinach in different farming practices. The vegetable samples were washed with 0.95% saline solution before processed with the sucrose flotation technique. Modified Ziehl Neelsen and Lugol's iodine techniques were used to detect *Cryptosporidium* and helminths, respectively. Among the 32 vegetable samples collected from five commercial and five traditional vegetable farms, 4 samples each were positive with *Ascaris* ova (12.5%), *Cryptosporidium* oocyst (12.5%) and hookworm ova (12.5%). None of the vegetable samples were positive with *Trichuris*, *Taenia* and *Toxocara* ova. The vegetables from traditional farms harboured higher parasite contamination (73.33% of positive samples) compared to commercial farms (11.76%). The current finding provides information on the level of parasite contamination in vegetable farms with different mode of farming practices in Kuching, Sarawak.

ORAL 056 BEC

PRODUCTION OF PIGMENTS BY *Rhodotorula mucilaginosa*

Lau Wai Xian¹, Octavio Carvajal-Zarrabal², Cirilo Nolasco-Hipólito³, Mizuno Kohei⁴, Zayn Al-Abideen Gregory¹, Mohammad Omar Abdullah¹, Toh Seng Chiew¹ and Samuel Lihan¹.

¹*Faculty of Resource Science and Technology Universiti Malaysia Sarawak;*

³*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Biochemical and Nutrition Chemistry Area, University of Veracruz, Boca del Río, Veracruz, México;*

⁴*Department of Materials Science and Chemical Engineering, Kitakyushu National College of Technology, Japan.*

Corresponding author: hcnolasco@unimas.my

Pigments have a large and growing market in the world. Drawbacks in their production such as raw materials availability and low productivity prompt the

search for fermentation routes for industrial production. A carotenoid-producing yeast identified as *Rhodotorula mucilaginosa* was isolated in our laboratory. The aim of this study was to investigate the growth and carotenoid production capacity of the yeast. A cost-effective substrate of sago starch hydrolysate (SSH) derived from sago fiber waste was used for the fermentation. The fermentation was carried out for 96 h at 27°C in batch mode. The biomass produced during 5 days of fermentation was 9.6 g/L, which contained a carotenoid concentration of 8.1 mg/L and a specific yield of 845.9 µg/g. The results demonstrated the capacity of *R. mucilaginosa* yeast to produce carotenoids and its potential for larger-scale production.

ORAL 057 BEC

A SURVEY OF UNDERSTORY BIRDS AT A RICE FIELD AND A MIXED DIPTEROCARP FOREST IN KUCHING, SARAWAK

Nurgamareena Karim, Chong Yee Ling, Mohd-Azlan Jayasilan and Mohamad Fizi Sidq Ramji

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak
Corresponding author: neenakarim1010@gmail.com

Habitats modification can lead to reduction of biodiversity. This preliminary study aimed to determine the diversity of understory birds and their feeding guilds at a rice field plantation and mixed dipterocarp forest. The understory birds were mist-netted from March to May 2017 (three months) that resulted in 110 bird individuals of 32 species from 19 families. Among them, five species are legally protected and three species are considered Near Threatened under the IUCN Red List (2017). Preliminary analysis suggests most birds are habitat specialist. Only two omnivore species [i.e. Yellow-vented Bulbul (*Pycnonotus goiavier*) and Pied Fantail (*Rhipidura javanica*)] were caught at both habitats. Cream-vented Bulbul (*Pycnonotus simplex*) and Brown-throated Sunbird (*Anthreptes malacensis*) were the most predominant bird species captured at Santubong National Park (SNP), whereas Chestnut Munia (*Lonchura atricapilla*) was the dominant species at rice field at Stunggang Melayu Village, Lundu. Although omnivores and insectivores dominated both habitats, three species of nectarivores were only caught in SNP. As expected SNP showed higher bird species diversity and mean richness ($H' = 3.045$; 0.935) compared to rice field ($H' = 2.565$; 0.7257), (t-test; $p = 1.1432 \times 10^{-6}$). More sampling effort is necessary as the species cumulative graph has yet to reach an asymptote. This preliminary study has provided baseline information on bird species diversity and habitat preference at two different habitats in Western Sarawak.

EFFECTS OF LAND USE ON FISH ASSEMBLAGES IN INUNDATED AREA OF PLEIRAN RIVER AND DANUM RIVER SECTIONS OF MURUM RESERVOIR, BELAGA, SARAWAK

Angie Sapis¹, Gabriel Tonga Noweg², Lee Nyanti¹ and Jongkar Grinang²
¹Faculty of Resource Science and Technology, ²Institute of Biodiversity and Environmental Conservation, University of Malaysia Sarawak.

Corresponding author: angiesapis@gmail.com

Land use changes and degradation of riparian zone have been proven to have effects on water quality and eventually affecting fish communities of newly impounded tropical reservoirs. However, little is known on this environmental issue in this region. For the case of newly impounded Murum reservoir in Sarawak, the two major catchments of the reservoir, the Pleiran and Danum have shown a significant disturbance due to logging, plantation and subsistence farming. A drastic change of land use is observed within the Pleiran catchment, whereas the catchment of Danum is relatively less disturbed where some areas are still intact with good forests. This study aims to investigate the assemblages of fish fauna at inundated areas of Pleiran and Danum catchments for one year. A total of 5,367 individuals of fish representing 36 species and eight families were caught from the two inundated areas. Family Cyprinidae contains 23 species and constitute 62% of the total individuals. The most dominant species was *Barbodes binotatus*, which comprised 24% of the total individuals caught. Results of multivariate analysis show a significant land use changes in Pleiran and Danum catchments, which contribute to significant differences in water quality. The inundated area at Pleiran has significantly higher water temperature and total suspended solids, but lower concentration of Chlorophyll-a and dissolved oxygen. In contrast, the inundated area at Danum has cooler water and lower total suspended solids. A clearer water at Danum has resulted in higher Chl-a and subsequently contribute to high concentration of dissolved oxygen through photosynthesis. In this relatively good aquatic environment, the fish assemblage comprising the intolerant species such as *Tor douronensis* and *Osteochilus* spp. The results imply that conversion of forested area at riparian corridor to open area has lead to changes in physicochemical characteristics, and subsequently might have resulted in habitat partitioning by the fish species according to their environmental tolerance limit.

ORAL 059 BEC

COMPUTATIONAL STUDIES OF CONFINED SUBMERGE FAN TO CIRCULATE AND OXYGENATE HYPOLIMNETIC LAYER IN HYDRO POWER RESERVOIRS.

Muhammad Umar Mushtaq, Khairuddin Sanauallah, Andrew Ragai Henry Rigit, Afrasyab Khan and Harunal Rejan Ramji.
Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding email: muhammadumarmushtaq@gmail.com

The oxygen level is deficient at the depth of the lakes or reservoirs due to thermal stratification. Due to deficient oxygen level at the bottom of thermal stratified lakes, the reduction reactions occurs that form hydrogen sulphide, iron, phosphorous and other compounds which are harmful for the water quality, fish life as well as dam or reservoir structures and other species. Hypolimnetic aeration and oxygenation systems can be used for this purpose to prevent the formation of harmful substances. Prototype design of submerged fan will be used to penetrate at maximum depth of the lakes or reservoirs and find the velocity of submerged fan through CFD simulations.

ORAL 060 BEC

POLYGONAL DIPOLE PLACEMENTS FOR EFFICIENT, ROTATABLE, SINGLE BEAM SMART ANTENNAS in 5G AEROSPACE AND GROUND WIRELESS SYSTEMS

K.Pirapaharan¹, P.R.P. Hoole², Norhuzaimin Julai², Al-Khalid Othman², Ade Syaheda W Marzuki², K.S. Senthilkumar³ and S.R. H. Hoole⁴

¹*Department of Electrical and Communications Engineering, Papua New Guinea University of Technology, Papua New Guinea;*

²*Faulty of Engineering, Universiti of Malaysia Sarawak;*

³*Department of Computers and Technology, St. George's University, Grenada, WI*

⁴*Electrical and Computer Engineering, Michigan State University, East Lansing, MI 48824, USA*

Corresponding email: pirapaharan_k@yahoo.com

In telecommunication systems and radars, the common practice in using array antennas is to place a reflector behind the array so as to reflect the backward signal also in the forward direction. Moreover, in the 5G wireless systems, smart antennas, especially those with a single beam, are expected to play a critical role in its successful launching in 2020. We show in this paper that a linear array antenna necessarily ends up with symmetrical beamforming on both sides of the array axis. Thus, single direction (forward direction) beamforming cannot be achieved by placing the electromagnetic radiators (e.g. dipole elements) in a straight line. We propose that in situations where a smart array structure demands single rotatable beams, that single

rotatable beamforming can be achieved by changing the geometrical shape of the array. However, the computational intensity involved in finding optimized weight coefficients for beamforming over the entire 360o space turns into the major challenge. In order to minimize the computational repetition of optimizing weights for every direction, a regular polygon array antenna is proposed. We show that an array antenna placed in a regular polygon yields a smart antenna with a highly effective and computationally fast, reduced memory and electronically rotatable single beam.

ORAL 061 BEC

HIGH SPEED AND THROUGHPUT EVALUATION OF SHA-1 HASH FUNCTION DESIGN WITH PIPELINING AND UNFOLDING TRANSFORMATION TECHNIQUES

Shamsiah binti Suhaili¹, Takahiro Watanabe², Norhuzaimin Julai³

^{1,3}*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Graduate School of Information, Production and System, Waseda University, Kitakyushu-shi, Fukuoka, 808-0135 Japan*

Corresponding author: sushamsiah@unimas.my,

In recent years, designing of SHA-1 hash function has become popular because it was important in security design application. One of the applications of SHA-1 hash function was HMAC where the architecture of SHA-1 needed to be improved in terms of speed and throughput in order to obtain the high performance design. The objective of this project was to design high speed and throughput evaluation of SHA-1 hash function based on combination between pipelining and unfolding techniques. By using both techniques in designing the architecture of SHA-1 design, the speed of SHA-1 hash function can be increased significantly as well as throughput of the design. In this paper, five proposed SHA-1 architectures were designed with different stages of pipelining such as 1, 4 and 40 stages. The results showed high speed design of SHA-1 design can be obtained by using 40 stages pipelining with unfolding factor two. This design provided high-speed implementation with maximum frequency of 308.17 MHz on Arria II GX and 458.59 MHz on Virtex 5 XC5VLX50T. Furthermore, the throughput of the design also increased about 150.269 Gbps and 223.618 Gbps on Arria II GX and Virtex 5 XC5VLX50T respectively. Thus, high speed design of SHA-1 hash function was successfully obtained which can give benefit to society especially in security system data transmission and other types of hash functions.

ORAL 062 BEC

DIGITAL CIRCUMFERENTIAL FINGER MEASURING DEVICE FOR FINGER CLUBBING IDENTIFICATION

Sharifah Masniah Wan Masra¹, Mohd Saufee Muhammad¹, Rahardjo Darmanto Djodibroto², Rohana Sapawi¹, Kuryati Kipli¹, Siti Kudnie Sahari¹, Nur Syahira Shahrom¹ and Maryam Rufaidah Mazlan¹

¹*Faculty of Engineering, Universiti Malaysia Sarawak;*

²*Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak.*

Corresponding author: wmmasnia@unimas.my

This paper presents the development of a digital circumferential measuring device for facilitating measurements at various points along fingers, particularly at the nail-fold (NF) and distal interphalangeal joint (DIP). This project involves hardware and software development for helping clinicians to investigate and identify the early stage of finger clubbing within a short period. The value of Digital Index (DI) in this study is 9.30 ± 0.35 (Mean \pm SD) for 20 subjects. The average time taken to measure both NF and DIP circumferences using Digital Circumferential Finger Measuring Device (DCFMD) and to compute DI values using DI Calculation System for single subject is 5 minutes 10 seconds. The developed device and its system has shown to be reliable in this study and achieve significant time savings in comparison to the existing measurement device.

ORAL 063 BEC

A REVIEW OF SARAWAK OFF-GRID RENEWABLE ENERGY POTENTIAL AND CHALLENGES

Tan Kheng Wee¹, P.R.P Hoole², *K.Pirapaharan*³, *Norhuzaimin Jula*², *Al-Khalid Hj Othman*², *Martin Any*², *Ahmed M A Haidar*² and *S.R.H. Hoole*⁴

¹*Department of Electrical Engineering, Politeknik Kuching Sarawak;*

²*Faculty of Engineering, Universiti Malaysia Sarawak;*

³*Department of Electrical and Communications Engineering, Papua New Guinea University of Technology, PNG;*

⁴*Department of Electrical and Computer Engineering, Michigan State University, Michigan, USA*

Corresponding author: prhoole@unimas.my

Sarawak is the largest state in Malaysia, in spite of this, the population of Sarawak is relatively small and 42 percent of that population reside in the rural areas. Consequently, the Sarawak government is facing immense challenges in providing basic need such as electricity to the entire state due to the remoteness and small sizes of these settlements. Although the state produces sufficient amount of power but the cost of connecting these rural and non-rural small settlements to the grid are just impractical. The current energy scenario in Sarawak will be reviewed with focus on the two reliable

renewable energy resources currently being pursued by the Local Electrical Authority (LEA) for rural electrification projects which is the Hydro Power and Solar Energy. The paper will address the technical and localized challenges facing the micro hydro and solar electric energy generation in Sarawak. The micro hydro power potential in Sarawak is estimated at 10.2MW but is not being fully developed due to difficulty in distinctive design and implementation which requires full participation and support from the local community to make it more economically viable and functionality in long run. In addition, Sarawak also receives a daily solar irradiation of more than 5 KWh/m² throughout the year and that means huge potential for it to thrive. But design and implementation must be done carefully due to the tropical climate and operational temperature of the components. Ultimately, both renewable energy systems requires trained personnel to attend to and involvement of LEA or any appointed agency to provide assistance and coordination are necessary to ensure greater success in rural electrification projects.

ORAL 064 BEC

LINEAR SMART ARRAY ANTENNA CONFIGURATIONS FOR A TRANSCIVER IN A MULTI-SIGNAL ENVIRONMENT

Lwin Maw Abdul Rahim¹, Hikma Shabani², Al Khalid Hj Othman²,
Norhuzaimin Julai², Ade Syaheda Wani Marzuki², P.R.P. Hoole² and
S. R. H. Hoole³

¹*University of Malaya*

²*Faculty of Engineering, Universiti Malaysia Sarawak;*

³*ECE Dept., Michigan State University, East Lansing, MI, USA*

Corresponding author: hikmash@hotmail.com

Future smart antenna technology requires multi-element, adaptive array antennas to be placed on very small cell phone units. Small adaptive array antennas require heavy signal processing if the statistical techniques are used to maximize radiation in the desired direction and to null the beam in the direction of interfering signals. In terms of weight, battery energy and computational memory and time required it is imperative to minimize computational time, memory required and weight of the hardware to be used for adaptive beam forming in smart antennas. In this paper is presented a three-element antenna that uses analytically solved weight computation. No statistical or number crunching techniques are used. Moreover, it is shown that the antenna elements behind which two signal processing units are placed is critical. The placement of the weight processing signal processor units is critical for obtaining simultaneous beam maximizing towards desired direction and nulling towards the interferer direction.

ORAL 065 BEC

THE INTERNATIONAL BORNEAN FROGS RACE: ITS HISTORY AND SIGNIFICANCE

Indraneil Das, Pang Sing Tyan and Pui Yong Min
*Institute of Biodiversity and Environmental Conservation,
Universiti Malaysia Sarawak*
Corresponding author: idas@unimas.my

The International Bornean Frog Race is a day-long event, comprising talks, workshops, exhibitions, live auction and more. It ends in a photographic “race” that pits amateur photographers with professionals, school children with adults, in a two-hour hunt to document Borneo’s amphibian species. Organised by the students and staff of the Institute of Biodiversity and Environmental Conservation, UNIMAS, and supported by the university’s other Faculties, it is held on the last weekend of April every year (also, ‘Save the Frogs Day’). Six editions of the Race have been thus far held. In the last five years, the event has been co-organised by the Sarawak Forestry Corporation. Funding support for the event has come from members of the public, from public-listed companies to small private agencies. Participants come from all segments of society (from eight-year olds to septuagenarians), and speakers and other resource persons have come from many countries. The International Bornean Frog Race is now in the calendar of events of Sarawak Tourism, a major supporter of the event. Past Races have attracted participants from as many as 17 countries, making it a truly international event. Major objectives of the Race include conservation education, especially for our junior citizens, for whom several special events are organised, promotion of healthy living and active lifestyles (via visits to parks and other open areas), aiding citizen science, whereby ordinary city folks feel empowered to make scientific discoveries, and promotion of Sarawak and its national parks to domestic and international audiences.

ORAL 066 BEC

EFFECTS OF MULTIPLE LANDUSE ON MACROINVERTEBRATE COMMUNITIES OF LOW ORDER STREAMS IN BELAGA DISTRICT, SARAWAK (MALAYSIA, BORNEO)

Jongkar Grinang¹, Lee Nyanti², Emmy Goh Ling Ling², Andrew Alek Tuen¹ and Norman Kamarudin³

¹*Institute of Biodiversity and Environmental Conservation,*

²*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak;*

³*Malaysian Palm Oil Board, Biological Research Division, Kajang, Selangor Darul Ehsan*

Corresponding author: gjongkar@unimas.my

Macroinvertebrate communities of low order streams were sampled between December 2008 and December 2012 to assess effects of multiple landuse (logging, oil palm plantation and subsistence farming) on species richness and abundance of the fauna. A total of 18,780 individuals from 106 species, 19 orders and 67 families, comprising crabs, prawns, snails, isopods, aquatic insects and annelids were caught from eight stations at three low order streams. The most abundant taxa are aquatic insects (79%), followed by crustaceans (10%) and molluscs (7%). Non-parametric estimator (Jack 1) shows at least 107 species of macroinvertebrates are found in the streams. Gathering-collectors were the most abundant functional feeding groups. Nonmetric Multidimensional Scaling analysis shows assemblages of macroinvertebrates are associated with seasons and type of landuse. Effects of landuse on macroinvertebrate communities were prominent during wet season. All five functional feeding groups (shredders, scrapers, filtering-collectors, gathering-collectors and predators) show low abundance in wet season. This study shows that effects of logging, oil palm plantation and subsistence farming on macroinvertebrate communities are associated with habitat alteration (by sedimentation) and food availability (reduced riparian vegetation). Therefore, it is important to retain a minimal strip of forest along stream channel that will serve as buffer of sedimentation and source of food for the stream fauna.

ORAL 067 BEC

OVEREXPRESSION OF RECOMBINANT DOMAIN III ENVELOPE PROTEIN OF ZIKA VIRUS

Sylvia Empiang Andrew, Easterh Manye Kennedy and
Magdline Sia Henry Sum,

Institute of Health & Community Medicine, Universiti Malaysia Sarawak

Corresponding author: shsmag@unimas.my

Zika virus (ZIKV) is a member of the *Flaviviridae* family and is transmitted to humans by mosquitoes. It is very similar to other viruses such as dengue and Japanese encephalitis which are also members of the same virus family. In humans, it causes disease known as Zika fever. The severity of the infection ranged from asymptomatic to mild disease and to infection associated with neurological disorders and congenital anomaly. Commonly, the symptoms are maculopapular rash, fever, arthralgia, myalgia, headache and conjunctivitis. The flavivirus genome consists of structural and non-structural proteins. The envelope (E) glycoprotein is the major structural protein which is responsible for virus entry and represents a major target of neutralizing antibodies. The E protein consists of three distinct domains: domain I, domain II and domain III. The domain III (DIII) of the E protein has shown to be useful as antigen for flavivirus serologic diagnosis and immunization in animal model. Hence, the aim of this work is to express the DIII of E protein (EDIII)

of ZIKV for immunoreactivity study. The EDIII of ZIKV was clone and expressed as a recombinant fusion protein in *E.coli* expression system. The amplified product was cloned into pET SUMO cloning vector and transformed into Mach-T1 competent *E.coli* cells. Positive clone was selected, verified and transformed into BL21(DE3) competent *E.coli* for protein expression. The expression of recombinant protein was analysed on SDS-PAGE and western blot. The recombinant fusion protein of EDIII/SUMOHIS was expressed at a molecular weight of approximately 38.2 kDa. The expression of the protein was confirmed by detection with anti-histidine and a flavivirus antiserum, HPR. The expressed recombinant EDIII protein will be evaluated in further study for its sensitivity and specificity for serological detection of ZIKV infection as well as its capability for differential detection of other flavivirus infections.

ORAL 068 BEC

ROOSTING BEHAVIOUR AND SITE MAPPING OF CAVE DWELLING BATS IN WIND CAVE NATURE RESERVE, BAU, SARAWAK, MALAYSIAN BORNEO.

Qhairil Shyamri Roslia¹, Faisal Ali Anwarali Khan¹, Mohd Amsyari Morni¹, Julius William Dee¹, Roberta Chaya Tawie Tingga² and Mohd-Ridwan Abd Rahman²

¹Faculty of Resource Science and Technology,

²Pre-University, Universiti Malaysia Sarawak

Corresponding author: qhairilshyamri@yahoo.com

A roost survey of cave-dwelling bats in Wind Cave Nature Reserve (Wind Cave NR) was conducted for 11 days from July 2013 until April 2014. This study aims to explore roosting ecology of bats in Wind Cave NR. From the total of 462 observations, five families of bats were recorded comprising of 11 species of bats. This species includes *Penthetor lucasi*, *Megaderma spasma*, *Myotis horsfieldii*, *Rhinolophus affinis*, *R. borneensis*, *Hipposideros ater*, *H. cervinus*, *H. coxi*, *H. diadema*, *H. galeritus* and *H. larvatus*. *Penthetor lucasi* is the most abundant species observed in Wind Cave NR with colony size >100 individuals. Whereas the most roost observations was set by *M. horsfieldii* with 136 observations and the most diverse family in Wind Cave NR was set by *Hipposideridae* with six species. Chi square analyses using contingency table showed statistically significant association existed between roost behaviour and the bats assemblages ($p < 0.05$). Another key findings in the study is the discovery of a colony of *H. coxi*, one of Bornean endemic that serve as the first ever records for this species inside a cave and for Wind Cave NR. Overall information presented herein able to assist the local management in developing strategy for conservation, long-term species monitoring and beneficial in ecotourism purposes.

ORAL 069 BEC

FIRST ATTEMPT AT USING GEOMETRIC MORPHOMETRIC ANALYSIS FOR TAXONOMIC PROBLEMS ASSOCIATED WITH FEMALE FRESHWATER CRABS

Jongkar Grinang¹, Indraneil Das¹ and Peter K.L Ng²

¹*Institute of Biodiversity and Environmental Conservation,
Universiti Malaysia Sarawak;*

²*Lee Kong Chian Natural History Museum, National University of Singapore
Corresponding author email: gjongkar@unimas.my*

Challenges in taxonomic studies of freshwater crabs require a paradigm change in methodological approaches, particularly in investigations using morphological techniques. The traditional morphometric approach (two-dimensional measurements) tends to be inappropriate for identification of freshwater crabs because external morphology of the organism being variable and for lack of gonopods in females traditionally used for the external identification of the male crabs in taxonomic studies. This study demonstrates a geometric morphometric analysis in identifying characters for the identification of female freshwater crabs of two species of the genus *Isolapotamon* (*Isolapotamon consobrinum* and *I. nimboni*). The carapace shape could be as good character for identification of female freshwater crabs in particular by using a geometric morphometric technique. It also found that the advantage of carapace over abdomen and chela because its relatively flat orientation allows for more consistent and easier in data preparation for geometric morphometric analysis. The geometric morphometric technique is inexpensive, relatively less time consuming to employ and accurate. This technique is useful because dissections of specimens to examine the gonads are frequently not an option, due to destruction of specimens, or in case of endangered or rare species. Since only two species were used in this study, a more compelling and extensive evidence is needed before the reliability of the character is proven.

ORAL 070 BEC

MAXIMISING PRODUCTION OF PREBIOTIC SUGAR (CELLOBIOSE) FROM SAGO FROND

Dyg Salwani Awg Adeni, Muhammad Norhelmi Ahmad and Kopli Bujang

*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak*

Corresponding author: dayangsalwani@gmail.my

Numerous fronds are discarded as a waste upon harvesting of sago logs for starch production. Currently, these fronds are left to degrade in sago estates, which potentially pose fire hazard in the dry season, concomitantly accommodating various pests that endanger the livelihood of the sago

farmers. The objective of this study is to utilize the frond for the production of cellobiose, a non-table sugar known to harbour various prebiotic properties. Enzymatic hydrolysis was performed on treated sago frond fibre utilizing the cellulolytic enzyme Celluclast 1.5L. Characterization of the lignocellulosic component revealed that adolescent sago fronds have the highest cellulose content (41.43%) which is beneficial for high yield of cellobiose. Pruned sago fronds have the highest lignin (40.63%) which hinders the hydrolysis process. Nevertheless the hemicellulose content was found to be approximately similar (between 15 to 18%) which promotes the production of cellobiose. Optimum enzymatic hydrolysis was achieved at 6% (w/v) sago frond powder coupled with 10% (v/v) enzyme and incubated for 48 hours, producing a maximum recovery of cellobiose at 25.5%.

ORAL 071 BEC

IDENTIFICATION OF SPRAY TOWER SYSTEM USING ARTIFICIAL NEURAL NETWORK

Bashir Ahmed Danzomo¹ and Sani Jibrin²

¹*Department of Mechanical Engineering, College of Engineering;*

²*Department of Science Laboratory Technology, College of Science and
Technology; ^{1,2} Hussaini Adamu Adamu Federal Polytechnic, P.M.B 5004,
Kazaure, Jigawa State, Nigeria*

Corresponding author email: bdzomo@gmail.com

Spray tower is a system for industrial air pollution control of particulate matter (PM) contaminants. In the system, the PM contaminants are carried by gas which flows upward and the particles contained in the contaminant collide with liquid droplets formed by atomization of a spray nozzle situated across the flow passage. In this study, a dynamic model of spray tower system has been developed based on Artificial Neural Network (ANN) system identification technique using MATLAB code. The ANN model chosen for the identification is a recurrent neural network (RNN) based on a non-linear autoregressive with exogenous inputs (NARX) model. The developed model is aimed at providing a new approach for intelligent control of PM pollutants of sizes; 2.5 μ m and 10 μ m (PM_{2.5} and PM₁₀) which represent a significant fraction of PM emission from most industrial sources and also formed the regulated PM that penetrate the lower respiratory tract of human lungs. The results obtained are quite encouraging and suggests the usefulness of ANN based modeling method in accurate prediction of the spray tower system as an alternative to the analytical approach which appears to be more complex. The study concludes that, the ANN model output follows the trend of the theoretical output of the spray tower performance and all the prediction proved to be satisfactory with the correlation value of about 0.899 and mean squared error (MSE) of 0.000101.

ORAL 072 BEC

A RAINFALL SIMULATOR USED FOR TESTING OF HYDROLOGICAL PERFORMANCES OF MICRO-DETENTION POND PERMEABLE PAVEMENT

Norazlina Bateni^{1, 2}, Sai Hin Lai², Putuhena FJ^{1, 3}, Darrien Yau Seng Mah¹
and Md Abdul Mannan¹

¹ Faculty of Engineering, University of Malaya;

² Faculty of Engineering, Universiti Malaysia Sarawak;

³ Universitas Pancasila Jakarta, Jakarta, Indonesia

Corresponding authors: bnorazlina@unimas.my

A rainfall simulator for laboratory experimentation is developed to test hydrological performances of micro-detention pond permeable pavement, MDPP. Rainfall characteristics consisting of rainfall intensity, spatial uniformity, raindrop size, and raindrop velocity show that natural rainfall is simulated with sufficient accuracy. The rainfall simulator used pressure nozzles to spray water for rainfall intensity from 40 to 220mm/hr. Uniformity distribution test gives coefficient of uniformity of 95% over an area of 1m². The raindrops falling at velocity ranging from 0.5 to 15m/s with drop sizes diameter between 2 to 5mm. Free drainage system below the rainfall simulator is accompanied with outlet tanks attached with ultrasonic sensor devices to record the outflow data. During the experiments, the outflow received is 98% in average. Experiment results in typical runoff hydrograph and percolation rate of the MDPP system. This shows the ability of the rainfall simulator to obtain initial hydrology data to aid in the design of the MDPP prototype.

ORAL 073 BEC

CALCIUM CARBONATE FROM CLAM SHELL AS A THERMAL CONDUCTOR IN PARTICULATE FILLED POLYMER MATRIX COMPOSITES

Mahshuri Yusof¹, Amalina Muhammad Afifi², Nur Tahirah Razali¹, Marini Sawawi¹ and Abdul Razak Abdul Karim¹

¹ Faculty of Engineering, Universiti Malaysia Sarawak;

² Department of Mechanical Engineering, Faculty of Engineering, University of Malaya

Corresponding author: ymashun@unimas.my

The thermal conductivity of the raw and stearic acid treated calcium carbonate (CaCO₃) from clam shell powder infused in unsaturated polyester matrix has been experimentally measured. The CaCO₃ filler was derived from the shell of clam known as *Polymesoda bengalensis*. Eight different mean diameter sizes of clam shell filler were infused into unsaturated polyester (UPE) matrix. Thermal conductivity of neat UPE sample and when embedded with raw and

stearic acid treated CaCO₃ filler with different mean diameter sizes and filler loadings were measured by applying the guarded heat flow meter method according to ASTM E1225-99. The result showed that UPE matrix composites with untreated clam shell produced higher thermal conductivity than treated clam shell. At constant filler content, the thermal conductivity of CaCO₃/UPE composites was increased gradually as the filler size was decreased. The higher the filler content, the higher the thermal conductivity of the composites. Therefore, the inclusion of higher filler loading with finer filler size of seafood waste from clam shell is able to improve the performance of polymer matrix composites as a heat conductor.

ORAL 074 BEC

DYNAMIC SPECTRUM ALLOCATION SCHEME FOR HETEROGENEOUS NETWORK: BER ANALYSIS

Nurzati Iwani Othman¹, Ahmad Fadzil Ismail¹, Mohammad Kamrul Hasan²,
Wahidah Hashim³ and Khairayu Badron¹

¹*Department Electrical and Computer Engineering, International Islamic University Malaysia (IIUM);*

²*Faculty of Engineering, Universiti Malaysia Sarawak;* ³*College of Computer Science and Information Technology, Universiti Tenaga Nasional (UNITEN)*

Corresponding author: af_ismail@iiium.edu.my

The latest advancement in wireless communication technology enables mobile users to communicate with each other more easily and at a very high speed. With the developed technology that encourages fast delivery of data and signal, mobile users can experience the best kind of service provided by the network operators. However, with the increasing number of users in an area that consist of femtocell and macrocell users, the data and signal transmission can sometimes be corrupted with the presence of cross-tier interference. This interference occurs when the femtocell and macrocell operate in the same carrier frequency. Therefore, such interference mitigation method must be implemented in order to maximize the throughput and increase the spectral efficiency of a wireless network. In this paper, a Dynamic Spectrum Allocation (DSA) scheme is proposed in order to correlate with the bit error rate, which will in turn contribute in throughput maximization factor in a heterogeneous network.

ORAL 075 BEC

ECONOMIC DISPATCH STRATEGY FOR SOLAR HYBRID SYSTEM USING LAMBDA ITERATION METHOD

Harmen Muda, Al-Khalid Othman and Norhuzaimin Julai
Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding author: i.harmen@gmail.com

A method for optimal power dispatch of hybrid system consisting of Solar-Diesel-Battery systems in remote area is presented. The aim of this paper is to provide a performance analysis of the method applied for cost reduction related to the constraint and satisfaction of load demand. The method presented utilizes the data and parameter of the Bario Solar Hybrid Central Station, Bario, Sarawak, Malaysia (3.7350° N, 115.4793° E). This work proposes a MATLAB software package to estimate optimal real power value with the least generating cost for the system. The operation, maintenance and investment costs are specified in the cost functions of the energy sources and will consider the assumption of equal incremental cost. Different case study has been carried out to solve the system equation and finally the result from the proposed method is to be compared to a reduced gradient optimization method. It is found out the method in this study proved to be effective by giving an improved optimization results and efficiency for obtaining optimal power dispatch with few parameters in various tested conditions.

ORAL 076 BEC

OBSERVATIONS ON THE ELECTROSTATIC DISCHARGE THREATS TO AIRCRAFT BODY AND TO AEROSPACE ELECTRONICS

J. Fisher¹, Hikma Shabani², P.R.P Hoole², M.R.M. Sharip², K. Pirapaharan¹,
Al Khalid Hj Othman², Norhuzaimin Julai², R. Harikrishnan³, and
S.R.H. Hoole⁴

¹*Department of Electrical and Communications Engineering,
Papua New Guinea University of Technology;*

²*Faculty of Engineering, Universiti Malaysia Sarawak;*

³*Department of Electrical Engineering, University of Malaya;*

⁴*ECE Dept., Michigan State University, East Lansing, MI, USA*
Corresponding author: hikmash@hotmail.com

Electrostatic Discharge (ESD) is a well-known threat to aerospace vehicles and microelectronic systems. This is especially so with the increased use of non-metallic, composite material for the aircraft body. Moreover, the severe lightning flashes to aircraft also commence with ESD on the aircraft body. The ESD results in the initiation of positive leaders that grow towards the thundercloud from one part of the aircraft. Moreover, a negative leader is launched towards the ground or another cloud. In this paper, we discuss the

induced electric charges due to the vertical electric field component of the thundercloud charge center. Further, the electric currents induced on the surface of the aircraft body or equipment by the horizontal component of the thundercloud generated electric field is examined. From the electrostatic fields computed prior to the initiation of corona or the initial leader, we show that in addition to the most commonly identified part of the aircraft from which leaders are initiated, namely the radome, the main wing tips, the curved surface of the mid-wing and the stabilizer tips experience highly enhanced electric fields. These electric field enhancements may also lead to the generation of electric breakdown.

ORAL 077 BEC

CAMERA TRAPPING OF TERRESTRIAL ANIMALS VISITING SALT LICKS AT ULU BARAM, SARAWAK

Nurul Asna Hidayah, Jayasilan Mohd-Azlan, Sim Siong Fong, Samuel Lihan and Melynda Cheok Ka Yi

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak
Corresponding author email: azlan@unimas.my

Salt licks also known as mineral licks or natural licks is a mineral-rich place containing naturally deposited mineral which being visited actively by animal for mineral uptake. To date, it is under-documented and researched especially in Sarawak. The study focused on wildlife utilization towards salt licks and was carried out from October 2015 until December 2016 at two areas in Ulu Baram that are Long Selaan and Lio Mato. Camera traps were placed at salt licks in video mode to understand the wildlife utilization of salt licks by determining the activity pattern. The frequency of visitation of salt lick varied among species, but few species were observed to dominate the salt licks compared to others. The frequency of visitation reflects the demand of species towards mineral itself.

ORAL 078 BEC

NEW VECTORS IN NORTHERN SARAWAK, MALAYSIAN BORNEO, FOR THE ZONOTIC MALARIA PARASITE, *Plasmodium knowlesi*

Joshua Ang Xin De¹, Khamisah Abdul Kadir¹, Dayang Shuaisah Awang Mohamad¹, Asmad Matusop², Khatijah Yaman¹ and Balbir Singh¹

¹*Malaria Research Centre, Faculty of Medicine & Health Sciences, Universiti Malaysia Sarawak,*

²*Sarawak Department of Health, Kuching.*

Corresponding author email: jtopschi@gmail.com

The vectors for *Plasmodium knowlesi*, a significant cause of human malaria in Southeast Asia, identified previously in nature all belong to the *Anopheles*

Leucosphyrus Group. Only one study has been previously undertaken in Sarawak, Malaysian Borneo, on vectors of *P. knowlesi*, where *Anopheles latens* was incriminated as the vector in Kapit, central Sarawak. A study was therefore undertaken to identify malaria vectors in a different location in Sarawak. Mosquitoes found landing on humans and resting on leaves over a 5-day period at two sites in the Lawas District of northern Sarawak were collected and identified. DNA samples extracted from salivary glands of anophelines were subjected to nested PCR malaria-detection assays. The small sub-unit ribosomal RNA (SSUrRNA) genes of *Plasmodium* were derived from the *Plasmodium*-positive samples for phylogenetic analyses. A total of 65 anophelines and 127 culicines were collected. By PCR, 6 *An. balabacensis* and 5 *An. barbirostris* had single infections each with *P. knowlesi*, 1 *An. balabacensis* had a single *P. inui* infection, one a double infection of *P. knowlesi* and *P. cynomolgi* and one a triple infection with *P. cynomolgi*, *P. inui* and *P. fieldi*. Phylogenetic analyses of the *Plasmodium* SSUrRNA genes confirmed 3 *An. barbirostris* and 3 *An. balabacensis* with single *P. knowlesi* infections, while 3 other *An. balabacensis* had two or more *Plasmodium* species of *P. inui*, *P. knowlesi*, *P. cynomolgi* and possibly novel species of *Plasmodium*. New vectors for *P. knowlesi* in Sarawak were identified, including *An. barbirostris* that does not belong to the *Anopheles* Leucosphyrus Group.

ORAL 079 BEC

DIET OF PASSERINE BIRDS FROM DIFFERENT HABITAT TYPES IN SARAWAK, BORNEO

Sing-Tyan, Pang¹, Attiqqah, Fadziliah Sopian¹, Khatijah, Ismail¹, Kok, Cze Jhin² and Andrew Alek Tuen¹

¹*Institute of Biodiversity and Environmental Conservation,*

²*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

Corresponding author: tyanpang@gmail.com

Studies on food resources for wildlife are important, providing insights into why certain species are present and the abundant while others are not. This is based on the premise that wildlife are attracted to a particular habitat or site due to abundance of food resources. Small passerine birds inhabit different habitat types in Borneo, but the contribution of diet to this success is seldom investigated. This study aims to determine the diet of the passerine birds in six different habitat types- agroforest, secondary forest, logged forest, primary forest, limestone forest and oil palm plantation. A total of 253 individuals from 34 species of passerine birds were captured. Sources for dietary analyses comprised 149 regurgitated, 85 faecal and 33 stomach content samples, which were subsequently examined for prey items. A total of 15 orders of prey items were identified, of which 14, 11, 8, 7, 6 and 3 were associated with agroforest, secondary forest, logged forest, primary forest, limestone forest

and oil palm plantation, respectively. Coleoptera were found eaten by 40% of the birds in this study, followed by Hymenoptera (25%), Arachnidae (9.7%) and Orthoptera (7.5%). Regurgitated samples yielded the most number of intact prey item (15 individuals), compared to stomach content and faecal sample (one each). This study show that arthropods from the order Coleoptera are important prey items for small passerine birds inhabiting different forest types in Sarawak, Borneo.

ORAL 080 BEC

DEVELOPMENT OF PCR ASSAYS FOR IDENTIFICATION OF *Plasmodium knowlesi* SUBPOPULATIONS AND ASSESSMENT OF TEMPORAL VARIATION IN FREQUENCY OF SUBPOPULATIONS.

Ting Huey Hu¹, Paul C.S Divis¹, Khamisah A. Kadir¹, Dayang S.A Mohamad¹, Cyrus Daneshvar², King Ching Hii³, David J. Conway^{1,4} and Balbir Singh¹.

¹*Malaria Research Centre, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak;*

²*Department of Respiratory Medicine, Plymouth Hospitals NHS Trust, Plymouth, United Kingdom;*

³*Kapit Hospital, Kapit, Sarawak, Malaysia;* ⁴*Department of Pathogens and Molecular Biology, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, United Kingdom*

Corresponding author: t.hhu@hotmail.com

Plasmodium knowlesi, a parasite found in nature in long-tailed and pig-tailed macaques, is the leading cause of human malaria in Sarawak, Malaysian Borneo. Two divergent subpopulations of *Plasmodium knowlesi* (termed Cluster 1 and Cluster 2) were identified in Sarawak following whole genome sequencing of 48 clinical isolates. Multi-locus microsatellite typing indicated that Cluster 1 was associated with long-tailed macaques, while Cluster 2 was associated with pig-tailed macaques. Distribution of species population is affected by interactions between different factors (i.e. parasite, environment, vector and hosts) so any temporal variation in frequency of each subpopulation may reflect ongoing changes in epidemiology. The aims of our study were to develop simple PCR assays for each subpopulation and to determine whether there were any temporal changes in the proportion of *P. knowlesi* subpopulations in clinical isolates from Kapit over three different time periods. A single step PCR assay and a hemi-nested PCR assay were developed to identify each of the two divergent subpopulations. These were used to examine a total of 671 samples collected from patients at Kapit Hospital from 2006-2008 (n=157), 2013-2015 (n=259) and 2015-2017 (n=255). The novel PCR assays were highly specific and the hemi-nested PCR was ten times more sensitive compared to the single step PCR assays.

Cluster 1 was the major *P. knowlesi* subpopulation, infecting 68.9% of the 671 samples from Kapit. The proportion of Cluster 1: Cluster 2 was 71:29 for isolates from 2006-2008, and 68:32 for those from 2013-2015 and from 2016-2017. The changes in the proportions of the two subpopulations across the three time periods was not significant ($p=0.7427$) using Chisquare test. Continued monitoring of the frequency of the two subpopulations is necessary to determine whether there are changes in the epidemiology of *knowlesi* malaria.

ORAL 081 BEC

AVIFAUNA DIVERSITY IN KUCHING CITY, SARAWAK, MALAYSIA

Stephanie ak Judi, Andrew Alek Tuen and Gabriel Tonga Noweg

Institute of Biodiversity and Environmental Conservation,

Universiti Malaysia Sarawak

Corresponding author email: aatuen@unimas.my

Most modern cities are large and complex environment where humans and wildlife are often in conflict with one another especially when wildlife density is high. Birds that roost on building and other structures created by humans have been known to soil building and vehicles and may be carriers of diseases transmissible to humans and their pets. On the other hand, the birds also provide opportunities for urban dwellers to observe, appreciate and study birds from the safety and comfort of their homes. In order to have a better understanding of the ecology and diversity of birds in an urban area, a survey was conducted in Kuching City in 2016. The survey was carried out in recreational, residential, industrial and commercial areas, which are the major man-made habitat for bird in Kuching City. In each habitat type, six 500m road transect were identified and surveyed six times over a period of six months. All birds seen were identified to species level and Shannon Index of species diversity calculated for each habitat. Recreational sites have the highest diversity index of 2.851, followed by residential (2.378), industrial (2.331) and commercial sites (2.160). Recreational sites also have significantly ($p<0.05$) more species (58), compared to residential and industrial sites (34 species each) and commercial sites (32 species). Kuching City bird community includes one endemic species (*Dusky munia*), one totally protected species (*Cattle egret*) and 10 protected species comprising egrets, heron and bittern, woodpeckers and Hill Myna. Twenty-three species of birds can be found in all sites and most are from the family Sturnidae (Asian Glossy Starling, Common Myna and Javan Myna). Eurasian Tree Sparrow is the dominant species in residential, industrial and commercial sites accounting for 36.9, 28.4 of total birds observed in these habitats while Yellow vented Bulbul is the most common bird observed in recreational areas accounting for 25% of individuals observed. This study shows that Kuching City has a rich diversity of bird with 67 species and harbour endemic as well as protected species. Eurasian Tree

Sparrow is the dominant species in residential, commercial and industrial habitat while Yellow-vented Bulbul is the dominant species in recreational areas.

ORAL 082 BEC

POPULATION GENETIC STRUCTURE OF THE CAVE ROOSTING DUSKY FRUIT BAT (*Penthetor lucasi*) FROM SARAWAK, MALAYSIA.

Yuvarajan Manivannan¹, Mohd Ridwan Abd Rahman², Roberta Chaya Tawie Tingga² and Faisal Ali Anwarali Khan¹

¹Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

²Centre for Pre-University Studies, Universiti Malaysia Sarawak

Corresponding author email: akfali@unimas.my

Previous studies have revealed a high genetic divergence in *Penthetor lucasi* population in Sarawak, indicating it may consist of multiple genetic lineages. However, these studies are not accompanied by morphological data from the studied population suggesting this may be an effect of isolation by distance especially with small sampling coverage. Here, we provide information based on D-loop sequence analysis from 32 individuals of *Penthetor lucasi* collected from four different regions in Sarawak. Our results revealed a high haplotype diversity and low nucleotide diversity, suggesting that these populations are recovering from a recent catastrophic event. However, neutrality test and mismatch distributions showed a long-term population stability with no population subdivision observed among the studied populations. The moderate to high level of gene flow found in this study indicates that *Penthetor lucasi* population is likely panmictic. Meanwhile, the low level of genetic divergence value among and within populations could account for no species complexity in this study. Our result highlighted the importance of sampling coverage in properly assessing species diversity especially with wide distribution.

ORAL 083 BEC

MODELLING OF SURFACE PERMEATION IN MULTIPLE-ORIFICE PERMEABLE ROAD

Darrien Yau Seng Mah, Siew Ling Loh, Md Abdul Mannan and Wan Hashim Wan Ibrahim

Department of Civil Engineering, Faculty of Engineering,
Universiti Malaysia Sarawak

Corresponding author: ysmah@unimas.my

A patent-pending StormPav green pavement is introduced here as a form of permeable road, in which the system employed precast concrete pieces as modular units. The pavement layer consists of hexagonal plates with each a

service inlet to drain water. This study is exploring the water draining capability or technically surface permeation of these service inlets. Virtual and physical modelling are performed to investigate the service inlets as multiple orifices to permeate surface water of the said permeable road. Both modelling efforts have deduced that the permeable road has 18,000 – 24,000 mm/hr of permeation rate when subjected to a 5-minute red-alert storm (>60mm/hr of intensity). It implies that StormPav green pavement has superior surface permeation against the forming of water ponding and flash flood on roads.

ORAL 084 BEC

FREE SPACE ATTENUATION ANALYSIS FOR X -BAND AND S-BAND SATELLITE LINK USING METEOROLOGICAL RADAR DATA IN THE TROPICS

Khairayu Badron¹, Ahmad Fadzil Ismail¹, Atikah Balqis Basri¹, Syafrina Abdul Halim¹, Maszlan Ismail² and Hamid Salim²

¹*ECE Dept, Faculty of Engineering, International Islamic University Malaysia,*

²*National Space Centre, Selangor Darul Ehsan*

Corresponding author: khairayu@iium.edu.my

Free space fading for satellite link propagation studies in the equatorial regions are indeed particularly scarce, complicated and expensive to venture upon. Most of satellite propagation studies done in temperate climate are not reasonable for countries in equatorial region due to its huge climate differences. In equatorial regions, the future stratospheric and space based telecommunications systems are expected to operate with high elevation angle slant paths and high frequency of operation from the Earth stations' point of view. These systems will also be sharing frequency bands with other terrestrial and space services. From this standpoint, a precise modelling of the vertical variation of free space path loss parameters will be of great interest for improving the prediction of the clear sky margin along the slant path in the tropics. In this paper, the Free Space Path Loss (FSPL) propagation link for X-band and S-band RazakSAT satellite will be analysed using a Terminal Doppler Weather Radar (TDWR) data. Both links will be evaluated and the assessment of the link's fade margin will be suggested. An accurate estimation of the satellite fade margin will evidently save power from the satellite perspective and better transmission can be estimated. The outcome from this research will be very useful for future implementation on satellite link fade margin improvement during non-rain weather, both during clear sky and cloudy weather on tropical region. This research will facilitate the key decision makers and the satellite designers to progress business, availability and throughput proficiently. Therefore, hopefully the spending is well reasonable with better return on investment (ROI) and attracts more investors in satellite industries.

ORAL 085 BEC

A VARIABLE SAMPLING INTERVAL MULTIVARIATE EXPONENTIALLY WEIGHTED MOVING AVERAGE CONTROL CHART BASED ON MEDIAN TIME-TO-SIGNAL

Siow Yin Nyau¹, Ming Ha Lee¹, and M. L. Dennis Wong²

¹*Faculty of Engineering, Computing and Science,*

Swinburne University of Technology Sarawak Campus,

²*Institute of Sensors, Signals and Systems, School of Engineering and Physical Sciences, Heriot-Watt University Malaysia.*

Corresponding author: snyau@swinburne.edu.my

In this study, the median time-to-signal (MTS) is used as an alternative measure to the average time-to-signal (ATS) in evaluating the performance of the variable sampling interval (VSI) multivariate exponentially weighted moving average (MEWMA) chart. Although the ATS is one of the most commonly used performance measures when the sampling interval is varied, it is not an accurate representation of the entire time-to-signal distribution of the VSI charts. Therefore, the percentage points (percentiles) of the time-to-signal distribution are provided for a more comprehensive study of the VSI MEWMA chart. A Monte Carlo simulation is used to calculate the MTS values for various magnitudes of shifts in the process mean vector. The optimal design strategy is to find the charting parameters having the minimum out-of-control MTS (MTS₁). A comparison study shows that the VSI MEWMA chart is more effective than the standard MEWMA chart with fixed sampling interval, in detecting shifts in the process mean vector in terms of the MTS.

ORAL 086 BEC

CORROSION STUDY OF GALVANIZED ULTRA HIGH STRENGTH STEEL REINFORCED OVERHEAD TRANSMISSION CONDUCTORS

Amir Azam Khan, David Bong Boon Liang, Andrew Ragai Henry Rigit, Lim Soh Fong, and Al-Khalid Othman

Faculty of Engineering, Universiti Malaysia Sarawak.

Corresponding author: akamir@unimas.my

Overhead high voltage transmission conductors used worldwide are produced in several configurations. A multi-strand conductor of the type ACSR330 is typically used for 275 kV overhead transmission lines. The conductor is composed of 7 inner strands of Ultra High Strength Galvanized Steel for the mechanical support of the conductor and 26 strands of high conductivity Aluminum wires meant for power transfer over long distances. During the use, weather conditions and power fluctuations tend to degrade the properties of these conductors. In the present work, study of the state of galvanization and oxidation of an ACSR330 conductor is undertaken with a view to understand the effectiveness of the loss in corrosion protection and

changes in the zinc coating on the galvanized steel strands after use for 25 to 30 years. The Scanning Electron Microscopy (SEM), X Ray Diffraction (XRD) and Energy Dispersive Analysis through X rays (EDAX) provide a very useful insight into the state of the conductor and gives important information to the strategic decision maker, whether or not to replace the conductor. It was observed in the present study that the zinc coating diffuses inside the steel strand under temperature and time effect. This unique study on the used conductors also reveals that the morphology of the coating and its interface structure changes significantly compared to an unused conductor of the same age.

ORAL 087 BEC

PERSISTENT OVERLOAD CONTROL FOR BACKLOGGED MACHINE TO MACHINE COMMUNICATIONS IN LONG TERM EVOLUTION ADVANCED NETWORKS

Rofida Osman Dirar¹, Rashid. A. Saeed¹, Mohammad Kamrul Hasan², and Musse Mahmud³

¹*Sudan University of Science and Technology College of Engineering, Khartoum, Sudan,*

^{2,3}*Faculty of Engineering, Universiti Malaysia Sarawak*
Correspondence email: rofiada@yahoo.com

Machine to Machine (M2M) has become one of the most attractive technologies in wireless communications. Despite of this, Long Term Evolution Advanced (LTE-A) suffered the severe issues in machines initiating random access for all of the Base Stations (BTS). Therefore, this paper, investigated the previous/existing methods and come out with the P-persistent scheme. The scheme is proposed with backlogged M2M devices that use to control Radio Access Network (RAN) overload in LTE-A network. The performance of the proposed scheme is evaluated through MATLAB based simulation. Through the evaluation it can be seen that the M2M devices arrivals follow Beta distribution use for calculating the throughput and probabilities of collision, success and idle for M2M devices. The first case when P have a high value and the second case P have low value this results show that in first case the success probability of M2M device is high about 73% limited number of M2M devices and have lower collision probability but in the other case M2M devices have lower success probability about 26% with high collision probability.

ORAL 088 BEC

DESIGN AND SIMULATION OF A ZERO CROSSING VSC BASED PHASE SYNCHRONOUS INVERTER FOR MICROGRID SYSTEM

Tawfikur Rahman¹, Mohammad Kamrul Hasan², Musse Mohamud Ahmad²,
and AKM Zakir Hossain¹

¹*Department of Electrical and Computer Engineering,
International Islamic University Malaysia,*

²*Faculty of Engineering, Universiti Malaysia Sarawak*
Corresponding author: tawfikurr@gmail.com

A microgrid is a system which consists of the transmission line and loads capable of operating in parallel with the national grid and distributed power sources such as power generation, storage and demand management. However, to connect the wind, solar and electrostatic power generation system together with microgrid, a phase synchronisation issue arises. For the electrostatic system, generated DC voltage needs to be converted into AC to connect with the transformer-less microgrid system. This process inherently produces very low output current and also degrades the phase synchronization of the system. To counter these issues, a zero crossing voltage source controller based phase synchronous inverter system has been designed and implemented in this paper. In addition, an active LCL filter has been designed to reduce the high harmonic distortion. Moreover, to verify the result, MATLAB2014a software has been used. In this design, input DC voltage of 10kV, switching frequency of 1.65 kHz, grid frequency of 50Hz and balanced grid loads of star configuration (00, 1200, and 2400 degree) are considered. The simulated result has shown that inverter inversion efficiency is 96.8% and phase angle error is only 3.50 degrees.

ORAL 089 BEC

PHYTOREMEDIATION OF AMMONIACAL NITROGEN IN WASTEWATER USING *Eichhornia crassipes*: TOLERANCE LIMIT AND pH STUDY

Winnie Ting Huong Tien, Ivy Ai Wei Tan, Shanti Faridah Salleh, and
Noraziah Abdul Wahab

Faculty of Engineering, Universiti Malaysia Sarawak
Corresponding email: awitan@unimas.my

High ammoniacal nitrogen (AN) in industrial effluent must be treated before final discharge to prevent eutrophication phenomenon. Phytoremediation is recommended to be a better solution to treat wastewater with high AN content due to its cost-effective, environmental friendly and sustainable characteristics. Water hyacinth (*Eichhornia crassipes*) has been widely applied in phytoremediation technology to remove various types of pollutants. In this study, AN synthetic wastewater with varied AN concentrations of 10-200 mg/L was prepared to conduct tolerance limit test of water hyacinth for

10 days. The effect of pH on the physiochemical parameters of AN synthetic wastewater and water hyacinth biomass growth was also investigated. Under sunlight exposure, it was found that water hyacinth was able to survive up to 150 mg/L of AN concentration for duration of 10 days. The results showed that pH factor posed a significant impact on biochemical oxygen demand (BOD₅) and biomass growth of water hyacinth whereas less significant impact was exhibited on chemical oxygen demand (COD) and total suspended solids (TSS). Overall, water hyacinth has been shown to be a feasible macrophyte for phytoremediation of AN in wastewater.

ORAL 090 BEC

BIS-THIOUREA BEARING HALOGENATED ARYL AND APPLICATION ON ANTIBACTERIAL ACTIVITIES

Wan Sharifatun Handayani Wan Zullkiplee¹, Zainab Ngaini², Noratika Ramli² and Nur Izma Hani Ahmad Za'im²

¹Centre for Pre-University Studies, Universiti Malaysia Sarawak.

²Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author email: wzwsharifatun@unimas.my

A series of bis-substituted thiourea derivatives were synthesised by reaction of 1, 3-diacetylbenzoyl isothiocyanate with halogenated anilines. All synthesised compounds were characterised by FTIR, ¹HNMR and ¹³CNMR spectroscopy. The compounds were screened for their antibacterial activity against gram-negative bacteria (*E. coli* ATCC8739). The effect of molecular structure of the investigated compounds on the antibacterial activity is discussed.

ORAL 091 BEC

PREPARATION OF MANGANESE OXIDE-ACTIVATED CARBON CATALYSTS FOR THE OXIDATION OF BENZYL ALCOHOL: EFFECT OF CALCINATION TEMPERATURE

Melody Kimi¹, Bibie Nur Syafiqah Safiuddin² and Pang Suh Cem²

¹Centre for Pre-University Studies, Universiti Malaysia Sarawak

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author email: kmelody@unimas.my

Manganese oxide/Activated carbon (Mn₃O₄/AC) composites were prepared by deposition-precipitation method for oxidation of benzyl alcohol to benzaldehyde. The catalysts were characterized using X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM). The effect of calcination temperature (450-550°) on the catalysts physicochemical properties and catalytic activity were investigated. Mn₃O₄/AC calcined at 450°C showed the highest benzyl alcohol conversion at 63.8% and over 99% benzaldehyde

selectivity achieved within 2 h under low reaction temperature (353K). The smaller crystallite size of the samples promoted the conversion of benzyl alcohol.

ORAL 092 BEC

SYNTHESIS AND CHARACTERIZATION OF ALGINATE ENCAPSULATED ZIRCONIUM-BASED FERROMAGNETIC SORBENT FOR ADSORPTIVE REMOVAL OF DYES

Lim Soh Fong, Agnes Yung Weng Lee, Yat Seng Kam, and S.N. David
Chua

Faculty of Engineering, Universiti Malaysia Sarawak

Corresponding author: sflim@unimas.my

This paper provides insight on the removal of dyes from water using magnetic separation technique. A new alginate encapsulated zirconium-based encapsulated ferromagnetic sorbent has been synthesized by co-precipitation and electrostatic extrusion techniques. The ferromagnetic sorbent has the alginate as outer polymeric shell and zirconium-based iron oxides as inner ferromagnetic cores. The sorbent has the multi-functional properties as it is can be easily separated using external magnetic force, and effective in adsorptive removal of congo red, methyl violet, and methylene blue dyes. The sorbent was characterized by particle size analyser, Scanning Electron Microscope (SEM), Thermal Gravimetric-Differential Thermal Analyzer (TG-DTA), and Fourier Transform Infrared Spectroscopy (FT-IR). Adsorption assays were performed in batch using methyl violet, methylene blue, and congo red dyes as contaminants. The alginate encapsulated zirconium-based ferromagnetic sorbent was a potential candidate for removal of dyes under a magnetic field as separating agent. The present investigation demonstrates the ferromagnetic sorbent exhibiting good performance to remove the methyl violet, congo red, and methylene blue dyes from aqueous solutions. The adsorption experiments reveal that the adsorption performance is higher for the cationic dye than the anionic dye. The SEM and FT-IR studies show that the interaction characteristics between the dyes and the ferromagnetic sorbent where the surface of the ferromagnetic sorbent became smoother and less porous when the metal-O group (Zr-O and Fe-O) of the ferromagnetic sorbent attaches to the dye.

ORAL 093 BEC

IMPROVED MECHANICAL PROPERTIES OF SILANE TREATED JUTE/POLYETHYLENE/CLAY NANOCOMPOSITES

Md. Faruk Hossen^{1,2}, Sinin Hamdan¹, and Md. Rezaur Rahman¹

¹Faculty of Engineering, Universiti Malaysia Sarawak,

²Faculty of Science, University of Rajshahi, Rajshahi-6205, Bangladesh

Corresponding email: hmfaruk@unimas.my

In recent years, the jute reinforced polyethylene nanocomposites have developed attention to the scientists. Due to the hydrophilic nature of fiber and nanoclay, they exhibited poor interfacial interaction to hydrophobic polymer matrix. Thus, in this study, silane treated jute and organically modified different types of montmorillonite (MMT) nanoclay have been used for manufacturing the nanocomposites. Tensile tests were carried out to investigate the mechanical properties of the prepared nanocomposites. Fourier Transform Infra-Red (FTIR) and Scanning Electron Microscopy (SEM) were used for the surface characterization. The improved interfacial adhesion among jute, polyethylene (PE) matrix, and MMT within the nanocomposites were reflected on the mechanical behaviour. It was seen that, the treated jute composites showed higher tensile strength and modulus compared with that of raw one and also the nanoclay filled composites exhibited higher values compared to without nanoclay one. In addition, the MMT-1.31PS filled nanocomposites obtained highest improvement among the five nanoclays used in this work.

ORAL 094 BEC

ANTIOXIDANT PROPERTIES OF ENDOPHYTIC FUNGI ISOLATED FROM LOCAL MEDICINAL PLANT, *Morinda citrifolia*, *Piper nigrum* AND *Piper betle*

Syahir Norazi, Ahmad Husaini, Ngieng Ngui Sing, Edmund Sim, Sim Siong Fong and Hairul Azman Roslan.

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author email address: syahirnorazi@gmail.com

A total number of 21 endophytic fungi isolated from local medicinal plant, *Morinda citrifolia*, *Piper nigrum* and *Piper betle* were cultivated in vitro and their crude extracts tested for antioxidant properties. Total phenolic content (TPC) produced by the fungal endophyte was used as an initial screening to select three endophytes with the highest TPC value from each medicinal plant species. The selected endophytes with the highest TPC includes fungal isolates Mc 1.3 (0.234±0.024 mg/mL), Mc 1.4 (0.112±0.009 mg/mL) and Mc 2.6 (0.108±0.016 mg/mL) from *M. citrifolia*, fungal isolates Pn 1.2 (0.186±0.050 mg/mL), Pn 2.2 (0.109±0.014 mg/mL) and Pn 3.2 (0.088±0.003 mg/mL) from *P. nigrum* and fungal isolates Pb 1.3 (0.115±0.011 mg/mL), Pb

3.1 (0.100±0.034 mg/mL) and Pb 2.3 (0.087±0.002 mg/mL) from *P. betle*. These endophytes were then tested for their total flavonoid content (TFC) using flavonoid-aluminum chloride as a substrate and the results obtained shows that Mc 1.3 (0.121±0.007 mg/mL) produce the highest values of TFC while Pn 2.2 (0.043±0.002 mg/mL) produce the lowest amount among the selected fungal endophytes. Fungal extracts from these endophytes were further evaluated on their ability to scavenging free radical using a dye reagent 1-diphenyl-2-picrylhydrazyl (DPPH). The extract concentrations that decreases the initial DPPH radical by 50% (EC50) were determined. A fungal isolate obtained from *M. citrifolia*, identified molecularly as *Hypoxyton* sp. showed the highest scavenging effect with EC50 at 58.45±0.026 µg/mL while fungal isolate *Hypoxyton investiens* isolated from *P. betle* showed the least EC50 at 281.9±0.037 µg/mL. As fungal extracts tested with good radical scavengers can serve as a good source of safe natural antioxidants, our study here thus suggest that these bioactive compounds from endophytic fungi can be a potential source for antioxidants supplementary to human diet.

ORAL 095 BEC

STOMACH CONTENTS OF THREE CYPRINID FISH FROM LOGGED FOREST STREAMS IN SARAWAK (MALAYSIA, BORNEO)

Jongkar Grinang¹, Lee Nyanti² and Caroline Emang²

¹*Institute of Biodiversity and Environmental Conservation,
Universiti Malaysia Sarawak*

²*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak
Corresponding author email: gjongkar@unimas.my*

A total of 31 stomach samples of three cyprinid fish (*Tor douronensis*, *T. tambroides* and *Hampala bimaculata*) was analysed to determine food preference and dietary overlap of the fish species at logged forest streams in upper Rajang River, Sarawak, Malaysia. Frequency of occurrence and numeric proportion of aquatic insects in fish stomachs are relatively higher than other groups of macroinvertebrates. *Tor douronensis* and *T. tambroides* are selective feeders of Diptera, Trichoptera, Ephemeroptera and Coleoptera, whereas *H. bimaculata* prefers large-size preys such as crabs, Orthoptera, Odonata and Hemiptera. Pianka's overlap index shows high dietary overlap among the fish. Likewise, Detrended Correspondence Analysis shows composition of macroinvertebrates in the stomach does not have significant function among the fish species, which imply no group of macroinvertebrates is exclusively consumed by a single fish species. High diet overlap among the cyprinids suggests that the fish tend to prefer those abundant food sources. Interestingly, diet of *H. bimaculata*, which as piscivorous feed on small fishes, has showed high selectivity to nymphs of Ephemeroptera. High dietary overlap among fish fauna might have associated with food availability as a result of habitat disturbance by logging activities.

ORAL 096 BEC

CHARACTERIZATION AND BIOCHEMICAL PROPERTIES OF ENDOPHYTIC FUNGI

ISOLATED FROM *Aloe barbadensis* Miller (ALOE VERA)

Ahmad Husaini, Haifa Arghnia A. Jamal, Ngieng Ngui Sing, Carolynna Buyau James, Azham Zulkharnain, Dayang Salwani Awang Adeni and Hairul Azman Roslan.

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak
Corresponding author: haahmad@unimas.my

Growing need of bioactive compounds for various applications has resulted in the extensive exploitation of *Aloe barbadensis* Miller (Aloe Vera). Recent studies reported that endophytes in plants are a source of bioactive compounds with numerous biochemical properties. Therefore, the aim of this research is to examine the biochemical properties and bioactive compounds secreted by endophytic fungi isolated from Aloe Vera. A total number of five endophytic fungi isolates had been successfully isolated from Aloe Vera. Isolates S1, S2, S3, and S4 were chosen for further morphological, microscopic and molecular characterization. Molecular identification results revealed that S1 was *Colletotrichum gloeosporioides*, S2 and S3 were *Colletotrichum truncatum*, and S4 was *Xylaria* sp. The isolates were tested on their ability on antimicrobial and antioxidant activities. Based on the disk diffusion assay, *Xylaria* sp. and *Colletotrichum truncatum* showed antimicrobial inhibitory effect against pathogenic microorganisms tested. In terms of antioxidant activity, all of the isolates showed positive results in their total phenolic and flavonoid content and DPPH radical scavenging activity. It was revealed that *Xylaria* sp S4 conferred as the endophyte that having the highest antioxidant activity, followed by *Colletotrichum truncatum* S3, and *Colletotrichum gloeosporioides* S1 with the lowest antioxidant activity.

ORAL 097 BEC

THE EPIDEMIOLOGY OF CHRONIC MYELOID LEUKEMIA IN SARAWAK, BORNEO ISLAND

Kuan Jew Win¹, MS Michael², G Sashida³

¹*Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak*

²*University of Aberdeen, United Kingdom;*

³*International Research Center of Medical Sciences,
Kumamoto University, Japan*

Corresponding author: kuanjewwin@gmail.com

Very few published epidemiology studies of CML in South East Asia and none on East Malaysia, part of Borneo Island. We reported the cross-sectional study of adult CML patients in Sarawak. Results: Total 79 patients were identified from the databases. Compared to other area, median age at

diagnosis was young, 40, M:F was unusually high at 2.6:1, higher incidence 8.0/1,000,000/year in 2011-2016. The incidence was lowest among Iban, 12.8 and highest among Chinese, 19.5, which was 4x higher than Chinese in China. Presenting phase, symptoms, signs, laboratory data were similar to other regions. BCR-ABL1 transcript type was similar to other Asia countries. Quantitative PCR after three months of Imatinib had higher positive predictive value to predict Imatinib failure, 75%, compared to six months, 58%. Limitation in cytogenetic and PCR due geographical reasons should be addressed in the future development. Significant epidemiological differences warrant further study.

ORAL 098 BEC

IDENTIFICATION KEYS FOR THE SARAWAK PULCHRANA (AMPHIBIA: ANURA: RANIDAE) BASED ON CALL CHARACTERS

Ramlah Zainudin and Marly Matleen Ak Augustine

*Department of Zoology, Faculty of Resources Sciences and Technology,
Universiti Malaysia Sarawak.*

Corresponding author: zramlah@frst.unimas.my

The Sarawakian Pulchrana comprises of *P. baramica*, *P. glandulosa*, *P. laterimaculata*, *P. picturata* and *P. signata*. The aims of this study are to determine unique sound characteristics for species identification and to develop a dichotomous key based on advertisement calls. Through the Principal Component Analysis and Discriminant Factor Analysis, it was discovered that the variations of the advertisement calls of Sarawakian *Pulchrana* could discriminate the species within the genus. Call note, pulse duration, call energy, call frequency and call intensity are all useful groups in discriminating the Sarawakian *Pulchrana* species. Some of the useful call characters from Principal Component Analysis (PCA) and Discriminant Function Analysis (DFA) were used to develop dichotomous key based on the characters of advertisement calls. It was recommended that larger samples are needed and better recordings with low noises are used for more accurate and stronger species discrimination and identification via bioacoustic.

ORAL 099 BEC

A PRELIMINARY FINDING OF ECTOPARASITES-INFESTING RODENTS AND TREESHREWS IN A RESIDENTIAL AREA, OIL PALM PLANTATION AND FOREST IN KUCHING DIVISION, SARAWAK

Sieu Zhien Teo¹, Andrew Alek Tuen¹, Jin Kiet Tan², Yang Lee², and Yee Ling Chong²

¹*Institute of Biodiversity and Environmental Conservation,
Universiti Malaysia Sarawak;*

²*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak*

Corresponding author email: aatuen@unimas.my

Rodents and treeshrews are important components of landscape in which forests are continuously being cleared for agriculture and residential areas. These animals carry parasites and their associated zoonotic diseases, which may harm humans, their livestock and pets that occupy the same area. A study was therefore carried out to determine the species distribution of rodents and treeshrews in three different habitats in Kuching Division and also to collect and identify their ectoparasites. Small mammal trapping was carried out at a residential area in Kuching City, oil palm plantation in Kota Samarahan and limestone forest in Bau between September 2016 and April 2017 by using cage traps baited with banana, pineapple, tapioca, and salted fish. Only *Rattus rattus* was found in the residential area; *R. rattus* and *Sundamys muelleri* were found in oil palm plantation while *Tupaia longipes*, *Tupaia minor*, *Tupaia gracilis*, *Callosciurus notatus* and *S. muelleri* were found in the limestone forest. Rodents from both residential area and oil palm plantation had more diverse ectoparasite communities comprising *Ixodes granulatus*, *Dermacentor* sp., *Laelaps* spp., *Hoplopleura* sp., and *Chigger* sp.1 compared to rodents from forest that were only infested with *Laelaps* spp. and *I. granulatus*. *Laelaps* spp. was the most common ectoparasite recovered from the animals in the three different habitats. Furthermore, chiggers were only found on the rodents trapped in oil palm plantation where they usually attached themselves to the rodents' ear-lobes. This study showed that landscape change not only affects the diversity of small mammals but their ectoparasite infestation as well.

ORAL 100 BEC

MICROCLIMATE AND PHYSIOLOGICAL EFFECT ON SPECIES OF CONSERVATION IMPORTANCE OF CAVE DWELLING BATS ROOST CHARACTERISTIC AND PREFERENCES IN SARAWAK

Praveena Rajasegaran, Nursyafiqah Shazali and Faisal Ali Anwarali Khan
Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

Corresponding author: akfali@unimas.my

In Sarawak bats are species of conservation importance and they are protected by the state law. This is primarily due to the rapid development where natural habitat especially cave that holds large number of bats is converted into agricultural and industrial land. This pose great threat to bats that use cave as their roosting site suggesting that study on bat roost ecology are crucial in order to properly protect this species. Therefore, in this study we investigate the effect of cave microclimate and physiological parameters in bat roost preference in Fairy Cave Nature Reserve (Fairy Cave NR). The microclimate and physiological parameter such as temperature (°C), relative humidity (RH), light intensity (lux), air flow, passage dimension (m), roost height (m) and distance of roost from nearest entrance (m) were measured. Result showed that a total of four species of bats, *Emballonura monticola*, *Hipposideros diadema*, *Hipposideros larvatus* and *Penthetor lucasi* were found roosting in Fairy Cave NR. These bats can be distinguished by their colony size, roost posture, spatial arrangement and position of the roost. *Penthetor lucasi* make up the largest colony in the bright zone whereas *E. monticola* has the smallest colony occupying the twilight zone throughout the cave. Members from the family Hipposideridae roost in the dark portion of the cave with zero light intensity. *Emballonura monticola* utilize the hottest roost in the cave compared to the other microbats whereas *H. diadema* inhabit the coolest roost in Fairy Cave NR. Physiological parameter such as light intensity, passage dimension and distance from nearest entrance are the significant parameters in roosting preferences at Fairy Cave NR. These parameters should be monitored to ensure the sustainability of these species in the cave.

ORAL 101 BEC

ASSESSMENT OF WILD SALTWATER CROCODILE POPULATION IN BAKO RIVER, WESTERN SARAWAK, MALAYSIAN BORNEO FOR POTENTIAL ECOTOURISM INDUSTRY

Ruhana Hassan¹, Muhammad Amirul Arib Md Adzhar¹, Mohd Izwan Zulaini Abdul Gani¹ and Rambli Ahmad²

¹*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

²*Sarawak Forestry Corporation Sdn Bhd*

Corresponding author: hruhana@unimas.my

Saltwater crocodile, *Crocodylus porosus* could be found in almost all water bodies in Sarawak, Borneo. For decades, crocodiles are feared by the public, but the sentiment has gradually changed because local people livelihood has improved by ecotourism industry. Wild crocodile sighting is now being offered as one of ecotourism products in Sarawak but the activity is based solely on local knowledge. Scientific evidence is crucial to improve ecotourism industry. Therefore, the objective of this study is to determine relative density and distribution of saltwater crocodile along the Bako River, Sarawak during

different monsoon seasons. Standard night spotting technique was deployed during northeast monsoon (NEM), southwest monsoon (SWM) and inter-monsoon (IM) while day surveys were carried out to document riparian landscape along the river. Selected water quality parameters namely pH, temperature and salinity were measured in situ while cumulative rainfall data obtained as secondary data. Approximately 117, 60, 92 wild crocodiles had been spotted along the 15 km of the river during SWM, IM, and NEM, respectively. Relative density fluctuated with 3.65, 1.93 and 4.67 non-hatchling/km during SWM, IM and NEM, respectively. Adults could be seen either resting on river banks or in the middle part of the river while juveniles appeared in small groups near the mangrove patches. Selected water quality parameters of the rivers falls within the range of good tropical estuarine ecosystem. Data obtained will help relevant state agencies and ecotourism industry players in Sarawak to improve on the crocodile watching activity offered to tourists. This is important in order to ensure maximum enjoyable experience (without compromising safety) among tourists as well as benefit local communities.

ORAL 102 BEC

POPULATION GENETICS ANALYSES OF ENDANGERED PROBOSCIS MONKEY FROM MALAYSIAN BORNEO

Norfarhana Mazlan¹, Mohd Ridwan Abd Rahman², Roberta Chaya Tawie Tingga², MT Abdullah³ and Faisal Ali Anwarali Khan¹

¹Faculty of Resource Science and Technology, Universiti Malaysia Sarawak

²Centre for Pre-University Studies, Universiti Malaysia Sarawak

³Kenyir Research Institute, Centre for Kenyir Ecosystem Research, Universiti Malaysia Terengganu

Corresponding author: akfali@unimas.my

Nasalis larvatus is an endemic species to Borneo Island. It is listed under IUCN Red List as endangered with a decreasing population trend. Nevertheless, the biological information especially the genetic diversity of the species is still lacking due to their fragmented distribution. This study aims to determine the genetic variation and structure of *N. larvatus* populations within Malaysian Borneo (Sarawak and Sabah), hence explaining gene flow among known population. The genetic variation and structure of *N. larvatus* were examined using 1434 bp *Cytochrome Oxidase* subunit I (COI) gene region of mitochondrial DNA. The COI gene sequences revealed very low genetic variation among *N. larvatus* populations in Malaysian Borneo. This may be affected by the bottleneck effect with no population expansion observed through our analyses in recent years. Analysis of molecular variance (AMOVA) showed that the subpopulations are significantly differentiated from larger populations and might have experienced population changed. Although COI gene is not commonly used in studying population level genetic variation within a species, our study highlight that there are enough haplotypes

suggesting that proboscis monkey would have originated from Sabah. This is inferred based on the location of most shared haplotype found in our limited samples from Malaysian Borneo.

ORAL 103 BEC

ABUNDANCE AND ACTIVITY PATTERN OF NIGHT FLYING INSECT IN KUCHING CITY AND THREE RURAL TOWNS IN WESTERN SARAWAK, MALAYSIA

Andrew Alek Tuen¹, Siti Sarah bt Saharuden², Siti Amira bt Abdul Ghani² and Ratnawati bt Hazali²

¹*Institute of Biodiversity and Environmental Conservation,*

²*Faculty of Resource Science and Technology,
Universiti Malaysia Sarawak*

Corresponding author: aatuen@unimas.my

Human have modified the landscape and created new habitats for themselves much to the detriment of the environment especially other organisms. Insects however seem to adapt well to these new habitats, causing considerable discomfort to the human inhabitants while at the same time themselves being prey items to insectivorous birds and bats. Knowledge of these insects and their activity pattern is crucial to effective management of their impact on humans. A recent study was carried out to determine the major groups of insects present in towns and city in Western Sarawak. The survey was conducted in Kuching City and Bau, Lundu and Serian town using a modified aerial net mounted at the back of a pickup truck. The net was towed at a constant speed of 40 km/h over a distance of one kilometer every 30 minutes starting from 6:30 until 9:00 pm. The majority (>99% in city and 98% in town) of the insects caught were less than 5 mm in size. The number of insect netted in the outskirts of the city (1203 individuals) is significantly ($p < 0.05$) higher than in the city centre (496 individuals). However there was no significant difference in the number of insects netted between Bau, Lundu and Serian town with 423, 600 and 349 individuals, respectively. Six orders of insects were identified and the majority was from the order Diptera. Peak insect activity in the city centre (6:30-7:00 pm) was slightly earlier than in the outskirts or towns of Bau, Lundu and Serian (7:00-7:30 pm). Different insect groups were active at different time of the evening depending on sampling location, however there was no common pattern. Diptera tend to be active early (6:30-7:30 pm) while Lepidoptera were active later (8:00-9:00 pm). This study shows that peak activity occurs between 6:30 and 7:30 pm and small Dipterans were the most abundant night flying insect.

COMPARATIVE DISTRIBUTION OF SMALL MAMMALS DIVERSITY IN PROTECTED AND NON PROTECTED AREA OF MALAYSIA

Julius William Dee¹, Qhairil Shyamri Rosli¹, Muhd Amsyari Morni¹, Nur Izzati Abdullah³, Lee Lim Sim³, Mohd Isham Mohd Azhar³, Roberta Chaya Tawie Tingga², Mohd Ridwan Abd Rahman² and Faisal Ali Anwarali Khan¹.

¹*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

²*Centre for Pre-University Studies, Universiti Malaysia Sarawak*

³*Faculty of Natural Science and Sustainability,
University College Sabah Foundation*

Corresponding author: akfali@unimas.my

As a developing country, Malaysia faces continuous geographical landscapes changes due to urbanisation and anthropogenic activities. Forested areas especially those that are close to urban area or with anthropogenic activities are the primary areas that may undergo habitat degradation. Therefore, there is an urgency to assess our forest including non-protected areas for the diversity of flora and fauna that may be unique and of conservation importance. This will allow the potential disturbances on animal diversity being identified and help in planning effective conservation management plans for the selected sites. In order to achieve this goal, we conducted surveys at Tasik Bera, Ulu Gombak Forest Reserve, Sungkai Wildlife Conservation Centre, Penang Island (consisting of 3 sites) and Wang Kelian State Park to document and assess species of small mammals including bats, rodents and shrews. Harp traps, mist-nets, cage traps and pitfall traps were set during the surveys. Based on our survey data from all the five forest sites, *Rhinolophus affinis* was recorded with the highest abundance (N= 61), followed by *R. lepidus* (N=27) for volant small mammals. Meanwhile, the highest abundance of non-volant small mammals is set by *Leopoldamys sabanus* (N=33), followed by *Maxomys rajah* (N=25) and *Tupaia glis* (N=22). Two species of shrew, *Suncus etruscus* and *Crocidura monticola* were caught as singletons. Statistical analysis showed Ulu Gombak Forest Reserve has the highest species diversity index ($H' = 2.754$), whereas Penang Island is recorded as the lowest ($H' = 2.245$). Our survey results provided small mammal species lists of this decade for the future conservation and monitoring plans of our visited sites.

ORAL 105 BEC

HISTOLOGICAL DESCRIPTION OF THE BORNEAN HORNED FROG *Megophrys nasuta* (AMPHIBIA: ANURA: MEGOPHRYIDAE) SKIN STRUCTURE FROM DIFFERENT BODY REGIONS

Ramlah Zainudin¹, Elvy Quatrin Deka¹, Dayangku Norlida Awang Ojep²,
Lela Su'ut², Aida Shafreena Ahmad Puad¹, Mohd Azlan Jayasilan¹ and
Ahmad Hata Rasit²

¹*Faculty of Resources Science and Technology,*

²*Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak.*

Corresponding author: zramlah@unimas.my

Skins are the first protection barrier for the frog species that protect them from high temperature, chemical toxics, and over exposure to sunlight. Thus, variation in skin characteristics might reflect their adaptation to environment. Since leaf litter frogs are facing threats to habitat fragmentation, we investigate the skin structure of the Bornean leaf litter horned frog *Megophrys nasuta*, from different body regions. Histological analysis of the frog skins and slide preparations using Haematoxylin and Eosin staining protocol were employed. Findings indicate that all body regions of *M. nasuta* skins have similar characteristics of the strata, epidermis and dermis layers. However, thickness of the epidermis layer and glands distribution varies between dorsal and ventral (areas that were first in contact with the environment) thus suggesting their adaptation strategy. The observed distributions of serous and mucous glands on different skin regions might also reflect the habit of this species in their natural habitat. These results may help in understanding the function of the skin structure to meet their ecological needs especially in the changing environment at fragmented area. The data should be extended and explored to study the effects of habitat fragmentation on the amphibians.

ORAL 106 BEC

DISTRIBUTION AND OCCUPANCY OF HORNBILLS IN WESTERN SARAWAK

Philoveny anak Pengiran¹, Sim Lee Kheng², Oswald Braken Tisen²,
Andrew Alek Tuen³ and Jayasilan Mohd- Azlan¹

¹*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

²*Sarawak Forestry Corporation, Kuching;*

³*Institute of Biodiversity and Environmental Conservation,
Universiti Malaysia Sarawak*

Corresponding author: azlan@unimas.my

There are eight species of hornbills in Borneo. However little is known on the distribution and ecology of hornbills in western Sarawak. Their large size requires habitats that consist of large forest patch with large fruiting trees for feeding and nesting. They have an important ecological niche function as

seed dispersers throughout the tropical rainforests of South East Asia. This study briefly describes the distribution of hornbills in Totally Protected Areas (TPA) within western Sarawak. We discuss the hornbill species distribution and the species area relationship within western Sarawak. The most common hornbill species found in TPA of western Sarawak is the black hornbills (*Anthracoceros malayanus*) followed by the bushycrested hornbills (*Anorrhinus galeritus*). The rhinoceros hornbills (*Buceros rhinoceros*) and helmeted hornbills (*Rhinoplax vigil*) appear to occur in fewer TPA within western Sarawak. The occupancy of the hornbills within western Sarawak is also discussed. A long term conservation plan is required to ensure the sustainability of the hornbill population through extending protected areas and connecting forest patches.

ORAL 107 BEC

SUSTAINABLE COMMUNITY-BASED MARINE DEBRIS FRAMEWORK: KAMPUNG PULO SALAK EXPERIENCE

Ruhana Hassan¹, Shahren Ahmad Zaidi Aduce², Abang Mohd Heikal
Abang Othman², Khairul Adha Abd Rahim¹ and Roslianah Asdari¹

¹*Faculty of Resource Science and Technology,*

²*Institute of Borneo Studies, Universiti Malaysia Sarawak*

Corresponding author: hruhana@unimas.my

Marine debris is an eyesore, affects the health of wildlife, people and hurts local economies. People in Kampung Pulo Salak claim nothing much could be done on marine debris issue, blaming the location of the village which is at the mercy of nature - rising and ebbing tides. Limited knowledge on the marine debris has led to unresolved marine debris problem. Therefore, UNIMAS spearheads research efforts and works, to change behaviour among the public through outreach and education initiatives. This study has successfully established a framework suitable for marine debris awareness program. The highlight of one-day education initiative program was involvement of academia, university students, state agencies and local people in the collection of marine debris followed by sorting the debris into categories, counting the items and weighing. This exercise helps to enhance understanding on marine debris and act as the catalyst to find possible solutions. Approximately 438.4 kg (16, 434 items) of marine debris was collected around the village. Plastics was the dominant category with 50% (216.7 kg; 14, 094 items) followed by fabrics 29.2% (126.3 kg; 1,642 items), rubber 10.8% (46.7 kg; 310 items), metal 6.7% (29.7 kg; 291 items) and glass 4.4% (19 kg; 99 items). The overwhelming amount of plastic debris requires a change of attitude. By giving economic value on marine debris, the level of awareness among the villagers had increased. Besides positive attitude shown by local people, continuous support from NGOs and other agencies is paramount to reduce and solve marine debris problem.

SUSTAINABLE COMMUNITY TRANSFORMATION

ORAL 001 SCT

RISK FACTORS OF PRETERM DELIVERY AMONG MOTHER WITH PRETERM CONTRACTION IN SARAWAK

Soe Lwin, Myat San Yi, Mardiana binti Kipli, Tin Moe New and
Cheah Whye Lian

Faculty of Medicine & Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: lsoe@unimas.my

Preterm delivery is a one of the major maternal health issues globally. This preliminary descriptive study was undertaken to determine characteristics of preterm delivery among mothers who were admitted for pre term contraction. Materials and Methods: It was a cross-sectional study carried out at the Sarawak General Hospital, Kuching, Sarawak among admitted patients presented with pain and contractions in early 3 rd trimester. Data were collected using face-to- face interview guided questionnaire based on the Pregnancy Risk Assessment Monitoring System (PRAMS), and medical records of the respondents. A total of 276 patients were recruited in this study with 85.1% went into preterm delivery. Out of these preterm delivery respondents, 17.0% were from age group of 18 and below and 13.2% from age group 35 and above, 7.2% with past history of genital tract infection, 30.2% with history of pre-existing diabetes mellitus, 58.7% with preterm labor rupture of membranes, 2.6% with complications during puerperium, have a higher rate of normal delivery (76.1%), 35.7% with genital tract infection, majority from parity groups of parity 0-4 (97.4%) and primigravida (52.4%). The study demonstrated that preterm delivery is still a challenging maternal health issue and current antenatal care and services need to be further strengthened particularly during the patients' admission in the hospital.

ORAL 002 SCT

WORKPLACE BULLYING AND ITS ASSOCIATION WITH DEPRESSION AND SELF-ESTEEM AMONGST HEALTH CARE WORKERS IN SELECTED HOSPITALS IN SARAWAK

Peter Chang Chung Meng, Anselm Su Ting and Md Mizanur Rahman

Faculty of Medicine & Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: stanselm@unimas.my

Bullying at the workplace has been recognised as an increasing problem amongst healthcare staff, and has been associated with a low self-esteem and depression. This study was aimed to determine the proportion of bullying amongst healthcare workers in selected hospitals in Sarawak and its association between depression and self-esteem. A cross sectional study using self-administered questionnaires was done in three selected hospitals in Sarawak. The questionnaires were distributed to doctors, nurses and medical assistants during their teaching sessions. The questionnaires

consisted of socio-demographics, Negative Acts Questionnaire (NAQ), Beck Depression Inventory (BDI), and Rosenberg Self-Esteem (RSE) scale. A sample size of 426 was included for analysis, after discarding 72 samples due to grossly missing information. The response rate was 71.1%. The mean age of the respondents was 32.5 years. Nurses comprised 45.5% of the study population, followed by doctors (37.8%), whilst the rest were medical assistants and midwives. Based on the definition of bullying as at least two occurrences of any negative act either on a weekly or daily basis, 20.7% of respondents had been bullied. 22.5% of the study group had mild to severe depression, and 8.5% had a low self-esteem. There was an association between depression and being bullied, with a p value of <0.001 . Those healthcare workers who had a low self-esteem were associated with higher exposure to bullying, with a p value <0.001 . The factors associated with bullying were the younger age group, shorter length of service, shifting work, non-managerial position and the designation as a doctor. A significant proportion of healthcare workers had been bullied, and bullying exposure was shown to be associated with depression and low self-esteem. Hence, regular screening for bullying, depression and low self-esteem should be done to enable early intervention.

ORAL 003 SCT

PREVALENCE OF CARDIOVASCULAR RISK FACTORS AND ITS DIFFERENCES BETWEEN GENDERS IN A PUBLIC UNIVERSITY

Myat Su Bo, Cheah Whye Lian, Ng Ming Hui, Dayang Nur Fazrina Awang Buang, Mimi Syazwani Junaidi, Isthara Uding Shilling, Soe Lwin, Tin Moe Nwe, Than Than Win and Myint Aung

Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak
Corresponding author email: dperera@unimas.my

Non-communicable diseases (NCDs) are one of the important determinants associated with longevity of human life. The cardiovascular disease (CVD) risks for men and women are the same, but there may be gender differences in the prevalence of risk factors. This study aimed to determine the CVD risks between male and female government staff of a public university in Sarawak. It was a cross-sectional study carried out among the staff of a public university in Sarawak. Using universal sampling, all the respondents from seven administrative divisions and nine faculties, who fulfilled the inclusion criteria, were invited to participate. Data was collected using questionnaire, anthropometric, blood pressure measurement and taking blood sample. Data was analyzed using SPSS version 20. A total of 349 respondents participated with majority females (66.8%), aged 38.5 ± 7.82 years. The obesity related indicators showed prevalence of obesity among the respondents (79.9% of overweight and obese, 87.0% of high and very high body fat percentage, and

46.8% of high and very high visceral fat). Blood profiles indicated 15.5% had hypercholesterolemia, 16.1% had high levels of low density lipoprotein (LDL-C), 15.8% had low levels of high density lipoprotein (HDL-C), 10.6% had high levels of triglyceride (TG), 16.4% had high atherogenic index of plasma (AIP) and 12% of respondents had hyperglycemia. For comparison between male and female respondents, significant differences were observed for systolic blood pressure, diastolic blood pressure, LDL-C, HDL-C, TG, AIP, body fat percentage, and visceral fat with $p < 0.01$. There is an immediate action to develop an intervention program at the workplace to help to address this health issue. A routine health screening should be done in place to help for identifying government employees at high risks of cardiovascular disease.

ORAL 004 SCT

A PROSPECTIVE STUDY ON THE EPIDEMIOLOGY OF ACUTE SEVERE COMMUNITY ACQUIRED VIRAL LOWER RESPIRATORY TRACT INFECTION IN CHILDREN AGED 5 YEARS AND BELOW IN SARAWAK

Chai May Yin, Ooi Mong How and David Perera

Institute of Health and Community Medicine, Universiti Malaysia Sarawak

Corresponding author email: dperera@unimas.my

The epidemiology of acute lower respiratory infections (ALRIs) in children younger than five years of age in Borneo has not been previously determined. Understanding the burden of disease in a Sarawak setting is important in order to improve strategies to reduce the overall morbidity and mortality of acute respiratory disease. A three-year prospective study was conducted from November 2012 to October 2015 among children with ARTIs aged five years and below who were admitted into the High Dependency Unit and Intensive Care Unit at 3 major hospitals in Sarawak including Sarawak General Hospital (SGH), Sibu Hospital and Bintulu Hospital. A previously published multiplex PCR/RT-PCR capable of detecting 18 respiratory viruses was used in this study. Nasal flocced swab (NS), nasopharyngeal aspirates (NPA) or endotracheal tube secretion (ETT) from eligible children were collected and tested. A total of 1203 viruses were detected in 902 of a total 1165 (77%) hospital admission episodes. The most frequent detected viruses were respiratory syncytial virus (RSV) ($n=434$, 37.2%), followed by Human adenovirus (HAdV) ($n=339$, 29.1%) and Human rhinovirus (HRV)/enterovirus (EV) ($n=200$, 17.2%). Co-detections were common, occurring in 270/902 (30%) of ARTIs. The most prevalent co-detections were RSVHAdV ($n=90$) followed by HAdV-HRV ($n=60$). Overlapping seasonal trends of RSV and HAdV were observed. HAdV activity was positively associated with temperature while HPIV positively associated with temperature and negatively associated with rainfall. In conclusion, this three-year study provided an important baseline profile of the epidemiology of ALRIs in

hospitalized children in Borneo. RSV, HAdV and HRV were the predominant viruses associated with severe respiratory disease. As such, more effort should be put into the detection of RSV and HAdV rather than for influenza virus alone, which is typically done presently. From a public health perspective, information on the prevalence and seasonality of respiratory viruses are crucial as a basis to optimize the timing of interventions for future vaccination programs.

ORAL 005 SCT

MATERNAL AND FOETAL OUTCOMES IN TRIAL OF LABOUR WITH A PREVIOUS LOWER SEGMENT CAESAREAN SECTION SCAR AT SARAWAK GENERAL HOSPITAL, 2010

Yee Yee Kyaing¹, Awi Anak Idi¹, Mardiana Binti Kipli¹, Haris Njoo Suharjono² and Kyawswa Mya³

¹*Faculty of Medicine and Health Sciences, University Malaysia Sarawak*

²*Department of Obstetrics and Gynaecology, Sarawak General Hospital, Sarawak, Malaysia*

³*Department of Biostatistics, University of Public Health, Yangon, Myanmar*
Corresponding author email: ykyee@unimas.my,

The objective of this project is to maternal and foetal outcomes in women on trial of vaginal delivery with a previous caesarean section scar (Vaginal Birth After caesarean section) at Sarawak General Hospital, Malaysia in 2010. The population of study are all pregnant women with a previous lower segment caesarean section scar who had no prior vaginal delivery and chose trial of labour at Sarawak General Hospital in 2010. This study was conducted in Sarawak General Hospital through the antenatal, intrapartum and postnatal records. A total of 390 women with a previous caesarean section scar who had no prior vaginal delivery were eligible for this study. Successful vaginal delivery rate was 53.3% (95% CI- 48.2% - 58.3 %). There was neither maternal mortality nor lower segment caesarean section scar rupture. There were 2 cases of lower segment caesarean section scar dehiscence (partial uterine rupture) among the women of failed Vaginal Birth After caesarean section (VBAC) group. There was 4 women had blood loss more than one litre, during TOLAC (trial of labour after caesarean section) and out of these, one woman (25%) was from the group of successful VBAC (Vaginal Birth After caesarean section) and 3 women (75%) were from the group of failed VBAC (Vaginal Birth After caesarean section). It was statistical significant ($p = 0.018$). Although blood transfusion was more common among women of successful VBAC, it was not statistical significant ($p=0.258$). Successful VBAC (Vaginal Birth After caesarean section) rate was significantly associated with foetal birth weight i.e (56.1%) in the group of foetal weight between 2.5 to 3.5 Kilogram vs. (36.4%) in the group of foetal weight more than 3.5 Kilogram ($p= 0.048$). Newborns with Apgar score less than 7 after 1

minute of delivery were more common in failed VBAC (Vaginal Birth After caesarean section) than successful VBAC i.e. 10 newborns (76.9%) vs. 3 newborns (23.1%) ($p = 0.026$). Neonatal intensive care unit (NICU) admission was not significantly different between successful and failed VBAC (Vaginal Birth After caesarean section). ($p = 0.595$). Majority of newborns to NICU admission were premature showing 8 newborns (33.3%) were from group of gestational weeks less than 37 weeks and remaining 3 newborns (0.8%) were from group of gestational weeks more than 37 weeks. ($p < 0.001$).

ORAL 006 SCT

CALORIE INTAKE AND FACTORS ASSOCIATED WITH FOOD CONSUMPTION

Mar Mar Lwin, Cliffon Akoi Anak, Khin Than Yee and Khin Cho Aung
Faculty of Medicine and Health Sciences, University Malaysia Sarawak
Corresponding author email: mlmar@fmhs.unimas.my

Medical students experience time constraints and stress in studying thus they tend to have an imbalanced diet. This cross-sectional study assessed the calorie intake and factors associated with food consumption among second year medical students in the Faculty of Medicine and Health Sciences of Universiti Malaysia Sarawak (UNIMAS). A total of 101 students completed the self-administered questionnaires regarding the knowledge and attitude about food consumption, factors affecting food intake and a 24-hour dietary recall. More than half (52.5%) of participants had normal BMI. 4.0% were Obese Class II. The participants had overall good knowledge on food consumption, calorie content, hygienic food preparation and balanced diet. Almost three-quarters (73.3%) took breakfast and 80.2% considered to reduce fast food consumption. More than three-quarters (76.2%) consumed food for the tastiness. There was a strong positive correlation between respondents' knowledge and total calorie intake ($p < 0.05$). This study has found that majority of the respondents had normal BMI and had good attitude towards food consumption where they take breakfast in the morning and they do not consume fast food between meals. However, majority of them also eat food because they taste nice even though it has high calories. The main factor which affects the student's food consumption is the biological factor in term of types of food chosen, amount of food taken and frequency of meals consumed. When it comes to choose the food outlet, majority of the respondents were affected with the environment factor. It is indicated that there is significant relationship between respondents' knowledge and total calorie intake. The total calorie intake differs between male and female. Eating three meals or more per day is the most common subject's frequency of eating daily. Majority of the students had one to two servings of fruit per day. This study has found that knowledge plays an important role in total calorie intake. The results suggest that the subjects were more concern about

the taste of the food rather than the cost and nutritional value when it comes to eating.

ORAL 007 SCT

ADAPTATION TO THE CLIMATE CHANGE BY REAL-ESTATE SECTOR: A CASE STUDY IN DEVELOPING COUNTRY

Mehedi Islam and Rohaya Mohd-Nor

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: mnrohaya@feb.unimas.my

Adaptation to minimize negative impacts of climate change on vulnerable community is a serious concern for developing countries. Though with limited resources and capacity of those governments urgently requires engagement of private sector in adaptation, the responses from businesses or private sector are less visible. The objective of the case study is to explore how a real-estate business in developing country is engaging itself in adaptation to climate change and what are the main drivers and barriers in the adaptation process. Findings: The case study reveals that though organization might recognize climatic stimuli to affect business performance, adaptation responses is limited or deferred due to a number of external and internal barriers like low-awareness, in effective leadership, high price of adaptation technology, lack of information and adaptation finance, corruption, political unrest, and unfriendly regulatory environment. To engage real-estate sector successfully, we must remove those barriers. Government must incentivize the real-estate sector by changing urban planning, building code, taxation, energy regulation, and other financial and environmental laws. Government also needs to communicate climate risks and opportunities, patronize research, and increase collaboration among private sector for technology transfer and knowledge sharing. Real-estate companies also need to change corporate governance to raise employee awareness and improve social responsibility. Findings of the study have significant implication in sustainable construction management and developing effective public policy for climate adaptation in developing countries.

ORAL 008 SCT

RURAL WOMEN ENTREPRENEURS ENROLMENT INTO SUSTAINABLE SUPPLY CHAIN NETWORKS: FROM ACTOR NETWORK THEORY PERSPECTIVE

Sidikat Shitu and Rohaya Mohd-Nor

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: mnrohaya@feb.unimas.my

Rural women entrepreneurs in the West African sub-region are considered as focal actors at the bottom of many commodity supply chains. Evidently, the positions they occupy in supply chain are fraught with connected challenges of sustainability which hinders them from efficiently participating in global supply chains. Despite the critical role of rural women entrepreneurs in the West African sub-region, majority of them have not been practicing responsible and sustainable supply chains. In view of these snags, multi-stakeholders are required to collaborate and intervene by developing processes of enrolling rural women entrepreneurs into sustainable supply chain networks (SSNC). Hence, an exploration of the enrolment process utilizing the four moments of translation of the Actor Network Theory (ANT) in the context of the shea butter industry with a cross-border supply chain network as a case study is presented in this paper. Consequently, it is found that the enrolment process is shaped by the collaborative relationships within the external context which comprises the influencing stakeholders. It is also found that sustainability standards can serve as the obligatory passage point to transmit sustainability principles to the women within and beyond the traditional supply chain networks.

ORAL 009 SCT

DETERMINANTS OF KNOWLEDGE TRANSFER IN THE MULTINATIONAL CORPORATIONS

Yuen Yee Yen, Low Zheng Quan, Devinaga A/P Rasiah and Ramasamy
A/P Suganthi

Faculty of Business, Multimedia University, Malaysia
Corresponding author email: yyyuen@mmu.edu.my

Knowledge transfer implementation in Malaysia based multinational corporations (MNCs) is still very low. Most of the employees do not realize the benefits of transferring knowledge between each other. In view of very limited previous research on effective knowledge transfer in MNCs Malaysia, this study is conducted to examine the impact of the relational, cognitive and structural social capitals, as well as geographical, cultural and technological distance on the effectiveness of knowledge transfer in MNCs. The result shows that relational capital and cultural distance significantly affect knowledge transfer effectiveness in MNCs.

ORAL 010 SCT

The Impacts of Tourism Development on Poverty Alleviation in Sarawak

Komathi Wasudhawan and Rossazana Ab-Rahim
Faculty of Economics & Business, Universiti Malaysia Sarawak
Corresponding author email: arrossazana@unimas.my

The study aims to investigate economic impact of tourism development such as local economy development, tourism entrepreneurial activity and tourism employment generation in alleviating poverty. Five hundred and twenty local community from Kuching and Miri, East Sarawak, Malaysia have participated in the research. The result indicates that the tourism development contributes to the local economy development, creates tourism entrepreneurial activity and generates tourism employment among the local communities' in increasing the household income.

ORAL 011 SCT

BOARD DIVERSITY AND FINANCIAL SUSTAINABILITY IN CHARITIES: A MALAYSIAN PERSPECTIVE

Sharon Cheuk, Esmie Nichol, Michael Tinggi and Tin Hla Daw
Faculty of Economics and Business, Universiti Malaysia Sarawak
Corresponding author email: ccssharon@unimas.my

Charity failure has been a problem that has been plaguing developed countries and developing alike. In Malaysia, it has been reported that charities faced difficulties in raising donations due to the difficult economic climate. Past research has provided some evidence on the role of board diversity on the financial performance of for-profit organizations. This study examines the impact of board diversity in improving charity financial sustainability. A sample of 211 active charities (companies limited by guarantee) in 2016 was selected. Data on board diversity (age, gender, race and tenure) as well as financial sustainability were obtained and binary logistic regression via XLSTAT was performed. The findings suggested that director tenure diversity significantly predicts financial sustainability of charities. Age, race and ethnic diversity were found to be not significant. The implications of the study's findings mean that charities in general should embark upon regular new director appointments, in order to maintain a fresh outlook and to bring in new infusion of skills at the strategic and operational levels.

ORAL 012 SCT

ACCESSIBILITY AND DEVELOPMENT. A CASE STUDY FROM RURAL SARAWAK, MALAYSIA

Regina Garai Abdullah
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: argarai@unimas.my

It has been argued that accessibility has an important influence on the geography of development especially during periods of de-agrarianisation, when rural population disengage from rural farm work and venture into other

mainly non-agricultural pursuits. This paper explores just how different levels of accessibility to market affect the way in which households amend their livelihood strategies as alternatives to agriculture open up. The findings are based on data collected in face-to-face interviews using a semi-structured questionnaire. Twenty villages in Kapit Division, Sarawak, Malaysia were randomly selected in three different accessibility zones. Interviews were conducted at three different levels: the village head, head of the household and selected individuals within the household. The findings show how level of accessibility to urban markets influenced the livelihood strategies adopted at the different accessibility zones. It is found that, in the case of vegetable and other agricultural commodity sales, the further away the settlements are from the urban market, the less likely the residents will be involved in vegetable and commodity sales. By contrast, the most inaccessible zone adapts to this problem by resorting to 'alternative' markets. In other words, as rural dependence on agriculture as the main source of income lessened, the source of income of rural dwellers has become more diversified. The nature of this diversity has been heavily influenced, either direct or indirectly, by the degree of accessibility villages, households and individuals have to the closest urban area. The study highlights how accessibility to market raises opportunity for development (as proxied by income sources) but, at the same time, also increases inequality among communities, households and individuals.

ORAL 013 SCT

THE REACTIVITY OF RECOMBINANT CHIKUNGUNYA VIRUS E2 PROTEIN UNDER REDUCED AND NON-REDUCED CONDITION

Anna Andrew¹, Nur Aimi Aizzah Binti Azmi¹ and Magdline Sia Henry Sum²

¹*Faculty of Medicine and Health Sciences, University Malaysia Sarawak*

²*Institute of Health and Community Medicine, University Malaysia Sarawak*

Corresponding author email: aanna@unimas.my

Chikungunya virus (CHIKV) is a re-emerging virus which causes Chikungunya fever. It is becoming a concern as its clinical presentations are similar to dengue virus (DENV) infection. In Malaysia, CHIKV and DENV are endemic and thus differential diagnosis is crucial to improve treatment and clinical management. CHIKV infection can be underreported as diagnostic test is not routinely performed in most of the hospital laboratories. A serology assay to identify CHIKV is needed and thus the objective of this study is to generate CHIKV E2 recombinant protein that can be used as a target in developing an assay. CHIKV E2 gene was cloned, expressed and purified and the reactivity of the recombinant protein was determined by Western blot analysis under both reduced and non-reduced conditions. Serum sample from patients infected with CHIKV (CHIKV positive), non-CHIKV (CHIKV negative), DENV (dengue positive) and one from healthy human (PNR) was

used. We found that the recombinant protein was reactive against CHIKV positive serum and no reaction was detected with CHIKV negative serum under both reduced and non-reduced conditions. Interestingly, the antibodies in dengue positive and PNR sera recognized recombinant CHIKV E2 protein under reduced but not under non-reduced condition. This finding suggests that the linear epitope (reduced condition) of the recombinant protein can be recognized by antibodies other than CHIK antibodies and thus provide insight to apply CHIKV E2 protein in its conformational form in the future study involving serology assay and vaccine development. Since only one serum from each type of patient was used in this study, further works using more panels of serum samples is needed to assess the potential of this recombinant CHIKV E2 protein to be used as a target for developing serological assay.

ORAL 014 SCT

PRELIMINARY PHYTOCHEMICAL SCREENING OF THE POTENTIAL MEDICINAL PLANTS OF THE MELANAU IN PULAU BRUIT, SARAWAK, MALAYSIA

Siti Zaleha binti Raduan¹, Rasidah binti Abd Wahab¹, Dayang Hajrayati binti Awg Kassim², Alexander ak Chelum³, Asrul Asshadi B Mohamad Morni³ and Muhammad Wahizul Haswan B Abdul Aziz¹

Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak

Faculty of Social Science, Universiti Malaysia Sarawak

Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak

Corresponding author email: rszaleha@unimas.my

Potential medicinal plants are widely used by Melanau community in Pulau Bruit, Sarawak, Malaysia and their biological and phytochemical properties have not been thorough evaluated. By studying the presence of phytochemical, the uses of it in traditional treatment can be explained scientifically. Preliminary phytochemical screening was performed on ethanolic extracts of leaves of *Acanthus ebracteatus*, *Clinacanthus nutans*, *Derris trifoliata*, *Erigeron Canadensis*, *Gynura procumbens*, *Lygodium microphyllum*, *Macaranga pruinosa*, *Poikilospermum cordifolium* and the rhizomes of *Boesenbergia pulchella* and *Etingera littoralis*. The phytochemical compounds were determined using conventional chemical tests. Alkaloids were detected in all tested plant with various cloudiness of precipitation except *Macaranga pruinosa*. *Acanthus ebracteatus* contains highest concentration of alkaloid. Flavonoids were detected in all tested plant with various strength of the color except for *Gynura procumbens*. *Acanthus ebracteatus* and *Derris trifoliata* contains highest concentration of flavonoids. Saponins were detected in *Acanthus ebracteatus*, *Clinacanthus nutans*, *Derris trifoliata*, *Erigeron Canadensis*, *Gynura procumbens* and *Macaranga pruinosa* with various length of froth. Tannins were detected in all samples

with either brownish-green or blue-black colour appearance. It can be concluded that all tested plants do contain promising pharmacology properties based on the presence of various secondary metabolites.

ORAL 015 SCT

PREVALENCE AND ANTIBIOTIC SENSITIVITY PROFILES OF *Staphylococcus aureus* NASAL CARRIAGE AMONG PRECLINICAL AND CLINICAL MEDICAL STUDENTS IN A MALAYSIAN UNIVERSITY

Isabel Lim Fong, Efa Ezan binti Abdul Razak, Janice Tham Jia Mei, Nurul Akmal binti Safian, Ong Sheng Tian, Ng Poh Pheng, Helmy Hazmi
Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak
Corresponding author email: flisabel@unimas.my

Prevalence of Methicillin-resistant *Staphylococcus aureus* (MRSA) strains in healthcare (HA-MRSA) and community (CA-MRSA) incurred costly morbidity and mortality. Few studies had examined MRSA carriage among medical students. This study assessed the prevalence of SA carriage, particularly MRSA and their antibiotic sensitivity profiles from both preclinical and clinical cohorts. Results: A cross-sectional prospective collection of nasal swabs from 60 preclinical and clinical students yielded 93% positive SA (20 preclinical year students and 36 clinical year students) from the nasal swab samples. There were 4 SA negative samples collected from preclinical year students. The antibiotic sensitivity test was performed against a panel of antibiotics, namely erythromycin, fusidic acid, gentamicin, penicillin, vancomycin and methicillin. The most significant antibiotic sensitivity against SA was fusidic acid (p -value=0.0042). Overall, the SA and MRSA isolates from clinical year students were found to be more resistant than preclinical students against erythromycin (44%; 15%), fusidic acid (33.3%; 10%), penicillin (85%; 86.9%), vancomycin (11.1%; -) and methicillin (19.4%; 15%) respectively. On contrary, the culture samples obtained from preclinical year students were more resistant than clinical students against gentamicin (5%; -). This study found that gender, age and duration of clinical exposure did not have statistically significant bearing on the nasal carriage rate of SA and MRSA respectively. Both preclinical (15%) and clinical (19%) students were MRSA carriers in their nares without exhibiting any sign or symptoms of infection. These findings suggested that these medical students may be carriers of CA-MRSA than HA-MRSA as there was no significant correlation in duration of clinical exposure. This data would help to strategize a bigger study to plan an appropriate measure for monitoring CA-MRSA and HA-MRSA infections in hospitals and community as well as providing a baseline data for future genotyping and phylogenetic tree construction.

**THE RELATIONSHIP BETWEEN SOCIAL SUPPORTS AND WORK
FAMILY ENRICHMENT IN PUBLIC SECTOR: MEDIATING ROLE OF
OPPORTUNITIES OF PROFESSIONAL DEVELOPMENT**

Surena Sabil, Siti Balqis Wong Mohd Abdullah, Zaiton Hassan, Nur Fatimah
Abdullah Bandar and Farida Abdul Halim.

*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: surena7173@gmail.com

The interfaces between work and family had recently engaged numerous scholars in examining the nature of such interface both in the Western and Eastern contexts. Most of these studies however focused on the adverse nature of this interface rather than on the beneficial enrichment relationships between work and family which in turn could determine the choice of role balancing strategies utilized. Further to this, there are yet fewer studies exploring the relationship between the perception of being a member of a supportive social network and the enrichment nature of the work family interface with the opportunities for professional development as the mediator influencing the relationship between these variables. Thus, this study is important in closing the gap between social support encompassing the components of supervisory and organizational supports towards work-family enrichment. The study will also examine the mediating effects of opportunities to earn professional credentials on the relationship between social support and work-family enrichment among employees in public sector. A questionnaire survey was distributed to 150 employees and the data was analysed by using descriptive analysis and inferential analysis. The findings showed that social support comprises of supervisor support and organizational support was significantly related to work-family enrichment. Meanwhile, the opportunities to earn and maintain professional credentials partially mediate the relationship between supervisor support and work-family enrichment. The findings of this study will serve as important guidelines to develop planning strategies, implementing more effective policies in managing work and family role, promoting work-life balance, and quality of life among the employees that suit to their needs.

EARLY CARDIOVASCULAR MRI POST SUCCESSFUL REPERFUSION OF ACUTE MYOCARDIAL INFARCTION: AN EXPLORATORY STUDY

Norhanim Mohd Amin², Asri Said^{1,2}, Keng Tat Koh², Yen Yee Oon², Alan Yean Yip Fong², Yee Ling Cham², Sian Kong Tan², Ning Zan Khiew², Kuan Leong Yew², Chi Yen Voon² and Tiong Kiam Ong²

¹*Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak*

²*Department of Cardiology, Sarawak Heart Centre, Kota Samarahan, Sarawak*

Corresponding author email: sasri@unimas.my

Acute myocardial infarction has variable outcome despite successful thrombolysis. Long-term survival of post myocardial infarction (MI) requires titration of therapy which is not widely available throughout the state and thus, a need to risk-stratify patients to optimise limited resources. In this study, we used the presence of left ventricular (LV) remodelling as a surrogate for poor outcome post MI. Cardiac magnetic resonance imaging (CMR) is used to delineate factors that influence LV remodelling in successfully reperfused patients defined as TIMI-3 flow on coronary angiogram. Consecutive patients admitted to Sarawak Heart Centre from Dec 2012 to Nov 2014 with a diagnosis of acute anterior or inferior ST elevation myocardial infarction (STEMI) were screened. 119 patients were enrolled but only 101 patients had TIMI 3 flow. Patients underwent CMR during the index admission and a follow up CMR imaging between 3 to 6 months after the event. LV remodeling was defined as $\geq 15\%$ change in LV end-diastolic diameter from baseline. Mean age was 47.8 ± 19.1 years, 90.0% were males and 29.7% were active smokers. There were 41 anterior STEMI and 60 inferior STEMI. LV remodeling occurred in 21.8% of patients. Despite TIMI 3 flow, 38.6% of patients had microvascular obstruction (MVO). LV infarct size and MVO was also significant in those with LV remodelling on follow up ($p=0.002$ and $p=0.026$). Absence of MVO had a negative predictive value of 85.4% for LV remodelling. Door to perfusion time and total ischaemic time were not significantly different among those with MVO or LV remodelling. We had 15 major adverse cardiovascular event (MACE); 5 heart failures, 3 admissions to hospital, 1 myocardial infarction, 2 unstable angina, and 4 deaths. MACE was significant in those with larger infarcts ($p=0.037$), but not significant in MVO ($p=0.065$). Patients with LV remodelling had larger infarct size and MVO. Infarct size also predicted a poorer LV systolic function and MACE. Absence of MVO helps risk-stratification and pose a potential surrogate end-point to evaluate successful reperfusion strategies.

ORAL 018 SCT

GENOMIC DIVERGENCE BETWEEN TWO SYMPATRIC *Plasmodium knowlesi* SUBPOPULATIONS

Paul C. S. Divis^{1,2}, Craig W. Duffy², Khamisah A. Kadir¹, Balbir Singh¹ and David J. Conway^{1,2}

¹*Malaria Research Centre, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak,*

²*Pathogen Molecular Biology Department, London, School of Hygiene and Tropical Medicine, Keppel St, London WC1E 7HT, United Kingdom.*

Corresponding author email: pcsimon@unimas.my

Plasmodium knowlesi, a malaria parasite found in nature in long-tailed and pig-tailed macaques, is a significant cause of human malaria, particularly in Malaysian Borneo. A population genetic survey using a highly polymorphic microsatellite toolkit to study *P. knowlesi* isolates from humans and wild macaques across Malaysia indicated an admixture of two highly divergent subpopulations in Malaysian Borneo. One subpopulation (Cluster 1) was associated with long-tailed macaques and the other subpopulation (Cluster 2) was associated with pig-tailed macaques. These two major subpopulations identified by microsatellite analyses matches analysis of whole genome sequences of clinical isolates from Sarawak, Malaysian Borneo. To further investigate variation in genome-wide divergence between the sympatric subpopulations in Sarawak, new whole genome data was derived from 21 clinical isolates of Cluster 2 subpopulation and compared to those from a previous study of clinical isolates from Sarawak (Cluster 1, n = 41; Cluster 2, n = 10). This analysis revealed remarkable heterogeneity in the level of divergence between the sympatric subpopulations across the genome. Genomic architectures show 20 high-divergence regions scattered in different chromosomes. These findings suggest independent adaptation of *P. knowlesi* parasites in different macaque hosts that persist sympatrically.

ORAL 019 SCT

MOLECULAR EPIDEMIOLOGY OF DENGUE VIRUSES CIRCULATING IN KUCHING FROM 2014 TO 2016

Bong Kee Kai, Ooi Mong How and David Perera

Institute of Health and Community Medicine, Universiti Malaysia Sarawak

Corresponding author email: dperera@unimas.my

Dengue is an acute systemic viral infection that is associated with considerable mortality and morbidity. Presently, the disease is endemic in more than 125 countries and threatens approximately 40% of the world's population. Continuous upsurge of dengue infection has been estimated at nearly 400 million cases and 500,000 severe dengue cases worldwide per annum. Dengue virus (DENV), of the Flaviviridae virus family, manifests as

four genetically-related serotypes (1-4) which are further grouped phylogenetically into distinctive genotypes. In the present study, we investigated dengue samples collected over a 2 years period from 2014 to 2016 from the Sarawak General Hospital (SGH) and Borneo Medical Centre (BMC). Patient samples were tested for the presence of DENV by a combination of PCR and cell culture-based approaches. A total of 323 serologically positive dengue samples were tested and of these, 86 (26.6%) were tested positive for DENV. Additionally, another 467 serologically-negative dengue samples were also tested which yielded another 4 (0.9%) DENV positive samples. We observed that generally, higher rates of DENV positives were obtained from samples that were serologically positive for the NS1 antigen. A total of 124 patient samples were subjected to cell culture which yielded 61 DENV isolates (49.2%). PCR and sequencing targeting the entire envelope and portion of the capsid-premembrane (C-prM) junction genes revealed the circulation of DENV 1, 2 and 3. Additionally, phylogenetic analysis showed that DENV-1 isolates were clustered within genotype I, which has been dominating in Southeast Asian countries and were closely related to strains from neighbouring regions including Peninsular Malaysia, Singapore, Indonesia, and Thailand, indicating frequent exchanges of genotype I strains in the Southeast Asian region. DENV-2 isolates were grouped in the cosmopolitan genotype and further subdivided into two distinct sub-lineages. Some of the DENV-2 viruses of one sub-lineage were closely related to a Singapore strain sampled in 2012, indicating likelihood of virus introduction from Singapore due to geographical proximity. In contrast, DENV-2 isolates of the other sub-lineage were related to virus strains sampled from Peninsular Malaysia and Sarawak. In this case, these DENV-2 viruses were likely stemmed from local transmission and microevolution. Interestingly, DENV-3 isolates fell within two different genotype groups with the majority in genotype III and a single isolate in genotype I. The Sarawak genotype III isolates formed into two sub-lineages with one lineage suggesting importation from of the virus from Singapore and the other lineage suggesting local transmissions. The single DENV-3 genotype I isolate was closely related to a Singapore and Thailand 2010 strain, indicating independent importation as supported with patient's travel history to Singapore prior to observed clinical manifestations. Overall this study showed that multiple serotypes and genotypes of DENV were found to co-circulate in Kuching division from 2014 to 2016 with frequent virus exchanges from neighbouring geographical regions.

**DEVELOPMENT OF DUPLEX REAL TIME RT-PCR FOR
DIFFERENTIATION OF GENOGROUP B AND C ENTEROVIRUS A71**

Nurul Huda Bt Abdul Malek, Ooi Mong How and David Perera
Institute of Health and Community Medicine, Universiti Malaysia Sarawak
Corresponding author email: dperera@unimas.my

Enteroviruses (EVs), particularly of species A are widely known as main causative agents for Hand, foot and mouth disease (HFMD). Of these, Enterovirus 71 (EV-A71) has been associated with neurological complications which occasionally leads to fatal outcomes. Phylogenetically, EV-A71 are divided into 3 genogroups (A, B and C). In Sarawak, major outbreaks of EV-A71-associated HFMD have been recorded in 1997, 2000, 2003, and 2006. All these outbreaks were associated the genogroup B strains of EV-A71. Sarawak has never experienced a major genogroup C EV-A71 HFMD outbreak (albeit for the occasional sporadic occurrences of genogroup C1). Previous studies have shown partial or no cross-neutralization between genogroups. As such, it is a concern that a genogroup C EV-A71 outbreak in Sarawak may potentially lead to more severe clinical outcomes. In this study, we developed a one-step, duplex real-time RTPCR assay for simultaneous detection and differentiation of genogroup B and C EV-A71. Specific primers and Taqman probes were designed based on VP3/VP1 region of EVA71. The specificity and sensitivity of the real time RT-PCR were evaluated with 78 EVA71 (genogroup B and C), 76 other EV serotypes and 5 non-EV isolates collected between 1997 and 2012. A total of 9 TaqMan probes were evaluated. For EV-A71 genogroup B, one probe (gB-P7) showed 100% specificity to all 63 EV-A71 genogroup B isolates and did not detect any of the 15 genogroup C, other EVs and non-EV isolates tested. For EV-A71 genogroup C, one probe (gC-P1) showed 100% specificity to all 15 EV-A71 genogroup C isolates with no detection to EV-A71 genogroup B, other EVs and non-EVs isolates tested. The performance of the singleplex assay for both the EV-A71 genogroup B and C assays respectively, were comparable to a multiplex format that included both probes. The EV-A71 RT-PCR realtime multiplex assay for EV-A71 developed in this study will help in rapid diagnosis of EV71 particularly for early detection of genogroup C EV71 strains which until now have not been associated with major HFMD outbreaks in Sarawak. This will provide a useful early warning system to public health authorities to better respond and manage future HFMD outbreaks in Sarawak.

ORAL 021 SCT

DESCRIPTIVE STUDY ON DEMOGRAPHIC FACTORS AND PERFORMANCE STRATEGIES AMONG ATHLETES

Ghazali N.M., Fauzan N., Anuar A. and Aden E.
*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Correspondence author email: gnmazlina@unimas.my

The purpose of this research was to investigate the differences between demographic factors and performance strategies among athletes. The demographic factors such as gender, years of study, and years of involvement in sports play an important role in the use of performance strategies in determining their performance strategies in sports. The instrument used for this research was the Test of Performance Strategies (TOPS) to measure the performance strategies. The finding has shown that there were significant differences between the demographic factors and the performance strategies. The demographic variables consist of age, gender, year of study, and years of involvement in sports. The performance strategies include the constructs (goal setting, relaxation, activation, imagery, self-talk, attentional control, emotional control, and automaticity). In general, the result showed that the differences between the demographic factors such as; gender at $t(21) = 13.75$; $p < .05$; years of study at $t(21) = 9.46$; $p < .05$ and years of involvement at $t(20) = 11.37$; $p < .05$ and the performance strategies were significant. In addition, there were significant differences between the demographic factors (age, gender, year of study, and years of involvement in sports) and all sub factors in the performance strategies such as goal setting, relaxation, activation, imagery, self-talk, attentional control, emotional control, and automaticity. Based on the findings, it can be inferred that to enhance the athletes' ability and competency in sports, they have to be trained in various styles/methods according to their age, gender, years of study, and years of involvement.

ORAL 022 SCT

IMPROVED ENSPART FOR DNA MOTIF PREDICTION

Allen Chieng Hoon Choong¹, Nung Kion Lee¹, Chih How Bong² and
Norshafrina Omar¹

¹*Faculty of Cognitive Sciences & Human Development,
Universiti Malaysia Sarawak*

²*Faculty of Computer Science & Information Technology,
Universiti Malaysia Sarawak*

Correspondence author email: nklee@unimas.my

In our previous work we proposed ENSPART-an ensemble method for DNA motif discovery which partitions input dataset into several equal size subsets

runs by several distinct tools for candidate motif prediction. The candidate motifs obtained from different data subsets are merged to obtain the final motifs. Nevertheless, the original ENSPART has several limitations: (1) the same background sequences are used for the calculation of Receiver Operating Cost (ROC) of motifs obtained from different datasets. This causes bias because different datasets might have different background distribution; (2) it does not consider the duplication of a motif and its reverse complement. This causes many redundant motifs in the result set which requires filtering. In this work, we extended the original ENSPART to solve those two issues. For the first issue, we employed background sequences that is based on the distribution of bases in the input sequences. As for the second issue, we employ a "triple" merging strategy to reduce redundant motifs. Our evaluation results indicate that the two improvements obtain better AUC values in comparison to the original implementation.

ORAL 023 SCT

INDIGENOUS KNOWLEDGE AMONG IBAN KUA' IN SAMARAHAN DISTRICT, SARAWAK: SOME OBSERVATIONS

Neilson Ilan Mersat, Mohamad Suhaidi Salleh, Spencer Empading Sanggin, Ahi Sarok, Wong Swee Kiong, Mohd. Azizul Hafiz B. Jamain and Elvin Jawol.

Faculty of Social Science, Universiti Malaysia Sarawak
Correspondence author email: elvinjawol@gmail.com

This paper presents some findings of a study and observations on indigenous knowledge (IK) among Iban Kua' and uses of natural resources in Samarahan District, Sarawak. Like the other Iban in Sarawak, Iban Kua' in Samarahan is also rich in indigenous knowledge. As Samarahan has the fastest growing population in Sarawak with an average annual population growth rate of 6.0% in the year of 2000 to 2010, the study tries to examine the state of IK among Iban Kua' in Samarahan. A qualitative research design which involves semi-structured questionnaires to the 165 respondents was used. This paper discusses some of the findings and observations based on the fieldwork at 14 Iban Kua' villages in Samarahan in February 2017. This study also reveals the effect of physical development projects to the IK practice and to the natural resource management. Modernisation and Christianity are the key factors that affect the state of IK practices that are now diminishing.

ORAL 024 SCT

THE IMPACT OF NATURAL RESOURCES, CULTURAL HERITAGE, AND SPECIAL EVENTS ON TOURISM DESTINATION COMPETITIVENESS: THE MODERATING ROLE OF COMMUNITY SUPPORT

May Chiun Lo¹, Abang Azlan Mohamad¹, Chee Hua Chin¹ and T. Ramayah²

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia, Malaysia*

Correspondence author email: cch.febunimas@hotmail.my

Tourism destination competitiveness has been proven as one of the crucial factors to improve the performance of rural tourism destination. It is important for a tourism destination to possess the uniqueness of rural destinations in term of its nature, culture and ethnics because these are the factors that attract tourists' attention and intention to visit. Hence, this study intends to investigate the impacts of natural resources, cultural heritage, and special events on tourism destination competitiveness from the tourists' perspective. Moreover, this is the first known study to adopt community support as the moderating variable to examine its moderating impact among the constructs. A total of 210 respondents had completed the questionnaires. To assess the developed model, SmartPLS (version 3.2.6) is applied based on path modeling and then bootstrapping. The results revealed that natural resources, cultural heritage, and special events are significantly and positively correlated to tourism destination competitiveness from tourists' perspective. Surprisingly, community support was found to be no moderating relationship among the constructs. The implications, limitations, and directions for future research are further discussed.

ORAL 025 SCT

BUSINESS ENGAGEMENT IN ADAPTATION TO CLIMATE CHANGE IN DEVELOPING COUNTRIES: A CASE STUDY BASED ON BEHAVIORAL PERSPECTIVE

Islam, Mehedi and Mohd-Nor, Rohaya

Faculty of Economics and Business, Universiti Malaysia Sarawak

Correspondence author email: mehedi8@yahoo.com

Objectives of the paper are to explore the current state of business engagement in adaptation to climate change in Bangladesh, identify hidden drivers and barriers of adaptation, and ways to accelerate the engagement process. Based on behavioral perspective the authors deployed a qualitative multiple case study method to investigate three business cases in Bangladesh. Organization's overall perception of climate change impacts on business is unclear. Their present engagements in adaptation to climate change are not separate phenomena rather can be termed as co-adaptation with other regular organizational changes. Majority of adaptation decisions

are reactive. Businesses show more sensitivity to non-climatic factors like regulation or market force than direct climatic factors like extreme weather events. Therefore, they follow 'wait and see' or 'deferred' adaptation approaches. There exist a number of internal and external drivers/enablers and barriers that are directly or indirectly determine whether a business will engage in adaptation or not. Lack of awareness and wrong perception about climate change are the main barriers. However, unavailability of information and adaptation finance, costly adaptation technology, poor organizational leadership, corruption, political unrest, and uncondusive policy are other major obstacles.

ORAL 026 SCT

GAMING PERFORMANCE MEASURES: INSTITUTIONAL AND INDIVIDUAL

S.R.H. Hoole¹ and, P.R.P. Hoole²

¹*Faculty of Engineering, Universiti Malaysia Sarawak*

²*Department of Electrical and Computer Engineering,
Michigan State University,*

Correspondence author email: prhoole@unimas.my

Our best universities in the Global South educate our best undergraduates who are sought after by western graduate schools because such students are clever and have a good work ethic. Yet, those from the South generally lean westward – we prefer name-brand western degrees and value articles in western journals because they are rated/ranked better. But in answering which is really better, the western- or home-brand, the issues are complex and many. This paper underscores the aspect of gaming in these ratings which make us think the western academic products to be superior. The evaluation of universities, journals and scientists is examined to show how it is subject to gaming. Common measures of universities – the number of NAE members or IEEE Fellows teaching, publications, research funds, the reputational survey, median SAT score of freshmen – are all gamed and many highly reputed universities have been caught at it. Even the IEEE's executive committees and IEEE Fellow award seem to be racially tainted, based on head counts and the indexed journal record of the Fellow Class of 2013. Further, this paper shows the practices behind a journal getting on to the Science Citation Index to be gamed. A range of well-ranked journals provide easier access to their pages to those who can pay. These then affect performance evaluation of individuals and institutions. The lesson of this paper, particularly for the Global South, is to use rankings in building up self-confidently our institutions – journals, universities, etc. – because they do say something useful, but taking them cum grano salis because of their flaws.

ORAL 027 SCT

COMMUNITY PERCEPTIONS ON THE USAGE OF DIGITAL MARKETING FOR HOMESTAYS: THE CASE OF BA'KELALAN, MALAYSIA

Sharon Cheuk, Azuriaty Atang, May-Chiun Lo and T. Ramayah

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia, Malaysia*

Correspondence author email: ccssharon@unimas.my

Rural tourism has become a dynamically developing area in tourism. Apart from developing physical infrastructure, a national priority is to develop ICT in rural areas to improve the local communities' communications with the outside world. It is believed that with the help of ICT, rural tourism industries have risen up and tourist behaviour, when making purchases for tourism activities, has changed (Buhalis and Law, 2008). In other words, the internet helps tourists and rural destination suppliers to interact and make arrangements. The objective of this study is to examine the perceptions and attitudes of rural homestay owners and other tourism service providers in Ba'kelalan in setting up websites in order to facilitate the promotion of their premises and services. A structured questionnaire was used as a guide to conduct in-depth interviews. Fieldwork was carried out in July 2016 and a total of 7 people were interviewed. The study revealed that homestay owners and other tourism suppliers largely depended on word-of-mouth or direct contact (either via phone calls or emails) for accommodation bookings, and were generally not aware of the potential of digital marketing to promote their businesses. This is a first baseline study on communities' attitudes towards the usage of digital marketing with respect to their tourism products in this area. The findings will be relevant to future studies of community-based ICT initiatives. Implications from the study and recommendations therefrom are further discussed.

ORAL 028 SCT

WOMEN'S PERCEPTION OF CAREER BARRIERS ACCORDING TO LIFE STAGES: A CASE OF THE MALAYSIAN BANKING INDUSTRY

Pah Yen Fang, Farida Binti Abdul Halim, Agatha Lamentan Anak Muda, and Nur Fatihah Abdullah Bandar

*Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak*

Correspondence author email: ahfarida@unimas.my

The purpose of this study is to examine women's perception of career barriers in the banking industry according to their life phases. The Career Barrier Inventory - Revised (CBI-R) of Swanson, Tokar and Daniel (1996) is adopted to measure the 13 dimensions of career barriers (sex discrimination, lack of confidence, multiple role conflict, conflict between children and career

demand, racial discrimination, inadequate preparation, disapproval by significant others, decision-making difficulties, dissatisfaction with career, discouraged from choosing non-traditional career, disability and health concerns, job market constraints and networking/socialization). The design of this study is cross-sectional with data collected via questionnaires. This study is conducted in 24 local banks both in Kuching and Kuala Lumpur. The population identified for this study is a group of women employees and the final sample consists of 98 female employees. The Statistical Package for the Social Science (SPSS) Version 20.0 is used to analyse the data. The results showed that there were no significant difference between the perceptions of women in life phase 1, 2 and 3 towards sex discrimination, racial discrimination, disapproval by significant others, decision-making difficulties, discouraged from choosing non-traditional career and job market constraints as career barriers. However, there are significant differences between the perceptions of women in life phase 1, 2 and 3 towards lack of confidence, multiple role conflict, conflict between children and career demand, dissatisfaction with career, disability and health concerns and difficulties with networking or socialization as career barriers. This indicated that in this era of talent scarcity, it is imperative that the banking industry move towards greater gender inclusiveness in their management and administration activities.

ORAL 029 SCT

UNDERSTANDING PEDAGOGICAL APPROACHES OF UNIMAS MOOCS IN ENCOURAGING GLOBALISED LEARNING COMMUNITY

Tasnim Mohd Taib, Chuah Kee Man and Norazila Abd Aziz

*Faculty of Language Studies and Communication Studies,
Universiti Malaysia Sarawak*

Correspondence author email: tasnim.taib@gmail.com

Massive Open Online Courses (MOOC) have made learning opportunities in higher education possible for anyone. Universiti Malaysia Sarawak was amongst the first pioneers to conduct MOOC namely ICT Competencies. In September 2016, four MOOCs were launched which included Animal Physiology, English in Media, English for Self-Expression and Multimedia Technology and Design. 2017 marks the second year these four courses are offered. This study believes the importance of research and evaluation of courses that can provide information and details to further improve their delivery method. By focusing on ten pedagogical approaches taken by each MOOCs, the design patterns are illustrated. This study uses Assessing MOOC Pedagogy (AMP), an instrument developed to assess accredited MOOCs from the United States. Further analysis may assist in deeper understanding of design pattern towards MOOCs effectiveness and success rate.

**BUTTONED THE UNBUTTONED: BRIEF INSIGHTS FROM PEOPLE
LIVING WITH HIV/AIDS AND THEIR CAREGIVERS**

Zamri Hassan¹, Zaimuariffudin Shukri Nordin² and Collin Jerome³

¹*Faculty of Social Sciences, Universiti Malaysia Sarawak*

²*Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak*

³*Faculty of Language and Communication, Universiti Malaysia Sarawak*

Correspondence author email: hzamri@unimas.my

The number of people infected with HIV continues to increase globally, despite recent advances in treatment and prevention. Statistics show that an estimated 36.9 million people around the world were living with HIV in 2014, with 2 million people became infected with the illness (UNAIDS, 2014). To aggravate matters, people living with HIV/AIDS (PLWHAs) continue to face many forms of stigmatization throughout their lives, despite the various measures or initiatives taken by themselves and others to minimize them. However, little has been done on examining the creation of newly invented identities as an equally important measure/initiative taken by PLWHA and caregivers, to lessen stigmatization and to gain the support that they direly needed. Moreover, little is known about the awareness of human rights among PLWHA and their caregivers. Using ethnographic methods to collect data in the form of face-to- face interviews and participant observations, the proposed study explores the newly invented identities created by PLWHAs and their caregivers, how they develop and express them, and the ways in which they integrate human rights awareness into the creation of these identities. Approximately 13 (N13) PLWHAs and caregivers mainly from the Kuching area were purposively selected. Findings reveled that, participants developed certain initiatives to reduce stigma; and they also portrayed low level of knowledge related to their rights. The outcomes were then translated into stigma reduction initiatives in which these initiatives can be deployed to minimize stigmatization and gain social support that are direly needed. This indirectly, tightened their rights for better living. The study also suggests some modifications in existing policies and programs both at local and national level so that to improve their quaality of life in general.

ORAL 031 SCT

THE ROLE OF KNOWLEDGE MANAGEMENT ON ORGANISATIONAL EFFECTIVENESS: ORGANISATIONAL CULTURE AS THE MODERATOR

May Chiun Lo¹, Abang Azlan Mohamad¹, T Ramayah², Muhammad Asraf Bin Abdullah¹ and Lim Mei Chee¹

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia*

Correspondence author email: maazlan@unimas.my

This research was conducted to investigate the relationship between three underlying dimensions of knowledge management, i.e. knowledge acquisition, knowledge dissemination and responsiveness to knowledge; and organisational effectiveness with organisation culture as the moderator. Questionnaires were distributed to 159 respondents who held the position of supervisor and above in the manufacturing sector in Malaysia. The results of this study indicated that two dimensions of knowledge management namely knowledge dissemination and responsiveness to knowledge are significant and positively related to organization effectiveness. Lastly, the results indicated that the organisation culture does not moderate any of the relationships between knowledge management and organisation effectiveness.

ORAL 032 SCT

BOTTOM UP APPROACH IN DEVELOPING RELIEF PROTOCOL: CASE FROM RAJANG

Elena Gregoria Chai Chin Fern

Faculty of Social Sciences, Universiti Malaysia Sarawak

Correspondence author email: gelena@unimas.my

The paper elucidates the objectives, methods and findings of a research project undertaken at Rajang River. The project was carried out with the intention to identify the hazards/disasters coping mechanism used by local communities. The bottom up coping mechanism was drafted and proposed to the relevant committee as three forms of relief protocols, namely for flood, fire and riverbank erosion. It is envisaged that the protocols will help to alleviate the situation faced by the riverine communities and to complement and initiate improvement in government's disaster management programs.

ORAL 033 SCT

DIAGNOSTIC AND CLASSIFICATION SYSTEM FOR KIDS WITH LEARNING DISABILITIES

Rehman Ullah Khan, Julia Lee Ai Cheng and Oon Yin Bee
*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Correspondence author email: krullah@unimas.my

Most experts are using manual techniques to diagnose dyslexia. Machine learning algorithms are capable enough to learn the knowledge of experts and thus, automation of the diagnosis process is possible. In this research, we propose an automated diagnostic and classification system. The system is trained by pre-classified data of 857 school children scores in spelling and reading. The twenty-fifth percentile was applied on the scores to label the data. The scores of the twenty-fifth percentile and below were marked as indicators of children who were likely to have dyslexia while the scores above the twenty-fifth percentile were considered to be indicators of children who were non-dyslexic. The system has three components: the diagnostic module is a pre-screening application that can be used by experts, trained users and parents for detecting the symptoms of dyslexia. The second module is classification, which classifies the kids into two groups, non-dyslexics and suspicious for dyslexia in spelling and reading. A third module is an analysis tool for researchers. The system managed to detect 20.7% of students seems to be dyslexic out of 257 in the testing data set which has confirmed by human expert.

ORAL 034 SCT

INFLUENCE OF MEDIA ON UNIVERSTIY STUDENTS' EFFICACY IN PARTICIPATING IN POLITICAL CONVERSATIONS

Su-Hie Ting and Sharifah Sophia Wan Ahmad
*Faculty of Language Studies and Communication Studies,
Universiti Malaysia Sarawak*

Corresponding author email: shting@unimas.my

The key agents that influence political orientations of youths are family, peer, school and media. The study examined the influence of media on university students' efficacy in participating in political conversations. In particular, the relationships between media use, knowledge of issues, political dominance and efficacy in participating in political conversations were investigated. Survey data from 305 students in a Malaysian university were analysed. The results showed that a majority of the respondents read the online newspaper and the least popular media for getting information on community or national issues was magazines. For knowledge of issues, more respondents understood the concept of 1MDB and knew its context in politics compared to

BR1M. The results also showed that the respondents were moderately dominant in political conversations. More than half of them reported presenting sensible arguments in support of their political views but did not dominate the other person. However, when taken as a whole, the group of respondents felt that they were more confident about engaging in political action than in participating effectively in group discussions about political issues. There was a significant positive correlation between political efficacy and political dominance. The findings suggest the prevalence of political apathy among the university students studied.

ORAL 035 SCT

NATURAL RESOURCE MANAGEMENT AND LIVELIHOOD STRATEGIES OF THE IBAN OF NANGA TALONG, ULU ENKARI, SARAWAK

Khin Eva Kristin, Larry Sait, Neilson Ilan Mersat, Wong Swee Kiong, Peter Songan, Spencer Empading Sanggin, Ahi Sarok, Mohamad Suhaidi Salleh and Mohamad Azizul Hafiz Jamian

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: ev.kristin@gmail.com

This paper discusses the livelihood strategies among the Iban of Rumah Bada, Nanga Talong, Ulu Engkari, Sarawak as well as the uses and management of natural resources. The livelihood of the remote Iban community in Rumah Bada relies heavily on natural resources for survival, thus management of these resources is important to the community. Through in-depth interviews, the information about local knowledge on the uses and management of natural resources were identified. Agricultural activities such as cultivation of cash and subsistence crops are their primary economic activities. In addition, villagers periodically harvest freshwater fish from Sungai Engkari as well as wild vegetables and fruits to supplement their food and income. The dependence of this rural community on the surrounding natural resources for their livelihood leads to their careful management of these resources as seen in the community's participation in the tagang system that was introduced by the Sarawak Forestry Department. Despite the fact that the villagers in the rural Rumah Bada, Nanga Talong do not enjoy modern facilities and infrastructure such as road access like those in the urban areas, they are able to survive by relying on the utilisation and management of the land, river and forest resources that surround them.

ORAL 036 SCT

NATURAL PUBLIC- PRIVATE PARTNERSHIP: GHANAIAN PERPECTIVE OF URBAN WATER SUPPLY

Adam Andani Mohammed and Abdallah Mpawenimana Saidi

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: maandani@unimas.my

In Ghana, tariff of utilities including water is put below cost recovery levels such that government is unable to cope with the challenges in water supply. As such, the government resort to private partnership to fund the gaps in the urban water supply in the country. The study adopted an integrative multi-stage critical review of relevant literature on public-private partnership in urban water supply. As such articles published between 2006 and 2017 were selected by specific inclusion criteria. Relevant articles on the topic were identified through references and citations. The paper examines the status and trend of water supply, reforms and management of urban water supply in Ghana. The study found problems like poor water supply system, inadequate human and economic resources as well as poor resource allocations and urban water management.

ORAL 037 SCT

EMOTIONAL INTELLIGENCE LEVEL OF YEAR ONE AND TWO MEDICAL STUDENTS OF UNIVERSITI MALAYSIA SARAWAK: ASSOCIATION WITH DEMOGRAPHIC DATA

Khin Than Yee, Myat San Yi, Khin Cho Aung, Mar Mar Lwin and
Wai Wai Myint

Faculty of Medicine & Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: ktyee@unimas.my

Emotional intelligence is the ability to monitor one's own and other's emotions, to discriminate among them, and to use this information to guide one's thinking and actions. It is one of the mostly sought-after criteria in a leader to manage an organization. Emotional intelligence has gained a lot of attention in the academic literature. It is very important for us to assess our emotional intelligence because it helps us to reason with our emotions and how to act on it. The objective of the study is to assess the emotional intelligence level of Year 1 and Year 2 medical students of UNIMAS. Based on the findings, majority of the respondents have strength in all the domains except managing emotions domain where 51.5% need attention. No respondents fall into the development priority competency. Comparing the level of emotional intelligence of Year 1 and Year 2, result shows no significant difference among all the domains but Year 1 medical students need more attention in managing emotions domain compared to Year 2

medical students. There is no association between demographic characteristics of respondents – age, gender, residency, qualification and ethnicity – and their emotional intelligence level in each domain except in empathy domain where gender has a p value of 0.038 (<0.05), which is significant. In conclusion emotional intelligence of Phase 1 medical students shows positive result to all domains except managing emotions. There is no significant difference between emotional intelligence level among Year 1 and Year 2 medical students. There is also no strong association between demographic characteristics with emotional intelligence except for gender in the empathy domain. Further study should be done using large sample group spanning from Year 1 to Year 5 to have a greater difference in age and Year 3 to Year 5 medical students are already exposed to clinical practices which may have a significant impact on their emotional intelligence.

ORAL 038 SCT

SATU SOROTAN LITERATUR TENTANG PENGLIBATAN SOSIAL BELIA BERSTATUS SOSIO-EKONOMI RENDAH (A LITERATURE REVIEW ON SOCIAL PARTICIPATION OF LOW SOCIO-ECONOMIC YOUTH)

Dolly Paul Carlo and Kamsiah Bt. Ali
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: maandani@unimas.my

Youth is the importance asset of a country. The focus of youth development should be given priority in order to sustain development of a country. Social participations in the society are influenced by an individual socio-economic status (SES). SES is a combination of measurement based on individual and family income, and education and occupation. Literature review shows that low income and poor education of individual and family are the indicators to array of social problems, and poor physical and mental health. Health status is one of important factors in human resource which is an important resource of development of any nation. In low SES society, youth is very vulnerable to various social and health risks, for examples, dropping out from educational systems, unemployment, and involvement in criminal and delinquent activities, drug abuse, and poor physical and mental health. This exploratory study aims to study youth in the influence of low SES and their social participations in Sadong Jaya and Samarahan areas. The focus is on their occupation, and education and social problems. However, in this working paper the focus of discussion is only based on literature review which is social participation of low SES youth.

ORAL 039 SCT

EXAMINING KNOWLEDGE TRANSFER USING SECI MODEL AS LENSES: A STUDY OF INTERACTION AMONG LOCAL MALAYSIAN ENTREPRENEURS AND INDONESIAN CROSS-BORDER ENTREPRENEURS IN CROSS-BORDER SERIKIN WEEKEND MARKET

Ida Juliana Hutasuhut, Hasbee Usop, Shahren Ahmad Zaidi Adruce, Surena Sabil and Mark Kasa
*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*
Corresponding author email: hijuliana@unimas.my

Little attention has been given to the study on the impact of local Bidayuh entrepreneurs in Serikin weekend market despite the tremendous presence of cross-border Indonesian entrepreneurs. The objective of this study is to examine the knowledge transfer that may have happened between the entrepreneurs between two countries during their interaction every weekend by using SECI Model as lenses. Qualitative phenomenological study was conducted to answer the research questions. A total of thirty local/Bidayuh entrepreneurs were purposively selected to participate in this study in order to get rich data. Participants were interviewed using semi-structured interview questions and the data were analyzed using content analysis approach. This study concluded that the presence of Indonesian-cross border entrepreneur helps to improve the economy of the villagers, open the opportunities for business partner, provide role model in doing business, and bring revenue to the government. However, although the business-activities in Serikin market have been going on for decades, the transfer of knowledge among fellow entrepreneurs (between Indonesian cross-border entrepreneurs and Bidayuh-entrepreneurs) is still very minimal. This is due to the very limited time and space for them to have interaction. Recommendations to improve this situation are provided at the end of this paper.

ORAL 040 SCT

DISSECTING FACTORS CAUSING ACTIVE BEHAVIOURS ASSOCIATED WITH CONTINUITY OF YOUTH PARTICIPATION IN AGRO-PRENEURSHIP: A QUALITATIVE STUDY ON YOUTH FARMERS IN SARAWAK

Abdul Rahman Saili¹, Jamayah Saili², Mazia Mohamad Safai'Ee³ and Nur Masriyah Hamzah⁴

*Faculty of Plantation and Agrotechnology, UiTM Sarawak
Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: maziasafaiee@gmail.com

Despite of an aggressive growth of agricultural sectors, the number of youth participating in the industry is low. Agriculture as one of the main income generator industry should be exposed to the community in order to raise and encourage the participating of the community and also for the development of the industry. Thus, this research is conducted using a qualitative study to understand and dissecting the youth behaviour toward their activities in agropreneurship. Data from six in-depth interviews were analysed to explore the experience of youth agro-preneurs. The result indicated that the two major groups of behaviours dictated the acceptances of youth toward agropreneurship in Sarawak are psychological factors and economic factor.

ORAL 041 SCT

WHAT ISSUES MATTER TO LOCAL VOTERS, AND WHY? ELECTORAL POLITICS IN RANAU, SABAH

Arnold Puyok

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: arnpyk@gmail.com

This research was an attempt to gauge the electorates' opinion on key electoral issues in Ranau, Sabah. It involved 712 respondents from the state constituencies of Kundasang, Paginatan and Karanaan. A survey questionnaire based on a five-point Likert scale was distributed to the respondents. The respondents were asked on electoral issues ranging from primordial sentiments, personality politics, patronage politics, regional sentiments, development, economy and governance. The research theoretical framework is based on the sociological, psychological, and economic models of voting behaviour. The research found that race and religious considerations have less influence on the people's voting decisions and are unlikely to feature prominently in the upcoming elections. However, electoral issues based on regional sentiments related to Sabah's state of affairs remain very popular among the respondents. The politics of personality formed on the basis of patrimonial, cultural and patronage ties is also evident, suggesting that the role of the candidate is more important than the role of the party in influencing people's voting decisions. The ruling government is viewed less favourably on the issue of governance and economy, indicating that local and national issues are equally important in shaping Ranau's, and Sabah's political landscape.

ORAL 042 SCT

CARE-GIVING CHILDREN HAVING DOWN SYNDROME - LIFE IMPACTS AND PSYCHO-SOCIAL EXPERIENCES OF MOTHERS

Chan Kim Geok

Faculty of Medicine & Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: kgchan@unimas.my

Mothering children could be a challenging task with various concerns. The demands for bringing up children having Down syndrome (DS) who are disadvantaged in various developmental aspects could be even more in a developing country like Malaysia where resources are still limited. The condition of DS has been reported to be approximately one in every 800 live-born infants globally. Findings of life impacts of care-giving children with DS and the psychosocial experiences will be elaborated and would draw one's attention to the underlying salient issues. Findings would provide useful insights to guide the care professionals who provide care to children with DS and their mothers in the hospital or within the community context. Findings as elaborated constitute a part of the main study guided by the main research question 'What are the experiences of Malaysian (Sarawak) mothers caring for children with DS?'

ORAL 043 SCT

THE MODERATING IMPACT OF COMMUNITY SUPPORT ON TRI-DIMENSIONAL IMPACTS OF TOURISM (ECONOMIC, SOCIO-CULTURAL, & ENVIRONMENTAL) TOWARDS RURAL TOURISM COMPETITIVE ADVANTAGE

Jason Lim¹, May-Chiun Lo¹, Abang Azlan Mohamad¹, Chee-Hua Chin¹ and T Ramayah²

¹ *Faculty of Economics and Business, Universiti Malaysia Sarawak*

² *School of Management, Universiti Sains Malaysia, Malaysia*

Corresponding author email: limweijason@gmail.com

Rural tourism being one of most influencing industries in Malaysia, particularly in the state of Sarawak. Competitiveness to a host destination especially in rural tourism has always be a concern to the stakeholders. As a result, increase competitive advantage to a host destination is somehow necessary if rural tourism is valued and to be invested for future development. Thus, the theory of resource based view underpins the proposed research framework and intends to investigate the influence of tri-dimensional impacts on rural tourism competitive advantage from local communities' perspectives. This is the first known study to adopt community support as the moderating variable to examine the proposed constructs. A total of 222 respondents were used for statistical analysis. To assess the developed model, SmartPLS (version 3.2.6) is applied based on path modeling and then bootstrapping. The results

revealed that socio-cultural impacts and environmental impacts are significantly and positively correlated to rural tourism competitive advantage from the communities' perspectives. As per expectation, the findings also revealed that community support exists in moderating the relationship among environmental impacts and rural tourism destination competitive advantage.

ORAL 044 SCT

DEVELOPING 3D ACOUSTIC-BASED VIRTUAL ENVIRONMENTS FOR THE TEACHING OF ENGLISH VOCABULARY TO VISUALLY-IMPAIRED LEARNERS

Chuah Kee-Man¹, Radina Mohamad Deli¹ and Chwen-Jen Chen²

¹*Faculty of Language and Communication, Universiti Malaysia Sarawak*

²*Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: kmchuah@unimas.my

Many researchers have revealed how extensive repertoire of vocabulary is capable of expanding learners' language competence or mastery. Various computer-based tools have been proposed to improve vocabulary learning among English language learners but almost none of those tools focused on visually-impaired learners. While they may be the minority in academia, assistive technology in helping them to acquire vocabulary especially for academic purposes is equally crucial. This study proposes the use of 3D acoustic technology in creating virtual environments for the visually-impaired learners to learn vocabulary in context. Since they are unable to depend on visual cues like normal learners, the 3D sounds play a vital role in triggering their cognitive ability in generating mental representations for the accurate use of specific words. The study was divided into three phases. In the pre-development phase, a thorough investigation of suitable scenarios to be created was conducted by involving the visually-impaired learners. In the development phase, the identified scenarios were developed using 3D acoustics, which were then assembled to form interactive virtual environments specific to the context of the vocabulary. Subsequently, in the initial evaluation phase, the developed learning environments were tested on 5 visually-impaired learners. The preliminary findings revealed the potential use of learning environments based on 3D acoustics in teaching the visually-impaired learners vocabulary. Instead of depending on braille, they noted how it helped to create mental representation of the words. The outcome of this study has highlighted the need to further assist visually-impaired learners in learning vocabulary through novel means.

ORAL 045 SCT

RESEARCH POSSIBILITIES IN THE FIELD OF HUMAN RESOURCE DEVELOPMENT IN SMALL – MEDIUM ENTERPRISES IN DEVELOPING COUNTRIES: A REVIEW AND RESEARCH AGENDA

Hana Hamidi

*Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: hhana@animas.my

Research in HRD in developing countries' SMEs, although significant, proved to be limited. Although HRD is evident in various levels and forms of organizations, there is a tendency for researchers to favour large organizations study. The preference of studying HRD in large firms may put SMEs at a disadvantage from not gaining the benefits of properly conducted HRD research. Past literature review revealed that there is disconnect between theory and practice of system theory and thinking in HRD research and practice. One of the recommendations made by past researchers was to increase and articulate practical application of the systems theory and thinking in the scholarly literature, teaching and research of HRD. This literature review aims to do just that by first, taking a step back and investigate what is known in the literature about HRD in developing economies' SMEs. This paper attempted a systematic approach to literature review to synthesize possible research agenda in this area, from the lens of System Theory. A sample of 28 papers published in 25 journals from 1995 to 2017 was used. The synthesis of these empirical and theoretical studies revealed that (a) a narrow range of theoretical and conceptualized perspectives were utilized; (b) Training and Development related topics remain the foremost research of interest among researchers; and (c) the dependency on quantitative methods when conducting HRD research as opposed to utilizing various methods which may provide insights to current issues on SMEs' HRD. Several suggestions for future research topics were offered based on theory, methodology and content.

ORAL 046 SCT

DETERMINANTS OF INNOVATION PERFORMANCE AMONG SMEs: MODERATING EFFECT OF ENTREPRENEURIAL ORIENTATION

Shiaw-Tong Ha¹, May-Chiun Lo¹, Abang Azlan Mohamad¹, and T. Ramayah²

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia, Malaysia*

Corresponding author email: revetong@gmail.com

Small and medium enterprises (SMEs) play a significant role in the economic development of many countries all over the world. As globalisation has reduce

the importance of economies of scale, growth opportunities for SMEs are increased. To be able to grab the opportunities, being innovative has become a necessity for SMEs. Therefore, it is crucial for SMEs to understand the determinants fostering their innovation performance. Accordingly, this study proposed top management support, employee orientation, and customer focus as the determinants of the innovation performance among SMEs and examined the moderating effects of entrepreneurial orientation on the relationships among the determinants. Using a quantitative research design, data was collected from top management personnel working in SMEs in Malaysia. SmartPLS 3.0 was applied and the research model was empirically tested using the 214 responses received from the survey. The analysis revealed that among three constructs, only employee orientation and customer focus significantly related to innovation performance. In addition, the results revealed that entrepreneurial orientation plays a moderating role. The positive relationship between employee orientation and innovation performance is greater when high level of entrepreneurial orientation is present. The implications and limitations of the present study were further discussed.

ORAL 047 SCT

SOCIO-DEMOGRAPHIC FACTORS AS A DETERMINANT OF HOUSEHOLD POVERTY IN NIGER STATE, NIGERIA

Mukaila A. Ijaiya, Dayang Affizah Awang Marikan, Nor Afiza Abu Bakar and Muhammad Ashraf Roszopor

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: amdaffizah@unimas.my

This paper focuses on the socio-demographic factors as a determinant of poverty in Niger State, Nigeria. Using a set of household data generated from structured questionnaires administered on 519 households, in which 479 responses found suitable for the analysis, and Tobit regression analysis. Multistage sampling was used to obtain data from six local government's areas of the state. Mean age and household size were 35.1 ± 11.1 years and 4.5 ± 2.2 years respectively. The results of the analysis showed that age, gender, household size, educational status, and health facility were the factors that significantly affected poverty in Niger State. The marginal effects of Tobit regression on each of the independents variable were also identified. The results show that if household size increase by 1, poverty will increase by 0.7 per cent, also additional age by 1 year shows that poverty will reduce by 0.07 per cent. The results notwithstanding, policy measures that would reduce the poverty status of the heads of household were suggested.

ORAL 048 SCT

SEMENGGOH WILDLIFE CENTRE, SARAWAK: TOURISTS' PERCEPTIONS TOWARDS ITS RURAL DESTINATION COMPETITIVENESS

Kim Mee Chong¹, Abang Azlan Mohamad¹, Tze Horng Tan¹, May Chiun Lo¹
and T. Ramayah²

Faculty of Economics and Business, Universiti Malaysia Sarawak
Corresponding author email: kimichong91@gmail.com

The aim of this paper is to examine and discuss the relationship between relevant influencing factors in tourism destination competitiveness. A competitive model is proposed to evaluate these important factors that link to destination competitiveness. The factors to be discussed in this study include natural resources, cultural, tourism infrastructure, range of activities, entertainment, special events, lodging, accessibility, and local communities. Data was gathered using technique of convenience sampling with a total of 100 questionnaires from Semenggoh Wildlife Centre. SmartPLS 3.0 is applied to analyse the collected data on path modelling and bootstrapping. Interestingly, tourism infrastructure, entertainment and local communities have significant influence on destination competitiveness. The findings of this study are believed to benefit tourism authorities in their decision making on the right tourism development paradigms in each of the rural tourism area. Findings implications, study limitations and future research directions are further discussed

ORAL 049 SCT

TOWARDS SUSTAINABLE WELL-BEING: FROM THE CARE-SEEKER AND THE CARE-GIVER: CHALLENGES TO THE IMPLEMENTATION OF COMMUNITY-BASED HEALTH PLANNING AND SERVICES

Bougangue Bassoumah and Mpawenimana Abdallah Saidi
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: asmpawenimana@unimas.my

The community-based health planning and services is a national health reform that provides healthcare services at the door steps of rural women to reduce health inequalities and promote equity of health outcomes in Ghana. This qualitative study used thirty in-depth interviews involving eight community health officers, eight community health volunteers and fourteen women receiving maternity care in the Yendi Municipality of the Northern Region of Ghana. The objective of this paper was to explore the implementation challenges of the community-based health planning and services following persistent reports by the Ghana Statistical Service of poor clinical attendance, high incidence of maternal and child mortality and morbidity in the Region. Amongst other factors, the study observed poor co-

ordination of healthcare interventions, cultural beliefs and practices, lack of incentives and poor community engagement as major setbacks to the progress of the policy. The policy should be carried out as part of the healthcare system by linking up with other healthcare interventions to increase access. There is the need for the policy to be re-visited and reformed to equip and mandate the facilities to provide skilled birth care. The community engagement aspect of the initiative should be given particular attention to make the healthcare services more accessible and acceptable to women to improve access to maternity care towards sustainable development.

ORAL 050 SCT

EXPLORATORY STUDY IN MODELING A PERFORMANCE INDEX FROM HETEROGENEOUS RISK AND GOVERNANCE STRUCTURE THAT PROMOTES GOING CONCERN AMONG MALAYSIAN FIRMS

Michael Tinggi, Daw Tin Hla, Shaharudin Jakpar, Sharon Check and Esmie Nicol

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: tmichael@unimas.my

This research explores the plausibility of constructing a performance index of risk and governance structure which will characterize both successful and unprofitable companies. Risk is expected to be examined pertinent to liquidity risk, financial risk and strategic risk. In a construct that represents each risk, a measurement ratio will be developed into an index. An estimated 390 companies of the estimated 1000 companies listed at Bursa Malaysia from 2001 to 2014 are used. The reduction in the number of companies compiled, has been due to a substantial amount of insufficient information which may lead to severe unbalanced data when the panel is regressed. A panel estimation will be run on risk and governance construct, of which an output with higher cumulative index may match viable companies. Companies with lower cumulative index will represent unprofitable companies. The cumulative index on risk and governance that are developed will provide a general snapshot or overview on what level of risk and governance structure the company can adopt if it has to be sustainable as a going concern company.

ORAL 051 SCT

THE SOCIO-ECONOMIC IMPACT OF NGOS DEVELOPMENT ON BENEFICIARIES IN KYBER PAKHTUN KHWA PROVINCE (KPK) OF PAKISTAN

Anwarul Mujahid Shah and Wong Swee Kiong
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: swkwong@unimas.my

This study focuses on the analysis of socio-economic impacts of Non-Governmental Organizations (NGOs) development on beneficiaries in KyberPakhtunKhwa (KPK) of Pakistan. In order to accomplish the task, qualitative approach based on the triangulation method has been adopted in the study. Three fundamental theories comprising of Regime Theory, Agency Theory, and Theory of Change have been applied to examine the role of NGOs. The findings illustrated a fact that NGO in KPK are the root of improving the standard of living of beneficiaries who are poor and socially separated. In opposition, some adverse impacts of these NGOs were found during the 9/11 incident when the beneficiaries were socially divided and poorly developed. However, these impacts do not take over the positivity of NGOs development in KPK including the Aga Khan Rural Support Program (AKRSP) and such kinds of other NGOs.

ORAL 052 SCT

MACROECONOMIC INSTABILITY INDEX AND MALAYSIA ECONOMIC PERFORMANCE

Venus Khim-Sen Liew, Puah Chin Hong, Jerome Kueh Swee Hui,
Rossazana Bt Ab Rahim, and Shirly Wong Siew Ling
Faculty of Economics and Business, Universiti Malaysia Sarawak
Corresponding author email: ksliew@unimas.my

The economic performance of Malaysia was affected by a series of financial crises that had induced macroeconomic instability in the country, which in turn immensely dampened the nation's economic growth rate. For instance, the negative effect of 1997 financial crisis and the 2008 US subprime mortgage caused Malaysian economy to perform poorly. Typically, Malaysia gross domestic product experienced an economy contraction of 7.4% in 1998. Malaysian production growth was exposed to high inflation, excessive budget deficit and negative trade balance when the economy slumped into recession in 1997. Hence, it is obvious that Malaysia needs an indicator to monitor the nation's economic performance from time to time. In this conjunction, Macroeconomic Instability Index (MII) is an important indicator of a country's economic condition. However, MII involves tedious calculation processes. This study develops a MII Graph Plotter that allows users to generate and update MII graph instantaneously by simply inputting raw macroeconomic

data. Inflation rate, budget deficit, unemployment rate, trade deficit and exchange rate had been identified to be included in the modeling aspect as they had high correlation with the economic growth. The generated output could serve as end-product for policy purposes or intermediate-product for other economic/finance studies. It could be customized for any other indices plotting purpose. Results obtained indicate that MII could signal negative growth rates in one or two periods in advance. The potential users of this new index include governments, exporters, foreign direct investors, international firms, corporations, bankers, fund managers, stock market and foreign exchange markets participants.

ORAL 053 SCT

EFFECTS OF LEISURE EDUCATION PROGRAMME ON LEISURE BENEFITS AND MOTIVATION AMONG RURAL IBAN ADOLESCENTS IN SIBU, SARAWAK

Saimon R, Lee CL and Chana HN

Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: srosalia@unimas.my

Leisure education is becoming an important concept in the Western world, but less established and practiced in Malaysia. Evidence has shown the positive effects of leisure education programme to reduce adolescent's engagement in risky behaviours, such as substance use, sexual behaviour, obesity, and internet addiction, which are detrimental to adolescent's health and well-being. This study was aimed to examine the effects of leisure education programme on leisure benefits and motivation aspects among rural Iban adolescents in Sibu, Sarawak. The study employed a pre-post evaluation design. Convenience sampling was used to select the participants. Thirty-four Iban adolescents from two longhouses had completed 9-hour leisure education programme for three weeks. Respondents were surveyed before and immediately after the intervention to observe changes in knowledge of leisure benefits and free time motivation scales. Data were analyzed with the use of Wilcoxon signed ranks tests. Significance level was set at $p < 0.05$. The leisure education intervention showed improvement in respondent's knowledge on benefits of leisure time, but no significant changes was detected in all five motivation types (intrinsic, amotivation, extrinsic, introjected and identified). The leisure education intervention conducted had effectively improved the knowledge of the respondents on leisure benefits. Therefore, leisure education service can be considered to promote a balanced and healthy leisure lifestyle among adolescents.

ORAL 054 SCT

A DYNAMIC SEIPR MODEL FOR THE SPREAD OF HAND, FOOT AND MOUTH DISEASE IN SARAWAK

Sze Jan Chan¹, Jane Labadin² and Yuwana Podin³

Faculty of Computer Science and Information Technology,

Universiti Malaysia Sarawak

Institute of Health and Community Medicine, Universiti Malaysia Sarawak

Corresponding author email: ljane@unimas.my

In Sarawak, a series of hand, foot and mouth disease (HFMD) outbreaks since 1997 started to catch the public attention. Feared and worried among society in the region had arisen followed by the unusual fatalities cases. Some clinical researches and mathematical models regarding HFMD were produced. Clinical researches revealed that there exist the incubation period and post-infection virus shedding period which are not captured together in any mathematical models so far. In this study, the SIR (Susceptible-Infected-Recovered) model is being improved by building a simple deterministic SEIPR (Susceptible-Incubation(Exposed)-Infected-Post infection virus shedding-Recovered) model. By adding the incubation and post-infection virus shedding as parts of the compartments into SEIPR model, the number of infected cases is predicted. The simulation result shows rapid spreading of HFMD viruses through cohort and the ability of the model to predict the outbreak behaviour pattern in the first ten weeks. Comparison between the SEIPR model and SIR model verified SEIPR model. Validation of the model is done by comparing the simulation with the actual data in 2006. Basic reproduction number, computed was 2.15 which suggesting the highly contagious HFMD is likely to spread fast. The threshold value analysed can allow the possible interventions based on the minimum proportion of the population which create the liability of disease spreading. We hope that this model can help the public health personnel to reduce the burden of the disease by planning an effective manner of intervention during the outbreaks.

ORAL 055 SCT

FULL GENOME CHARACTERIZATION OF EV-A71 ISOLATES FROM THE 2006 SARAWAK HAND, FOOT, AND MOUTH DISEASE OUTBREAK

Dayana Binti Saiful Ikhwan, Ooi Mong How and David Perera

Institute of Health and Community Medicine, Universiti Malaysia Sarawak

Corresponding author email: dperera@unimas.my

In 2006, an outbreak of hand, foot, and mouth disease occurred in Sarawak in which 13 fatal cases were reported. This outbreak marked a dramatic increase in the number of death cases as there was no death cases reported in the previous EV-A71-associated outbreaks in 2000 and 2003. The Health Ministry of Malaysia ordered all child care centers and kindergarten in

Sarawak to be closed following this outbreak. Initial laboratory investigations at that time suggested that three separate lineages of subgenogroup B5 EV-A71 viruses were circulating. In this study, a total of 30 isolates EV-A71 subgenogroup B5 with 10 isolates representing each lineage were characterized by full genome sequencing and phylogenetic analysis. Generally, these three lineages share a minimum of 96% homology with other subgenogroup B5 strains across the entire genome. Phylogenetic analysis of individual gene regions and the P1 (structural proteins) and P2 and P3 (non-structural proteins) regions revealed that these isolates formed three separate subgenogroup B5 clusters designated as cluster 1, cluster 2, and cluster 3 respectively. Clusters 1 and 2 viruses appeared to be related to earlier viruses of EV-A71 B5 isolated in Sarawak in 2003. However, cluster 3 viruses were observed to be similar to viruses isolated primarily in Taiwan in 2000 and 2008-2012. Additionally, cluster 3 viruses were also observed to co-circulate in Brunei at the same time. Taken together, these results suggest that clusters 1 and 2 and cluster 3 viruses appear to have independent epidemiological pathway histories. This may have contributed to the observation that all fatal cases from the outbreak were related to cluster 3 viruses. Amino acid alignments and analysis revealed cluster-specific substitution sites and random isolate-specific differences observed across the genome. Interestingly, a cluster-specific amino acid substitution was observed in the VP4 protein of cluster 3 viruses. This is highly unusual as the VP4 protein is folded into the structure of the capsid and not exposed and all available VP4 sequences to date across the different EV-A71 genogroups have shown a 100% homology in the VP4 protein sequence.

ORAL 056 SCT

VALIDATION OF ENDOGENOUS REFERENCE GENES FOR RELATIVE QUANTITATION STUDIES OF GENE EXPRESSION IN NASOPHARYNGEAL CARCINOMA

Ashley Edward Roy Soosay¹, Ismail Maamar Makhzoum Alhwij¹, Parvathee Ponniah¹, Alan Khoo Soo Beng² and Wong Chun Yiing³

¹*Faculty of Medicine Health Sciences, Universiti Malaysia Sarawak*

²*Institute for Medical Research, Kuala Lumpur*

³*Sarawak General Hospital, Kuching, Sarawak*

Corresponding author email: sashley@unimas.my

Reverse transcription real-time quantitative polymerase chain reaction (RT-qPCR) is a useful molecular contraction in translational biomedical research and clinical settings. RT-qPCR requires normalization. Housekeeping gene (HKG) as reference gene (RG) is commonly used for the relative quantification of the target gene (TG) in gene profiling assays. Normalization

requires stably expressed endogenous RG. Recently, RGs were found to be regulated in a various experimental milieu in different tissues. Therefore, it is pertinent to identify HKGs that are stably expressed and are independent of factors influencing the cell. To validate 4 endogenous RGs for the relative quantification of TGs in gene expression analysis performed via RT-qPCR in nasopharyngeal carcinoma. The qbase+ software utilizing geNORM analysis identified GAPDH, TBP and YARS as stably expressed HKGs. ACTB was the least stable RG in this study. The most suitable set of RG for NPC gene expression studies include GAPDH, TBP and YARS. No single gene was identified as the best RG for expression study. The RG that can be utilized during RT-qPCR on normal and malignant nasopharyngeal tissue samples is a collection of 3 genes (GAPDH, TBP and YARS) used as an average.

ORAL 057 SCT

ILLUMINATING PROFESSIONALISM AMONG NURSES IN THEIR DOCUMENTATION WITHIN THE MALAYSIA CONTEXT – A QUALITATIVE STUDY

Rekaya Vincent Balang¹, R.L. Burton² and A. N. Barlow²

¹*Faculty of Medicine Health Sciences, Universiti Malaysia Sarawak*

²*University of Huddersfield*

Corresponding author email: vbrekaya@unimas.my

Nursing documentation is the key to nursing care in hospitals. Pertinent literature suggests nursing documentation that contains evidence regarding the comprehensive level of nursing care has a strong correlation with nurses' professional practice. Nurses in Malaysia are trained to abide by the Code of Professional Practice (1998), which requires Malaysian nurses (or nurses who practice in Malaysia) to produce comprehensive nursing documentation. Despite the significance of nursing documentation in nursing practice, no study has been conducted and published on this crucial aspect of nursing practice in Malaysia. The objective is to explore how nurses demonstrate professionalism within their documentation. This study utilised a qualitative design to explore the evidence of professionalism in nursing in Malaysia, specifically in the context of their nursing documentation. A total of 40 semi-structured interviews were conducted with nurses involved in completing the nursing documentation. In this context, thematic analysis was used to identify categories and themes in nurses' accounts of their documentation, in relation to professionalism in nursing. The findings reveal that the nurses could not demonstrate their comprehension of the existence of professionalism within their documentation.

ORAL 058 SCT

CHALLENGES OF SUSTAINABLE LIVELIHOOD AMONG SMALL-SCALE SAGO FARMERS IN MUKAH DISTRICT OF SARAWAK

Ahmad Nizar Yaakub, Hafizan Mohamad Naim and Dayang Asmah Awang Hamdan

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: nizar@unimas.my

Sago is produced by small-scale sago farmers and large estate sago plantation in Sarawak. Despite the rigorous development under estate sago plantation, small-scale sago farmers still dominate the production of sago. The objectives of the paper are threefold; firstly, to understand the strategies adopted by the smallholders to sustain their livelihoods, secondly, to examine the change in socio-economic activities and community social-cultural system among the small-scale sago farmers due to the development of sago industry and finally to discuss the challenges encountered by small-scale sago farmers to sustain their livelihoods? This study employs a survey of 308 households of small-scale sago farmers in the Mukah District and a series of in-depth interviews with the village headmen and officers from the Department of Agriculture Sarawak, CRAUN and sago mills. This study shows that majority of the small-scale sago farmers are Melanau who planted less than five hectares of land with sago. Their livelihoods also depended on non-sago agriculture activities such fruit trees and vegetables as well as being general labourers. About a third of young people would follow their parents to be small-scale sago farmers. Most of the small-scale sago farmers believed that their children should continue with the tradition of cultivating sago. The challenges in sustainable livelihoods among small-scale sago farmers include changing to estate sago plantation through LCDA and SSSD, amalgamating traditional and modern methods in cultivating sago, lacking of interest among youth to be sago farmers like their parents, moving from planting sago to oil palm and sago mills fixing the price of sago. This study also provides recommendations on how to improve and sustain the livelihood of the small-scale sago farmers in the Mukah District.

ORAL 059 SCT

MELANAU WOMEN ENGAGEMENT IN INCOME GENERATING ACTIVITY OF SAGO PEARLS-BASED FOOD PRODUCTS: LEVEL OF PARTICIPATION AND MOTIVATION FACTORS

Malia Taibi¹, Siti Zanariah Ahmad Ishak² and Khadijah Mohamad Tuah¹

¹*Faculty of Language and Communication, Universiti Malaysia Sarawak*

²*Faculty of Social Sciences, Universiti Malaysia Sarawak*

Corresponding author email: tmalia@unimas.my

Melanau women play an increasingly important role in supplementing their family household income. They are actively involved in economic activities related to processing and selling of sago-based food products. This is evident in their involvement of making sago pearls, lemantak, tebaloi, cookies and selling of other local delicacies that are made from sago flour. The objectives of the paper are twofold; firstly, to identify the level of participation of Melanau women in the production of sago-based food products and secondly to examines the motivational factors that influence Melanau women's participation in the production and selling of sago-based food products. A total number of 30 Melanau women who resided in Mukah and Dalat (15 from each area respectively) were interviewed for this purpose. The study used qualitative research method with semi-structured interviews and field observation as the techniques for data collection. The findings on level of participation suggest that women involvement is on part-time basis. There are three important motivating factors that can be attributed to the participation intentions of Melanau women in the processing and selling of sago-based food product. They are monetary gain, socialisation and keeping the Melanau culture and tradition alive.

ORAL 060 SCT

TRANSFORMATIONAL LEADERSHIP, MOTIVATION, AND ORGANIZATIONAL COMMITMENT TOWARDS CORPORATE SOCIAL RESPONSIBILITY IN BANKING SERVICE INDUSTRY, SARAWAK

Poh Ming, Wong Winnie¹, Ek Tee, Ngian¹ and Chee Hua, Chin²

¹School of Business and Management,

University College of Technology Sarawak

²Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: winniewong@ucts.edu.my;

Corporate social responsibility (CSR) is increasingly being adopted on a global scale and its importance is rising on multi discipline industry. The main purpose of this study is to investigate the key determinants that drive to CSR in its banking service industry. This study posits that CSR is mainly influenced by transformational leadership, motivation, and organizational commitment. The data presented in this study were collected from several banks in Sibu Sarawak using quantitative survey questionnaire. A total of 149 respondents from 12 different banks were voluntarily participated in this survey. The SmartPLS (version 3.2.6) was used to assess the model developed based on path modelling, and followed by bootstrapping. The results indicated that transformational leadership and organizational commitment provided statistically significant contributions to the prediction of CSR in banking service industry. Surprisingly, motivation was found no significant relationship

with CSR. Several implications of the findings and potential limitations of the study were highlighted.

ORAL 061 SCT

DETERMINANTS AFFECTING RELATIONSHIP BANKING IN MALAYSIAN COMMERCIAL BANKS

Yuen Yee Yen, Devinaga A/P Rasiah and Suganthi A/P Ramasamy
Faculty of Business, Multimedia University, Malaysia
Corresponding author email: yyyuen@mmu.edu.my

This study aims to investigate which factors will significantly affect the relationship banking in Malaysian commercial banks. As the success of financial institutions relies on the effectiveness of commercial banks in building relationship with their customers, it is extremely important for commercial banks to understand how to develop close relationships with their customers. Two hundred survey responses were collected for analysis. Purposive sampling method was adopted in where the researchers set a few criteria in selecting the respondents such as the respondents should be a regular customer of Malaysian commercial banks who has visited the banks for at least twice a month in the past 12 months. The finding shows that empathy and reliability significantly affect customer satisfaction in relationship banking.

ORAL 062 SCT

MODELING MALAYSIA DEBT THRESHOLD: DEBT COMPOSITION PERSPECTIVE

Jerome Kueh, Venus Khim-Sen Liew and Yong Sze Wei
Faculty of Economics and Business, Universiti Malaysia Sarawak
Corresponding author email: kshjerome@unimas.my

This study intends to examine the effect of the debt on economic growth of Malaysia from the perspective of the domestic debt and external debt. Furthermore, the impact of the different type of debts on growth upon either above or below certain threshold level of the debt also investigated using Threshold regression method for sample period 1980-2015. Empirical findings indicate that the threshold level for domestic debt is approximately 37% of GDP while 4% of GDP for external debt. Initial domestic debt accumulation contributes positively to the economic growth of Malaysia when the domestic debt level is below the threshold level. Nonetheless, the debt becomes detrimental to economic growth when the debt level exceeds the threshold level. On the other hand, external debt has negative impact on the economic growth when the debt is below the external debt threshold and become positive when exceed the threshold level. In terms of policy

recommendation, government has an uphill task in managing the debt at optimal level. This is due to the different type of debts and different levels of debt may have different impact on the economic growth. Understanding the threshold level enable the policy makers to be cautious regarding the level of debt as either can be considered high level or low level.

ORAL 063 SCT

KNOWLEDGE MANAGEMENT IN MSC MALAYSIA: THE ROLE OF INFORMATION TECHNOLOGY CAPABILITY

Abang Azlan Mohamad¹, T Ramayah² and May Chiun Lo¹

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia*

Corresponding author email: maazlan@unimas.my

The present study endeavours to investigate the dimensions of knowledge management, information technology capability and firm innovativeness. It attempts to examine the impact of information technology capability in mediating the connection between the dimensions of knowledge management, namely knowledge acquisition, knowledge conversion, knowledge application and knowledge protection; on firm innovativeness. A total of 202 Malaysian organisations took part in the survey. The results highlight that knowledge conversion and knowledge protection are positively and significantly related to firm innovativeness. Information technology capability was found to mediate the connection between knowledge conversion and knowledge protection.

ORAL 064 SCT

CONSTRUCTING A COMPOSITE LEADING INDICATOR FOR THE GLOBAL CRUDE OIL PRICE

Mei-Teing Chong, Chin-Hong Puah and Shazali Abu Mansor

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: chpuah@unimas.my

Crude oil, as the most traded commodity in the world, exhibits prices with a clear influence on other commodities in the worldwide market. It also poses implications regarding the economic growth of oil-exporting and oil-importing nations. This study provides an unprecedented method of employing the indicator approach as proposed by the Conference Board, National Bureau of Economic Research, to construct a leading indicator for the global crude oil price. The results reveal that the constructed oil price indicator can predict the cyclical movement of the oil price by moving in advance of 3.5 months on average. This finding could provide better signalling to oil-related nations as well as other commodities that consider crude oil to be a leader in the market.

ORAL 065 SCT

KAMPUNG BANTANG, SERIAN, SARAWAK AS A TOURISM AREA: BENEFITS AND CHALLENGES TO THE VILLAGERS

Angelina Ansley, Wong Swee Kiong, Spencer Empading Sanggin, Neilson
Ilan Mersat, Ahi Sarok, Mohamad Suhaidi Salleh and
Mohd. Azizul Hafiz B. Jamain

Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: angelansley88@yahoo.com

The objective of this paper is to discuss some of the major attractions identified in Kampung Bantang besides highlighting the challenges faced to make the village a tourism destination. Research methods adopted in this study include documents analysis, observation, and in-depth interview. Kampung Bantang is located between Mount Nambi and Mount Sadong in Serian, Sarawak. Mount Sadong is an early Bidayuh Bukar settlement. Few villages of Bidayuh Bukar community and their orchards are still found at the foot of Mount Sadong. Natural resources, both flora, and fauna, still exist in these two mountains. These could become an attraction to tourists besides being an important source of livelihood for the villagers in Kampung Bantang. Located at Mount Nambi is an important archaeological site named Sireh Cave in Kampung Bantang. It was believed that Sireh Cave could have been occupied about 20,000 years ago. This archaeological site was protected and conserved by the Sarawak Museum under the Sarawak Cultural Heritage Ordinance 1993. The historical value and the attraction of natural beauty around Sireh Cave have made this village a potential site for tourism. However, transforming Sireh Cave as a tourism site is challenging. The cave is situated close to the villagers' orchard under Native Customary Right (NCR) land area. To upgrade this area to be a tourism site might incur a high cost. Some of the villagers also refuse to surrender their lands and gardens to be included in an upgraded area for tourism purposes. A big amount of compensation to the landowner is needed if it is to turn this area into historical tourism site with archaeological value. The findings of the study show that cooperation between the community and the Museum Department of Sarawak is essential for making this tourism site a success.

ORAL 066 SCT

PROACTIVE BEHAVIOUR AS A MEDIATOR IN THE RELATIONSHIP BETWEEN QUALITY OF WORK LIFE AND CAREER SUCCESS

Ling Nyuk Ping, Nur Fatimah Abdullah Bandar, Farida Abdul Halim @ Alil
and Agatha Lamentan Anak Muda

Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak

Corresponding author email: abnfatihah@unimas.my

Achieving career success among employees is a primary concern for both individuals and organisations. Career success acts as a powerful motivator for one to advance great progress, such as improving his or her job performance and achieving more success. Quality of work life is in accordance with various needs of individuals' well-beings in the workplace, which may promote career success. Additionally, instead of having knowledge and skills required, individuals should possess positive personalities and right attitude to ensure that they always exert their best endeavours to achieve career success. This study examined the mediating effect of proactive behavior on the relationship between quality of work life and career success. Self-administered surveys were employed for data collection among 304 married academicians from two (2) selected Public Institutions of Higher Learning. Data were analysed by using Analysis Moment of Structures Software (AMOS) for Structural Equation Modelling (SEM). Results indicated that a partial mediation effect of proactive behaviour was established on the relationship between quality of work life and career success. It can be concluded that the quality of work life can positively influence career success among academicians. If they, however, also have proactive behaviour, they will be eagerly urged to achieve higher levels of career success.

ORAL 067 SCT

ACCOMMODATING STUDENTS WITH DISABILITIES IN HIGHER EDUCATION: REHABILITATION COUNSELING PERSPECTIVES

Azzahrah Anuar, Merikan Aren, Edris Aden, Nor Mazlina Ghazali and Fatahyah Yahya

*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: aazzahrah@unimas.my

Individuals with disabilities are often under presented in higher education setting in which have led these marginalized groups to problems such as having lack of access to academic services and facilities, unequal opportunities to participate in activities on campus thus, hindering their intellectual and psychological growth. As students with disabilities are anticipated to encounter many challenges throughout their academic endeavor, rehabilitation counselors can play integral roles in facilitating these situations. This paper presents the unique roles of rehabilitation counselors and identifies the required competencies to accommodate the academic needs of university students with disabilities. Rehabilitation counselors work collaboratively with the university faculty, staff, and administrators to ensure students with disabilities acquire equal access to academic services and facilities on campus. The required competency when working with students with disabilities in higher education setting is to have a substantial knowledge

in psychosocial and medical aspect of disability, vocational rehabilitation counseling, and rehabilitation technology. To create an inclusive and integrated counseling service for student with disabilities, training in the core knowledge area of rehabilitation counseling must be provided to the existing counselors. The inclusion of rehabilitation counseling in the counseling education curriculum will drive the emergence of the field in higher education.

ORAL 068 SCT

PRELIMINARY ANALYSIS OF ADOPTION OF SAGO SMALLHOLDERS SATELLITE ESTATE DEVELOPMENT (SSSED) PROGRAMME AMONG SAGO CULTIVATORS IN MUKAH/DALAT AREAS OF SARAWAK, MALAYSIA

Hjh Siti Haslina Hussin, Awang Ideris Awang Daud and
Noratikah Mohamad Ashari

Centre for Sago Research (CoSAR), Universiti Malaysia Sarawak

Corresponding author email: hhaslina@unimas.my

The main aims of our study are to examine the awareness and level of knowledge among sago cultivators concerning the Sago Smallholders Satellite Estate Development (SSSED) programme as well as their readiness and willingness to participate in the programme. Framed based on the Diffusion of Innovation theory (Rogers, 1995), the study focuses on the first three stages of the Innovation- Decision Process model: Knowledge, Persuasion and Decision. Based on the still ongoing fieldwork, this paper reports some of the preliminary findings on adoption decisions made by the respondents. Data collected from 64 sago cultivators surveyed were analysed. Initial findings of the study indicate that slightly more than half of the respondents claimed to be the participants in the SSSED program. However, surprisingly their levels of awareness of the program as well as readiness and willingness to participate in the program measured in various dimensions, were reported to be at the moderate level only. Hence, investigating the underlying reasons leading to such findings is warranted in the future.

ORAL 069 SCT

IN PURSUIT OF THE RIGHT TO EDUCATION FOR UNDOCUMENTED CHILDREN: VOICES FROM THE MARGINS

Linda A. Lumayaq

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: allinda@unimas.my

I argue in this paper that the human rights perspective is the approach to resolving the issue of increasing number of undocumented children in Sabah,

East Malaysia who have no access to formal schooling. Hence, Section 130 of Education Act 1996, as amended in 2002 and which took effect in 2003 which bans undocumented children from going to school must be repealed. While informal schooling may be available to some undocumented children, still it does not equate to a full learning experience that formal school system provides. By allowing undocumented children to register, it would then be a collective voice in Borneo in as much as the state of Sarawak has allowed undocumented children to attend schools and receive health and social services from the state. More importantly, immigrant and migrant population is the backbone of the state/national economy especially in the plantation, manufacturing, construction, and services sectors- accounting for at least 15% of the national labour force in 2016.

ORAL 070 SCT

DETERMINANCE OF NATURAL RESOURCE USAGE IN SARAWAK: GIS APPROACH IN MAPPING DIFFERENT APPLICATION OVER ETHNICITY AND SPATIAL EXTEND

Mohd. Azizul Hafiz Jamian, Neilson Ilan Mersat, Wong Swee Kiong, Mohamad Suhaidi Salleh, Spencer Empading Sanggin, Ahi Sarok, Peter Songan and Eva Kristin Larry Sait

Faculty of Social Sciences, Universiti Malaysia Sarawak

Corresponding author email: jmahafiz@unimas.my

This paper discusses the differences over natural resources applications and usages across the geographically spatial extend in Sarawak region particularly within internal and coastal regions. This study also looks into ethnicity aspects over their locality and relates with the environment surroundings thus translates different usage of natural resources in different locations. By using Geographical Information System (GIS) to map the location as well as the information in regards of natural resources usages in different location provides determinacies of how local communities use natural resources around them. Different environmental and geographical aspects influence the communities of know how in natural resource uses. The study has determined that several factors contribute to the differences of natural resource usage that is land cover of the community areas, distance from one area to another as well as proximity of one ethnicity to another in spatial extend. Two different ethnicities may share the same uses of particular natural resources due to close spatial proximity. The importance of the resource has also been reflected with the abundance of the sources and land cover patterns of the area.

ORAL 071 SCT

RETHINKING AND MOVING BEYOND GDP: A NEW MEASURE OF SARAWAK ECONOMIC PANORAMA

Shirly Siew-Ling Wong, Toh-Hao Tan, Shazali Abu Mansor and Venus Khim-Sen Liew

Faculty of Economics and Business, Universiti Malaysia Sarawak

Corresponding author email: wslshirly@unimas.my

In recent years, global market is marveling in surprise due to the shaky economic outlook along with falling commodities and crude oil prices. Economic uncertainty is looming over the Malaysian economy as ringgit movement is rests ambiguous ahead while volatile capital flows, inflationary pressure as well as vulnerable external sector and global trade remains intense for the time being. Sarawak, as one of the resources-rich states that rely heavily on primary commodities and export earnings from oil-based industries, is about to face a noxious cocktail of economic risks following the plunge in commodity prices. Besides, the commodity market is likely to extend losses in the face of tumbling crude oil prices, leading to a weaker fundamental stance of the state as a third largest Gross Domestic Product (GDP) contributor in the country. Above all, moving beyond the GDP as a leading measure of economic activity is a way forward for sustainable economic development in the state, while producing a bottom line statistic that can encapsulate an insightful bird's-eye view of the economy is a key need for policy analysis and decision-making processes. Therefore, it is of key priority to establish a well-timed signaling mechanism to estimate the erratic economic forces derive from a complex and multidimensional issues of the domestic and global economies. In this respect, the Sarawak Economic Barometer (SEB), which is tested to be statistically welldefined with a remarkable leading power of 3.5 months on average, is deemed to be essential in depicting a notable economic outlook for the state. More importantly, the SEB will be a valuable reference to ease the economic risks mitigation process and countercyclical policy measures, at both national and state levels.

ORAL 072 SCT

THE RELATIONSHIP OF BURNOUT DIMENSIONS WITH ORGANIZATIONAL CITIZENSHIP BEHAVIOR (OCB) AMONG BANK EMPLOYEES IN SARAWAK: MEDIATING ROLE OF FLOW EXPERIENCE

Mark Kasa, Zaiton Hassan

*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: markedmund@unimas.my

Bank employees are perpetually working in an increasingly stressful and arduous work environment. The purpose of this study is to investigate the effect of burnout dimensions on Organizational Citizenship Behavior (OCB). As bank employees are requested to work overtime and often overloaded with endless yet demanding tasks, the situation would contribute to the burnout dimensions, namely exhaustion and disengagement experience. Furthermore, this situation may exert adverse impact on employee OCB. A primary survey of 298 bank employees in Kuching, Malaysia indicated that there are mediating effects between burnout dimensions and OCB. The study's findings can be utilized by organizations to develop effective strategies to minimize exhaustion and disengagement while enhancing flow phenomena toward favorable OCB experience in the organization.

ORAL 073 SCT

TRADE OPENNESS, FDI AND ECONOMIC GROWTH: EVIDENCE FROM SUBSAHARAN AFRICA COUNTRIES

Eric Olabode Olabisi¹ and Evan Lau²

¹*Department of Economics and Development Studies, Elizade University, Ilara-Mokin, Ondo State, Nigeria;*

²*Faculty of Economics and Business, Universiti Malaysia Sarawak*
Corresponding author email: olabode.olabisi@yahoo.com

Empirical literatures seek to explain the causal relationship between trade openness, foreign direct investment (FDI), and economic growth but such evidence were scarce for the SubSaharan region. The paper uses Dumitrescu-Hurlin Granger non-causality, Pooled Mean Group and a sample of 10 Sub-Saharan African (SSA) countries for the year 1980-2015. In the long-run, the paper finds positive and significant relationship between foreign direct investment and economic growth. Trade openness shows a positive and significant relationship on economic growth in the short-run. The paper finds a bi-directional causal relationship between FDI and economic growth. This finding is consistent with an opinion that growth of the economy promotes FDI vice-versa. Trade openness and economic growth shows a two-way causality. As part of the policy recommendations of the paper, it is suggested that all the necessary inducements to attract foreign direct investment to SSA region should be embarked on by the government.

ORAL 074 SCT

DEPENDENCE OF LOCAL COMMUNITIES ON FOREST RESOURCES AS LIVELIHOOD: IS IT STILL RELEVANT TODAY?

Wong Swee Kiong, Neilson Ilan Mersat, Spencer Empading Sanggin, Peter Songan, Ahi Sarok, Mohamad Suhaidi Salleh and Mohamad Azizul Hafiz Jamian
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: swkwong@gmail.com

Forest resources have always been important resources to support the livelihood of the local communities particularly those living in the interior part of the world. Nevertheless, the 21st century today has seen major development, which has caused environmental change and subsequently affected the stock of forest resources in most parts of the world. Sarawak, one of the two states in Malaysia located in the island of Borneo, is richly endowed with natural resources. The abundant natural resources found in Sarawak are not only the main driver for economic growth, but in many parts of Sarawak, they are also sources of which many local communities still dependent on to sustain their livelihoods. The aim of the paper is to discuss on issues pertaining on the relevance of forest resources to the livelihoods of the local communities in Engkilili, Sarawak. This study adopts qualitative approach. Cluster sampling method is used to select heads of the households of the villages in Engkilili for face-to-face interview. Besides, in-depth interview was also carried out with key informants particularly the headmen of the villages to find out the dependence of local communities on forest resources. The findings show that though rapid infrastructure and agriculture development had been carried out in this area, most of the local communities in Engkilili still depend very much on the forest resources for their livelihoods. Measures should thus be taken to preserve these natural resources from being further exploited by the irresponsible entities.

ORAL 075 SCT

FACTORS AFFECTING SOCIOECONOMIC AND SOCIAL STATUS IN THE RURAL COMMUNITY WITH MEDIATING EFFECT OF INTERNET ADOPTION

Nur Adila Binti Latif and Shahren Ahmad Zaidi Adurece
Institute of Borneo Studies, Universiti Malaysia Sarawak
Corresponding author email: Inuradila.90@gmail.com

Internet provides the effectiveness in knowledge management and transfer which is vital in various aspects of development. Moving towards digital economy, several interventions have been implemented by the government to achieve its objectives, not only in the urban areas but also in the rural areas. The availability of internet as the platform for business, communication, and

information access helps in developing ideas for socioeconomic development and community transformation as a whole. In this study, the researcher will investigate the factors affecting socioeconomic (occupation, income, and education), as well as social status (health and social structure), with the causal mediated effect of internet adoption. Several factors will be investigated in this research, including demographic factors, generational differences, cultural differences, Information and Communication Technology (ICT) skills and behavioural intention to use ICT. The mediation analyses will provide information in on the process by which the intervention achieved its effects on the outcome measure. Therefore, by integrating internet adoption as the mediator in this study, it will help in assessing the effectiveness of the intervention, other than understanding what and how it affects the relationship between the determining factors (independent variables) and socioeconomic as well as social status (dependent variables) in the rural community.

ORAL 076 SCT

THE IMPACT OF ACCESSIBILITY QUALITY AND ACCOMMODATION QUALITY ON TOURISTS' SATISFACTION AND REVISIT INTENTION TO RURAL TOURISM DESTINATION IN SARAWAK: THE MODERATING ROLE OF LOCAL COMMUNITIES' ATTITUDE

Chee-Hua Chin¹, Fung-Yee Law¹, May Chiun Lo¹ and T. Ramayah²

¹*Faculty of Economics and Business, Universiti Malaysia Sarawak*

²*School of Management, Universiti Sains Malaysia*

Corresponding author email: fy3075@gmail.com

Past studies have proven that there is an increasing trend showing more tourists are travelling to rural areas for vacation because of its richness of the local natural, cultural, and heritage resources. Despite the potential importance of rural tourism, however there has been an ongoing debate on ways to better develop rural tourism destinations that will ensure sustainable of profitability. Service quality has been proposed as one of the crucial determinants to enhance tourists' satisfaction and subsequently lead to revisit intention. Therefore, this study intends to examine the influence of two service quality components, namely accessibility quality and accommodation quality and its impacts towards tourists' satisfaction and subsequently leads to revisit intention. This study also examines the moderating role of local communities' attitude in enhancing the relationship among the two namely service quality components on tourists' satisfaction. A total of 251 tourists volunteered participated in this study. The SmartPLS (version 3.2.6) is used to assess the measurement and structural model. The results found that both accessibility quality and accommodation quality was positively related to tourists' satisfaction, and tourists' satisfaction was found positive relations with revisit intention. Interestingly, local communities' attitude was found enhanced the

relationship between accommodation quality and tourists' satisfaction. Both theoretical and practical implications are discussed.

ORAL 077 SCT

KNOWLEDGE STATES OF PUPIL LEARNING AT A HIGH PERFORMANCE RURAL PRIMARY SCHOOL

Philip Nuli Anding, Linton Britten, Lambat Lindong, Sirai Daha
Faculty of Social Sciences, Universiti Malaysia Sarawak
Corresponding author email: aphilip@unimas.my

Socio-economic status, parent education and infra-structures are some of the factors that are believed to influence pupil learning in rural primary schools. However, some rural primary schools are actually high performance schools, which imply that it may be necessary to consider pupil learning from a different perspective. This paper considers the phenomenon of pupil learning at the school-level on the basis of the school as an entity that learns and in terms of the states of the knowledge of the entity. The objective of this study is to identify the states of knowledge or knowledge states of pupil learning at a high performance rural primary school in Sarawak. Observations, interviews, documents, artifacts and discourses were used to generate data, and data analysis involved interpreting the meaning of the data. The respondents of this study included pupils, parents, teachers, support staff, head teacher and members of the PTA and local community. The findings uncovered thirteen knowledge states of pupil learning, which are Basic Profile, Infrastructure, Transportation, Structures-Finance Support, Events, Academic Curriculum, Programs, Language, People or Learning Resources, Practices, Values, Awareness and Dispositions or Beliefs. The knowledge states are concerned with creating time, giving attention, designing suitable structures, constructing events for learning, and construction of high-order conceptual structures that facilitate pupil learning. The findings of this study may be considered for other learning situations or community development, and that further research should consider pupil learning at other rural primary schools or communities.

ORAL 078 SCT

INFLUENCE OF ASPECTS OF RELIGION ON THE WORK-FAMILY INTERFACE IN MALAYSIA: A LONGITUDINAL STUDY

Zaiton Hassan, Dayang Kartini Abang Ibrahim, Nik Norsyamimi Md Nor,
Surena Sabil and Nur Fatimah Abdullah Bandar
Faculty of Cognitive Science and Human Development,
Universiti Malaysia Sarawak
Corresponding author email: hzaiton@unimas.my

Shifting from Western-dominated perspectives, this study aimed to investigate relationship between religion and work-family conflict and enrichment. SPSS analysis was conducted on data obtained through two self-report questionnaires completed three months apart by 296 executives and non-executives from six public and private sector organizations in Kuching, Sarawak. After controlling for conflict and enrichment at Time 1, aspects of religion (importance of religion and perception of religiousness) negatively related with work-family conflict and positively associated with work-family enrichment. The study underscores the roles religion, which have been neglected in Western studies, as important parts in shaping the work-family interface in Malaysia. Therefore, organizations should include religious activities to encourage work-life balance among employees.

ORAL 079 SCT

SECTORAL GDP CONVERGENCE OF SELECTED RCEP COUNTRIES: LEAD OR LAGS?

Dayang Affizah Awang Marikan, Md. Mahbubur Rahman, Nor Afiza Abu Bakar and Mohd Affendy Arif

Faculty of Economics and Business, University Malaysia Sarawak

Corresponding author email: purnimabd72@yahoo.com

The study investigates sectoral value-added convergence in selected RCEP countries by applying the non-linear time-varying coefficients factor model suggested by Phillips and Sul (2007a) over the period of 1987-2015. To converge, this technique allows a large number of transition paths and as well provides for clubs convergence. Structural convergence occurs, if income convergence progress is associated with sectoral convergence or disaggregated level. Interestingly, this investigation finds income converge at the aggregate level. Further clubbing analysis indicates three clubs, indicating advanced countries (Japan, Singapore and Korea) lead club, Upper-middle income countries (Malaysia, China and Thailand) as second club, and finally lower middle income (Indonesia, Philippines and India) form another club. The three sector hypothesis states that, inter sectoral convergence is anticipated to appear whenever the less developed nations are capable of closing the income disparity with those advanced nations. Asian economies are in transition process of heading to the later stage of this hypothesis. Convergence in Income per capita was quite rapid, indicating the highest level of convergence at sectoral level. There is an obvious indication for a catching up countries to form large clusters. For robustness, this application offered the measures of value added convergence in five sectors namely, agriculture, manufacture, service, construction and mining sectors. Test of convergence on GDP share at aggregate level shows divergence in all the sectors which points the way to possible formation of club convergence. Within the service sector and construction sectors in RCEP countries reveal strong sectoral club

convergence whereas, for agriculture, and manufacturing as well as for mining is indicated rather weak club convergence.

ORAL 080 SCT

‘BERISIK’ DAN ‘BEPETIT’: KAJIAN BAHASA HALUS MASYARAKAT MELAYU SARAWAK

Hamidah Abdul Wahab, Imran Ho Abdullah, Khazriyati Salehuddin and Mohammed Azlan Mis

*Faculty of Language Studies and Communication Studies,
Universiti Malaysia Sarawak*

Corresponding author email: awhamidah@unimas.my

Bahasa halus atau eufemisme merupakan salah satu strategi berbahasa yang lazimnya berperanan untuk menjaga sensitiviti penutur dan pendengar mengenai sesuatu isu yang boleh menimbulkan rasa malu, menyinggung perasaan dan seumpamanya. Kajian Bahasa halus dalam makalah ini memfokus kepada penggunaan bahasa dalam domain kewanitaian, iaitu kehamilan. Bahasa halus bagi kehamilan dikaji untuk menunjukkan bahawa penggunaan bahasa dalam masyarakat ini mempunyai hubungan yang erat dari sudut makna dan budaya Melayu yang berlandaskan agama Islam. Data bahasa halus berkaitan kehamilan diperoleh menerusi kajian lapangan di Kampung Buntal, Kuching Sarawak, menggunakan kaedah soal selidik dan temu bual melibatkan dua orang informan wanita dan dua orang informan lelaki Melayu. Data kajian dianalisis dari sudut semantik kognitif, iaitu satu cabang kajian linguistik yang meneliti aspek bahasa dari sudut pemaknaan dan pemikiran penutur berlandaskan pengalaman dan persekitaran mereka. Menerusi kerangka semantik kognitif, skema imej (Lakoff 1987) diterapkan dalam analisis data oleh sebab kesesuaiannya dalam meneliti pengkonsepsian penutur, sejajar dengan hubungan penggunaan bahasa ini yang berkait rapat dengan pengalaman seharian. Dapatan kajian ini memperlihatkan wujudnya kata-kata bersifat halus bagi memperkatakan topik kehamilan, iaitu ‘ada isik’, ‘berisik’, ‘petit’, dan ‘bepetit’. Secara langsung, kajian ini menggambarkan kehemahan dan ketinggian peribadi, serta ketelitian penutur dalam berbahasa. Kajian ini turut menonjolkan sisi kebahasaan masyarakat Melayu Sarawak yang memiliki variasi bahasa santun dalam mengungkapkan hal-hal seperti kehamilan, yang secara dasarnya mempunyai sedikit perbezaan dengan masyarakat Melayu umumnya.

ORAL 081 SCT

TARAF KOGNAT ANTARA BAHASA MELAYU STANDARD DAN DIALEK MELAYU KABONG

Salbia Hassan

*Faculty of Language Studies and Communication Studies,
Universiti Malaysia Sarawak*

Corresponding author email: hsalbia@unimas.my

Kajian ini menghuraikan analisis umum terhadap hubungan antara Bahasa Melayu Standard (BMS) dan Dialek Melayu Kabong (DMKb) menerusi kaedah perbandingan leksikostatistik. Kaedah ini menggunakan 100 kata dasar Swadesh (Samarin, 1967:221) yang kemudiannya dibandingkan dengan kosa kata DMKb bagi menentukan taraf kognat antara kedua-dua bahasa atau dialek yang dikaji. Kosa kata ini bersifat bebas budaya (free culture) dan kata asas (basic core) yang diandaikan terdapat dalam semua bahasa. DMKb ini dituturkan oleh masyarakat Melayu di Daerah Kecil Kabong, Betong Sarawak. Majoriti penduduknya adalah masyarakat Melayu dan selebihnya adalah masyarakat Iban dan Cina. Berdasarkan analisis yang telah dilakukan, didapati hubungan antara BMS dan DMKb sangat dekat dengan 87.75% persamaan kata berkognat. Dapatan ini membuktikan bahawa DMKb bertaraf dialek dan menunjukkan wujudnya perpisahan DMKb daripada bahasa induknya, Bahasa Melayu sejak 0-5 abad yang lalu.

ORAL 082 SCT

THE RELATIONSHIP BETWEEN WORKLOAD AND STUDENTS' DISRUPTIVE BEHAVIOURS WITH TURNOVER INTENTION AMONG ACADEMICIANS OF PRIVATE HIGHER EDUCATION INSTITUTIONS IN SARAWAK, MALAYSIA: BOREDOM AT WORKPLACE AS MEDIATOR

Michael Teng, Zaiton binti Hassan, Mark Kasa, Nur Fatimah binti Abdullah

Bandar, Rusli bin Ahmad and Nik Norsyamimi binti Md Nor

Faculty of Cognitive Sciences and Human Development,

Universiti Malaysia Sarawak

Corresponding author email: tlimichael2@hotmail.my

Boredom is widespread contagious bacterial experienced by all occupational levels at increasing trend and that influences employees' affection, cognition, and well-being. However, limited studies are carried out to investigate the influence of boredom at workplace on turnover intention. In academia, academicians are mentally and physically overloaded due to heavy workload and student disruptive behaviour. Therefore, this study investigates the relationship between workload, student disruptive behaviour, and turnover intention among academicians. A quantitative study was conducted to obtain

the data from 279 academicians working for 20 private higher education institutions (PHEIs) in Sarawak. The results showed that workload was negatively associated with turnover intention, while student disruptive behaviours were positively associated with turnover intention. A structural mediation model showed that workload was negatively associated with boredom which led to positive association with turnover intention. In contrast, student disruptive behaviour was positively associated with boredom and which resulted in turnover intention. After performing bootstrapping, the result confirmed the presence of boredom as mediator. PHEIs should establish technologies and facilities to reduce the academicians' workload. The academicians should also be provided with trainings related to class management and learning tools in order to minimize their boredom and turnover intention.

ORAL 083 SCT

QUALITY OF WORK LIFE AMONG ACADEMICIANS IN SELECTED PUBLIC INSTITUTIONS OF HIGHER LEARNING IN SARAWAK

Nur Fatimah Abdullah Bandar, Surena Sabil, Samsiah Jayos, Mazdan Ali
Amaran and Rosita Hamdan

*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author email: abnfatihah@unimas.my

This study aims to determine the factors influencing the Quality of Work Life (QWL) among academicians and to determine the differences between QWL and responses by those in the selected demographic profile (Gender and Marital Status). A survey methodology was used in this study. This research involves the utilization of questionnaires which were administered among two hundred and seventy-eight (278) academicians currently working in a selected Public Institutions of Higher Learning in Sarawak. The factors influencing QWL were analyzed using descriptive analysis. The comparative between QWL and selected demographic profile (Gender and Marital Status) was analyzed using the Independent T-Test method. The results of the study showed that the respondents were satisfied with their work context (co-worker) domain. The major influencing factors include having good communication and relationship with students, support staff, and other stakeholders. Results also indicated that there are significant differences between QWL and Gender. There were no significant differences found between QWL and Marital status. These findings will help policy makers to implement the best practice to improve the QWL. This may assist to improve individuals and organizations performance whilst increasing commitment levels among academicians.

ORAL 084 SCT

EXPERIENCE OF MOTHERS LEARNING AND DOING INFANT MASSAGE

Chan Kim Geok, Saloma Pawi, Shalin Lee, Chor Yau Ooi, Helmy Hazmi,
Zuraini Arabi and Emily Hii

Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak

Corresponding author email:

Mothering a baby is a happy event for most people. However, it could be challenging for many, especially for the first-time mothers. Baby massage could play a significant role for the well-being of mothers and their babies during the transition state of adapting to motherhood. Baby massage has been reported to be practiced for years as a part of traditional parenting styles in cultures around the world. In the recent years, it has become more popular in the western countries such as the United States and Europe as more findings that support its use have emerged (Caple & Schub, 2016). Locally, the teaching of mothers to practice massage with their babies are relatively new. Besides service provision noted to be run in selected private clinics or settings, infant massage is presently not included as a program in the government maternal and child health clinics. This study is a part of an ongoing comparative cohort study which examines infant massage and its influence on the maternal-child attachment, babies' sleep and the breastfeeding outcome. These involves mothers who are recruited from the selected maternal and child health clinics with babies between 4-6 weeks old. Those assigned to the study group were invited to attend the four weekly sessions of the adapted infant massage program (McClure & IAIM Circle of Trainers, 2015), guided by a certified infant massage instructor (CIMI) in the clinic. The program integrated teaching of massage strokes with discussion on use of oil, preparation of environment, etc. Participants were given handouts and were requested to massage their infants twice a day for 15 minutes at home. Study aims to generate a rich data which would provide further insights from the participants' perspectives to supplement the existing evidence base which may influence service provision for maternal and child health care with potential for inclusion of infant massage program.

ORAL 085 SCT

WILLINGNESS TO PAY (WTP) FOR NATIONAL SOCIAL HEALTH INSURANCE SCHEME IN SARAWAK, MALAYSIA: A CONTINGENT VALUATION STUDY

Mohamad Norhaizam Ahmad@Narawi, Anselm Su Ting and Zafar Ahmed

Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak

Corresponding author email: haizamnarawi2@yahoo.com

Expenditure on healthcare in Malaysia has been increases over the years and brings a challenge not only for the government but also to insurance provider and individual. Thus, an alternative to current health financing should be studied to ensure that proactive action have been taken for future. The objective of this study is to determine the willingness to pay for national health insurance scheme among population in Sarawak. This study is a cross sectional study involving working age group between 18 to 60 years old with total respondent of 930. The selection of respondent was done using Enumeration Block (EB) method where total of 81 EBs were selected involving 6 divisions in Sarawak. The selection of EB and houses were done by Department of Statistics Malaysia and only one respondent was selected from each selected house either the breadwinner or head of family. The respondents selected were interviewed using questionnaire for data collection. This study found that 62.8% of the respondents have a good knowledge on the health insurance scheme. This study also found majority of the respondents agree to enroll in the National Social Health Insurance Scheme where 92.7%, 91.1% and 92.5% agreed based on Scenario 1, 2 and 3. About 60% of the respondents also willing to pay between RM30 to RM40 per household per month for this scheme across all three Scenarios. Ethnicity (Malay OR: 0.462, 95% CI, 0.257 to 0.832), education ($p < 0.05$), occupation ($p < 0.05$), household income ($p < 0.05$, OR: 1 95% CI 0.999 to 1.000) and level of knowledge on the insurance scheme ($p < 0.05$) are the significant factors contributing to willingness to pay for this scheme.

ORAL 086 SCT

CONGENITAL AMUSIA AMONG YOUNG ADOLESCENTS IN KUCHING, SARAWAK

Siti Norazilah Mohd Said, Nisha Nurshazwani Baharom, Shaira Parveen Hamilin, Amalia Madihie and Salmah Mohamad Yusoff

Faculty of Cognitive Sciences and Human Development,

Universiti Malaysia Sarawak

Corresponding author email: ssthia@unimas.my

This paper outlines an investigation into the occurrence of congenital amusia, commonly known as tone deafness, among young adolescents in Kuching, Sarawak. It provides new insight on the prevalence of congenital amusia, among young adolescents aged between 13-14 years of age, using Montreal Battery of Evaluation of Amusia (MBEA). It also compares the occurrence of congenital amusia between tonal and non-tonal language speakers; and establishes the predictors of the MBEA scores, namely musical experience, musical training/listening habits and musical difficulties, with questions adapted from Queen's music questionnaire. Using quantitative method, the

results suggest that there is no prevalence of congenital amusia among the group of young adolescents who took part in this study. It also appears that first language, either tonal or non-tonal, does not have significant impact on the ability to comprehend music. The findings show that musical experience, musical training/listening habits and musical difficulties are not the predictors of the Montreal Battery of Evaluation of Amusia (MBEA) scores among young adolescents. The study contributes useful knowledge about how first language, both tonal and non-tonal language, could have an impact on the ability to comprehend music among young adolescents. This new knowledge would assist future research in the possibility of music appreciation in young adolescents' second 'window of opportunity' in brain development.

ORAL 087 SCT

DEVELOPMENT OF MINDFULNESS MODULE FOR PROMOTING HEALTHY LIFESTYLE AMONG FEMALE STUDENTS IN HIGHER EDUCATION INSTITUTIONS

Siti Norazilah Mohd Said, Nisha Nurshazwani Baharom, Shaira Parveen Hamilin, Amalia Madihie and Salmah Mohamad Yusoff
*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*
Corresponding author email: mssnorazilah@unimas.my

This study introduces the development of a mindfulness-based module named as The Journey to Healthier Me: Be Mindful, Be Healthy, & Be Happy (TJHM) according to the counselling intervention or module standard. The main objective of this module was to promote healthy lifestyle and wellbeing among female students at university. The Cognitive Behaviour Therapy (CBT) approach, Mindfulness approach and Sidek's Module Development Model (SMDM) were applied as guidelines in developing the mindfulness module. The validation stage was carried out by four expert counsellors, and Cronbach's alpha index 0.85 was obtained. A group of eighteen female participants aged between 20 to 25-year-olds had undergone the module in order to measure the module's reliability, where the reliability index was 0.95. As a result, the module is ready to be implemented as guidance and intervention for counsellors and health practitioners to enhance their client's wellbeing and quality of life.

INFORMATION, COMMUNICATION AND CREATIVE TECHNOLOGY

ORAL 001 ICCT

EVALUATING SOUTH KOREAN BASED MOBILE ROLE PLAYING GAMES WITH PLAYABILITY HEURISTIC EVALUATION

Louis Laja Uqqah¹, Ahmad Azaini bin Abdul Manaf² and
Azaze-Azizi Abdul Adis³

¹*Institute of Design and Innovation,*

²*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak;*

³*Faculty of Business, Economics and Accountancy,
Universiti Malaysia Sabah*

Corresponding author: Louislaja83@gmail.com

This research compared two role-playing games developed by South Korean-based company which is Netmarble Games. These games were selected based on their number of downloads among iOS mobile users. The Heuristic Evaluation method was selected to study these games based on 3 categories which are Mobility, Usability and Gameplay. In conclusion, this study has presented evaluation on these 2 games based on playability heuristic evaluation and have identified key areas to be improved by game designers.

ORAL 002 ICCT

ORGANIZING VISUAL INFORMATION OF TRADITIONAL ORNAMENTS ADORNED BY EMBHAN'S RING LADIES

Rafee, Y. M.^{1,2}, Awang Arshad, A. H.^{1,2}, Aman Leong, S. N.^{1,2}, Maying, D.¹,
Siri, H¹ and Jussem, S.^{1,2}

¹*Institute of Borneo Studies,*

²*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak*

Corresponding author: mryakup@unimas.my

This article aims to discuss an alternative system to organize information in the context of visual ethnography study particularly on the documentation of diminishing traditional ornaments worn by the remaining Ring Ladies of Embhan Community, the only community in Sarawak who still practice this culture. The system was developed based on problems faced by the researcher when visual and data collected during the investigation has difficulty with storage due to the lack of a systematic compilation method. Thus, it is challenging for the researcher to identify or retrieve the information, especially relating to visual data on the cultural objects. Through visual ethnography method, visual information related to cultural objects of Bidayuh Embhan particularly with the Ring Ladies was collected and analyzed. Hence, an alternative system in organizing visual information relating to the cultural object called, Digital Ethnographic Organizer (e-Divo) was created using Adobe InDesign and published in a Flash format. It is hoped that this system can be developed further as an information-seeking tool that can be used in

the context of cultural objects and ethnography exhibition, especially in the galleries or museums.

ORAL 003 ICCT

CAN ANIMATED NARRATIVE CONTENT AFFECT THE CONSUMER'S MOTIVATION AND INTENTION TO PURCHASE A PRODUCT?

Yousef K. A. Alallan¹, Azaini A. Manaf¹ and Ruslan Rahim²

¹*Faculty of Applied & Creative Arts, Universiti Malaysia Sarawak;* ²*Faculty of Art & Design, Universiti Teknologi MARA Shah Alam*

Corresponding author: alallany@yahoo.com

Animation is a dynamic visual narrative and is frequently used for advertising purposes, expanding the advertisement content and causing affective stimuli to consumers. It has been documented that animation may increase effectiveness in terms of the consumers' affective, cognitive and conative response thus having a positive and significant impact on their attitudes. This includes brand awareness and preferences, products choice, and intention to purchase, although the role of involvement is significant for assessing consumers responses to ads. The aim of this paper is to investigate animation influences on ads' effectiveness, by examining consumers' responses to animated ads (cognitive and affective) as the intention to buy and taking also into account the role of involvement. The findings suggest that watching animated ads is positively correlated with the intention to purchase. In addition, consumers' intention to buy is higher by watching cognitive than affective animated ads for the moderate-involved subjects, as well as that for highly involved individuals, intention to purchase is high for both types of ads, i.e. cognitive and affective. This study suggests that the animation element as stimuli in advertising plays an important role in high-involvement individuals. Animation in advertising can significantly influence consumers' attitudes toward the brand, as well as purchase intention, partly due to higher attention-grabbing impact.

ORAL 004 ICCT

A NEW HARMONY SEARCH ALGORITHM WITH EVOLVING SPIKING NEURAL NETWORK FOR CLASSIFICATION PROBLEMS

Abdulrazak Yahya Saleh¹, Siti Mariyam Shamsuddin², Haza Nuzly Bin

Abdull Hamed³, Teh Chee Siong¹ and Mohd Kamal Bin Othman¹

¹*Faculty of Cognitive Science and Human Development,
University Malaysia Sarawak;*

²*UTM Big Data Centre, Universiti Teknologi Malaysia (UTM);*

³*Soft Computing Research Group, Faculty of Computing,
Universiti Teknologi Malaysia (UTM)*

Corresponding author: ysahabdulrazak@unimas.my

In this study, a new hybrid harmony search algorithm with evolving spiking neural network (NHS-ESNN) for classification issues has been demonstrated. Harmony search has been used to enhance the standard ESNN model. This new algorithm plays an effective role in improving the flexibility of the ESNN algorithm in creating superior solutions to conquer the disadvantages of ESNN in determining the best number of pre-synaptic neurons which is necessary in constructing the ESNN structure. Various standard data sets from UCI machine learning are utilised for examining the new model performance. It has been detected that the NHS-ESNN give competitive results in classification accuracy and other performance measures compared to the standard ESNN. More argumentation is provided to verify the effectiveness of the new model in classification issues.

ORAL 005 ICCT

CULTURAL DESIGN OF RINAGANG IN WOMEN TRADITIONAL COSTUME OF DUSUN TINDAL

Salbiah Binti Kindoyop¹ Noria ak Tugang¹, Junior Kimwah² and Nurul Aisyah Othman²

¹*Department of Liberal Arts, Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak;*

²*Borneo Heritage Research Unit, Faculty of Humanities, Arts and Heritage, Universiti Malaysia Sabah*

Corresponding author: salbiah.bea@gmail.com

Culture describes the way of life practiced by a certain society. As cultural design means a traditional design that forms a standard design for all types of designs especially to the traditional costume designs. Traditional costume is part of a culture and it's a cultural heritage since immemorial time. The design and accessories of the Dusun Tindal traditional costume reveals an intricate relationship between the materials used and their view of life that is reflected in the costume leading to conclusions about a cosmological relationship between them. The cultural practice of wearing the traditional costume during festivals and ceremonies reflect the Dusun Tindal community's commitment in preserving their culture. Kota Belud is seen as the Dusun Tindal's centre of the town. This study analyzes the culture related to the design of the Dusun Tindal traditional costume especially those who are living in the id Nuluhon (hilly land area), a village near the slopes of Mount Kinabalu. Researchers use interview methods in order to obtain information from traditional costume makers. While the analytical process, the researcher chose aesthetic approach in making analysis of the data. The parts of the Dusun Tindal costume that will be analyzed are known as the rinagang (women's costume). This research is based on field work activities conducted in the hilly area or id Nuluhon where the focus was on the structural design of the costume in respective of the Dusun Tindal culture. The results of this

research, a clear disclosure and information can be identified by identifying the Dusun Tindal ethnic who lives in the foothills and flat valleys.

ORAL 006 ICCT

TIKAR BERGERANG: THE REFLECTION OF CULTURE AND HERITAGE OF THE SARIBAS MALAY, SARAWAK

Faridah Sahari¹, Rahah Hasan¹, Shahren Ahmad Zaidi Adruce², Shahri Abdul Rahman² and Anna Durin¹

¹Faculty of Applied and Creative Art, Universiti Malaysia Sarawak

²Faculty of Cognitive Sciences & Human Development,
Universiti Malaysia Sarawak

Corresponding author: sfaridah@unimas.my

This paper investigates the indigenous knowledge of mat making and its social context in Malay community of Saribas. It focuses on tikar bergerang in particular. The mat which incorporates open weave, creates a lace impression pattern around the body weave frame. As stated by Awang Azman (2010), material culture's scholar, there is an urgency to study Sarawak Malay due to a significant dissimilarity between them with the Malay of Peninsular Malaysia in many aspects of local knowledge and heritage. Thus, the aim of this research is to discover the production technology, role and values of tikar bergerang in the Saribas Malay community in Sarawak. Through in-depth interviews with tikar bergerang weavers and observation, the cultural object is analysed using material culture study developed by Fleming (1974). The result indicated that the mat is only intended for important function and perceived as a sacred material object. The mat complex patterns and complicated weaving techniques reflect the idiosyncrasy of Saribas region compared to other parts of Sarawak, the intellectual, indigenous technology and common values shared among its community

ORAL 007 ICCT

CAPTURING SERVICE VERSIONING IN PROVENANCE TRACE TO SUPPORT REPRODUCIBILITY

Dayang Hanani Abang Ibrahim, Chiew Kang Leng and Nadianatra Musa,
*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: hananii@unimas.my

Reproducibility has long been a cornerstone of science. Underpinning reproducibility is provenance, which has the potential to provide scientists with a complete understanding of data generated in e-experiments, including the services that were produced and consumed. A key to reproducibility is the provenance model: a data model that structures information about an e-experiment. When all the entities in the experiment have been identified, they

must be captured and recorded as a provenance trace. The provenance trace gives information about the actual execution of an experiment. Therefore, in running an experiment, the creation of the final results that are derived from the input data are documented in a provenance trace. This paper describes in greater detail the conceptualization of an experiment using the Open Provenance Model (OPM). As Open Provenance Model (OPM) is the provenance model standard, this paper explores whether the OPM is able to describe an experiment sufficiently precisely so as to support reproducibility. The paper also addresses the issue of how to ensure that the versions essential requirements in reproducibility.

ORAL 008 ICCT

TRANSFORMING SEMI-STRUCTURED INDIGENOUS DICTIONARY INTO MACHINE-READABLE DICTIONARY

Bali Ranaivo-Malançon¹, Suhaila Saeed^{1,2}, Rosita Mohamed Othman¹ and
Jennifer Fiona Wilfred Busu¹

¹*Faculty of Computer Sciences and Information Technology;*

²*Institute of Social Informatics and Technological Innovations,
Universiti Malaysia Sarawak*

Corresponding author: ssuhaila@unimas.my

Creating a machine-readable dictionary for an indigenous language is not an easy process and thus, transforming an existing indigenous dictionary into a machine-readable dictionary is one approach to speed up the process. This paper presents the sequential transformation of two bilingual Sarawak indigenous dictionaries, Melanau-Mukah-Malay and Iban-Malay dictionaries, from their initial semi-structured form into their structured representation. The transformation makes use of an OCR to convert the original PDF format of the dictionaries into HTML files, which is then analysed by the Python HTMLParser to extract only the content of the dictionaries. The extracted content is saved in plain text file. To understand the original structure of each dictionary, the textual units in the plain text file are converted into generic symbols. The observation of the collocations of the generic symbols yields to the writing of regular expressions that can delimit each dictionary element. The result is a machine-readable dictionary stored in comma-separated values format. The inspection of each column in the comma-separated values file indicates that the written regular expressions offer a good coverage of the different dictionary elements present in the studied dictionaries. Therefore, the proposed sequential transformation is efficient in accomplishing the conversion of a semi-structured indigenous dictionary into a structured machine-readable dictionary.

ORAL 009 ICCT

APPLYING BIPARTITE NETWORK APPROACH TO SCARCE DATA: VALIDATION OF THE HABITAT SUITABILITY MODEL OF A MARINE MAMMAL SPECIES

Chin Ying Liew¹ and Jane Labadin²

¹*Faculty of Computer and Mathematical Sciences,
Universiti Teknologi MARA, Sarawak;*

²*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: liewchinying@hotmail.com

This paper presents the validation of the bipartite habitat suitability network (BiHSN) model formulated for a marine mammal. The model formulation published earlier resulted in the ranking of location nodes of the concerned area of possible habitats. Thus, the validation of the model is achieved by comparing the result produced by the BiHSN Model with the result acquired i) using another sample of actual data; and ii) from an ecological survey conducted by another researcher. Spearman's Rank Correlation Coefficient (SRCC) is used to quantify the similarity of the comparison where a threshold value of at least 0.70 is set in order to signify an acceptable validation analysis. In the former validation analysis, this study reports an SRCC of 0.976 whereas the later validation analysis reports an SRCC of 0.914. Due to the high values of SRCC obtained, we conclude that the BiHSN Model is thus validated.

ORAL 010 ICCT

PITFALL OF GOOGLE TRI-GRAMS WORD SIMILARITY MEASURE

Linda Wong Lin Juan, Bong Chih How, Johari Abdullah and Lee Nung Kiong
*Faculty Computer Science and Information Technology,
Universiti Malaysia Sarawak.*

Corresponding author: 15020282@siswa.unimas.my, chbong@unimas.my,
ajohari@fit.unimas.my, nklee@unimas.my

This paper describes and examines Google Trigram word similarity based on Google n-gram dataset. Google Tri-grams Measure (GTM) is an unsupervised similarity measurement technique. The paper investigates GTM's word similarity measure, which is the state-of-the art of the measure, and we eventually reveal its pitfall. We test the word similarity with MC-30 word pair dataset and compare the result against the other word similarity measures. After evaluation, GTM word similarity measures is found significantly fall behind other word similarity measure. The pitfall of GTM word similarity is detailed and proved with evidences.

ORAL 011 ICCT

PAL: PERSONAL ASSISTANT SYSTEM USING LOW-COST COMPUTER

Melanie Louisa Khong Fui Yee¹ and Sarah Samson Juan²
*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: louisa940321@gmail.com

Automatic Speech Recognition (ASR) describes the ability of a computer to capture, identify and recognize the variety of human speech. It has been applied in many technologies such as personal assistant systems. Unfortunately, many personal assistant systems have been built in a way that may not always be disability-friendly and this causes the affected users whom are blind, disabled, illiterates and those who have physical limitations unable to enjoy the benefits of operating a computer. Hence, PAL is introduced. PAL is a personal assistant system built using low-cost device called the Raspberry Pi and open source voice-controlled software called Jasper. The functionalities of PAL include searching for information on the internet, check for unread emails, schedule events in the calendar, manage a to-do list and translate texts through voice commands. Apart from that, a friendly graphical user interface (GUI) is also designed to display the output of each of the functional modules. Lastly, a number of tests are conducted to evaluate the performance and accuracy of the functional modules, GUI output display as well as response rate of the system. These tests include GUI output display test, user acceptance testing, the Command Success Rate (CSR) and Word Error Rate (WER) tests as well as response rate test. With the development of this project, it is hoped that PAL will be able to provide users with the benefits of using a computer in a more convenient and cost-efficient manner.

ORAL 012 ICCT

ANALYSIS OF NINE INSTANCE-BASED GENETIC ALGORITHM CLASSIFIERS USING SMALL DATASETS

Hossin, M., Mahudin, F., Din, I. and Mat, A.R
*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: hmohamma@unimas.my

The application of genetic algorithm (GA) has emerged covering various areas including data classification. In data classification, most studies of GA were focused on the enhancement of GA and development of different types of GA classifiers. To the best of our knowledge, there is no study has been conducted to examine the influence of GA operators based on the size of data set towards training time and generalization ability. Therefore, this study develops and compares nine Instance-based genetic algorithm (IbGA) classifiers with different combinations of GA operators. The goal of this

comparison is to examine and identify the best combination of GA operators which have performed better on generalization ability and training time efficiency. Nineteen benchmark data sets were used in this study. The non-parametric statistical tests were applied to justify the comparison results. The statistical tests suggest that the combination of roulette wheel selection and uniform crossover operator is the best combination of IbGA model although the training time is a bit lengthier than compared to other IbGA models.

ORAL 013 ICCT

CULTURAL DESIGN OF SINURANGA IN MEN TRADITIONAL COSTUME OF DUSUN TINDAL

Noria ak Tugang and Salbiah Binti Kindoyop
*Department of Liberal Arts, Faculty of Applied and Creative Arts,
Universiti Malaysia Sarawak*

Corresponding author: salbiah.bea@gmail.com

This study analyzes the culture related to the design of the Dusun Tindal traditional costume which is a significant heritage to those who live in the id Nuluhon (hilly land area) located at Kota Belud. Kota Belud the centre of the town for the Dusun Tindal people. The id Nuluhon village is located near the slopes of Mount Kinabalu. Cultural design means a traditional design that forms a standard design for all types of designs especially for the traditional costume designs. The design and accessories of the Dusun Tindal traditional costume reveals an intricate relationship between the materials used and their view of life that is reflected in the costume leading to conclusions about a cosmological relationship between them. Researchers use interview methods in order to obtain information from the traditional costume makers. As for the analytical process, the researcher chose aesthetic approach in making the analysis of the data. The wearing of this traditional costume during festivals and ceremonies reflects commitment in preserving the Dusun Tindal's culture. The Dusun Tindal costumes which will be analyzed are known as sinuranga (menswear). In order to study this costume cultural design, a field work was conducted at id Nuluhon, in which the focus was on the structural design of the costume in respect to the Dusun Tindal culture. The results of this research, a clear disclosure and information can be identified by the Dusun Tindal ethnic who lives in the foothills and flat valleys.

ORAL 014 ICCT

“I’M NOT MARRIED, LET’S JUST ALL LOOK AT ME”: SINGLE PROFESSIONAL MALAY WOMEN’S EXPERIENCE

Jamayah Saili¹ and Musdi Shanat²

¹*Faculty of Cognitive Sciences and Human Development*, ²*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak*

Corresponding author: sjamayah@unimas.my

Clearly for most people and most cultures, marriage is a pre-ordained path, the preferred social status and the sanctioned way. In Malay culture, most people cannot accept the idea that a never married ‘normal’ woman could be happy and satisfied with her life. To be an andartu (anak dara tua) or andalusia (anak dara lanjut usia) is still marginally acceptable in Malay culture. This paper explores the voices of single Malay women in Malaysia with ‘single’ being defined as never married and focus on the professional working women. Using interpretative phenomenological analysis, 20 interviews were conducted using semi structured in-depth interviews. This research examines perspectives of these women on being single and thus highlights some of the negative emotional consequences of being single. The analysis revealed that the emotional consequences include feelings of loneliness, feeling of incompleteness and inadequacy, regrets of missed opportunities and anger at perceived harassment. As the delayed marriage of women aged 30 years and over in Malaysia is a relatively recent phenomenon, the research outcomes will have important implications to the extant literature on professional Malay women who have not married by relating to Muslim women in general and Malaysia or South-East Asia in particular.

ORAL 015 ICCT

STYLISTIC ANALYSIS OF ELECTION BANNERS OF RULING AND OPPOSITION PARTIES IN 2016 SARAWAK STATE ELECTION

Siti Haslina Hussin¹, Malia Taibi², Awang Ideris Awang Daud¹ and Ting Su Hie²

¹*Faculty of Social Science*, ²*Faculty of Language and Communication, Universiti Malaysia Sarawak*

Corresponding author: adideris@unimas.my

This paper presents a stylistic analysis of election banners put up by the ruling and opposition parties during the 2016 state election campaign in Sarawak, Malaysia. The specific aspects analysed were the graphetic, typographical and textual features. Election banners put up during the 2016 state election in three cities in Sarawak were photographed. Using Crystal and Davy’s (2006) framework, 30 election banners were analysed. The results showed different use of banner space by the ruling and opposition parties. The ruling

party banners usually have the photograph of the candidate, sometimes side by side with the chief minister's photograph. The opposition parties put more text on the banners, often capitalised for emphasis. Most of the election banners conveyed clear messages using factual and literal language. In trying to fit as many words as possible into the banner to highlight pertinent issues to the electorate, the opposition parties tended to use phrases separated by commas but the ruling party banners had short sentences, mostly stating the party and candidate to vote for. The study showed that the ruling and opposition political parties use different strategies in their election banners to persuade voters because of their differential status and position in the society.

ORAL 016 ICCT

WORKPLACE FACTORS AND WORK-LIFE BALANCE AMONG EMPLOYEES IN SELECTED SERVICES SECTOR

Wong Pui Yee, Nur Fatimah Abdullah Bandar and Jamayah Salli,
*Faculty of Cognitive Sciences & Human Development,
Universiti Malaysia Sarawak*

Corresponding author: puiyee.1775@gmail.com

This study is conducted to examine the relationship between workplace factors and work-life balance among employees in selected services sector. The independent variables of this study comprise of supervisor support, co-worker support and flexible working arrangement; whereas the dependent variable in this study is work-life balance. The quantitative research method is selected and questionnaire is used as the research instrument to collect data. There are 98 samples randomly selected from selected services sector (N=110). The data collected is analysed by using Statistical Packages for Social Science Version 22.0 (SPSS Version 22.0) software. The Spearman rho test is used to test the relationship between independent and dependent variables. The results revealed that there are positive relationship between work-life balance with supervisor support, co-worker support and flexible working arrangement. In short, the workplaces factors contribute to work-life balance under Malaysia context. This study gives an insight to the organization in designing an appropriate system to enhance work-life balance.

ORAL 017 ICCT

FORECASTING CONSUMERS' SATISFACTION OF FURNITURE DESIGN THROUGH SEMANTIC DIFFERENTIAL METHOD

Musdi Shanat¹ and Jamayah Salli²

¹*Faculty of Applied and Creative Arts,* ²*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author: smusdi@animas.my

The objective of this paper is to forecast and analyse consumers' satisfaction level based on physical furniture design features particularly occasional chair. The rational thinking and behaviour responses from participants when accessing furniture allow researcher to predict the valuable input of seeking people perceptions and expectation in its physical appearance. Two chair prototypes were designed and built in this study to explore end user feedback on how they perceived furniture and the qualities features and image that contribute to a better understanding of the preferences and taste. The Semantic Differential questionnaires were applied thoroughly to examine participants' perceptions especially those related in consumer studies. The writing concludes; (i) the end users' satisfaction and furniture features significantly revealed positive relationships; (ii) furniture designers should employ the three product design attributes namely aesthetics, form and utility for their design criteria during the design processes and (iii) the Semantic Differential approach together with actual scaled prototype able to provide prediction and suggestions what to embed into furniture creation in order to increase consumers' satisfaction and fulfil end user needs and requirements.

ORAL 018 ICCT

THE IBAN TRADITIONAL RELIGION: MIRING

Bibiana Motey Bilon@Senang¹ and Noria Tugang²

*Department of Liberal Arts, Faculty of Applied and Creative Arts,
Universiti Malaysia Sarawak*

Corresponding author: babyannamotey2@gmail.com

This paper aims to discuss about the offering ceremony, which is one of traditional culture performed by the Iban in Sarawak. Miring is performed to give honor to their Gods (Petara), Holy Spirit (Orang Panggau & Bunsu Antu) and souls of their dead ancestors (Petara Aki-Ini) whom they invited to their various festivals. If the supernatural is not fed, they will not obtain the necessary kindness in which will cause disaster. The arrival of Christianity led to the fact that almost all the Iban left their pagan religion. At the same time, the Iban community today is less aware of the offering ceremony procedure. Fieldwork was carried out at several locations in Saratok, Betong, Sarawak. The data are collected through participant observation technique and through face-to-face interview with the informants. The interviewed informants were selected based on their expertise in the origins, customs and cultures of the Iban community. Results show that not all of the Iban perform the miring ceremony. Lack of ritual specialists and conversion to Christianity among the Iban are the causes of this ritual to be less performed. The Iban community today faces many challenges in maintaining and practicing the traditions inherited by their ancestors. Even though there is a are changes and differences of miring performed by the Iban community in Sarawak, their aims

and needs remained the same, and that is to beg for the gods' protection and avoid from unwanted or bad things to happen.

ORAL 019 ICCT

“NGAJAT” THE IBAN TRADITIONAL DANCE

Anna Durin, Connie Lim, Yow Chong Lee, Alexander Chelum, Noria Tugang, Mohd Fahmi Yahaya and Mazdan Ali Amaran
*Department of Liberal Arts, Faculty of Applied and Creative Arts,
Universiti Malaysia Sarawak*
Corresponding author: danna@unimas.my

This paper is about Iban traditional dance called ngajat. Currently, the ngajat usually performed in formal occasions. For examples, wedding receptions in villages and hotels (Tan & Matusky, 2004). The objective of this research is to identify the types of the Iban traditional ngajat. Secondly, this research is also to find out the symbolic meanings of the Iban traditional dance, which reflect the Iban traditional culture. One of the examples of woman's dance is ajat indu ngisar padi which means this dance is reflecting how the women using wooden grinder to grind the paddy. The problem statement is that many of the Ibans have migrated to urban areas so the traditional ways of life has been changing. This means some of the life styles in the longhouse are not practiced anymore. The changes of culture occur to the people in the rural areas too. Many longhouses are not farming the paddy so this contribute to the extinction of the method called ngisar or grind the paddy. Therefore, both word and work of ngisar are almost forgotten and even not known among the new generation. The issue is how the movement of the dance become a symbol and lastly portray the traditional culture of the Iban people. The method for data collection are carried through observing the dance performance and interviewing the traditional dance choreographers in Kuching and Betong. The research outcome proved that the Iban traditional dance ngajat for both women and men are very symbolic and reflect the Iban traditional culture. As culture changes and so does the performance of the dance. In traditional days the dance was performed in the long house as solo but currently most performance is presented in group and in hotels.

ORAL 020 ICCT

NEGOTIATING MODERNITY AND THE NEW NATIONHOOD IN IBAN POPULAR SONG LYRICS IN 1960S-1970S

Connie Lim Keh Nie, Yow Chong Lee, Anna Durin and
Alexander anak Chelum
Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak
Corresponding author: lkconnie@unimas.my

Iban is the largest indigenous ethnic group in Sarawak, Malaysia which made up of approximately one third of the total of Sarawak's population. During the 20th century, the Iban society had gone through a state of flux where people have to readapt themselves in meeting the demanding challenges of Malaysian nationalism. Drawing upon Barendregt's (2014) 'alternative conceptions of modernity' this paper examines how the Iban reference both a national as well as a local music industry particularly through their use of language as an expression of Iban. As seen in Iban popular music, which are created and used as a propaganda tool for national building. First the paper will examine the meaning of modernity. Then, combining the concept of modernity and historiography methods, tracing the history of Sarawak in analysing the the Iban song lyrics. Hence, the aim of this paper is to interpret the meaning of the lyrics and how the song lyrics in 'Malaysia Baru' responded to modernity in the history of Sarawak. This reflects how the Iban people responded to the modernity through the historical processes on the social, cultural, physical, economic and political environments in Sarawak.

ORAL 021 ICCT

THE RELATIONSHIP BETWEEN ROLE CONFLICT AND BURNOUT AMONG SECONDARY SCHOOL COUNSELORS IN SARAWAK

Chua Sim Huat, Jamayah Saili and Surena Sabil

*Faculty of Cognitive Sciences and Human Development,
Universiti Malaysia Sarawak*

Corresponding author: shchua23@hotmail.com

Despite the relatively high degree of research on counselors in schools, there remain lack of research on the relationship between role conflict and burnout among secondary school counselors. School counselors are by far the increasing sub-group in the school community, yet little is known about the counselors' well-being in schools. Three aspects of burnout, i.e. emotional exhaustion, depersonalization and personal accomplishment were measured in this study and their relationship with the role conflict was explored. Statistical analyses using Structural Equation Modelling (SEM) revealed that there was a significant positive relationship between Role Conflict and Emotional Exhaustion and also between Role Conflict and Depersonalization. Nevertheless, there was no significant relationship between Role Conflict and Personal Accomplishment. Qualitative survey also indicated that role conflict influenced burnout among secondary school counselors in Sarawak. The results of the three dimensions of burnout revealed that emotional exhaustion and depersonalization were at high level where as personal accomplishment was at low level, therefore the secondary school counselors in Sarawak are at the risk of burnout.

ORAL 022 ICCT

KOMUNIKASI LELUCON TOK NAN: DENOTASI DAN KONOTASI SEMANTIK YANG SIGNIFIKAN

Mary Fatimah Subet and Nurul Jannah Roslan

Fakulti Pengajian Bahasa dan Komunikasi, Universiti Malaysia Sarawak

Corresponding author: sufatimah@unimas.my

Bahasa yang lucu menarik perhatian audiens jika perucap mampu menggunakannya sepanjang masa berucap berlangsung. Allahyarham Datuk Patinggi Tan Sri Datuk Amar Hj. Adenan Hj Satem atau lebih mesra dikenali dengan panggilan Tok Nan, Ketua Menteri Sarawak yang ke-5 didapati banyak menggunakan lelucon dalam ucapan beliau. Ucapan-ucapan beliau menarik perhatian audiens dan sering mengundang gelak ketawa. Kertas kerja ini mengenal pasti bahasa-bahasa lelucon yang terdapat dalam ucapan beliau, menganalisis makna implisit di sebalik penggunaan lelucon ini dan mengemukakan alasan di sebalik penggunaan bahasa lelucon dalam ucapan beliau. Sebanyak 15 teks ucapan Tok Nan dikaji dan ditranskripsi. Kata-kata dan ujaran yang didapati mengandungi unsur lelucon dikenal pasti dan dipilih secara rawak untuk dianalisis. Analisis dilakukan dengan menggunakan pendekatan analisis makna denotasi dan konotasi dalam bidang semantik. Kajian mendapati unsur lelucon yang digunakan terdiri daripada gabungan beberapa bahasa atau dialek. Kajian juga mendapati ucapan-ucapan beliau mempunyai makna tertentu yang hendak disampaikan kepada pendengar, tetapi disampaikan dalam keadaan berseloroh. Didapati juga, kata-kata lucu yang beliau gunakan wujud dan sinonim dengan masyarakat yang berbilang kaum di Sarawak. Kata-kata berkenaan dikongsi secara kolektif oleh penduduk negeri Sarawak dan oleh itu mudah difahami. Kata-kata lucu ini diterima dengan baik oleh audiens kerana kata-kata ini berfungsi secara tidak langsung untuk menghiburkan hati audiens yang mendengar ucapan tanpa sebarang sikap prejudis.

ORAL 023 ICCT

ENERGY EFFICIENT RESOURCE ALLOCATION AND UTILIZATION IN FUTURE HETEROGENEOUS CELLULAR NETWORK

Abdul Qahar^{1,2}, Adnan Shahid Khan¹, Yasir Javed^{1,3}, Johari Abdullah¹

¹*Network Security Research Group, Faculty of Computer Science and Information Technology University Malaysia Sarawak;*

²*University of the Punjab Lahore, Pakistan;*

³*Prince Sultan University, Riyadh, KSA.*

Corresponding author: aqahar.itc@pu.edu.pk

Future Mobile Heterogeneous Cellular Networks are emerging as promising technology in terms of high speed, low latency and ubiquitous connectivity. Providing energy efficient services in exponentially increasing user size and

rigorous utilization of mobile services is a key challenge for mobile operators. The mobile operators deployed dense small cells to enhance the network capacity for providing the network services to maximum users. Instead of fully utilize of the existing deployment, operators lead to enhance the number of small cell base stations to enhance the network coverage. When the number of small cells increases, the energy consumption of the cellular network also increases. Thus, a resource efficient, cost effective and energy efficient solution is required to control the deployment of new base station that consequently enhance the energy efficiency. In this paper, an efficient resource allocation and utilization model is proposed using Cognitive Fusion Centre (CFC). Where the CFC has Resource State Information (RSI) of the network resources and manages the free available resources. It helps in generating resource segment to facilitate the incoming users at peak hours. The propose solution can be deployed to any dense environment for maximum resource utilization.

ORAL 024 ICCT

MOBILE APPLICATION FOR IMPROVING SPEECH AND TEXT DATA COLLECTION APPROACH

Sarah Samson Juan¹ and Jennifer Fiona Wilfred Busu²

^{1,2}Institute of Social Informatics and Technological Innovations,

²Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak,

Corresponding author: sjsflora@unimas.my

This paper describes our work in developing a mobile application for collecting language speech and text data. The application is built to assist linguists or researchers in simplifying their tasks in data collection who of native speakers living in remote interiors. Researchers rely on numerous apparatus to carry out their tasks to capture audio or text from far to reach places, but with this mobile application, they would only need to carry one device, which can ease their logistics troubles. The mobile app, named as Kalaka, is designed for users to store details of native speakers, record speech and insert speech transcripts all in one platform. Kalaka is built on the Android platform, which allows data stored in the mobile device to be transferred to a cloud storage using WiFi networks. Usability tests performed in respondents shows, all participants in the evaluation are able to use the application to record their voices and save texts. We also received positive feedbacks on the mobile application from our survey, with more than half of the respondents gave their confidence using Kalaka and they would use the system frequently.

ORAL 025 ICCT

REAL-LIFE FACULTY EXAMINATION TIMETABLING TO UTILISE ROOM USED

San-Nah Sze¹, Min-Hui Phang² and Kang-Leng Chiew³
*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*
Corresponding author: mhui_91@hotmail.com

Examination timetabling is an important and yet tedious task to do in every semester. The large number of courses and students increase the difficulty of developing a good examination timetable. Furthermore, the examination timeslots and rooms are very limited in this case study. Therefore, an improved version of two-stage heuristic is proposed and developed a web-based prototype (Faculty Examination Scheduling System, FESS 2.0) to solve faculty examination timetabling problem at Universiti Malaysia Sarawak (UNIMAS). The prototype has been practically used starting from Semester II, 2016/2017. The main objective of the proposed solution is to maximise the room utilisation and minimise the number of rooms for a splitting examination. The outcome of research not only outperform the previous prototype FESS 1.0 but also enhance the services given by faculty management.

ORAL 026 ICCT

PREVENTING DOS ATTACKS IN IOT USING AES

Yasir Javed^{1, 2}, Adnan Shahid Khan¹, Abdul Qahar^{1, 3} and Johari Abdullah¹
¹*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak;*
²*Prince Sultan University, Riyadh, KSA;*
³*The University of Punjab, Lahore, Pakistan.*
Corresponding author: skadnan@unimas.my

The Internet of Things (IoT) is significant in today's development of mobile networks enabling to obtain information from the environment, devices, and appliances. A number of applications have been implemented in various kinds of technologies. IoT has high exposure to security attacks and threats. There are several requirements in terms of security. Confidentiality is one of the major concerns in the wireless network. Integrity and availability are key issues along with the confidentiality. This research focuses on identifying the attacks that can occur in IoT. Packet filtering and patches method were used to secure the network and mitigate mentioned attacks but these techniques are not capable of achieving security in IoT. This paper uses Advanced Encryption Standard (AES) to address these mentioned security issues. Official AES version uses the standard for secret key encryption. However, several problems and attacks still occur with the implementation of this original AES. We modified AES by adding white box and the doubling of the

AES encryption. We also replaced the Substitute-Byte (S-Box) in the conventional AES with the white box. The significance of a white box is where the whole AES cipher decomposed into round functions. While doubling the process of AES gives difficulty to the attacker or malware to interrupt the network or system. From the algorithms, our proposed solutions can control DoS attack on IoT and any other miniature devices.

ORAL 027 ICCT

COMPARATIVE STUDIES OF ONTOLOGIES ON SARAWAK GAZETTE

Fatihah Ramli, Bali Ranaivo-Malançon, Stephanie Chua and
Mira Shumiza Mohammad

*Department of Information Systems, Faculty of Computer Science &
Information Technology, Universiti Malaysia Sarawak*

Corresponding author: rfatihah@unimas.my

This paper presents a discussion on experience and process during initial stage of ontology building in history. The objective of this paper is to create a manual semantic annotation process to determine the concepts that will be used in the historical news ontology. It will describe the tasks of facilitating the analysis of missing concepts existing in Sarawak Gazette (SAGA) documents. Semantically annotating SAGA documents enable to enrich the element of concepts and relations taken from existing ontologies. Furthermore, an initial result is provided to observe the performance gain due to domain-specific annotations. Finally, we conclude on the importance of semantic annotations process in the construction of an ontology.

ORAL 028 ICCT

A SENTENCE SIMILARITY MEASURE BASED ON CONCEPTUAL ELEMENTS

Wendy Tan Wei Syn, Bong Chih How and Dayang Hanani Abang Ibrahim

*Faculty Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: wendytws@siswa.unimas.my

There has always been a growing interest in sentence similarity measure for practical NLP tasks using various state-of-art NLP methods. Some of the widely used methods in measuring sentence similarity are lexical semantics, deep learning, neural networks, ontology, statistical models, graph based model and etc. Based on our findings, one of the main drawbacks in using these methods is not able to resolve word ambiguity where one word can have different interpretations in different sentences. In this paper, we present a sentence similarity measure by representing the sentences in conceptual elements to measure the semantic similarity between sentences. We used

Microsoft Paraphrase Corpus (MSR) and Quora question pairs dataset to evaluate the performance. The study concludes that we were able to use conceptual elements to measure sentence similarity with the highest micro averaged precision of 0.71.

ORAL 029 ICCT

TECHNIQUES AND SEQUENCE OF SKETCHING IN THE CONCEPTUAL PHASE OF AUTOMOTIVE DESIGN

Saiful Bahari Mohd Yusoff¹, Sinin Hamdan¹ and Zalina Ibrahim²

¹*Institute of Design and Innovation (INDI), Universiti Malaysia Sarawak;*

²*Faculty of Business and Management,*

Universiti Teknologi MARA (UiTM) Sarawak

Corresponding author: mysaiful@unimas.my

This paper evaluates the techniques of sketching in the conceptual phase of automotive design among automotive designers. The research identifies sketch types used in conceptual stage and a distinction is made between Thumbnail Sketch, Rough Sketch and Concept Sketch and they portray different stages of sketching process in the conceptual phase. An investigation (sketching task evaluation) with 9 automotive professional designers was conducted to evaluate the sketching approaches. Video Observational Analysis was carried out concerning 9 aspects identified such as Medium Used, Left/Right Hand, Line Thickness, Sequence of Activity, Size and Types of Sketch Produced with the results documented and discussed. An early finding shows that 5 types of sketching approaches portray 5 different sequence techniques for early automotive design conceptual phase.

ORAL 030 ICCT

GAME USABILITY HEURISTICS EVALUATION APPROACH FOR SPEECH THERAPY MOBILE APPLICATION GAMES

Carolyne Alphonsus Tommy¹, Jacey-Lynn Minoi² and Chin Saw Sian³

¹*Institute of Social Informatics and Technological Innovation,* ²*Faculty of Computer Science and Information Technology, Universiti Malaysia*

Sarawak; ³*Medecins Sans Frontieres*

Corresponding author: tommycarolyne@gmail.com

In this paper, we present an approach used to evaluate speech therapy mobile application games using a usability heuristics evaluation method for speech delay children. Designing a mobile application specifically for children with speech delay is always a challenge. A well-designed user interface and game flow are vital in a therapy game to promote self-learning and therapy by exploration in the game. There have been many proposed and used usability evaluation methods, however, heuristics evaluation strategy was

used in our study as this method was specifically designed and developed to evaluate mobile application games. There are three components in the heuristics models, which are Game Usability, Mobility, and Gameplay. In our experiment, we were evaluating a local prototype of speech therapy mobile application using the game usability component because we focus more on the user interface designs. The target group of this study was pre-school children aged 3 to 6 years old with speech delay. Questionnaires were developed based on the game usability heuristics and distributed to their parents or caregivers. Interviews were also conducted to obtain their comments and feedbacks. The study results showed that the game usability heuristics are useful in identifying potential issues and problems in user interface designs of the prototype. In addition, the results also revealed that the heuristics strategy is useful in producing a set of effective design guidelines for mobile application games.

ORAL 031 ICCT

INTERACTIVE ENGLISH PHONICS LEARNING FOR KINDERGARTEN CONSONANT-VOWEL-CONSONANT (CVC) WORD USING AUGMENTED REALITY

Jonathan Sidi¹ Lay Foong Yee² and Wang Yin Chai²
Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak,
Corresponding author: jonathan@unimas.my

This paper is described about Interactive English Phonics Learning in Kindergarten Consonant-Vowel-Consonant (CVC) Word using Augmented Reality (AR) Technology with aims to make phonics learning more interesting, interactive, and effective. The image marker based technique of Augmented Reality technology allowed children to interact with virtual phonics content through physical manipulation. With this courseware, children are allowed to learn the phonics sound and CVC word matching through phonics card matching. Phonics card here is the image marker. This interaction method provides a better learning experience for children.

ORAL 032 ICCT

DESIGN OF A TRANSCRIPTION TOOL FOR THE KELABIT COMMUNITY OF BARIO, SARAWAK

Emmy Dahliana Hossain, Sarah Flora Samson Juan, Jane Labadin and
Priscillica Agas
*Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*
Corresponding author: hedahliana@unimas.my

This paper describes the design of a transcription tool developed for the Kelabit community of Bario, Sarawak based on the community's requirements and feedbacks. Transcribing is the process of making a full written copy of spoken or dictated material. Using this transcription tool, users can listen to audio files of recordings and proceed to do the transcribing within the tool itself. Afterwards, they can save the transcription into text files for future uses. Users can control the audio file while it is playing, and do updating or editing to the transcription. This project was carried out on the motivation to assist in language preservation works as Kelabit is an under-resourced language.

ORAL 033 ICCT

THE IBAN FOLK BELIEF

Noria T.¹, Anna D.¹, Yow, C. L.¹, Hashim A.², Adilawati A.¹ and Bibiana S¹.

¹*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak,*

²*Sociology and Social Anthropology Programme, Faculty of Humanities, Arts and Heritage, Universiti Malaysia Sabah*

Corresponding author: tnoria@unimas.my

This paper aims to examine Iban's miring tradition using Victor Turner's (1985) theoretical framework of sociodrama. Miring is a worship presentation by providing food to extraordinary powers consisting of god, goddess, good spirit and evil spirit, and their ancestors' spirit that have died long ago in order to seek for solution to the problems they encountered in their daily life. In other words, miring is part of Iban's folk belief system passed down from one generation to another. By incorporating Turner's sociodrama, it gives new perspective on miring ritual as a form of sociodrama, of which mantra and ritual dance are performed with many other ingredients prepared alongside the ritual. Symbols that signify Iban people's life is very much interconnected with their environment and the supernatural world are recorded and given meanings in this article.

ORAL 034 ICCT

DESTINATION IMAGE OF UNESCO WORLD HERITAGE SITES IN MALAYSIA

Salmiah Abdul Hamid, Qistina Donna Lee Abdullah and Teo Miaw Lee

Faculty of Applied and Creative Arts, University Malaysia Sarawak

Corresponding author: ahsalmiah@unimas.my

People travel from one place to another for different purposes. Based on literatures, destination branding is found to be very significant to attract the tourists to places of interests. In Malaysia, there are variety of cities, beaches, rainforests, villages and mountains' sites to be visited. In addition, we should be proud that part of our cities and sites in Malaysia have been recognized

and listed by United Nations Educational, Scientific and Cultural Organization (UNESCO) as world heritage sites. One of the listed site, Georgetown, Penang was selected by Los Angeles Times as one of “16 must see destinations in 2016”. This exploratory research looks into the tourists’ expectation towards signages at the UNESCO World Heritage sites in Malaysia based on tourist expectation model. This research is intended to evaluate the reliability of signages in terms of the visual graphics and tourist experience expectation. This paper identifies currently used signages system within the specific locations in Malaysia in portraying the brand of UNESCO as part of branding strategies through photo-based visual analysis. The findings of this research show that there is inconsistent visual representation of signages found at the World Heritage Sites between Melaka, Georgetown and Kinabalu Park. This paper summarizes the element of visual identity found on the signages at the specific locations within the WH sites for this study. Overall, this article seeks to address the importance of tourist expectation when visiting the UNESCO World Heritage sites through preliminary investigations on the visual representations of the UNESCO destination image.

ORAL 035 ICCT

THE IBAN TEXTILES

Alexander Chelum, Anna Durin, Connie Lim Keh Nie, Qawiem Hamizan and Mohd Jefri

*Department of Liberal Arts, Faculty of Applied and Creative Arts,
Universiti Malaysia Sarawak*

Corresponding author: calexander@unimas.my

The Iban traditional textiles are very well decorated with beautiful motifs. Some motifs are small and simple but some are complex (Durin, 2011). Both the simple and complex motifs are embedded meaning and symbols which depict the Iban traditional culture especially their traditional beliefs. This research aims to relate the motif of the Iban Textile and their traditional belief. Secondly, this research is also to analyse the usage of Pua Kumbu traditionally and currently. The data collection are carried out through observation and interviewing the experts in Iban textiles weaving in Kuching, Betong and Bintulu. The analysis method is used for the data collection is content analysis. In the research finding it is proven that the usage Pua Kumbu currently is not only confined to ritual purposes but also for the daily used as decorative accessories. It’s also proven, not only the Iban community weave the Pua Kumbu but few communities also weave the Iban’s textile motif. For example, Azmeer Sharkawi in Betong.

ORAL 036 ICCT

TRANSFORMATIONAL LEADERSHIP AND ITS FUNCTIONALITY IN ARTS ORGANIZATION

Qistina Donna Lee Abdullah and Khashini Devi a/p R. Varatharajoo
Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak
Corresponding author: dlqistina@unimas.my

Throughout the eyes of the world, an organization may have a great identity. However, without a leader with proper functionality in managing the organization, it is certain that the organization might face failure in the future. In addition to that, in this fast-paced world of competition and challenges, an up-to-date transformation is indeed necessary for a bright future. Transformational leadership is known to stimulate followers' performance and enhance their commitment to an outstanding level. Numerous researches have proved that practicing transformational leadership style in the management of every organization will lead to a bright competitive future but how this leadership style is practiced is rarely disclosed. In the conjunction to this, the researcher analyzed further on the functionality of transformational leadership concept or style in the organization. Mix method of qualitative and quantitative was employed through structured questions targeted to the main executives of ASTRO. The final outcome of the survey based on the conceptual framework was suggested to the firm to be implemented. Thus, there are three aspects where the functionality is reflected which are Exerting influence on subordinates with Idealized influence, Open and imaginative with Intellectual stimulation, as well as Idealized influence and Intellectual stimulation.

ORAL 037 ICCT

VACCINATION: IDENTIFYING INFLUENCERS IN THE VACCINATION DISCUSSION ON TWITTER THROUGH SOCIAL NETWORK VISUALISATION

Jamali Bujang Sanawi, Mus Chairil Samani and Malia Taibi
Faculty of Language and Communication,
Universiti Malaysia Sarawak
Corresponding author: bsjamali@unimas.my

The emergence of social media such as Twitter has brought the discussion about vaccination to a new dimension. In this study, the researchers aim to explore the discussion on issues related to vaccination on social media platform, specifically Twitter and identify the 'influencers' in the conversation. The paper also highlighted some of the subgroups that exist within the network where the influential individuals or organisations are the centre of their attention. The findings show that there are six types of influencers that dictate the discourse on vaccination on Twitter which are celebrity doctor,

media organisations, homeopathy promoter, government and government agencies, blogger and renowned medical journal. It also found that some of the influencers have their own circle of audience while some of the influencers are sharing the same crowd.

ORAL 038 ICCT

TRUST ON KNOWLEDGE-SHARING BEHAVIOUR AMONG ACADEMICIANS IN PUBLIC UNIVERSITIES: A REVIEW

Arenawati Sehat Binti Haji Omar and Shahren Bin Ahmad Zaidi Aduce

Institute of Borneo Studies, Universiti Malaysia Sarawak

Corresponding author: rieyn77@gmail.com

Universities are probably the places, where knowledge is freely and openly shared among the academicians. Although, the knowledge sharing is hardly presented within the university level these days in reality. Academic institutions, specifically the public universities are now experiencing the ever-rising faculty demands for quality expertise and resource sharing. Consequently, knowledge sharing has become a rising concern in academia. The study has aimed to assess the factors concerned with knowledge sharing among academicians in public universities. The study has reviewed the knowledge-sharing behaviour concept from the academic perspective in terms of written contribution, organizational communications, and communities of practice. Trust based on Social Exchange Theory has also been reviewed along with the association between trusts and knowledge-sharing behaviour. The study has highlighted trust as an essential factor, which makes an organization strive on valuable resources. Knowledge, on the other hand, is deemed as a power and considered as an undeniable aspect. Knowledge-sharing behaviour and humans are the two main constituents of knowledge. The study has presented the theoretical assessment of how the academicians are disposed positively towards the knowledge sharing within an organization. It is essential to assist practitioners to create and promote a knowledge-sharing environment especially within the context of public universities.

ORAL 039 ICCT

EFFECTIVE CLASSIFICATION USING ARTIFICIAL BEE COLONY BASED FEATURE SELECTOR

Hassan. SH, Yusup. N and D.N.F Awang Iskandar

Faculty of Computer Science and Information Technology,

Universiti Malaysia Sarawak

Corresponding author: cthazemah@gmail.com

Pepper classification is an important step in measuring the quality of the pepper. As of today, Malaysia Pepper Board (MPB) performed its classification task by doing a semi-automated process; where a commercial colour sorter is used to differentiate and categorized the peppers into respective groups. However, it is proven to be a challenging and time consuming process This paper introduces an effective pepper classification by applying a feature selection method in Artificial Bee Colony (ABC) algorithm. ABC algorithm is a metaheuristic algorithm inspired by the collective behavior of bees, which has been used successfully to solve complex problems of optimization. From this study, the proposed ABC algorithm that incorporates feature selection method resulted an accuracy of 92% tested with a small sample size. Meanwhile, 89.7% of accuracy was obtained with a larger sample size and a set of Red Mean; Green Median; Red Standard Deviation; Solidity Ratio; and Contrast were chosen as the best optimal features' subset.

ORAL 040 ICCT

A COMPARATIVE STUDY ON PRICE AND DISTANCE BETWEEN PAID AND FREE ENTRY EVENTS IN SARAWAK

Shaik Azahar Shaik Hussain and Wilfred Liew VL

Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak

Corresponding author: shazahar@unimas.my

The decision to travel and attend event is usually an important process for the visitor that involves many key factors especially motivation. Besides the most straight forward motivation question such as “Why do they come?”, this study has also asked “what are the main reasons they come and how price and distance factors influence their attendance?”. In this respect, the purposes of this study were to examine the importance of motivational items and investigate the underlying dimensions of motivation; focusing on price and distance aspects which lead to extension studies of willingness to travel and willingness to pay across two different events which were categorized as paid event (Rainforest World Music Festival 2014) and free entry event (Bintulu International Kite Festival 2013). The result of factor analysis suggested three motivation factors derived from 14 motivational items in both selected events. The findings proposed that price aspect influence greatly in free entry event but moderately in paid event. Surprisingly, distance aspect influence moderately in both events. This research also suggested that visitors' WTP between free entry and paid event shares different pattern. As for visitors' WTT research, different pattern of distance scale recorded in different events. Thus, this study has a contribution to understand event motivations as well as the visitors' willingness to travel and willingness to pay to three different annual events held in Sarawak.

ORAL 041 ICCT

VALIDATION OF PERCEIVED COMMUNITY SAFETY INSTRUMENT USING POLYTOMOUS RASCH MEASUREMENT MODEL

Shahren Ahmad Zaidi Adruce, Donald Stephen, Dayang Siti Aisah Abang Suhaili, Alexandra Nastassia John, Abg Mohd Heikal Abg Othman and Nur Adila Latif

Institute of Borneo Studies, Universiti Malaysia Sarawak

Corresponding author: azshahren@unimas.my

This study involves the designing, development and testing of an instrument for capturing perception of community safety in rural communities in Sarawak, Malaysia. Data were collected in Kampung Pulo Salak, Kampung Sebayor, Kampung Tanjong Bako and Kampung Pinggan Jaya. A total of 172 households were interviewed and their responses were recorded accordingly for each item listed in the instrument. The study details the validation of community safety instrument using a Rasch analysis technique. The instrument was adapted, translated from various sources and customized to the need of local communities. The many items in the original instruments were shortlisted and subsequently tested to assess the quality of the measurement used. Aspects investigated include personal and community safety, crime and social disorder, police effectiveness and engagement as well as the sense of community. Based on results from Rasch analysis, thirty items from the initial fifty-one shortlisted items were retained. The final version of the instruments implicates good reliability and validity. There was no differential item functioning detected and the measure was proven to be unidimensional. This instrument is expected to benefit local authorities especially for the formulation of necessary interventions to ameliorate issues pertaining to community safety.

ORAL 042 ICCT

THE ROLE OF DEMOGRAPHIC VARIABLES ON KNOWLEDGE- SHARING BEHAVIOUR AMONG ACADEMICIANS

Arenawati Sehat Binti Haji Omar and Shahren Bin Ahmad Zaidi Adruce

Institute of Borneo Studies, Universiti Malaysia Sarawak

Corresponding author: arena481@sarawak.uitm.edu.my

Every organisation needs to recognize knowledge as an important asset for individuals as well as the organisation itself order to survive in competitive environment. Since knowledge sharing is a critical activity for academicians, it has to be enhanced by stimulating individuals to share their knowledge voluntarily with other individuals and to contribute to the organizational knowledge base. Hence, institutions should focus on motivating the academicians to share knowledge among themselves, across the

departments, institutions, and industries; and to contribute to the knowledge base. To identify the role of demographic variables on knowledge-sharing behaviour among academicians. Every individual's attitude is subject to his own personal traits and to the environment or surrounding that the individual belongs to or is attached with. In the university, knowledge is intensively created and disseminated through research and publication. This is the most probable due to the belief that individual knowledge is not necessarily easy to be retrieved. Thus academicians play their roles as knowledge providers by transferring and sharing their knowledge through written contributions, organisational communications, personal interaction, and communities of practices activities. Motivational factors may be categorized according to different age, gender, designation, and organizational tenure of the academicians. This topic prompts individuals to actually oblige in sharing the knowledge. The reason is due to the fact that knowledge-sharing actually give more benefits than pitfalls. Individuals should require motivation to exchange the knowledge for the organization to gain competitive advantage. This concept paper provides an insight on the role of demographic characteristics towards knowledge-sharing behaviour among the academicians.

ORAL 043 ICCT

THE DEMOGRAPHIC PROFILE AND SUSTAINABILITY GROWTH OF THE BIDAYUH POPULATION OF SARAWAK

Lam Chee Kheung and Shahren Ahmad Zaidi Aduce
Institute of Borneo Studies, Universiti Malaysia Sarawak
Corresponding author: ytlam6162@gmail.com

Bidayuh is one of the seven major ethnic communities in Sarawak Malaysia, whose population number ranks fourth among all the communities. The analysis and description of the quantity and quality of Bidayuh population give a clear pattern and trends of change of Bidayuh population for the last 60 years, from 1947 to 2010. The study shows that the number of Bidayuh has increased almost 5 times since 1947. This is demonstrated by the annual growth rate and the percentage increase of the Bidayuh population over these years. It is evidenced from the analysis that the Bidayuh population has experienced a slower annual growth in recent years; this pattern simultaneously reflects the positive improvement of the social and economic conditions of the community. Although the growth rate of the Bidayuh has fallen, its size will still grow in absolute number, and the total Bidayuh could reach 220,000 in 2020. In view of the decline of the Bidayuh population which is slower than the Iban, the Melanau, the Chinese, and the others, the proportion and growth of Bidayuh population in Sarawak population is therefore still sustainable.

ORAL 044 ICCT

EEoP: A LIGHTWEIGHT SECURITY SCHEME OVER PKI IN D2D CELLULAR NETWORKS

Yasir Javed^{1,2}, Adnan Shahid Khan¹, Abdul Qahar^{1,3}, and Johari Abdullah¹

¹*Network Security Research Group, Faculty of Computer Science and Information Technology, Universiti Malaysia, Sarawak;*

²*RIOTU, CCIS, Prince Sultan University, Riyadh, KSA;*

³*The University of Punjab, Lahore, Pakistan*

Corresponding author: skadnan@unimas.my

Device-to-Device (D2D) communication is a promising technology that facilitates the deployment of devices to provide extended coverage where devices can act as user or relays. However, introducing such technology where the user can act as semi-intelligent relays, open a wide range of security threats, specifically, in terms of confidentiality and integrity. Another key issue of these devices is the limited computational and storage capabilities. Thus, to address the above challenges, this paper proposed a computationally lightweight crypto system based on Elliptic curve and ElGamal over public-key infrastructure (EEoP). It uses ECC for creation of keys while uses ElGamal for encryption and decryption over public-key infrastructure. Mathematical analysis shows that EEoP ensures the confidentiality and integrity of the communication. Performance analysis shows that proposed scheme outperformed the baseline protocols. The proposed crypto system can be used in relay-based communication.

ORAL 045 ICCT

PRELIMINARY PRODUCTION OF MATERIAL COMPOUND FROM SAGO WASTE

Saiful Bahari Mohd Yusoff¹, Sinin Hamdan¹, Kopli Bujang¹, Yeeni Ayu Rosita Marjani¹, Zalina Ibrahim², Mohd Taufik Abdul Jalil³ and Mohd Noor Rashidi Ahmad³

¹*Institute of Design and Innovation (INDI), Universiti Malaysia Sarawak;*

²*Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Sarawak;*

³*Politeknik Johor Bharu*

Corresponding author: mysaiful@unimas.my

Sago palm or its scientific name, Metroxylon sago Rottb is commonly found in tropical low forests and processed into sago flour. Processing of sago flour will produce sago waste (SW). This excess waste has been found to cause ecosystem imbalance. The research looks into the preliminary process of recycling the sago waste into a new material compound that can be used by any modeler as a substitute in the production of any products that are compatible with the material. The process goes through the filtering stage,

drying stage and molding stage using only natural resources as the main ingredients with different level of contents tested. The compound is also tested for its durability as a modeler material. The research shares the results from the process, the end product that can be used for model making and a sample of a product that is produced from the material compound.

ORAL 046 ICCT

OPTICAL CHARACTER RECOGNITION FOR BRAHMI SCRIPT USING GEOMETRIC METHOD

Neha Gautam and Soo See Chai

*Faculty of Computer Science and Information Technology, University
Malaysia Sarawak*

Corresponding author: nehagautam1208@gmail.com

Optical character recognition (OCR) system has been widely used for conversion of images of typed, handwritten or printed text into machine-encoded text (digital character). Previous researches on character recognition of South Asian scripts focus on modern scripts such as Sanskrit, Hindi, Tamil, Malayalam, and Sinhala etc. but little work is traceable to Brahmi script, which is referred to as the origin of many scripts in south Asian. This study proposes a method for recognition of both handwritten and printed Brahmi characters, which involve preprocessing, segmentation, feature extraction, and classification of Brahmi script characters. The geometric method was used for feature extraction into six different entities, followed by a newly developed classification rules to recognize the Brahmi characters based on the features. The method obtains accuracy of 91.69% and 89.55% for handwritten vowels and consonants character respectively and 93.30% and 94.90% for printed vowel and consonants character respectively.

ORAL 047 ICCT

A NOVEL INTEGRATED EVOLVING SPIKING NEURAL NETWORK USING DEEP LEARNING FOR CLASSIFICATION PROBLEMS

Abdulrazak Yahya Saleh, Teh Chee Siong and Mohd Kamal Bin Othman

*Faculty of Cognitive Science and Human Resources,
Universiti Malaysia Sarawak,*

Corresponding author: ysahabdulrazak@unimas.my

In this research, there are many areas in life, which need classification such as medical diagnoses, medicine, science, industry, speech recognition and handwritten character recognition. Among feasible classifiers, artificial neural network (ANN) classifiers have proved to be one of the most robust classification systems; their ability to deal with noisy input patterns and to handle both noisy and continuous data demonstrates their use as an

important tool for Classification. Spiking neural networks (SNNs), the third generation of ANNs, play an important role in biological information processing. Recently, Evolving SNNs (ESNN) have attracted extensive research attention because of the multiple advantages they offer compared to others models. On the other hand, Deep learning (DL) is a popular research area especially in the neural networks and already provides applications in various domains such as computer vision, speech recognition, natural language processing, hand writing recognition etc. Several technology companies like Google, Microsoft and Facebook empowered their big data with deep learning methods. Among the many real issues that need to be explored in ESNN, determining the effectiveness of applying deep learning on ESNN. Moreover, studying the impact of the new model to the big data problems can be considered as another issue. The aim of the study is to enhance the performance of evolving spiking neural network (ESNN) using Deep learning. The hybrid deep learning evolving spiking neural network (DLESNN) is a trendy model, which needs to be explored and enhanced to get more accurate and fast results. Several standard big data sets will be used for evaluating the performance of this model. It can be found that the DL-ESNN provides competitive results in classification accuracy and other performance measures compared to the standard ESNN. More discussion is provided to prove the effectiveness of the new model in classification problems.

ORAL 048 ICCT

COCHRAN'S Q WITH PAIRWISE MCNEMAR FOR DICHOTOMOUS MULTIPLE RESPONSES DATA: A PRACTICAL APPROACH

Donald Stephen and Shahren Ahmad Zaidi Aduce
Institute of Borneo Studies, Universiti Malaysia Sarawak
Corresponding author: donaldstephen89@gmail.com

When utilizing single-response questions for a survey, researchers often overlook the possibility that an item can have a smorgasbord of viable answers. It results in the loss of information as it forces the respondents to select a best-of-fit option. A multiple-responses question allows the respondent to select any number of answers from a set of preformatted options. The ability to capture a flexible number of responses allows collectively exhaustive concepts to manifest for deductive verification. This paper explores the practical use of Cochran's Q test and pairwise McNemar test to examine the proportion of responses derived from the results of Multiple Responses Analysis (MRA). This includes Cochran's Q operation on MRA data table using a simulated data set. Cochran's Q test detects if there is a difference in the proportion of multiple concepts. In the case of a significant result, it would require a post hoc analysis to pinpoint the exact difference in pairwise proportions. This pairwise difference can be detected

by utilizing pairwise McNemar test with Bonferroni Correction. This paper serves as a reference for researchers and practitioners who need to examine the proportion of collectively exhaustive concepts collected from a multiple responses item.

ORAL 049 ICCT

AN ETHNOGRAPHIC STUDY OF THE IBAN SOCIAL STATUS IN TRADITIONAL BELIEF FOR CULTURAL PRESERVATION

Fujica Anggo and Louis Laja

Institute of Design and Innovation, University Malaysia Sarawak

Corresponding author: fujian_anggo@yahoo.com

The Sea Dayaks, better known as the Ibans, inhabit nearly the whole of Sarawak. The Ibans belong to the Proto-Malay groups and historically, they were from the Kapuas Valley in West Kalimantan, Indonesia. They migrated to Sarawak about fifteen generations ago in the mid 16th century (the 1630s). They went to the state through the Kumpang Valley and inhabit Batang Ai and then split to several places in Sarawak (Morgan, 1968). Although the Ibans have a social status in their traditional belief, they do not have a hierarchy of social status such as the Orang Ulu. However, they have elevated the status so-called Pengulu, Tuai Rumah, Tuai Burung, Lemambang, Manang, Beliau, Tukang Sabak, dan Indu Takar. The era of modernization has led to changes to the knowledge of the young generation, especially the younger generation of the Ibans who lack knowledge about the function and role of each rank status in their communities. Therefore, this study was conducted qualitatively through an interview with expert informants, observation, and documentation. This research was hoped to contribute to the general knowledge of the Iban community and other communities in the preservation of the function and role of each social status in the Iban community.

ORAL 050 ICCT

A STUDY ON MATERIALS OF GAMELAN INSTRUMENTS – A COMPARATIVE STUDY OF ITS MATERIALS AND SOUNDS

H Abdul Wahid¹, S. Hamdan¹ and I. Amri Musoddiq²

¹*Institute of Design & Innovation,*

²*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak*

Corresponding author email: awnizam@unimas.my

Gamelan is a melodic instrument typically made from bronze and placed on a resonator. Initial observation proved that there are no two gamelan tuned exactly alike. The tuning methods during the crafting process were made in the fieldwork. In our initial observation, it is concluded that there is no specific reference to any specific tune devices as had been practiced on crafting

western musical instruments. Gamelan are known and recognized to have a specific scaled that is in either the five tones Slendro or seven tones Pelog scales. Interestingly, in Malaysian practice the ensemble are typically tune diatonically to pentatonic scale, which provoked interesting discussion. Preliminary findings on the Gamelan instruments have highlighted some issues, particularly on its physical composition, tunings, as well as the sound it produces. This paper will discuss some of the preliminary findings and issues related to the investigation on acoustic properties of selected Gamelan instruments.

ORAL 051 ICCT

TOURIST'S PERCEPTION TOWARDS TREE BARK HANDICRAFTS PRODUCTS IN WATERFRONT, KUCHING.

Shaik Azahar bin Shaik Hussain and Nur Izazi binti Bustamam
Faculty of Applied and Creative Art, Universiti Malaysia Sarawak
Corresponding author: shazahar@unimas.my

Perception is a description or reflection in someone's heart or mind about something. This research was conducted to discuss on tourist's perception towards tree bark handicrafts. Furthermore, the understanding of how tourist preferred tree bark handicrafts as souvenir and the way to market are also being discussed in this research paper. This research focuses on tourists at the Waterfront, Kuching as target respondents. 340 completed sets of questionnaires are collected as some of these questionnaires are not able to be retrieved. Mixed method consist of quantitative and qualitative are being used to gain reliable result for this research. The results show tourists are having different interest towards handicrafts products they would buy. In addition, the Waterfront itself, being a strategic location also become one of the main reason to market and sell the tree bark products as souvenirs. Researcher hopes that this research could help the future researcher to conduct a more detailed research for future of handicrafts industry in Malaysia.

ORAL 052 ICCT

MEASURING TEACHERS' READINESS TO USE TECHNOLOGY: TECHNOLOGICAL, PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK) PILOT STUDY

Jecky Misieng, Joseph Ramanair and Souba Rethinsamy
Faculty of Language and Communication, Universiti Malaysia Sarawak
Corresponding author: mjecky@unimas.my

Technology is now an integral part of education. It offers much potential to enhance teaching and learning not only in the classroom but beyond it,

making education accessible via cyberspace. The significance of technology to education has been also recognised an integral part of the 10 shifts outlined by the Malaysian government in the National Education Blueprint 2015 – 2025 (Higher Education) to ensure that online learning becomes the main pedagogical approach in higher learning institutions. The powerful potential of technology however, can only be realised through informed and purposeful use of it by teachers. Integrating technology in the language classroom requires that teachers not only have knowledge about the Technology but also the subject matter (Content), and how the subject matter needs to be purposefully delivered (Pedagogy). The interplay between these three components of knowledge – Technology, Pedagogy, and Content Knowledge (TPACK) determines the essential qualities of teacher knowledge that are required when teachers integrate technology in their classroom practices. This study is therefore designed to measure teachers' readiness to use technology in teaching English language in tertiary level classrooms to enhance student learning. A pilot study was carried out on 20 English language instructors to evaluate a questionnaire that was adapted for this purpose. This was followed by cognitive interviews on selected respondents to gain insight on whether items are functioning as intended. This was done to obtain a workable measurement instrument.

ORAL 053 ICCT

AWARENESS AND RISK PERCEPTION TOWARDS SEXUALLY TRANSMITTED INFECTIONS (STIS) AMONG ADOLESCENTS IN KUCHING AND KOTA SAMARAHAN, SARAWAK.

Khadijah Mohamad Tuah¹, Malia Taibi², and Awang Ideris Awang Daud³,
*Faculty of Language and Communication, Faculty of Social Science,
Universiti Malaysia Sarawak*

Corresponding author: mtejah@unimas.my

Sexually transmitted infections (STIs) are on the rise in Sarawak with the age of those infected getting younger by year. Latest available data on reported cases of STIs is from a newsletter published by the Sarawak Health Department in March 2015 showing 26 cases of gonorrhoea and 3 cases of syphilis for Kuching while 8 cases of gonorrhoea and 2 cases of syphilis for Samarahan recorded for that month. Based on reviews of past studies it can be concluded that the level of awareness is still low despite the rising cases of STIs reported in Sarawak. A study found gonorrhoea to be the most common infection affecting Sarawakians prior to 1981 and based on the current statistics, that has not changed. Knowledge on STIs among adolescents and youths is generally low to moderate, even among health sciences students. The prevalence of pre-marital sex among adolescents could be a factor in contributing to the rise of STIs infections. The Sexually Transmitted Disease Knowledge Questionnaire (STD-KQ) and the Health Belief Model are used in

this study to gauge the level of awareness and risk perception among the adolescents in Kuching and Kota Samarahan. The focus of this paper is to understand the level of awareness and knowledge of STIs among adolescents, to assess the attitudes of adolescents towards STIs, to determine the risk perception of adolescents concerning STIs, and to find out factors affecting level of awareness and risk perception of STI among adolescents.

ORAL 054 ICCT

THE IBAN VISUAL CULTURE: MIRING RITUAL

N. Tugang¹, K. Jusoff², A. Durin¹, C. L., Yow¹, A. R. Hashim Awang³, A. Asri¹ and Bibiana S¹

¹*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak*

²*Faculty of Resource Science and Technology, Universiti Malaysia Sarawak*

³*Sociology and Social Anthropology Programme, Faculty of Humanities, Arts and Heritage, Universiti Malaysia Sabah*

Corresponding author: tnoria@unimas.my

This paper examines the Iban society visual culture where the creative artwork is about the Iban's belief known as miring. It is a ritual ceremony that involves meals offering and worshipping activity as a gratitude sign to the Gods, deities, spirit and the Iban ancestor. Miring is conducted to express one's gratitude to the extraordinary powers to get a better life, including the provision of long life in this world, wealth, harmonies and blessing from the Gods. In this article, miring ritual is a visual culture to explain the miring ceremony amongst the Iban community in Sarawak. It is a visual culture that reflects the Iban symbolism which involves the usage of object as a sign to represent an abstract idea by way of ritual offerings simultaneously a medium of communication between human being and their Gods.

ORAL 055 ICCT

WHAT STUDENTS REALLY NEED: INSTRUCTIONAL STRATEGIES THAT ENHANCE HIGHER ORDER THINKING SKILLS (HOTS) AMONG UNIMAS UNDERGRADUATES

Collin Jerome¹, Julia Lee Ai Cheng² and Ting Su Hie¹

¹*Faculty of Language and Communication,*

²*Faculty of Cognitive Science and Human Development, Universiti Malaysia Sarawak*

Corresponding author: jcollin@unimas.my

Malaysia's education system has undergone major reforms with the inclusion of higher order thinking skills into the curriculum at all levels of education. The implementation of this curriculum, however, is marred by several issues,

especially the prevalent lack of higher order thinking skills (HOTS) among a majority of undergraduates. This is an important issue that requires addressing by higher learning institutions because of the challenges in the teaching of HOTS at undergraduate level. The present paper aims to examine one of these challenges, that is, the instructional strategies undergraduates genuinely need to enhance HOTS. To achieve this, the paper discusses findings from a study that investigated HOTS among undergraduates at Universiti Malaysia Sarawak (UNIMAS). Self-reported survey and interviews were used to gather the views of 120 undergraduates on HOTS and the teaching of HOTS in tertiary context. The views were then used to develop instructional strategies that could enhance HOTS among UNIMAS undergraduates. The findings show that UNIMAS undergraduates viewed HOTS as those that include critical, logical, reflective, metacognitive, and creative thinking skills. The undergraduates reported that the use of problem-based learning, case-based scenarios, demonstrations, lectures, and discussions were some of the instructional strategies used by their lecturers to enhance HOTS. The findings also show the subject taught, the learning tasks, and the approach(es) taken by the lecturers are some of the factors that may affect the types of instructional strategies that undergraduates really need to enhance their HOTS.

ORAL 056 ICCT

AT ODDS: PERCEIVED STIGMA OF SINGLE PROFESSIONAL MALAY WOMEN

Jamayah Saili¹ and Abdul Rahman Saili²

¹*Faculty of Cognitive Sciences and Human Development,
University Malaysia Sarawak,*

²*Faculty of Plantation and Agrotechnology, UiTM Sarawak*
Corresponding author: sjamayah@unimas.my

Anak dara tua (andartu) or anak dara lanjut usia (andalusia) are terms used in Malay culture to designate a woman's unmarried status which mean old virgin or old maiden. Our language further functions to enhance stigma in that population as they are being referred to as tak laku (not sellable) or jual mahal (playing hard). The majority of researchers have failed to consider the role culture and religion might play for single women in quality of life, social status and lifestyle that take precedence over the common experience women share. Drawing on in-depth interviews with 20 professional Malay Muslim women who have not married, this paper highlights some of the societal stigma, problems and pressures single Malay women experience when they are not married. This paper argued that the meanings of singlehood among women are personally constructed through one life's experiences that are situated within and reinforced by important social contexts, such as one's culture and religious faith.

ORAL 057 ICCT

PRELIMINARY INVESTIGATION OF ESL STUDENT WRITING IN ENGINEERING

Radina Mohamad Deli

Faculty of Language and Communication, Universiti Malaysia Sarawak

Corresponding author: mdradina@unimas.my

Given the importance of writing skills for communicating messages in the field of engineering, and the seemingly perpetual conflict between novice engineers' poor ability to write and the quality expected by employers, it is worthwhile to investigate student engineers' writing ability or experiences prior to their employment. This study thus aims to investigate English as a Second Language (ESL) students' writing in engineering studies. The objectives of the study are to (1) identify the genres of writing by ESL undergraduates in engineering studies, and (2) analyse students' laboratory reports for 'moves' typically identified in the genre. Students' written scripts were collected from various engineering courses within the mechanical, electrical, and electronic engineering programmes of a Malaysian public university, and identified by genre based on their structure and content. The preliminary finding suggests that the majority of the writings can be classified as laboratory and technical reports. Based on a 'move' analysis outlined for student laboratory reports in science and engineering (Parkinson, 2017), a total of 14 laboratory reports was analysed and 5 macro-sections were identified namely introduction, method, result, discussion, and conclusion. This is different from the 6 macro-sections found for engineering in Parkinson's study. Although the number of moves identified was essentially similar, some steps were unavailable in the laboratory reports within these macro-sections. Given the preliminary nature of this study and the limited number of scripts analysed, a conclusion cannot be made as yet to whether these findings on genre type and moves are true for the majority of the students' writing. Despite this fact, it is believed that findings from this genre-based study can have pedagogical importance in that it may help to enhance the writings of ESL students in engineering studies to reach a standard that may be more aligned to the accepted norms of laboratory report writing.

ORAL 058 ICCT

PARKBUDDY – FIND MY CAR ANDROID MOBILE APPLICATION

Flora Stephanie Francis, Nurfaeza Jali, Ahmad Hadinata Fauzi,
and Suriati Khartini Jali

*Faculty of Computer Science & Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: renlenox.np@gmail.com

As a result of technological progress, smartphones become an excellent choice for the user to make their life easier. This paper discussed how to locate parked vehicle using mobile application. The situation of forgetting where last vehicle location was parked and trying to remember it can become problem to some people especially to those who are having deterioration of memory such as a short-term memory and dementia. This mobile application helps these users to locate their vehicle by utilising the global positioning system (GPS) system. This paper presents and critically analyses the system developed to solve the problem.

ORAL 059 ICCT

THE ADOPTION OF AGILE SOFTWARE METHODOLOGY WITH TEAM SOFTWARE PROCESS (TSPI) PRACTICES IN THE SOFTWARE ENGINEERING UNDERGRADUATE COURSE

Nurfauza Jali, Azman Bujang Masli, Cheah Wai Shiang, Yanti Rosmunie Bujang, Abdul Rahman Mat and Norazian Mohd Hamdan
*Faculty of Computer Science & Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: jnurfauza@unimas.my

In computer science, software engineering courses expose the undergraduate students to both the technical and methodological aspects of software development. The traditional software development methods and techniques represent a huge proportion of the courses and hence contribute an essential part of software engineering students' development process. This plan-driven development is dependent on a set of predefined phases and ongoing documentation, which found to be problematic; such as time-consuming, slipped requirements and complicated processes. The main aim of this paper is to study and review the adoption of Agile Software Methodology and Team Software Process (TSPi) practices in the undergraduate course focus on software development. The framework and course plan will be designed in order to apply and observe the implementation. Furthermore, this study will help to gather the teams' viewpoint regarding the importance of Agile and TSPi practices in handling small projects with real clients.

ORAL 060 ICCT

VEHICLE CLASSIFICATION AND COUNTING FOR VEHICLE CENSUS

Dellas Chan Su Chieng and Wang Yin Chai
*Department of Computing and Software Engineering, Faculty of Computer Science and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: dellas1215@hotmail.com

Vehicle classification has been significantly important to vehicle census as it provides traffic count information to reflect the traffic density of a particular roadway. However, it has been a time consuming and sophisticated task to classify different vehicles into the desired category. Besides, the hardware-based technique used for classification leads to high cost of implementation and maintenance. Thus, we proposed an image processing based solution to extract the features of each vehicle in the traffic scene. The proposed framework incorporates a combination of detection, tracking and classification of vehicle to ensure high accuracy and performance for vehicle census. Experimental results show that our proposed framework can be applicable in real world applications.

ORAL 061 ICCT

SELECTING REQUIREMENT ELICITATION METHODS FOR DESIGNING ICT APPLICATION IN MINORITY COMMUNITY

Rosita Mohamed Othman, Suhaila Saeed, Yanti Rosmunie Bujang
and Bali Ranaivo-Malançon

*Faculty of Computer Sciences and Information Technology,
Universiti Malaysia Sarawak*

Corresponding author: morosita@unimas.my

In recent years, Information and Communication Technologies or widely known as ICT has rapidly acquired a place in society. ICT facilitates communities in terms of providing the latest information updates on various fields such as business, education, sports and many more. Various ICT applications have been developed to cater these arising needs. In ensuring the developed ICT applications achieving its purposes, user requirements must be fulfilled. Thus, gathering requirements from communities during system development is an important phase. A suitable elicitation technique is needed as this will determine the quality and accuracy of the requirements gathered which ensures success of the developed system. The same applies when developing systems for minority communities. Hence, this paper explores the existing requirement elicitation techniques to gain insight for constructing a suitable requirement elicitation technique for minority communities. As a result, a proposed framework for eliciting requirements in the minority community will be discussed.

ORAL 062 ICCT

A COMPARATIVE STUDY OF FEATURES EXTRACTED IN THE CLASSIFICATION OF HUMAN SKIN BURN DEPTH

Kuan Pei Nei¹, Stephanie Chua¹ and Ehfa binti Bujang Safawi²

¹*Faculty of Computer Science and Information Technology,*

²*Faculty of Medicine and Health Science, Universiti Malaysia Sarawak*

Corresponding author: 16020107@siswa.unimas.my

The first burn treatment provided to patient is usually based on the first evaluation of the skin burn injury by determining the burn depths. In this paper, the objective is to conduct a comparative study of the different set of features extracted and used in the classification of different burn depths by using an image mining approach. Seven sets of global features and 5 local feature descriptors were studied on a skin burn dataset comprising skin burn images categorized into three burn classes by medical experts. The performance of the studied global and local features were evaluated using SMO, JRIP, and J48 on 10-fold cross validation method. The empirical results showed that the best set of features that was able to classify most of the burn depths consisted of mean of lightness, mean of hue, standard deviation of hue, standard deviation of A* component, standard deviation of B* component, and skewness of lightness with an average accuracy of 77.0% whereas the best descriptor in terms of local features for skin burn images was SIFT, with an average accuracy of 74.7%. It can be concluded that a combination of global and local features is able to provide sufficient information for the classification of the skin burn depths.

ORAL 063 ICCT

THE IMPACT OF APPLYING PROJECT ORIENTED PROBLEMS BASED LEARNING (POPBL) FOR UNIMAS FINAL YEAR PROJECT STUDENTS (FYP) - CASE STUDY

Abdulrazak Yahya Saleh¹, Ong Mei Fong², Rafeah Binti Wahi³ and Shaziti Bt Aman¹

¹*Faculty of Cognitive Science and Human Development,*

²*Faculty of Medicine and Health Sciences and,*

³*Faculty Resource Science and Technology, Universiti Malaysia Sarawak,*

Corresponding author: ysahabdulrazak@unimas.my

A big dilemma has been done about the ability and the benefits of UNIMAS final year students to apply Project Oriented Problems Based Learning (POPBL). This research will shed the lights and provide reflections about that matter to help decision makers. Several interdisciplinary FYP projects will be applied to prove that. This research reports on a collaborative effort between the different department in cognitive science, artificial intelligence, nursing, environment science and human and computer interaction. A case study that

aims to develop a software or system with user-friendly interface that enables early detection of illnesses or diseases in human's health, which associated to the exposure of air pollutant. The idea behind that is Hospitals and clinics received clients daily with health problems. The time requires to diagnose health problems causes long waits and worsen the problem. Misdiagnosis affects the care of the clients where clients have received an inappropriate care. A user-friendly systematic procedure will save the cost, time and provide proper care for the clients. we can summarize the learning outcomes for this research as: identifying the effect of air pollutants hazardous to human's health, improving the care of clients, developing an AI system in diagnosing the air pollutants that hazardous to human's health and developing an effective and efficient interface for users to interact with the AI system. The project involved small groups between 4-5 students will be selected to solve this problem. The POPBL technique will be analyzed and evaluated to prove that.

ORAL 064 ICCT

COMMUNICATION VERSUS GEOGRAPHY: THE CASE STUDY OF SARAWAK HOMESTAY OPERATOR ASSOCIATION

Shaik Azahar Shaik Hussain and Farid Ismeth Amir Syamsul Bahri

Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak

Corresponding author: shazahar@unimas.my

Homestay is being developed throughout the decades making it as one of the best tourism product in Malaysia. The increasing number of homestay in Sarawak each year is challenging the communication among each other administratively. Communication among all the homestay is vital in order for the information could be reached in a timely manner. Without a proper communication media used to communicate, a lot of important information could be missed out causing some of the homestays to be left out. This research is conducted to study the communication used among the homestay operators using both quantitative and qualitative methods. Interviews are conducted with the representatives of Sarawak Homestay Operator Association (SHOA) and questionnaires are distributed to the homestay operators in gathering the information. Locations could not be changed as locations are the unique selling point of a homestay and recommendations can be addressed to have mobile communication towers within the vicinity of the homestays to improve the signals. It is revealed that communication issues could be resolved if operators are actively involved as there are a variety of apps available in the market for these operators to choose from.

ORAL 065 ICCT

COCONUT COIR EXPERIMENTAL PROCESS FOR PRODUCING AN ALTERNATIVE BLOCK TOY COMPOUND

Saiful Bahari Mohd Yusoff¹, Sinin Hamdan¹, Zalina Ibrahim⁴ and Shah Jhihan Abdullah²

¹*Institute of Design and Innovation (INDI),*

²*Faculty of Applied and Creative Arts (FACA), Universiti Malaysia Sarawak;*

³*Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Sarawak*

Corresponding author: mysaiful@unimas.my

Currently, children's block toys use solid wood, processed wood and Medium-Density Fiber board (MDF). MDF is a mixture of sawdust that is held together with wax, resin and formaldehyde and has been widely used to produce children's toys. MDF are heavy and found to be health hazardous especially to children. This research focuses on the process of transforming the waste from the coconut coir/husk as an alternative to the current unsafe materials into toy block. The coconut coir/husk is creatively processed to produce children toy block that are soft, lightweight, cheap, harmless for children to use and environmental friendly. The process involved treatment of insignificant waste and transforming it into a competitive product, thus reducing mass pollution by the coconut farmers and open burning of coconut coir/husks.

ORAL 066 ICCT

EVOLUTION OF THE GAMELAN – GAMELAN SARAWAK

H Abdul Wahid¹, S Hamdan¹ and I Amri Musoddiq²

¹*Institute of Design & Innovation,*

²*Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak*

Corresponding author: awnizam@unimas.my

Earlier researches and reports have acknowledged the existence of 'Gamelan Sarawak'. It is unique in such a way that they have been known to exist as early as in the 1920s. Known as the most active performing gamelan group in Sarawak particularly in Kuching-Serian-Kota Samarahan area, recent researches have shown the ensemble have gone through significant changes ranging from their repertoire as well as their musical instruments. This paper discussed their evolution, some of the changes and challenges in sustaining the future.

**SUSTAINABILITY OF COMMUNITY LIVING AROUND BAKUN:
DOWNSTREAM COMMUNITIES**

Haider Kowel Bete and Shahren Ahmad Zaidi Aduce
Institute of Borneo Studies, Universiti Malaysia Sarawak
Corresponding author: haiderkowelzg@gmail.com

Sarawak is currently promoting hydropower generation and sale of electricity in the state as a key economic development strategy. There are already three hydropowers been built in the state which are Batang Ai, Bakun, Murum and coming soon will be the Balleh Hydro Dam. Sustainability is a composite and thus ambitious policy and targets are put in placed. It comprises environmental, economic, social and institutional criteria with equal importance. The study defines some important issues concerning the sustainable development of hydroelectric dam by looking at Bakun Dam and its community as a specific case study. While helping the state Government to achieve its economic objectives and development goals, it is anticipated that the hydropower comes with a cost to other stakeholders especially the communities living downstream especially along the Rajang river. This study is based on interview with local folks and review of literature related to the Bakun Dam and nearby communities as well as review on related studies on positive and negative impacts of hydro dam in other parts of the world. This study highlights on opportunities other than pottential treats that affect or possibly could affect the Bakun and Rejang river communities. It has been already known that hydropower projects can interrupt, change and inhibit river flows and associated ecological services that have supported rural livelihoods. The impacts of hydropower therefore spread to people living downstream of the dams. This research identifies and explores the perceived direct and indirect effects hydropower projects have on communities living downstream of Bakun dam. Specific emphases are placed on the environmental and socio-economic impacts of the dam affecting the indigenous population of the region, most of which are Orang Ulu. Other than the benefits, this study also highlights the vulnerability of indigenous populations that are face with various problems associated with the hydro dam. The findings implicate some socio-economic problems that need to be urgently addressed. The study also exposes the marginalization of the Orang Ulu population in the region and recommending a change of approach on how relevant authorities manage development projects in the region. Corrective actions will be suggested to reduce negative impacts while optimizing positive impacts and ensure sustainability of communities living in the Bakun basin based on some experiences and best paractices of other nations.

ORAL 068 ICCT

FACEBOOK AND POLITICAL CYNICISM: UNDERGRADUATES' PERCEPTION

Malia Taibi¹, Siti Haslina Hussin² and Siti Zanariah Ahmad Ishak²
*Faculty of Language and Communication, Faculty of Social Sciences,
Universiti Malaysia Sarawak*

Corresponding author: tmalia@unimas.my

This paper aims to examine the perception of undergraduates about political cynicism based on the information that they consumed from Facebook. It is common for people to share various types of information on Facebook, which include news, commentary, videos and photographs of politicians and political parties. Such information may form perception among undergraduates about politics and politicians as a whole. Using quantitative approach, a total of 105 questionnaires were distributed to undergraduates across different faculties in UNIMAS. Out of 12 questions about trust adapted from Elderman Trust Barometer, undergraduates had chosen to be neutral in their answers. This indicates that undergraduates are undecided when it comes to their perception about political issues and politicians in the country.

ORAL 069 ICCT

SUSTAINABLE COMMUNITY INDEX INSTRUMENT

Shahren Ahmad Zaidi Aduce, Abang Mohd Heikal Abang Othman, Dayang Siti Aisah Abang Suhaili, Donald Stephen, Alexandra Nastassia John, Nur Adila Latif and Haider Kowel Bete.

Institute of Borneo Studies, Universiti Malaysia Sarawak

Corresponding author: azshahren@unimas.my

Holistic Knowledge about Rural communities has always been far-fetched and in most cases not known. There is thus far no known holistic instrument for indexing community (available index is measuring only certain aspects of the community such as security and wellness) standing nor performance; needless to say, concerted effort that attempt to collect holistic data for rural communities. Responding to the call by our beloved Chief Minister of Sarawak Datuk Amar Abang Haji Abdul Rahman Zohari Bin Abang Haji Openg that he will continue the legacy of the late Tan Sri (Dr) Adenan Hj Satem on the need to focus and transform rural communities and inline with UNIMAS research niche area "Sustainable Community Transformation", IBS took the initiative to design and develop this community index instrument. Various methodologies are involved in the preparation of this instrument, in the first phase the study uses observation and indepth interview as well as document analysis methods. The second phase uses mainly quantitative observation and survey methods. It is expected that knowledge derived from this instrument will be usefull for relevant authorities to plan and organize strategic efforts for the

intervention, development and transformation of affected communities. Specifically, the instrument will generate information such as; Community profiles, Local need for infrastructure, Safety issues, Community environment, Religiosity, Community wellbeing, Economic development and Education. Based on these indices, the overall index score is produced as a benchmark for communities that are being studied. The report generated from this instrument could be used to develop a holistic blueprint for the development and intervention to transform the community to that of a sustainable community. This instrument makes it easier to facilitate the State Government and non-governmental bodies to identify things that need to be addressed; with a more strategic transformation plan to make more accurate and useful intervention for the locals.

