



**UMS**  
UNIVERSITI MALAYSIA SABAH

**24 - 25**  
**OCT 2018**

**KOMPLEKS**  
**DEWAN KULIAH PUSAT KE-2,**  
**UNIVERSITI MALAYSIA SABAH**



Transformation towards  
**UNIVERSITY**  
**INDUSTRY 4.0**



**2018**  
**PEREKA**  
UMS RESEARCH & INNOVATION COMPETITION

**ABSTRACT BOOK**

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## BACKGROUND

UMS RESEARCH AND INNOVATION COMPETITION (PEREKA) is an annual research and innovation competition in Universiti Malaysia Sabah (UMS), organized by the Research & Innovation Management Centre (RIMC) of UMS.

This program is meant for lecturers and researchers to showcase and share information of their research activities and latest innovation to the public and UMS community.

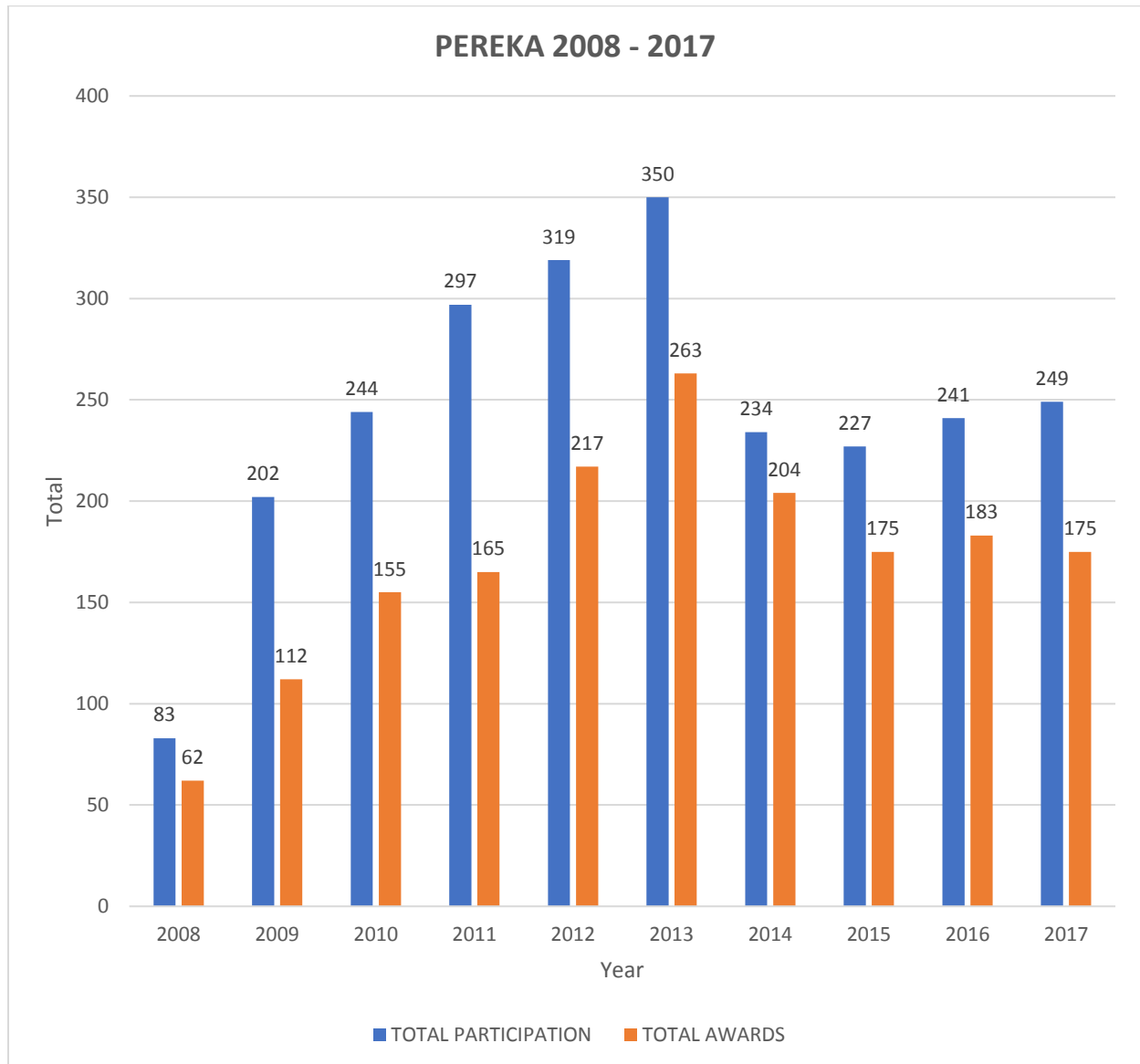
PEREKA is also a platform for evaluation and validation of the best research products and innovation that can be promoted further for competition or promotion at National and International level in order to get recognition and recorded in MyRA, MyMoheS and others.

## OBJECTIVES

In accordance to the importance of research activities and development as one of the core function of UMS, PEREKA prioritize the following objectives:

- To foster and nurture the culture of Research, Development and Commercialization (R&D&C) among the aspiring researchers in UMS.
- To encourage knowledge exchange and explore new knowledge that can be extended to the community and industry, have commercial values and potential technology that can be developed further.
- As a platform to encourage exchange of ideas and knowledge among researchers and as platform for community and industry to identify potential technology. Input from community and industry help researchers to enhance research and potential for commercialization or technology transfer.
- To identify research products and potential end result of an innovation that can be showcased in exhibitions and competitions at national as well as international level.
- To promote activities and university research products to the general community, particularly secondary and primary school students as well as to create interest in technology, innovation and intellect properties.

## PEREKA STATISTICS 2008-2017



## PROGRAMMES

DATE	TIME	ACTIVITY
23 October 2018 (Tuesday)	2:30PM – 5:00PM	<b>Registration and Booth Preparation</b>
24 October 2018 (Wednesday)	8:30AM – 5:30PM	PEREKA Exhibition
	9:00AM – 1:00PM	<b>Evaluation Session</b>
	1:00PM – 2:00PM	Break
	2:00PM – 5:30PM	<b>Evaluation Session</b>
25 October 2018 (Thursday)	9:00AM – 5:00PM	PEREKA Exhibition
	9:00AM – 12:00PM	<b>Evaluation Session</b>
	1:00PM – 2:00PM	Break
	2.30PM – 5:00PM	<b>Closing Ceremony and PEREKA 2018 Awards Presentation</b>

## MAIN COMMITTEE

<b>Advisor</b>	Y.Bhg. Prof. Datuk Dr. D Kamarudin D Mudin Vice-Chancellor
<b>Chairperson</b>	Y.Bhg. Prof. Dr. Shahril Yusof Deputy Vice-Chancellor (Research and Innovation)
<b>Coordinator</b>	Associate Prof. Dr. Normah Awang Besar @ Raffie Director Research & Innovation Management Centre
<b>Deputy Coordinator</b>	Associate Prof. Dr. Homathevi Rahman Deputy Director (Innovation)  Dr. Aza Sherin Mohamad Yusuff Deputy Director (Research)  Dr. Azali Saudi Deputy Director (Excellence & Consultation)
<b>Secretary</b>	Sharifah Ismail
<b>Treasurer</b>	Ammysiah Severinus
<b>Technical Committee</b>	Prof. Datuk Dr. Kasim Hj. Md. Mansur Prof. Dr. Ho Chong Mun Prof. Dr. Felix Tongkul Prof. Dr. Jacqueline Pugh-Kitingan Prof. Dr. Willey Liew Yun Hsien Associate Prof. Dr. Helen Benedict Lasimbang Associate Prof. Dr. Zaleha Aziz Associate Prof. Dr. Syed Nasirin Zainol Abidin Associate Prof. Mariam Abdul Latif

## COMMITTEE

<b>Secretariat</b>	Associate Prof. Dr. Homathevi Rahman (H)   Sharifah Ismail   Jumawati Catacutan   Nor Hidayah Bickel   Nooraini Abdul Ghaib   Ag. Ismawadi Hj. Ag. Jaman
<b>Procurement</b>	Aidah Sulaiman (H)   Rayner Nicasius
<b>Logistic &amp; Facilities</b>	Azlan Awang (H)   Rohani Hadi   Edwin Lumbating   Sudin Yusop
<b>Awards &amp; Prizes</b>	Zainorah Matnoor (H)   Roslia Mathew   Masrina Maujar
<b>F&amp;B</b>	Ahfidah Sanip (H)   Ruzita Mohammad   Aidah Sulaiman
<b>Multimedia &amp; Technical</b>	Mokdin Ahmad (H)   Abdul Latif Matali   Zainuddin Hashim   Ruzita Mohammad
<b>Protocol &amp; Invitation</b>	Talib Abdullah Shani (H)   Razeki Rashid   Norapidawati Mohd. Yunus   Roslinda Sanan   Allen Kayner Ongut Majambun
<b>Media &amp; Publicity</b>	Che Hasruddin Che Hasan (H)   Salbinous Saribun   Jumawati Catacutan
<b>Security</b>	Lt. Kol. Abdul Talib Ariffin (H)   Gorden Lazarus
<b>Floor Manager (FM)</b>	Sharifah Ismail (H)   Ag. Ismawadi Hj. Ag. Jaman
<b>Competition Technical &amp; Judges</b>	Dr. Aza Sherin Mohamad Yusuff (H)   Rozaidah Amir Hussein   Audrey Rose Andrew   Sylvia A. Emelius   Norni Lagung
<b>Speech Text</b>	Associate Prof. Dr. Homathevi Rahman
<b>Master of Ceremonies (Emcee)</b>	Zul Karnain Abu Bakar   Audrey Rose Andrew
<b>Prayer Recite</b>	Ag. Ismawadi Hj. Ag. Jaman

## ENTRIES STATISTIC BY CLASSIFICATION AND CATEGORY

CODE	CLASSIFICATION	CATEGORY		TOTAL
		RESEARCH	INNOVATION	
A	EDUCATIONS AND EDUCATIONAL AIDS	7	17	24
B	BIOSCIENCES AND BIOTECHNOLOGY	15	3	18
C	AGRICULTURE, FORESTRY AND FOOD	22	15	37
D	ENVIRONMENT, ENERGY AND ECOCAMPUS	11	5	16
E	HUMANITIES, ARTS AND PSYCHOLOGY	29	-	29
F	COMPUTING AND MATHEMATICS	8	4	12
G	HEALTH AND MEDICAL SCIENCES	7	4	11
H	BUSINESS AND ECONOMICS	9	-	9
I	ENGINEERING AND PHYSICAL SCIENCE	10	2	12
<b>TOTAL</b>		<b>118</b>	<b>50</b>	<b>168</b>

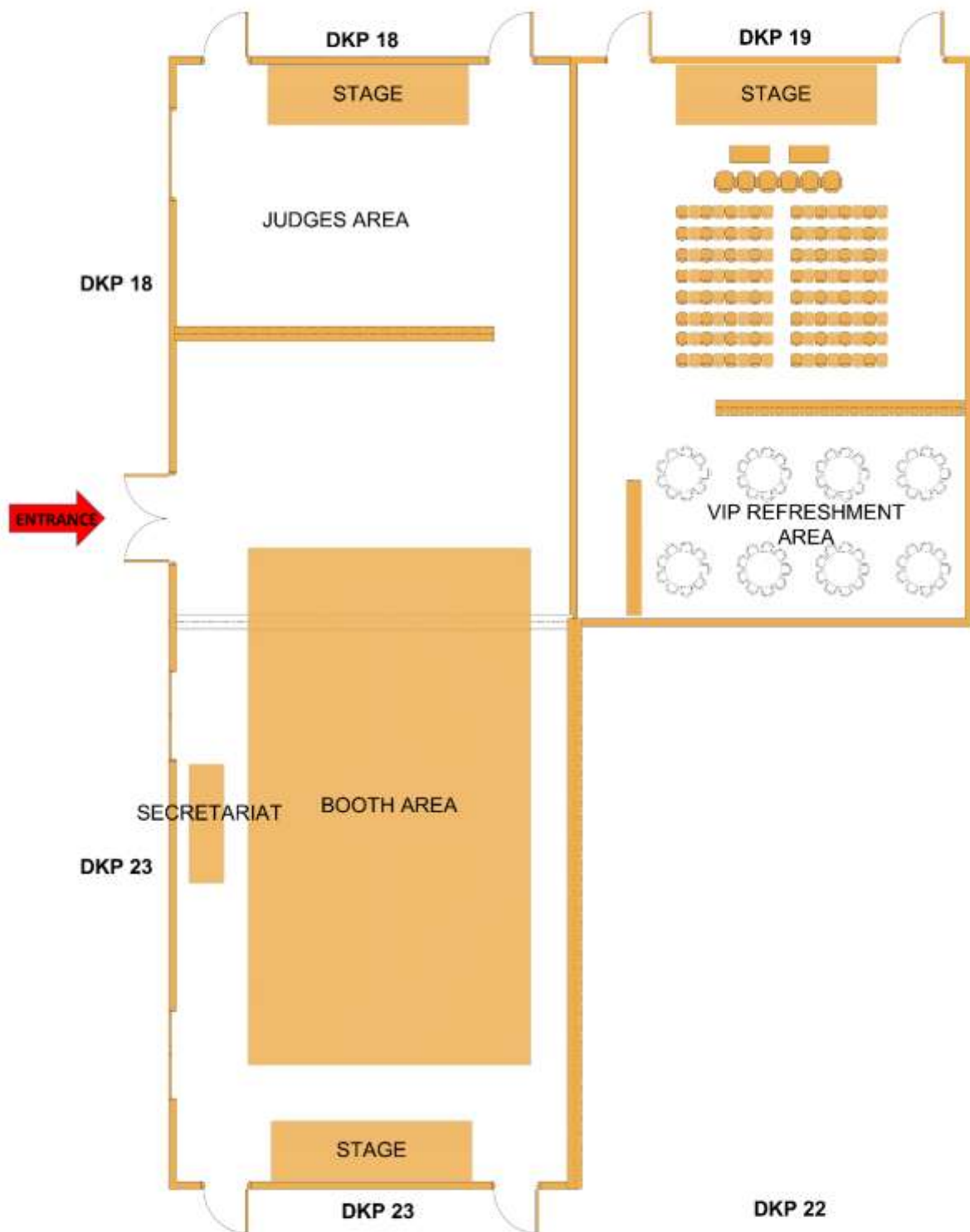
## ENTRIES STATISTIC BY FACULTY/CENTRE/INSTITUTE AND CATEGORY

FACULTY/CENTRE/ INSTITUTE	CATEGORY		TOTAL
	RESEARCH	INNOVATION	
LABUAN FACULTY OF INTERNATIONAL FINANCE	2	-	2
FACULTY OF COMPUTING AND INFORMATICS	7	13	20
FACULTY OF ENGINEERING	10	3	13
FACULTY OF HUMANITIES, ARTS AND HERITAGE	27	-	27
FACULTY OF BUSINESS, ECONOMICS AND ACCOUNTANCY	7	-	7
FACULTY OF SUSTAINABLE AGRICULTURE	3	-	3
FACULTY OF PSYCHOLOGY AND EDUCATION	5	3	8
FACULTY OF MEDICINE AND HEALTH SCIENCES	6	9	15
FACULTY OF FOOD SCIENCE AND NUTRITION	5	8	13
FACULTY OF SCIENCE AND NATURAL RESOURCES	10	3	13
INSTITUTE FOR TROPICAL BIOLOGY AND CONSERVATION	1	1	2
BIOTECHNOLOGY RESEARCH INSTITUTE	14	8	22
BORNEO MARINE RESEARCH INSTITUTE	15	2	17
CENTRE FOR THE PROMOTION OF KNOWLEDGE AND LANGUAGE LEARNING	5	-	5
PREPARATORY CENTRE FOR SCIENCE & TECHNOLOGY	1	-	1
<b>TOTAL</b>	<b>118</b>	<b>50</b>	<b>168</b>

## CLASSIFICATION AND CODE

CODE	CLASSIFICATION	BOOTH NO.		TOTAL BOOTH	LABEL COLOR
		RESEARCH	INNOVATION		
A	Educations and Educational Aids	RA-01 > RA-07	IA-01 > IA-17	24	
B	Biosciences and Biotechnology	RB-01 > RB-15	IB-01 > IB-03	18	
C	Agriculture, Forestry and Food	RC-01 > RC-22	IC-01 > IC-15	37	
D	Environment, Energy and Ecocampus	RD-01 RD-03 > RD-12	ID-01 > ID-05	16	
E	Humanities, Arts and Psychology	RE-01 > RE-29	-	29	
F	Computing and Mathematics	RF-01 > RF-08	IF-01 > IF-04	12	
G	Health and Medical Sciences	RG-01 > RG-07	IG-01 > IG-04	11	
H	Business and Economics	RH-01 > RH-09	-	9	
I	Engineering and Physical Science	RI-02 > RI-11	II-01 > II-02	12	
<b>TOTAL</b>				<b>168</b>	

# LAYOUT PLAN



# A : EDUCATIONS AND EDUCATIONAL AIDS



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		RA-01	
<b>PEREKA CODE</b>		P0003/2018	
<b>FPI</b>		PPIB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		THE USE OF GAMIFICATION IN IMPROVING UNDERGRADUATE STUDENTS' ENGLISH GRAMMAR ACHIEVEMENT	
<b>PROJECT LEADER</b>		CIK KWAN YIEN YEE	
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. TAN CHOON KEONG	

**Abstract :** Grammar learning is often perceived as boring and lack of learners' motivation. Traditional way of grammar teaching and learning has failed to motivate learners to actively engage in grammar lessons (Matas & Natolo, 2010). It is crucial to implement an effective pedagogical approach, such as Kahoot! to teach grammar so as to aid learners acquire the grammar skills (Matas & Natolo, 2010). Kahoot! is a game-based learning (Gamification) tool that can be used easily to a higher education classroom with limited instructors or student training required (Plump & LaRosa, 2017).

This study was conducted to investigate the effectiveness and students' acceptance of Kahoot! in helping them to improve English grammar achievement.

A quasi-experimental study was carried out with two groups of students, namely treatment group and control group. A total of 150 students were randomly selected for this study, with 75 students in each group. Treatment group received teaching and learning sessions with Kahoot!, whereas the control group was taught using conventional teaching and learning method. Achievement tests, questionnaire and interview are the instruments being used in this study. The data were analysed using descriptive and inferential statistical analyses.

The findings reviewed that there is a significant difference with regards to students' grammar achievement at the significance level of 0.05. The treatment group obtained higher mean score compared to control group. Furthermore, the findings also showed that students highly accepted the use of Kahoot! in grammar learning. In conclusion, this study has proven that Kahoot! is effective in improving undergraduate students' English grammar achievement.

The findings from this study showed that the use of Kahoot! is effective in improving students' English grammar achievement. Teacher or lecturers could benefit from this study and able to use game-based learning (gamification) in classrooms in order to teach English grammar or for other courses as well. The results of this study helped teachers to diversify their teaching methods by using Kahoot!. Teaching skills can be improved by producing more effective lessons and a fun learning environment can be created for the students. This will increase the students' interest and not feeling bored in learning English grammar.

**Keywords :** Kahoot!, effectiveness, students' acceptance, achievement



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		RA-02	
<b>PEREKA CODE</b>		P0008/2018	
<b>FPI</b>		PPIB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Enhancing Digital Literacy with Digital Storytelling: English Language Learners' Perceptions	
<b>PROJECT LEADER</b>		PUAN NATALIE ANN GREGORY	
<b>PROJECT MEMBER</b>		PUAN BERNADETTE TOBI,DR. JEANNET STEPHEN,CIK PATRICIA ANTOINETTE P. LAJUMIN	

**Abstract** : The integration of technology in the educational sector has resulted in the widespread use of technological tools in the language teaching and learning. One such tool is digital storytelling (DST) which combines storytelling with a variety of multimedia tools to enhance language learning. DST is an approach which may help to engage and motivate students to gain digital literacy skills. Digital literacy is necessary for students to communicate and express their ideas effectively using digital medias.

Whilst the use of DST in Western countries has been vast, they are less common in Asian countries. Thus, this university-funded study, undertaken at Universiti Malaysia Sabah, explores the use of DST over a period of 14-weeks (one semester).

Based on volunteer sampling, 14 participants from a Reading & Writing course in the Centre for the Promotion of Knowledge and Language Learning , which is one of the pre-requisite subjects for students scoring Band 1, 2 and lower Band 3 in the MUET examinations participated in this study as they have strong interest in the topic. Both quantitative and qualitative data were collected and mixed methods were used for analysis. The instruments include questionnaire and individual interviews.

The results from both questionnaire and interviews show positive perceptions towards the use of DST specifically in the use of it in their university tasks. This is because it is able to create more exciting learning environment for the learners aside from enhancing their digital literacy skills.

The study also provides valuable recommendation for strengthening the use of DST in English and even other languages classes in the future.

**Keywords** : Digital Literacy; Digital Storytelling; English language learning; Learners’ perceptions



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		RA-03	
<b>PEREKA CODE</b>		P0071/2018	
<b>FPI</b>		FPP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		MODIFIED EQUIPMENT TO ENHANCE SKILL ACQUISITION IN BADMINTON	
<b>PROJECT LEADER</b>		DR. PATHMANATHAN A/L SUPPIAH	
<b>PROJECT MEMBER</b>		Abdul Muiz Nor Azmi, ENCIK HASNOL BIN NOORDIN, Phylcia Phoa Siew Ching, Angelica Joanne Joummy	

**Abstract :** Sports skills are produced as a result of interactions between the individual, task and the environment. All the three are restrained by constraints which governs the efficiency and the accuracy of execution of the skill that is produced. In the case of badminton, the fast pace and even changing environment places unique demands on its participants. With their shorter limbs, children require more strength to generate enough force to execute strokes that would be able to propel the shuttle to achieve the desired objective. More often than not the constraints of the individual result in compensatory actions that reduce the efficiency and enforce improper stroke mechanics.

The study embarks on the following objectives

- to compare the hitting opportunities
  - to compare the success rate of badminton strokes
  - to compare the satisfaction/enjoyment off the participants
- under two different racquet and court conditions.

Participants aged between 7 & 9 years old, without any prior formal badminton experience, were divided into four groups; standard court and standard racquet (SCSR), standard court and scaled racquet (SCMR); scaled court and standard racquet (MCSR), and scaled court and scaled racquet (MCMR). They underwent a five-week program conducted by a certified badminton coach. One way ANOVA was used to analyze the data for hitting opportunities, stroke effectiveness and satisfaction during training between groups.

The results of one way ANOVA for hitting opportunities showed that there was a statistically significant difference between groups,  $F(3,36)=5.178$ ,  $p=0.004$ ,  $\eta^2=0.301$ ; The results for stroke effectiveness showed that there was a significant difference between groups,  $F(3,36)=4.178$ ,  $p=0.012$ ,  $\eta^2=0.258$ . The result of satisfaction for the kids also showed that there was a significant difference between groups,  $F(3,36) =7.953$ ,  $p=0.000$ ,  $\eta^2=0.40$ . Results showed that the mean of group that used the modified court and modified racquet (MCMR) had the highest hitting opportunities and the effectiveness of the strokes compared to other groups.

Scaled equipment and environments reduced the constraints and provide manageable tasks for children; providing the satisfaction of completing tasks. Parents, PE teachers and coaches should realize the positive implications of using scaled equipment and implement this approach with their charges.

**Keywords :** scaled equipment, modified rackets, scaled court, skill acquisition



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		RA-04	
<b>PEREKA CODE</b>		P0084/2018	
<b>FPI</b>		PPIB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Issues with Effective Design of an ESL Teacher Professional Development Programme in Sabah	
<b>PROJECT LEADER</b>		DR. WENDY HIEW	
<b>PROJECT MEMBER</b>			

**Abstract :** This study investigates English as Second Language (ESL) teachers' perceptions and the impact of the Professional Up-skilling of English Language Teachers (ProELT) programme, which was designed and conducted by the British Council Malaysia. This programme was sponsored by the Malaysian Ministry of Education.

A review of previous studies revealed a paucity of research focusing on large-scale, standardised teacher professional development programmes that involved English language teachers from both heterogeneous teaching levels (i.e. primary and secondary schools) and heterogeneous districts (i.e. urban and rural). The limited published studies available have been critical of this mode of professional development for a number of reasons, and the purpose of this study was to investigate these issues in the Malaysian context.

The aim of this research is to investigate the perceptions of the primary and secondary school ESL teachers from the urban and rural districts in Sabah, and the impact of the ProELT on the teacher participants. The specific research objectives are listed as follows:

To investigate the ESL teachers' views on elements that they want in a professional development program.

To investigate the ESL teachers' perceptions of the ProELT as a professional development program.

To investigate the ESL teachers' experiences with the ProELT and to gather their suggestions for the program.

To investigate the compatibility between the standardised ProELT coursebook content and the Malaysian curriculum specifications.

Based on the research objectives, the study attempts to answer the following four central questions:

What are teachers' perceptions of a professional development program that would fulfil their professional development needs?

How is the ProELT perceived as a professional development program?

What experiences and suggestions can be gathered from the ProELT participants?

How does a standardised coursebook fulfil the learning needs of teachers from different teaching levels?

A mixed methods explanatory sequential design was adopted, which utilised a questionnaire survey, interviews and focus group with the teachers and District English Language Officers.

350 survey respondents from seven districts in Sabah namely Keningau, Kota Belud, Kota Kinabalu, Penampang, Sandakan, Tuaran and Tawau and were selected using cluster sampling

10 teachers from 5 districts were selected via voluntary sampling, and two District English Language Officers were selected via purposive sampling. The teachers participated in the focus group interview while the District English Language Officers participated in the individual interview.

Findings from the survey were analysed using descriptive statistics and Mann-Whitney U test.

Meanwhile, the focus groups and interviews were transcribed and analysed using NVivo

The findings reveal three major issues with the programme design:

1. The coursebook materials

A majority of the coursebook materials did not match the primary and secondary school syllabus. The coursebook seemed to serve as a commercial coursebook rather than a customised coursebook that caters to the teaching needs of the teachers. As a result, a majority of the teachers did not utilise the materials in their lessons. This may be considered a large setback on the programme provider's aim and objectives.

2. Selection of participants



The selection of participants was based on an online proficiency test that was sometimes flawed due to technical issues. In addition, the programme provider did not take into consideration the teacher's professional needs and experience. Senior teachers perceived the programme as boring because it taught basic grammar and teaching methodology that the experienced teachers were already proficient and well-versed.

### 3. The amount of follow-up support

The programme trainers did not visit the teachers at their schools to observe their ability to incorporate the programme and coursebook materials in their lessons. The focus group indicated the teachers experienced some difficulties in utilising the materials due to their lack of relevance to the teaching syllabus and also classroom logistics. Had the trainers visited the schools, they would have been able to discuss and offered the teachers with ideas to successfully implement the materials.

The findings from this study:

1. address pertinent measures that programme providers and programme designers should consider prior to offering and designing teacher professional development programmes namely:
  - a. programme providers and programme designers need to ensure that the coursebook is specifically designed based on the teacher's teaching syllabus, in order to ensure the training materials would be applicable and transferable to the teacher's lessons. It would be a setback for the programme providers and programme designers if the teachers fail to utilise the materials.
  - b. programme providers and programme designers need to adopt valid forms of assessment methods to assess teachers' language proficiency and teaching skills separately. In the ProELT, the programme provider only adopted an online language proficiency test to select the participants but did not have a method to assess the teacher's teaching skills. As a result, experienced teachers were required to participate in the ProELT, which they perceived to be a waste of time because they were taught basic teaching methodology.
  - c. programme providers should conduct a needs assessment among the teachers by incorporating Michael Knowles' six Adult Learning principles into the needs assessment. It is hoped that this would ensure that only teachers who actually need to attend the course for professional upskilling would be selected. Otherwise, it would be a waste of the teachers' time and a waste of the programme providers' fund.
  - d. programme providers need to provide follow-up support to the teachers by instructing trainers to visit the teachers at their schools and to conduct classroom observations. This would ensure the trainers are able to see the effectiveness of the materials and the difficulties experienced by the teachers in utilising the training materials. In addition, it would provide an opportunity for the trainers to offer suggestions to the teachers to effectively adopt the materials in their lessons.

**Keywords :** professional development programme, English language teachers, standardised programme



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		RA-05
<b>PEREKA CODE</b>		P0149/2018
<b>FPI</b>		FPP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Pengajaran KBAT melalui Pembelajaran Koperatif
<b>PROJECT LEADER</b>		DR. CHRISTINA ANDIN
<b>PROJECT MEMBER</b>		DR. ABDUL SAID BIN AMBOTANG, AZIEYANA AZIZ

**Abstract :** Menyebatkan kemahiran berfikir aras tinggi (KBAT) dalam pengajaran ditekankan dalam Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013-2025. Namun begitu, sehingga kini masih lagi wujud masalah pengajaran KBAT dalam pengajaran dan pembelajaran di sekolah (Nor Hasmaliza, 2016). Masalah tersebut terdiri daripada kesukaran mengintegrasikan KBAT di dalam bilik darjah disebabkan oleh pengajaran dan pembelajaran yang masih dilaksanakan secara konvensional dan tidak aktif (Ishak, 2009; Harison, 2008; Rajendran, 2001). Untuk mengintegrasikan KBAT, guru-guru seharusnya melaksanakan strategi pembelajaran aktif. Ini kerana pembelajaran aktif akan dapat membantu dalam meningkatkan pemikiran dan tindak balas pelajar. Oleh itu kajian ini akan membina modul pembelajaran aktif menggunakan pendekatan pembelajaran kooperatif sebagai usaha untuk menyokong pengintegrasian pengajaran KBAT di sekolah.

Objektif kajian adalah seperti berikut:

Untuk mengenalpasti perbezaan peningkatan penguasaan KBAT antara kumpulan kawalan (strategi kooperatif) dan kumpulan rawatan (strategi konvensional).

Untuk mengenalpasti tahap persepsi pelajar terhadap keberkesanan strategi pembelajaran kooperatif dan konvensional untuk meningkatkan KBAT pelajar.

Kajian dijalankan menggunakan reka bentuk eksperimen pengagihan rawak. Sampel melibatkan 62 orang pelajar tingkatan lima yang mengambil subjek ekonomi di tiga buah sekolah di daerah Keningau. Di setiap sekolah, pelajar dibahagikan kepada dua kumpulan iaitu kumpulan kawalan dan kumpulan rawatan dan diuji menggunakan kaedah ujian pra-pasca. Kumpulan kawalan diajar menggunakan strategi pembelajaran konvensional manakala kumpulan rawatan menggunakan strategi pembelajaran kooperatif selama sembilan minggu. Instrumen kajian yang telah digunakan dalam kajian ini ialah ujian pra-pasca, borang senarai semak kaedah asas pemikiran, dan borang soal selidik.

Hasil kajian menunjukkan terdapat peningkatan tahap penguasaan KBAT pelajar selepas pelaksanaan strategi pembelajaran kooperatif dilaksanakan baik dari segi peratusan peningkatan skor min mahupun persepsi pelajar. Penggunaan strategi pembelajaran kooperatif membolehkan pelajar berupaya membentuk pendapat dan hujah sendiri, membuat rumusan dan mengemukakan pendapat, menganalisis, mensintesis serta membuat keputusan dengan kerjasama daripada rakan kumpulan sepanjang proses pengajaran dan pembelajaran berlangsung.

Modul pembelajaran kooperatif ini boleh digunakan oleh guru sekolah untuk menerapkan KBAT dalam pengajaran.

**Keywords :** pembelajaran kooperatif, kemahiran berfikir aras tinggi



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		RA-06	
<b>PEREKA CODE</b>		P0186/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		RELATION BETWEEN ATTITUDE & BEHAVIOUR ASSESSMENT AND FINAL GRADING OF YEAR 1 MEDICAL STUDENTS (2017-18 SESSION), FPSK, UMS	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. TIN SABAI AUNG	
<b>PROJECT MEMBER</b>		DR. TIN TIN THEIN, DR. M. TANVEER HOSSAIN PARASH, DR. TUN AUNG, PROFESSOR DR. MOHAMMAD SAFFREE BIN JEFFREE, DR. FAIRRUL BIN MASNAH @ KADIR	

**Abstract :** Learning taxonomies are used to describe different kinds of learning behaviours and characteristics, that the students are intended to achieve. There are three learning domains: Cognitive, Affective and Psychomotor. Bloom's Taxonomy was developed in 1956 and the original categories were Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation and revised as Remember, Understand, Create, Apply, Analyze and Evaluate. Krathwohl's Taxonomy of the Affective Domain includes concepts of Receiving, Responding, Valuing, Organizing and Characterizing.

The aim of this study is to correlate the cognitive and affective elements of the students and to assess the differences between gender on these two elements.

.This study is a descriptive study based on secondary data, of year 1 session 2017-18, of Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah. Study population were 92, and six modules were included. Attitude & Behaviour (A&B) assessment is to assess each and every students of mentor mentee group by peer evaluation (70%) and by mentor (30%). We determined the correlation of final grading and A&B marks of students for six modules by using Chi square test. The differences between male and female on these 2 elements were also compared.

It was found that there was a significant relation between A&B marks and final grades. However, there was no significant differences in respect of A&B marks and final grades between male and female respondents.

Nowadays some of the public universities are implementing an Integrated Grade Point Average (iCGPA) assessment which is an integrated system that assess and report both student academic performance and professional skills which was achieved during their studies at the university<sup>7</sup>. In conclusion, although iCGPA has not yet implemented in Universiti Malaysia Sabah, the affective domain should be introduced and assessed in the medical programme to ensure our end products are competent and caring doctors.

**Keywords :** Attitude & Behaviour Assessment, Final Grading, iCGPA



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		RA-07	
<b>PEREKA CODE</b>		P0196/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Malim and Porter: The Role and Contribution in Archaeological Research	
<b>PROJECT LEADER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE	
<b>PROJECT MEMBER</b>		Nurul Mardhiah binti Ahamd Lotfee,Jaswin Jalinus,Any Farina Manzes,Manuel Daliman,Mohamed Aliff Bin Rosli	

**Abstract :** Berdasarkan beberapa siri kajian survei arkeologi yang dilakukan oleh pengkaji UMS sejak tahun 2003 hingga 2017 melalui pelbagai sumber geran penyelidikan, Malim dan porter merupakan kumpulan atau individu sokongan barisan hadapan kajian lapangan yang amat penting. Kejayaan sesebuah kajian, penemuan semula dan baru tapak arkeologi tidak mungkin dapat dilakukan tanpa pengetahuan lokal dan kepakaran teknikal mereka. Justeru berdasarkan pendokumentasian libat-sama mereka yang telah dilakukan, satu kajian telah dilakukan untuk menghargai peranan dan sumbangan mereka. Hasil kajian ini seiring dengan kajian sebelum ini ke atas malim dan porter ketika zaman kegemilangan eksplorasi penjelajah Eropah dalam abad ke-19 oleh Felix Driver and Lowri Jones dari Royal Holloway, University of London dengan kerjasama the Royal Geographical Society and the Institute of British Geographer pada tahun 2009. Dunia Barat mengambil masa lebih dua abad untuk berani mengangkat peranan dan sumbangan dua golongan ini. Untuk itu para pengkaji arkeologi UMS tidak perlu menunggu tempoh yang terlalu lama untuk melakukan kajian yang sama. Malah malim dan porter yang terlibat dalam setiap kajian arkeologi yang dilakukan dilatih secara tidak langsung dalam melakukan kerja lapangan di tapak seperti keperluan logistik, aspek teknikal dan penjelasan ilmiah. Hasilnya, kajian pada masa akan datang di kawasan yang sama akan lebih mudah dengan bantuan malim dan porter yang berpengalaman dan memahami kehendak kajian. Malah mereka akan menggunakan pengetahuan yang dipelajari apabila menjadi pemandu pelancong kepada para pelancong yang mengunjungi tapak warisan budaya di kawasan mereka.

Objektif kajian ini adalah menjelaskan bentuk penglibatan malim dan porter dalam beberapa siri kajian survei arkeologi yang pernah dilakukan oleh pengkaji UMS antara tahun 2003 hingga 2017. dan, mengangkat serta menghargai sumbangan yang telah dilakukan oleh para malim dan porter dalam beberapa siri kajian survei arkeologi yang pernah dilakukan oleh pengkaji UMS antara tahun 2003 hingga 2017.

Kaedah kajian yang digunakan ialah libat-sama dan temubual berdasarkan kajian lapangan arkeologi survei.

Empat dapatan kajian ialah:-

Malim tempatan mempunyai pengetahuan terhadap kewujudan tapak arkeologi sedia ada atau yang pernah diketahui untuk diketemukan semula.

Porter bukan sahaja berperanan sebagai pengangkat barangan tetapi juga dalam penyediaan logistik dan teknikal di tapak kajian.

Malim dan porter dalam kalangan generasi muda dan berpendidikan peringkat menengah merupakan golongan yang lebih mudah dilatih dalam aspek teknikal berkaitan kajian di tapak.

Malim dan porter yang pernah terlibat dalam kajian survei arkeologi sebelumnya dapat meningkatkan kepada penemuan baru dan kelancaran kerja di tapak.

Tiga potensi kajian ialah:-

Memberi latihan teknikal kepada para malim dan porter berkaitan dengan kajian arkeologi.

Meningkatkan kesedaran pengetahuan dan usaha perlindungan dan pemeliharaan tapak warisan dan bersejarah di kawasan mereka.

Sebagai penghargaan dalam konteks ilmiah kepada para malim dan porter yang pernah terlibat dalam beberapa siri kajian survei arkeologi yang pernah dilakukan oleh pengkaji UMS antara tahun 2003 hingga 2017.

**Keywords :** Archaeology, Malim, Porter, Long Pasia, Marudu Bay



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		IA-01	
<b>PEREKA CODE</b>		P0022/2018	
<b>FPI</b>		FPP	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		GEOCAR	
<b>PROJECT LEADER</b>		DR. SOON SINGH A/L BIKAR SINGH	
<b>PROJECT MEMBER</b>		MOHD FARIHUDDIN BIN SUARDI, DR. SOON SINGH A/L BIKAR SINGH, BAZRUL BIN BABA, PROFESSOR MADYA DR. BALAN A/L RATHAKRISHNAN	

**Abstract :** Recent studies indicate that the achievement of Geographic subjects has declined. The main factor appears to be the teaching methods of teachers who are still using conventional methods. This causes students to be less interested and motivated to learn and consider geography as a boring subject. Therefore, the ‘GeoCar’ game model was developed by combining Geography, technology and game elements as one of the new teaching and learning aids to attract and motivate high school students to learn Geography. This innovative game comprising a remote control car, game circuit and a set of question cards can be used to enhance understanding of the concepts, contents of Geography and encourage students to apply High Order Thinking Skills (KBAT) in learning activities. This innovation game also can be used to sharpen soft skills such as communication, problem solving skills, teamwork, and leadership in students. This multi-functional game innovation improves the 21st century learning skills amongst students. The low cost based innovation game can be used as learning materials in co-curricular activities and can be used to increase STEAM interest among students. This game innovation also enhances eye coordination and student focus during teaching and learning activities

GeoCar has commercial potential as follows: -

Can be sold in the market as a teaching aid to teaching Geography in the classroom.

This game can also be sold in the market for use to conduct co-curricular activities at school.

The cost of building this game is low compared to other games on the market.

Can be commercially to parents as GeoCar’s potential to stimulate students creativity

This game can also be used as a gaming material to fill spare time and increase STEAM interest among the students.

This game model is specially designed to be easily moved, easy to carry and can be played anywhere.

**Keywords :** GeoCar, Geography. HOTS, Achievement, Motivation, Interest



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-02	
<b>PEREKA CODE</b>		P0023/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		PORTABLE BIOINFORMATICS GADGET BOX	
<b>PROJECT LEADER</b>		PROFESSOR DR. ZAINAL ARIFIN BIN MUSTAPHA	
<b>PROJECT MEMBER</b>		Jaeyres Bin Jani	

**Abstract :** The BioBox is potable garget with weight is 200 gram, It is to bring to class and anyway. Complete with wifi will easy access of network and connect to Internet. BioBox setup nomachine and can access through network IP address. The BioBoX low energy requirement and can plug-in with power bank as a source of power. Generally most of computer in Malaysia was setup with Microsoft Window such as Window 7, 8 and 10. Student, lecture and researcher will use Cgywin as in terminal interface in Window OS whether it is cheaper but they have a lot of limitation teaching and develop. Student, lecture and researcher required to setup or install Linux in dual mode of OS system, in same time bioinformatics. With this BioBox it provides solution.

The BioBox can commercial for beginner and advance researcher as propose as learning aid and also as a tool for researcher for bioinformatic analysis. BioBox is minicomputer which it is portable and can bring anyway and did the work bioinformatics. Buying a unit of computer for bioinformatic teaching for undergrate and posgraduate student will highly significant to the budget of univerty/Insitusi. BioBox is cheaper and can buy by student for learning propose, training, complete the assignment assessment at their home. Not enough unit of computer during teaching and practical bioinformatics subject at class will cause of effective of teaching and learning. By have these units it may help reduce of unit computer. Difficult to create image and install tools such as (virtualBox,USB ) during bioinformatic Traning/partical, by use BioBox it direct get the image and tools. For student difficult to install Linux operating system, bioinformatics tools, sharing computer during teaching/training and cannot doing homework/assignment bioinformatics at home will cause student cannot move on to have interesting and practice in bioinformatics technique. To have this BioBox it really help student to start their ability to learned this subject.

**Keywords :** Bioinformatic, BioBox, ubuntu,



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>	IA-03
<b>PEREKA CODE</b>	P0030/2018
<b>FPI</b>	FKI
<b>CATEGORY</b>	INNOVATION <b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>	An Interactive Augmented Reality Smart e-Learning System on Technical Vocational Education and Training (TVET) in Malaysia
<b>PROJECT LEADER</b>	PROFESSOR MADYA DR. NG GIAP WENG
<b>PROJECT MEMBER</b>	ANGELINE LEE LING SING, Kumari Annie, PROFESSOR MADYA DR. AG. ASRI BIN AG. IBRAHIM

**Abstract :** Skills Profession Career Focus Industry Guide is to engage Government, private, school and parents to collaborate and empowers students to identify the right skill set and develop the competencies to meet the local workforce and global markets. The objective of this project is to design and develop an interactive smart e-learning system on Technical Vocational Education and Training (TVET) in Malaysia using Augmented Reality (AR). This system provides a comprehensive e-learning system to various skills pathway and occupations in the respective sectors to deepen students' understanding of self and relate schooling to the different education and career pathways. This research modelled previously unarticulated perception experience and skill learning in AR TVET environment and to understand how this system promote learning, and what the learners can learn, given only instruction. 60 participants, who were illiterate in computer subjects, were selected. This experiment was guided by Cognitive Task Analysis and User Modelling Techniques. The participants were moved from understanding their current learning perceptions and practices to planning future learning possibilities, especially with computer aided instructions. The results shown AR technology is effective tool for promoting TVET skill learning and training and the paradigm of AR TVET, in terms of HCI methodology (users' participation). This research might effect a long-term change in the learning practice by allowing learners' the opportunity to become self-aware of their implicit beliefs, and direct examining of their learning processes. The results also suggest that a successful learning process was a joint product of learners' cognition and learning environment.

Department of Skills Development, Ministry of Human Resource Malaysia  
Information Broadcasting Network (M) SdnBhd  
Planetarium Sultan Iskandar Sarawak  
Sarawak Tourism Board (STB)

**Keywords :** Technical Vocational Education and Training, Augmented Reality, e-learning



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-04	
<b>PEREKA CODE</b>		P0042/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		COMMUNITY LEARNING APPLICATION FOR CHILDREN USING GAMIFICATION	
<b>PROJECT LEADER</b>		DR. ASLINA BINTI BAHARUM	
<b>PROJECT MEMBER</b>		NORSHIKIN BINTI ZAINAL ABIDIN	

**Abstract :** In this modern age, more children become the frequent user of smartphone. This research presents an approach to engage the students with the learning mobile application. Interest in education and learning process are increasing due to the emerging of the digital technologies. In learning process especially in e-learning particularly for children, the teachers encounter with problem on how to promote and engage with them. But, due to the new technology that applies the new method into the e-learning process they able to overcome the problem. The objectives of the study are to identify the features and guidelines for designing engaging for community learning with children using qualitative method then to develop a community learning application with children using gamification, and finally to evaluate the children engagement with the developed community learning application. Out of many educational apps, one locally developed app was use in the preliminary study to identify the element of gamification on 15 participants, and seven elements were identified. Based on the element identified from the preliminary study a new mobile learning application has been developed and used in the evaluation study that involved 10 participants. In the evaluation process, the participants interact with the new application and complete the questionnaire and observe by the researcher. The data collected then analyzed, and revealed that the hypothesis proposed for this research is positive where the element of gamification can engage the children to learn.

Community learning application for Kadazan Dusun language

**Keywords :** community, teaching and learning, children, gamification



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<b>BOOTH NO.</b>		IA-05			
<b>PEREKA CODE</b>		P0052/2018			
<b>FPI</b>		PPI			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Kit Pendidikan IoT untuk pembelajaran STKM			
<b>PROJECT LEADER</b>		DR. AZALI BIN SAUDI			
<b>PROJECT MEMBER</b>		CIK ASNI TAHIR,PUAN SITI HASNAH BINTI TANALOL			

**Abstract :** Kit Pendidikan IoT ini membantu dalam pembelajaran STKM. Kit ini dilengkapi dengan beberapa fungsi, sensor dan peralatan elektronik supaya ia sesuai untuk digunakan oleh pelajar bagi mempelajari bidang STKM. Perisian telah dibangunkan bagi memudahkan pembelajaran STKM melalui penggunaan kit ini. Ia turut dilengkapi dengan modul pembelajaran yang sesuai dengan tahap pembelajaran pelajar. Perkakasan kit adalah berasaskan Arduino supaya ia mudah diselenggara dan kos yang minima. Perisian pula adalah berasaskan "Open Source" bagi memudahkan sokongan dan rujukan. Modul pembelajaran pula disediakan dalam Bahasa Melayu supaya ia dapat dimanfaatkan sepenuhnya oleh semua golongan pelajar. Fokus utama adalah pasaran tempatan terutamanya pelajar luar bandar. Kit in mendapat maklumbalas yang sangat baik daripada para pelajar dan guru.

Kit Pendidikan IoT amat berpotensi untuk keperluan pasaran tempatan terutamanya pusat pembelajaran di luar bandar. Kit yang diimport daripada luar negara adalah sangat mahal dan kurang sesuai untuk keperluan pasaran tempatan.

**Keywords :** Kit Pendidikan, IoT, pembelajaran STKM, Robotik, Arduino



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		IA-06	
<b>PEREKA CODE</b>		P0061/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		BANANA PEEL S3 TRAINER	
<b>PROJECT LEADER</b>		PROFESSOR DR. KHIN MAUNG OHN @ ARIF	
<b>PROJECT MEMBER</b>		PROFESSOR DR. ZAINAL ARIFIN BIN MUSTAPHA, PROFESSOR DR. ZAINAL ARIFIN BIN MUSTAPHA, PROFESSOR DR. KHIN MAUNG OHN @ ARIF, DR. MAY HONEY OHN, PROFESSOR DR. URBAN JOHN ARNOLD D' SOUZA (DR.)	

**Abstract :** Banana is the second major produced fruit, contributing around 16% of world's fruit generation. It is a standout amongst the most generally established tropical fruits, developed more than 130 nations, along the tropics and subtropics of Capricorn. The greater part of the consumable bananas are grown from *Musa acuminata* or *Musa balbisiana*), Pacific tropical bananas (*Musa sapientum*) as well as cooking bananas, also called plantains (*Musa paradisiacal*). Banana isn't just exceptionally nutritious nourishment yet in addition valuable as fragrance, beauty care products and antioxidants for cancer prevention. The paper will feature the convenience of Banana peel as a rule and discuss about the use of banana peel for surgical training. Banana peel is using for practicing suturing skills to supplant the costly silicon surgical skin pad. The texture of banana peel is like human skin and more sensible practice. Students were permitted to practice different types of suturing method such as simple interrupted suture, vertical and horizontal mattress suture by using the different species of banana. Banana peel is cheap, bio-friendly and given more reasonable practice among medical students. The ripped banana is suitable to practice for the simple interrupted suturing skills and green banana is good for the mattress suture. Limitation is both cannot practice for the sub-cuticular suture. We would like to advice to use green banana in the beginning followed by ripped banana. Students can practice not only suturing skills but also practice incision skills and tissue handling skills using the banana. Banana peel is cheap, bio-friendly and given more reasonable practice among medical students.

**Keywords :** Banana, Peel, Surgical, Suturing, Training.



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-07	
<b>PEREKA CODE</b>		P0062/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		ACUTE ABDOMEN SIMULATOR	
<b>PROJECT LEADER</b>		DR. MAY HONEY OHN	
<b>PROJECT MEMBER</b>		DR. MAY HONEY OHN, PROFESSOR DR. KHIN MAUNG OHN @ ARIF	

**Abstract :** An anatomically meticulous abdominal half body mannequin used to examine the acute abdomen or acute surgical emergencies such as appendicitis and perforation which cannot be practised with the real patient because of ethical issues or of patient safety. The team develop a teaching mannequin it can be used for clinical diagnosis practice and clinical examination practice. Allow the students for palpation, auscultation and percussion gastrointestinal (GI) examination. It can create a variety of clinical scenes like appendicitis and perforation and ask the students to examine and look for the positive finding. The mannequin is the perfect model for objective structured clinical examination (OSCE) and clinical skills evaluation. It is a useful teaching aid for medical students in the clinical years.

It has the potential for comercialization. A useful tool for clinical examination skills training.

**Keywords :** acute abdomen, appendicitis, perforation



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		IA-08	
<b>PEREKA CODE</b>		P0078/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Towards Eco Campus, Paperless Examination Technique, Online MCQ exam	
<b>PROJECT LEADER</b>		DR. NANG KHIN MYA	
<b>PROJECT MEMBER</b>			

**Abstract :** Medical educators require development of test items in large quantities to facilitate the continual assessment of student knowledge. Traditional item development processes are time-consuming and resource intensive.

Multiple Choice Questions (MCQs) are generally recognized as the most widely applicable and useful type of objective test items, this project would achieve a high quality of professionalism and competency based education and achieve the university aims "Eco Campus".

It would also serve as important reference and guide. It is valuable useful in teaching in medical programme, nursing programme, police academy and scientist in medical field. It is also will be used in OSCE examination in professional II examination of medical programme.

It would also serve as important reference and guide. It is valuable useful in teaching in medical programme, nursing programme, police academy and scientist in medical field. It is also will be used in OSCE examination in professional II examination of medical programme.

**Keywords :** Traditional method exam, paperless exam online MCQs, Educational system, evidence-based teaching.



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		IA-09			
<b>PEREKA CODE</b>		P0081/2018			
<b>FPI</b>		FPSK			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		A gamification based GamPath application to augment engaging learning experiences			
<b>PROJECT LEADER</b>		DR. MIE MIE SEIN			
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. TIN TIN AYE, DR. CHIN KAI LING			

**Abstract :** Pathology is an essential topic of study for diagnosing diseases and need to memorize a lot of information. There is a need to develop a new learning platform that is gamification based GamPath applications to deliver and evaluate the skills and knowledge among the undergraduate medical students. Gamification is technology enhanced innovative learning to get immersive and challenging tools. GamPath is a gamifying application which includes setting up levels, challenges, awards, leaderboards as well as some tangible reward for performing well. It works superb in a competitive assessment an efficient tool for increasing learner's engagement. It would fit in with the wider adoption of mobile learning and increase in the Bring Your Own Device (BYOD) policy providing the flexibility to learners to use their smartphones for learning. This can be commercialized for any android and ios smart phone users.

**Keywords :** GamPath, gamification, pathology, BYOD



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-10
<b>PEREKA CODE</b>		P0091/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		RealColor Apps: Helping Color Vision Deficiency (CVD) Students Keeping Up
<b>PROJECT LEADER</b>		PUAN SITI HASNAH BINTI TANALOL
<b>PROJECT MEMBER</b>		PUAN SITI HASNAH BINTI TANALOL,DR. AZALI BIN SAUDI,DR. ASLINA BINTI BAHARUM,CIK ASNI TAHIR,DK Salfarina

**Abstract :** Nowadays, the number of patient suffering from colour blindness has increase as stated by National Eye Institute (NEI) . Colour blindness is also known as colour vision deficiency. Inability to recognise colour causing problems and inconvenience to the patient in undergoing daily life especially conducting certain colour-oriented activities. Colour blindness people had the potential to do some serious damage to theirs self-confidence and can be prohibited from certain professions that involve being able to differentiate between colours. The objectives of this project is to develop an android based mobile application for colour blindness.

This application will support eight real-time colour filter which consisting of four simulation filter , three correction filter and one for normal vision. Simulation filter is the filter for user with normal vision see the world through the eyes of people that struggling with colour

blindness, correction filter use for correcting the image with each type of colour blindness. The objective project is also to implement augmented reality in experiencing the vision of colour blindness. Besides, this application is developed to evaluate the usability augmented reality application to the user by distributing questionnaires to people who have experienced colour blindness.

This mobile application can be used to filter the school children in order to determine whether they are suffer from CVD.

Can also be used as a learning tools for children to learn the real color for CVD user and learn how CVD user see their world for normal user.

**Keywords :** color vision deficiency, real-time, simulator, color blind, mobile application



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-11
<b>PEREKA CODE</b>		P0118/2018
<b>FPI</b>		FPP
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Kit Robotik Minimalis : Ke Arah Revolusi Industri 4.0
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. SABARIAH BTE SHARIF
<b>PROJECT MEMBER</b>		IR. DR. MURALINDRAN MARIAPPAN, DR. ROSY BINTI TALIN, DR. PATHMANATHAN A/L SUPPIAH, DR. SOON SINGH A/L BIKAR SINGH, Nur Lisa Zaharin, Anna Felicia, Mohd Shakir Saad

**Abstract :** Penggunaan robotik di sekolah-sekolah adalah meningkat di seluruh dunia. Tujuan penggunaan robotik ini adalah pelbagai terutamanya untuk dijadikan aktiviti ko-kurikulum atau pertandingan antara sekolah. Namun demikian, penggunaan robotik dalam kurikulum adalah masih kurang terutamanya di sekolah-sekolah Malaysia. Inovasi ini dibangunkan untuk menggalakkan penggunaan robotik pendidikan dalam kurikulum terutamanya dalam menyokong usaha STEM negara dan meningkatkan bilangan pelajar dalam aliran sains. Modul pengajaran telah dibangunkan dimana diintegrasikan kemahiran STEM dan minat terhadap STEM dalam mata pelajaran biologi, kimia, sains dan pembelajaran pengaturcaraan itu sendiri. Pembangunan modul pengajaran robotik pendidikan ini berdasarkan model pengajaran ADDIE dan berpandukan kepada pendekatan pedagogi berasaskan gamifikasi. Keberkesanan penggunaan modul robotik minimalis ini telah dilakukan ke atas 474 pelajar matrikulasi. Kajian berbentuk quasi-experimen telah dilaksanakan dalam jangkamasa 8 minggu dan didapati penggunaan robotik minimalis ini dapat meningkatkan prestasi pelajar dari segi pengetahuan, kemahiran dan sikap/nilai. Didapati peningkatan yang signifikan telah diperolehi untuk kumpulan rawatan berbanding dengan kumpulan kawalan dari segi prestasi, motivasi dan komunikasi berkesan. Keunikan inovasi ini adalah ia berbentuk permainan, boleh dilaksanakan secara berkumpulan, boleh mengintegrasikan beberapa kemahiran berfikir dalam menyokong pembelajaran abad ke-21. Dengan pengetahuan pengaturcaraan, &#39;konten&#39; dan kreativiti serta komitmen semua pihak, banyak lagi modul-modul pengajaran berbantuan robotik dapat dihasilkan.

Modul pengajaran robotik minimalis pendidikan ini boleh dijual di sekolah rendah, menengah dan pra-universiti di seluruh Malaysia.

**Keywords :** robotik minimalis pendidikan, STEM, prestasi, kolaborasi, motivasi



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-12
<b>PEREKA CODE</b>		P0127/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		QRAGI – A Mobile and Web-based Attendance System Utilizing QR Code and Geolocation Information
<b>PROJECT LEADER</b>		DR. LEAU YU BENG
<b>PROJECT MEMBER</b>		RODDY BIN JEFFERY MINGGU,PUAN SITI HASNAH BINTI TANALOL

**Abstract :** The main purpose of this project is to develop a mobile and web-based attendance system that will utilize technology such as QR code and Geolocation Information (GPS). The application is intended for the use in a learning institution such as a university. Most universities are still using a paper as an attendance sheet and pass around during the lecture for the student to sign. This traditional method requires high numbers of papers each semester. Student is also need to wait the attendance sheet before concentrating on the lecture given. Through the proposed system, the paper usage will be reduced and the cheating on attendance can be avoided. At the beginning of the class, student can scan the QR code which displayed by their lecture to mark the attendance. Meanwhile, the location of capturing the QR code will also be taken by reading the GPS data of the Android smartphone that student used in the background. A web interface allows lecturer to view the attendance record for each course and generate the attendance analysis. The methodology used for this project is agile methodology. It involves iteration in the development which more suitable for applications testing, iterate it and refining the applications before finally releasing it. Agile methodology includes planning, requirement analysis, design, development, testing and deployment. The significant output of this project is less time is needed for the attendance taking process in the class as well as reduction of paper usage overall for the process. Fraudulent activity in taking attendance by the students can also be avoided as their location is taken into account when scanning the QR code for marking the attendance.

This system has good commercial potentials. With over 100 higher learning institution including public universities, polytechnics, private universities and private university collages in the country, this system can be commercialized by licensing to other higher learning institutions for their student attendance system.

**Keywords :** QR Code, Geolocation Information, Attendance System



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-13
<b>PEREKA CODE</b>		P0137/2018
<b>FPI</b>		FPP
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		UMS ATAC 1.1 (UNIVERSITY MALAYSIA SABAH AGILITY & AEROBIC CONDITIONING): FUNCTIONAL TRAINING FOR SPORTS
<b>PROJECT LEADER</b>		DR. PATHMANATHAN A/L SUPPIAH
<b>PROJECT MEMBER</b>		IR. DR. MURALINDRAN MARIAPPAN, ENCIK HASNOL BIN NOORDIN, Abdul Muiz Nor Azmi, Angelica Joanne Jounmy, Phylcia Phoa Siew Ching, KOLONEL MOHAMAD NIZAM BIN NAZARUDIN

**Abstract :** ATAC 1.1 is a revolutionary system for Agility and Aerobic Conditioning. It is a scalable system capable of simultaneous multiple monitoring via any online system such as web and smart phone with an affordable solution for an effective training. It can be employed at any location where the training need to be done. The ATAC 1.1 system is a robust system which allows activating signals for training and monitoring of basic physical health condition of the trainee for the coach to view in real time and perform analysis. The ATAC 1.1 system is a complete system which consists of the ATAC 1.1 Beacon, Base Station and Central Server. The ATAC 1.1 uses optimized power resources for reliable data acquisition and signal transmission. This beacon can also be coupled with the health monitoring devices.

**ATAC 1.1 Beacon**

The ATAC 1.1 Beacon is a sensor based device with embedded computer for transmitting and receiving signals with power management unit. It is also equipped with smart proximity and ultrasound sensors to triangulate the position of the trainee for agility and aerobic signal activation and analysis. It also has long range wireless communication which provides reliable communication link to the Base Station up to 150m.

**Base Station**

The Base Station has an operating radius of almost 1 kilometer. It acts as a wireless access point to all the ATAC 1.1 Beacon within 1 kilometer. It is equipped with GSM internet access that links all ATAC 1.1 Beacon to the Central Server. The Base Station operates independently with minimal maintenance due to its low power management system and simple circuitry.

**Central Server**

The operation and health of each ATAC 1.1 Beacon is monitored by the Central Server. The Central Server records information such as: battery health, run state (on or off), agility and aerobic data, bio signals and any electrical faults.

As a functional training device that would be able to replicate competition situations.

As a timing device.

**Keywords :** agility training, reactive agility, cardiovascular endurance, aerobic training



## A : EDUCATIONS AND EDUCATIONAL AIDS

<b>BOOTH NO.</b>		IA-14			
<b>PEREKA CODE</b>		P0138/2018			
<b>FPI</b>		FKI			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		KadazanDusun to Bahasa Melayu Text Translation			
<b>PROJECT LEADER</b>		DR. SAMRY@MOHD SHAMRIE SAININ			
<b>PROJECT MEMBER</b>		DR. SAMRY@MOHD SHAMRIE SAININ,CIK ASNI TAHIR,PUAN SURAYA BINTI ALIAS			

**Abstract :** Perhaps, there is no translation of sentences in Google Translate. Behind the successful Google Translate, the application has the power of machine translation where one language can be translated into different languages. To date, there is no similar application is found to related to this idea. In this innovation, a machine translation specifically for KadazanDusun to Bahasa Melayu Text Translation prototype system and vice versa is developed to support the language. This system consists of words database and translation algorithms which accepts Kadazandusun sentences input text from user and translate the input text into Bahasa Melayu or vice versa.

Commercial potential

1. Can be sold to Google Translate
2. Development of translation system for learning in schools
3. Service for translation via website/mobile phone

**Keywords :** kadazandusun, machine translation, bahasa melayu, translation



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-15	
<b>PEREKA CODE</b>		P0159/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		Dynamic teaching model on Indirect Inguinal hernia	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. AUNG MRA	
<b>PROJECT MEMBER</b>		MD ARMAN BIN TANDING, JYRION JITOUR, MOHD FADZLY BIN ISMAIL, MOHD HELMIE BIN JANONG	

**Abstract :** This is a dynamic teaching model for medical students on the pathophysiology of indirect inguinal hernia, the understanding of which will contribute in appreciation of how the hernia needs to be treated. Medical students have difficulty in understanding the events leading up to a full blown indirect inguinal hernia with a hernia sac completely reaching up to the scrotum. The events are as follow.

Development of weak anterior abdominal wall muscles especially in the right lower quadrant.

Increase in intra-abdominal pressure gradually pushes out the parietal peritoneum through the weak point in the deep ring into the spermatic cord creating a false passage between the abdomen and the groin. This model clearly demonstrates the fact that the hernia sac is a continuation of the parietal peritoneum. In order to treat this type of hernia it is therefore necessary to disconnect the connection which is the hernia sac between the peritoneal cavity and the groin.

This model has moderate commercial potential after refining the materials used.

**Keywords :** Dynamic model, Indirect Inguinal hernia, Hernia Sac



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-16	
<b>PEREKA CODE</b>		P0170/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		DISCOVERING AUTISM CHILD POTENTIAL USING AUTISM PARENTING APPLICATION	
<b>PROJECT LEADER</b>		DR. ASLINA BINTI BAHARUM	
<b>PROJECT MEMBER</b>		A.BHANUPRIYA NAIDU A/P ANATHAN	

**Abstract :** Autism has become prevalent disorder among children nowadays. Parents with autism kid having high level of stress than other parents. There is some remarkable skill in autism kid that by discovering the skill can make parents to have a better approach or better parenting toward their kid. Autism children are said to have a visual spatial or good memory power. The problem here is most of the parents cannot discover which skill do their kids have. A study was carried out to produce a prototype of a mobile application (prototype) for autism parents to discover their child's remarkable skills. The application will be focusing on testing the memory and visual-spatial skill in autism children with aids of parents. Prototyping methodology and mixed method were applied throughout the project. Seven respondents use the application on their child, the results were two of their kids are having memory power, another two kids were having both remarkable skill and remaining three of them have visual-spatial as their skill. The application is expected to help parents to discover their kid's remarkable skill.

Suitable for parents with autisms' children and researchers for research purpose.

The SUS (System Usability Scale) scale score shows that the mobile application is easy to use and usable to user. Easy to access and the chat room could help improve the autisms' community.

**Keywords :** AUTISM, CHILDREN, PARENTING, MOBILE APPLICATION



**A : EDUCATIONS AND EDUCATIONAL AIDS**

<b>BOOTH NO.</b>		IA-17	
<b>PEREKA CODE</b>		P0201/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   EDUCATIONS AND EDUCATIONAL AIDS
<b>PROJECT TITLE</b>		An Academic ChatBot via Pattern-Growth technique - AcaBot	
<b>PROJECT LEADER</b>		PUAN SURAYA BINTI ALIAS	
<b>PROJECT MEMBER</b>		DR. SAMRY@MOHD SHAMRIE SAININ	

**Abstract :** In the edge of where information is disseminated without time constraint and boundaries, an automated conversational programme using Natural Language Processing (NLP) and Artificial Intelligence (AI) also known as ChatBot has a promising future to assist in improving student interaction in an Academic Institution. A ChatBot can assist students for example by automatically answering FAQ, notifying updates on course timelines and in an academic advisory.

A ChatBot programme can converse via voice and textual method has seen much advancement since the evolution of ELIZA where it has been adopted for the use of customer service advisor, health advisor, e-commerce shopping assistant, and in a smart home environment.

The existing ChatBot design mostly refers to a set of keywords pattern matching in a knowledgebase where a set of predefined answers are stored. Intelligent Chatbot with the implementation of AI and NLP can converse naturally with users by understanding and learning the set of questions and providing personalized solutions such as the Apple Siri, Google Assistant and Amazon Alexa.

This innovation focuses on automation of student experience via an Academic Chatbot model (AcaBot) to solve the issue of manual labour time needed to compose and replying to redundant academic queries by proposing a twofold approach.

First, the concept of Frequent Text Pattern Mining is proposed in this research to identify textual conversational features for the Academic ChatBot using Pattern-Growth technique.

Next, a new Academic ChatBot model is developed on top of the discovered textual conversational features for pattern matching and pattern ranking related to Academic topics in order to converse the textual answer.

The outcome of the Academic ChatBot model will be able to assist academicians and students in Academic Institution automatically and instantly 24/7 regarding relevant Academic topics.

This Academic ChatBot (AcaBot) model can be customized by faculties/centres/departments in UMS and can be extended to cater university-level requirements.

**Keywords :** chatbot, pattern mining, pattern-growth, Artificial Intelligence, Natural Language Processing

## **B : BIOSCIENCE AND BIOTECHNOLOGY**



## B : BIOSCIENCE AND BIOTECHNOLOGY

<b>BOOTH NO.</b>		RB-01			
<b>PEREKA CODE</b>		P0004/2018			
<b>FPI</b>		IPMB			
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>		BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Sperm viability and quantity of mud crab, <i>Scylla tranquebarica</i> in different cryoprotectants			
<b>PROJECT LEADER</b>		DR. SITI NOR FATIHAH BINTI ZAKARIA			
<b>PROJECT MEMBER</b>		DR. CHEN CHENG ANN			

**Abstract** : The aim of the present study was to determine the optimum concentrations of different cryoprotectants and to determine the sperm quantity with different durations of exposure for *S. tranquebarica*'s sperm. The body weight of *S. tranquebarica* was 280-350 g. In the present study, male *S. tranquebarica* were dissected out and got the sperm to determine its viability and quantity using six types of cryoprotectants (glycerol, glycine, methanol, dimethyl sulfoxide (DMSO), ethylene glycol (EG) and proline). The sperm was exposed with different durations of 5, 15, 30 and 60 min at room temperature (25oC). For the cryoprotectant glycine 10%, there was the highest mean sperm viability with  $84.75\pm 1.01\%$  (exposure at 60 min). Meanwhile, 15% proline was the lowest mean sperm viability with  $15.39\pm 0.39\%$  after exposure for 60 min at room temperature. There were significant differences between the duration of exposure for some types of cryoprotectants ( $p$ -value < 0.05). As a conclusion, 10% glycine was the best cryoprotectant of mud crab, *S. tranquebarica*. As a recommendation, *S. tranquebarica*'s sperm should be preserved in the cold conditions such as -20oC, -80oC and -196oC (liquid nitrogen) to determine the sperm viability and quantity for further breeding programs and biochemical changes.

**Keywords** : *Scylla tranquebarica*, cryoprotectant, sperm, concentration



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-02	
<b>PEREKA CODE</b>		P0035/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Phytochemical constituents, antioxidative and hepatoprotective effects of <i>Lygodium circinnatum</i> against carbon tetrachloride (CCl <sub>4</sub> )-induced hepatic damage and toxicity in rats	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. MOHAMAD IQBAL	
<b>PROJECT MEMBER</b>		Riana Binti Awang Saman, ENCIK RUZAIDI AZLI BIN MOHD MOKHTAR	

**Abstract :** Oxidative damage of biomolecules is implicated in the pathogenesis of various liver injuries. This has led to intensive investigation aimed at reducing the extent of such oxidative injury. According to WHO (2011), there are more than 80% of people around the world are still relying on medicinal plants as cure for diseases. *L. circinnatum* possesses many medicinal values in treating several diseases and for health care maintenance. However, its hepatoprotective mechanism has not been fully investigated so far.

To understand the mechanism of pharmacological action, hepatoprotective and antioxidant properties, it was aimed to evaluate the hepatoprotective effect of *L. circinnatum* against CCl<sub>4</sub>-induced oxidative damage and hepatic dysfunction in rats.

Rats were pretreated with *L. circinnatum* (100 and 400 mg/kg b. wt.) prior to the administration of CCl<sub>4</sub> (1.0 ml/kg b.wt.). Hepatic damage was evaluated by employing serum biochemical parameters (alanine aminotransferase-ALT, aspartate aminotransferase-AST), malondialdehyde (MDA) level, reduced GSH and antioxidant enzymes. In addition, CCl<sub>4</sub> mediated hepatic damage was further evaluated by histopathological examination. The dry sample of leaves of *L. circinnatum* was also tested for the identification of bioactive compounds, quantification of total phenolics, flavonoids content, and its radical scavenging activity. Plant extract was prepared following the method of Mhamed et al. (2003). Total polyphenolic content of plant extract was estimated by the method of Velioglu et al. (1998). Antioxidative activity was determined by using DPPH free radical scavenging assay (Hatano et al., 1988). Total flavonoid content was measured by aluminium chloride colorimetric assay (Yuan et al., 2003). Phytochemical screening was carried out using standard methods describe by Krishnaiah et al. (2009).

Oral (gavage) administration of rats with *L. circinnatum* at a dose of 100 and 400 mg/kg b. wt. showed significant decrease in the level of aspartate transaminase (AST), alanine transaminase (ALT) and lipid peroxidation against animals treated with CCl<sub>4</sub> alone (1.0 ml/kg b.wt.). Reduced glutathione and antioxidant enzymes were also restored to significant normal level. The protection was further evident through decreased histopathological alterations in liver. The presence of bioactive compounds in the aqueous extract of *L. circinnatum* were chemically tested and has resulted in the detection of these compounds; alkaloids, flavonoids, tannins, phenolics compound and glycosides. The content of phenolics was 31.84 + 0.24 mg/ml gallic acid equivalent and flavonoids were 63.5 + 1.67 mg/ml catechin equivalent. The IC<sub>50</sub> value of *L. circinnatum* in DPPH assay was 529.61 µg/ml whereas IC<sub>50</sub> of standard ascorbic acid was 17.72 µg/ml. We concluded that *L. circinnatum* has antioxidant potential and can be used to treat or prevent degenerative diseases where oxidative stress is implicated.

Discovery of herbal plants with phytopharmaceutical properties for the prevention and treatment of liver diseases.

**Keywords :** *L. circinnatum* , liver damage, carbon tetrachloride, oxidative stress, antioxidant activity



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-03
<b>PEREKA CODE</b>		P0036/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Antihyperglycemic and antioxidative effects of <i>Lygodium microphyllum</i> in alloxan induced diabetic rats
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. MOHAMAD IQBAL
<b>PROJECT MEMBER</b>		DR. TEOH PEIK LIN, Dg Syahidah Nadiah binti Abdull Majid

**Abstract :** The increased prevalence of diabetes mellitus (DM) over the years was the main reason for conducting this study. DM is a complex, chronic illness which requires continuous medical care as well as with multifactorial risk-reduction strategies beyond glycaemic control. Approximately 70% of the world's population use traditional medicines derived from medicinal plants. Study on this area is very important to provide scientific proof in order to justify the use of *L. microphyllum* as antidiabetic agents. Since the nature of this plant is easily grows in Malaysia, medicinal value will give access to a medicine that is cheap and easily accessible.

Antihyperglycemic and antioxidative effects of *L. microphyllum* were evaluated by using In Vitro and In Vivo methods in normal and alloxan induced diabetic rats.

Diabetes was induced in Sprague Dawley rats by injecting alloxan through intravenous (i.v) at a dose of 100 mg/kg of body weight. Aqueous extract of *L. microphyllum* at different doses (400, 200, and 100 mg/kg of body weight) were administered orally (orogastric intubation) for 14 days. The standard procedure modified from Mohandas et al. (1984) was adopted for the preparation of tissue fractionations for all biochemical estimations. Reduced GSH was estimated by the method of Jollow et al. (1974). Lipid peroxidation in post-mitochondrial supernatant was measured following the method of Buege & Aust (1978) by measuring the rate of production of TBARS (expressed as malondialdehyde equivalents). Catalase activity was determined by the method of Claiborne (1985). Blood glucose level was determined using glucometer. Protein content in all samples was determined by the method of Lowry et al. (1951) using bovine serum albumin as a standard. Histopathological slides was prepared by embedding the tissues in paraffin wax, sectioned at 4- $\mu$ m and mounted on glass slides for haematoxylin and eosin staining (H&E). The sections were evaluated for the pathological symptoms of pancreas toxicity such as necrosis, fatty infiltration, fibrosis, lymphocyte infiltration etc.

At the 14 days interval, fasting blood glucose were measured and showed reduction in serum glucose levels in animals pretreated with *L. microphyllum* compared with alloxan alone treated group. Oxidative stress was noticed in rats pancreatic tissue as evidenced by a significant decrease in glutathione level, glutathione reductase, glutathione-S-transferase, and catalase activities. Malondialdehyde showed a significant increase compared to the normal saline treated control group. Serum biochemistry and oxidative stress markers were consistent with the pancreatic histopathological studies. The phytochemical screening of the plant showed the presence of flavonoids, alkaloids, tannins, and steroids. Total phenolic content of leaves was found to be 966.7  $\pm$  0.03 mg/g (expressed as milligram gallic acid equivalent per gram of plant extract). Total flavonoid content of leaves was found to be 42.9  $\pm$  0.01 mg/g (expressed as milligram catechin equivalent/g). As a conclusion, optimistically this study will contribute towards validation of the traditional use of *L. microphyllum* in the treatment of diabetes. This study may be helpful in prevention of diabetes complication associated with oxidative stress.

It is very important to close the knowledge gap in therapeutic use of *L. microphyllum*. This research will contribute to the scientific knowledge of the use of the plants as an antidiabetic agent and also become potentially alternative medication in the treatment of diabetes.

**Keywords :** *L. microphyllum*, antihyperglycemic, antioxidative, alloxan, diabetes mellitus



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-04
<b>PEREKA CODE</b>		P0048/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Programmed cell death driven by down-regulation of phospholipids in cancer cells: A potential anticancer compound from Bornean Jaspis sp.
<b>PROJECT LEADER</b>		DR. LING YEE SOON
<b>PROJECT MEMBER</b>		Lim Leong Rui, Yoong Soon Yong, Dexter Lee Jiunn Heng, DR. LING YEE SOON, Perng Yang Puah, Oriana Tamin

**Abstract :** The studies of cytotoxicity of natural products were commonly carried out using cell survival assay and their respective IC50 will be determined. Then, most of these studies just ended without further investigation on the mechanisms involved when the growth of cell line is inhibited. Determination of cell inhibition mechanistic elucidation using high-throughput metabolomics study, where the metabolites change of the treated cell line could be mapped. This step is essential and could provide an overview of the inhibition mechanism of the natural products, thus useful for pharmaceutical industries. In this study, we have evaluated the cytotoxicity of Bornean Jaspis sp. and induced programmed cell death of various cancer cell lines. Among the treated cell lines, the isolated compound from Jaspis sp. was showing specificity in treating cell line HCT116 (colorectal cancer). Therefore, detail metabolic study was performed using high-throughput metabolomics and the pathway was mapped.

- Discover potential Anti colorectal cancer compound from marine organisms
- Evaluate the efficiency of the discovered compound
- Elucidate colorectal cancer inhibiting mechanisms

Bornean Jaspis sp. was collected and prepared for compounds extraction using ethyl acetate. Half maximal lethal concentration (LC50) was determined using cell viability assay on Hep 3B at 24, 48 and 72 h time points. Following, Hoechst 33342 staining was conducted to determine the cell death mechanism post treatment. Concurrently, cell metabolomics was carried out to elucidate cell death triggering mechanisms. Concisely, snap frozen cell underwent modified Folch extraction to separate polar and non-polar metabolome. Following, extracted samples were introduced to pentafluorophenyl column, for chromatographic separations. Metabolomes were profiled at m/z range 50 - 1500 using heated electrospray ionization at both positive and negative polarities. Acquired data were pre-processed using MZmine 2 followed by chemometric analysis. Each statistical significant metabolome were further determined using product ion scan.

MS-based metabolomics revealed the response of HCT116 against Saspis sp. extract. The extract was found to exhibit cytotoxic effect onto HCT116 cells in dose and time dependent manner. Cyto-staining revealed the extract triggered programmed cell death in treated group. Through high-throughput, unbiased profiling, changes of multiple metabolites could be determined simultaneously. Such method has advantages over conventional methods as they can facilitate the understanding of molecular events thoroughly. Current study demonstrates that Bornean Jaspis sp extracts may serve as alternative to inhibit cancer cell proliferation.

Discovery of new anti cancer compound.

Through high-throughput, unbiased profiling, researcher could screen changes of multiple metabolites simultaneously. Such method has advantages over conventional methods as they can facilitate the understanding of molecular events thoroughly.

**Keywords :** UHPLC-HRMS, Metabolomics, Marine, Anticancer drug



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-05
<b>PEREKA CODE</b>		P0072/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Inferring the Relatedness of Multi-Ethnic Population of Sabah to Neighboring Populations by Genetic Analyses
<b>PROJECT LEADER</b>		DR. YEW CHEE WEI
<b>PROJECT MEMBER</b>		DR. YEW CHEE WEI, Nur Asfariena Tupah, PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE, PROFESSOR DR. JACQUELINE PUGH-KITINGAN, PROFESSOR MADYA DR. VIJAY KUMAR A/L SUBBIAH

**Abstract :** Since Borneo Island is strategically located in the middle region of Southeast Asia, it has been proposed to be the central transition point for ancient human migration events for Austronesians, Negritos and Austro-asiatic groups of people. Sabah is located at the northern region of Boreno Island and therefore could have served as a viaduct for the movement of Austronesians and Negritos around Islands Southeast Asia. The plural society of Sabah is made up of more than 40 ethnic groups. Common mixed marriage and recent immigration of people from neighboring regions have further diversified the genetic entity of the people of Sabah. However, previous studies considered only locality rather than ethnicity in postulating hypotheses of human migration history in this region.

Therefore, this project aims to infer the relatedness of the indigenous ethnic groups in Sabah to neighboring populations by genetic analyses.

This project was initiated in 2011. Up to now, a total of 572 volunteers have been recruited. Majority of them are Dusun, Rungus, Sonsogon, Murut-Paluan, Orang Sungai, Bajau, Bugis and others. Genomic DNA was isolated and then subjected to various genetic analyses by either determining the haplogroups of the mitochondrial hypervariable region, genotyping with forensic-used short tandem repeats (STR) markers, microarray-based genotyping with high density single nucleotide polymorphisms (SNPs) markers, or whole genome sequencing. Their genetic relatedness was then analyzed with bioinformatic tools to determine their genetic differentiation, phylogeny, proportion of admixture, and matrilineal lineages.

Analyses with microarray-SNPs found that the indigenous ethnic groups of Sabah are closely related to the Taiwan Natives and the non-negritos Filipinos. Whereas, STR-genotyping revealed that the people of Sabah are uniquely distinct from the people of Sarawak. Whole-genome sequence analyses further unraveled that there is a gene flow from Sabah to other region of Southeast Asia, thus strenghtening the hypothesis of ‘Out of Taiwan’. To determine the dispersal of matrilineal ancestors in Sabah, current analysis on the mtDNA hypervariable region is being conducted.

The findings of this research could be used for forensic, population genetics and personalized genomics,

**Keywords :** Indigenous ethnic groups, Sabah, genetic analyses, genetic relatedness, human migration



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-06	
<b>PEREKA CODE</b>		P0077/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Adaptive Strategies of Bacterial Communities at Mamut Copper Mine, Sabah	
<b>PROJECT LEADER</b>		DR. KENNETH FRANCIS RODRIGUES	
<b>PROJECT MEMBER</b>		LOW YI YIK, DR. KENNETH FRANCIS RODRIGUES, DR. COLLIN GLEN JOSEPH A/L ANTHONY JOSEPH, PUAN GRACE JOY CHIN WEI LIE, PROFESSOR DR. BABA MUSTA, DR. CAHYO BUDIMAN	

**Abstract :** Mamut copper mine which is an abandoned copper mine located at the periphery of Kinabalu National Park, Sabah, Malaysia represents a typical Acid Mine Drainage (AMD) site. Attempts at remediation of this site have been stymied by the high levels of acidity (pH=3) and the high concentration of mining overburden in the form of Copper ions. This study focused on characterizing the bacterial diversity of the AMD site as a means towards understanding the process of adaptation and possible bioremediation.

To isolate bacteria which have adapted to an AMD and elucidate the genetic traits and mechanisms associated with adaptation.

Soil samples were collected at specific locations within the AMD site. Elemental analysis was done using ICP-OES. Bacteria were isolated and screened for Copper tolerance following which they were identified. The genomes of selected bacteria were sequenced and analysed in order to identify the presence of specific genes and their associated pathways,

Six genomes were sequenced and specific genes associated with adaptation to AMD were identified by analysis of the genetic pathways.

The bacteria have potential applications to Bio-remediation.

**Keywords :** Bacillus cereus, Bacillus thuringiensis, Pseudomonas sp., Bacillus sp.



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-07
<b>PEREKA CODE</b>		P0079/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Inhibition and Substrate Specificity Properties of FKBP22 from a Psychrotrophic Bacterium, <i>Shewanella</i> sp. SIB1
<b>PROJECT LEADER</b>		DR. CAHYO BUDIMAN
<b>PROJECT MEMBER</b>		HERMAN UMBAU LINDANG, DR. KENNETH FRANCIS RODRIGUES, PUAN CHEONG BO ENG

**Abstract :** Psychrophilic microorganisms have the capability to grow under low and moderate temperature. The application of Psychrophiles is opening many more new areas in Biotechnology. Due to its unique biological features, Psychrophiles can be significantly exploited for use in biotechnological industries like Pharmaceutical, Enzyme production, Bioremediation, Biosensors, Cosmetics, Agriculture, and Textile Industry. Accordingly, fundamental research to achieve comprehensive understanding on this microorganism is needed, which leads us to maximise its industrial applications. As an example, the mechanism by which this microorganisms adapt to low temperature remain to be fully understood. Our previous study on a psychrophilic bacterium *Shewanella* sp. SIB1 suggested the importance role of SIB1 FKBP22, a member of peptidyl propyl cis-trans isomerase of this bacterium, for cold-adaptation of this bacterium. Nevertheless, catalytic properties of this protein remain to be fully deciphered as well as comprehensive analysis on its functional activity towards protein substrate. Our understanding on this issue allows us to see the possibility of generating psychrophilic properties on the non-psychrophilic bacteria through transferring the gene encoding SIB1 FKBP22.

This study aims to :

1. To determine preferences of SIB1 FKBP22 towards peptide substrate
2. To analyse the sensitivity of SIB1 FKBP22 towards its specific inhibitor (FK506)
3. To investigate binding and inhibition properties of SIB1 FKBP22 towards calcineurin, another protein substrate.
4. To determine structural regulation of SIB1 FKBP22 responsible for substrate specificity, binding to FK506 and calcineurin.

(1). Protein

In this study, SIB1 FKBP22 and its derivatives, including monomeric variants (NNC- FKBP22, C-domain+, V37R/L41R mutants), active site dimeric mutant (R142A) and N-domain. These mutants were available as gift of Dr Shigenori Kanaya (Osaka, Jaolan).

All proteins were prepared in the recombinant system, expressed and purified according to previous method (Budiaman et al., 2016).

(2). Catalytic Inhibition by FK506

The inhibition of PPLase activity of SIB1 FKBP22 and its variants by FK506 was determined by measuring PPLase activity in the presence of various concentration of FK506. The PPLase activity was determined in 35 mM HEPES buffer, pH 7.8, at 10 °C in the protease-coupled assay using N-succinyl-Ala-Leu-Pro-Phe-p-nitroanilide (Suc-ALPF-pNA) (Wako Pure Chemical, Osaka Japan) at 25 µM of final concentration

(3) Calcineurin inhibition assay

The assay wmeasured phosphatase activity of 40 nM bovine brain calcineurin (Sigma- Aldrich, St. Louis, MO) in the presence or absence of SIB1 FKBP22 or its variants. For the measurement, the ProFluor serine/threonine phosphatase assay (Promega, Madison, USA) was used, which works based on the fluorescence of a rhodamine-conjugated peptide substrate that, upon dephos- phorylation by calcineurin, is digested by a protease.

(4). Substrate specificity

Substrate specificity was measured by measuring PPIase activity as explained above with N-succinyl-Ala-Xaa-Pro-Phe-p-nitroanilide (Suc-AXaaPF-pNA) (Wako Pure Chemical, Osaka, Japan) as a substrate, in which Xaa stands for a variable aminoacyl residue in the P1 position of various substrates, in the absence of FK506.

In this study, we found that wild type (WT) SIB1 FKBP22 bound to FK506 with IC<sub>50</sub> of 77.55 nM. This value is comparable to that of monomeric mutants (NNC-FKBP22, C-domain+ and V37R/L41R mutants), yet significantly higher than that of active site mutant (R142A). In addition, WT SIB1 FKBP22 and monomeric variants were found to prefer hydrophobic residues preceding proline. Meanwhile, R142A mutant has wider preferences on bulkier hydrophobic residues due to increasing hydrophobicity and binding pocket space. Surprisingly, in the absence of FK506, SIB1 FKBP22 and its variants inhibited, with the exception of N-domain, calcineurin phosphatase activity, albeit low. The inhibition of SIB1 FKBP22 by FK506 is dramatically increased in the presence of FK506. Altogether, we proposed that local structure at substrate binding pocket of C-domain plays crucial role for the binding of FK506 and peptide substrate preferences. In addition, C-domain is essential for inhibition, while dimerization state is important for optimum inhibition through efficient binding to calcineurin.

This finding leads to possible application of SIB1 FKBP22 to :

- (1). Generate psychrophilic properties in other non-psychrophilic bacteria
- (2). Enhance solubility of protein client expressed at low temperature by using its ability to bind to protein substrate and prevent mis-folding at low temperature

**Keywords** : Shewanella sp. SIB1; peptidyl prolyl cis-trans isomerase (PPIase); FK506-binding protein (FKBP); substrate specificity; FK506



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-08
<b>PEREKA CODE</b>		P0108/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Transcriptome analysis of <i>Kappaphycus alvarezii</i> (Rhodophyta, Solieriaceae) cultured under different light qualities and carbon dioxide enrichment
<b>PROJECT LEADER</b>		ENCIK WILSON YONG THAU LYM
<b>PROJECT MEMBER</b>		ENCIK WILSON YONG THAU LYM, PROFESSOR DR. CLEMENTE MICHAEL WONG VUI LING, THIEN VUN YEE, DR. KENNETH FRANCIS RODRIGUES

**Abstract :** Transcriptomes associated with the process of photosynthesis and carbon fixation have offered insights into the mechanism of gene regulation in terrestrial plants, yet limited information is available for macroalgae. Intertidal red alga, *Kappaphycus alvarezii* is exposed to different wavelengths of light throughout their lives as light quantity and quality changes at different depths in seawater. This study aims to examine the underlying mechanisms associated with photosynthesis and carbon fixation under specific light qualities and carbon dioxide (CO<sub>2</sub>) enrichment. Transcriptome profiling of *K. alvarezii* generated 76,871 qualified transcripts with a mean length of 979 bp and a N50 length of 1,707 bp, and about 55.83% transcripts were annotated for their functions. We analysed the effects of light regulation on the aspects of light-harvesting complex, phycobilisomes, photosystems and photoreceptors in relation to photosynthesis and observed that light-regulated gene expression is not a single light response. Different light qualities i.e. blue, green and red light were found transduced to regulate the same metabolic pattern. Analysis of carbon fixation pathway revealed that the key enzyme-encoding genes involving in C3 and C4 pathways were actively transcribed in *K. alvarezii*. In addition, the CO<sub>2</sub> induced transcriptome suggested the possibility of shifting carbon metabolism pathway after acclimation to increased level of CO<sub>2</sub>. The impact of CO<sub>2</sub> enrichment on the cultures has provided new insight into the response of *K. alvarezii* to rising atmospheric CO<sub>2</sub>.

This study aims to examine the underlying mechanisms associated with photosynthesis and carbon fixation under specific light qualities and carbon dioxide (CO<sub>2</sub>) enrichment.

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Seaweed industry is an important source of income for the coastal community in Sabah. This research is contributing to the production of germplasm for the community.

**Keywords :** carbon fixation; *Kappaphycus alvarezii*; light qualities; photosynthesis; transcriptome sequencing



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-09	
<b>PEREKA CODE</b>		P0110/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Hyptolide of Hyptis pectinata Poit inhibit proliferation and induce apoptosis breast cancer cell lines (MCF-7)	
<b>PROJECT LEADER</b>		ENCIK RUZAIDI AZLI BIN MOHD MOKHTAR	
<b>PROJECT MEMBER</b>		Tamar Kansil,Dr. Meiny Suzery,DR. CAHYO BUDIMAN	

**Abstract :** The  $\alpha,\beta$ -unsaturated d-lactone (hyptolide) as antitumor activity has been reviewed. Hyptolide was isolated from the leaves of Hyptis pectinata Poit (Lamiaceae) and was studied in order to discover and develop a potential anticancer drug.

This study aimed to investigate the cytotoxicity, antiproliferation and apoptosis induction of hyptolide isolated from Hyptis pectinata Poit on human breast cancer cells (MCF-7)

MTT assay was performed to analyze cytotoxic potential of hyptolide whereas Acridine Orange/Ethidium Bromide (AO/EB) staining was used to detect apoptosis.

Hyptolide was obtained as crystal of 87-88 °C melting point. Spectroscopic identification results showed wavenumber at 1735  $\text{cm}^{-1}$  indicated  $\alpha,\beta$ -unsaturated d-lactone presence. GC-MS analysis provide single peak with 11.701 retention time as well as m/z value at 239 unique for hyptolide. Hyptolide have growth inhibitory activity of MCF-7 cells with IC50 of 31,2  $\mu\text{g} / \text{mL}$ . Apoptosis assayed using etidium bromide-acridin orange staining, showed increasing in apoptosis.

The results conclude that hyptolide possesses antiproliferative effects through growth inhibition and apoptosis induction.

**Keywords :** Hyptolide, Hyptis pectinata, anticancer, apoptosis



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-10
<b>PEREKA CODE</b>		P0112/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Collagen regulates the characteristics and differentiation potentials of human Wharton jelly's-derived mesenchymal stem cells
<b>PROJECT LEADER</b>		DR. TEOH PEIK LIN
<b>PROJECT MEMBER</b>		Haselamirrah Mohd Akhir,Hiew Vun Vun,DR. TEOH PEIK LIN

**Abstract :** Biomaterials have been widely studied as scaffolds for tissue regeneration, but they might play role in proliferation and lineage differentiation of stem cells. Previous studies have shown that collagen promotes proliferation and osteogenesis of bone marrow derived mesenchymal stem cells. Due to high proliferation rate and less invasive procedure of Wharton jelly (WJ)-derived MSCs, they have been used as an alternative source for clinical applications.

To examine how collagen modulates the characteristics and differentiation potentials of WJ-MSCs.

MSCs were isolated from Wharton jelly using enzymatic method. At passage 3, cells were co-cultured with collagen for 7 days. The proliferation of WJ-MSCs were examined using Presto blue. Osteogenic and adipogenic differentiation were performed using Alizarin Red and Oil Red O staining, respectively. RNA was extracted from WJ-MSCs and gene expression profile was carried out using Stem Cell PCR array.

In the presence of collagen, WJ-MSCs showed no significant differences in term of proliferation but prolonged their survival when compared to the control. However, stemness genes including TERT, INS, POU5F1, and ZFP42 expressions were downregulated in WJ-MSCs co-cultured with collagen (col-WJ-MSCs). Upregulation of osteogenic genes including BMP2, GDF15, and TGFb1 was also observed in col-WJ-MSCs, suggesting that collagen promotes osteogenic differentiation in WJ-MSCs. WNT3A expression was declined in col-WJ-MSCs, indicating that Wnt pathway is associated with the suppression of osteogenic differentiation.

Collagen can improve cell differentiation potential and prolong their proliferation thus making it a valuable tool in stem cell therapy.

**Keywords :** Mesenchymal stem cells, collagen, proliferation, stemness, differentiation



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-11
<b>PEREKA CODE</b>		P0139/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Novel Discovery and Characterization of Microsatellite Loci from PacBio’s High-Throughput DNA Sequencer for Two Threaten Bat Species, <i>Hipposideros cervinus</i> and <i>Myotis muricola</i>
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. VIJAY KUMAR A/L SUBBIAH
<b>PROJECT MEMBER</b>		CIK AZNIZA BINTI MAHYUDIN, PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE

**Abstract :** DNA microsatellite markers are highly remarkable and useful genetic markers for ecological and evolutionary studies. However, the lack and unavailability of these microsatellite markers for many non-model organisms, including bats from the Old World populations, has hampered genetic conservation efforts. The Bornean bats - *Hipposideros cervinus* (the Fawn leaf bat) and *Myotis muricola* (Whiskered myotis) are two of example of the Old World bats, and both species are widely distributed throughout Southeast Asia. In addition, due to a high rate of deforestation occurring across Southeast Asia's tropical lowland forest, the population stability of these two species have dwindled and is a cause of concern.

The aims of this project are to isolate and characterise novel DNA microsatellite markers for *Hipposideros cervinus* (the Fawn leaf bat) and *Myotis muricola* (Whiskered myotis). We also aim to characterise the genetic diversity of the two species by using our newly developed microsatellite markers in order to determine its genetic health and to propose conservation programs.

In this study, genomic DNA from *Hipposideros cervinus* and *Myotis muricola* were isolated and sheared to approximately 6 kb fragments for SMRTbell template library generation. Genome shotgun sequencing was then performed for both the genomic DNA samples on a PacBio's RSII sequencer using the P6v2C4 chemistry platform. Using Bioinformatic tools, novel microsatellite loci were isolated and newly designed primers were developed to test the genetic population structure of the two threaten bat species.

High-throughput sequencing using the PacBio resulted in a total of 117,009 and 125,740 DNA circular consensus reads (CCS) for *Myotis muricola* and *Hipposideros cervinus*, respectively. The resulting high-quality CCS reads revealed numerous microsatellite motifs consisting of di-, tri-, tetra- and penta-nucleotide repeats. Novel microsatellite markers with specific primers for the two species were developed for the first time. These were tested and validated for genetic polymorphism.

This research has developed a set of novel microsatellite DNA markers which is used to determine to genetic health status of two threaten bat species. These markers can also be easily transferable to other bat species. The microsatellite markers will be useful in conservation biology of endangered and threaten bat species.

**Keywords :** Bornean Bats, *Hipposideros*, *Myotis*, Microsatellite Markers, High-throughput DNA Sequencing



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-12
<b>PEREKA CODE</b>		P0147/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Fabrication of spin-coated graphene oxide film supports in vitro proliferation of Wharton’s jelly derived mesenchymal stem cells
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. HOW SIEW ENG
<b>PROJECT MEMBER</b>		PUAH PERNG YANG,Umul Hanim Binti Yusoff,DR. MOH PAK YAN,PROFESSOR MADYA DR. LEE PING CHIN,PROFESSOR MADYA DR. HOW SIEW ENG

**Abstract :** Wharton's jelly-derived Mesenchymal Stem Cells (WJ-MSCs) have drawn much attention for being more primitive representing an early-stage mesenchymal-like stem cells and easily collected without ethical restrictions. Graphene oxide is an artificial substrate that is attracting a lot of attention in biomedical field due to its nanoscale topography which can significantly influence the characteristic of stem cells by enhancing cell adhesion, proliferation, and differentiation.

Here, we aimed to synthesize graphene oxide (GO) using modified Hummers method and prepare the GO film substrate using spin-coated method. Then, evaluation of cell viability and morphology of WJ-MSCs on spin-coated GO substrate were carried out on Day 1 and Day 6 culture.

Synthesized Graphene oxide (GO) was characterized by ultraviolet&dash;visible spectroscopy (UV-vis), Fourier transform infrared spectroscopy (FTIR), x-ray diffraction (XRD), and scanning electron microscope (SEM). Then, GO powder was coated on a glass support through spin-coating technique and characterized using SEM and atomic force microscope (AFM). Wharton's Jelly mesenchymal stem cell (WJMSC) was used in this study and confirmed by cell morphology, immunofluorescence of staining surface CD markers (CD105 and STRO-1), as well as differentiation into adipogenic and osteogenic lineages. Cell viability of GO treated WJ-MSCs was evaluated using PrestoBlue™ assay and the morphology of the WJ-MSC on substrate was observed using an inverted microscope (Olympus IX73, Japan) with CellSens software (Olympus).

The spine-coated GO substrate, the measurements by AFM shows a range of 5 nm to 30 nm thickness, which corresponding to the stacking of 5 to 30 layers. Therefore, the as-prepared GO substrates were coated with combination of multilayer and thin GO sheets. The WJ-MSCs was confirmed by its potential to be induced for adipogenic and osteogenic differentiation. On the first day of culture of WJ-MSCs on GO substrate, adherent of cells on the GO substrate was observed and the WJ-MSCs were continued to increase its cell proliferation up to 6 days culture. The results also show no significant difference in the proliferation of GO substrate at day 1 and 6 (p-value > 0.05), as compared to control. This explained that the presence of GO substrate did not hamper the proliferation of WJ-MSCs.

This study implies that GO substrate can be a suitable biomaterial for culturing WJ-MSC, which is an alternative mesenchymal stem cells source.

**Keywords :** Graphene oxide, Wharton’s Jelly mesenchymal stem cells, cell culture



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-13
<b>PEREKA CODE</b>		P0150/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH <b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		MICROBIAL 16S rDNA DETERMINATION OF BACTERIA ASSOCIATED WITH TOXIC DINOFLAGELLATE, <i>Pyrodinium bahamense</i> var. <i>compressum</i>
<b>PROJECT LEADER</b>		PUAN GRACE JOY CHIN WEI LIE
<b>PROJECT MEMBER</b>		Sylvia Yahumin, DR. KENNETH FRANCIS RODRIGUES, Salley Venda Law

**Abstract :** Harmful algal bloom (HAB) has become frequent phenomenon in coastal waters of West Sabah where one of causative organisms is the toxic dinoflagellate, *Pyrodinium bahamense* var. *compressum*. This species produces saxitoxin which causes paralytic shellfish poisoning that can lead to paralysis and death. Previous studies suggested that bacteria-algae association may play a direct or indirect role in saxitoxin hence it is important to study the bacterial diversity associated with this dinoflagellate.

The study was carried out to identify the bacteria diversity associated with the toxic dinoflagellate, *Pyrodinium bahamense* var. *compressum*.

Amplification and sequence analysis of the 16S rRNA gene were applied to identify the bacteria samples.

By amplifying V3-V4 region of the 16S rRNA gene, sequences of a total of 64 samples were analyzed. The bacterial diversity was limited to the phyla Proteobacteria, Actinobacteria, and Bacteroidetes. Out of 44 Proteobacteria, 29 isolates were gamma-Proteobacteria (*Marinobacter* sp.) and 28 isolates were alpha-Proteobacteria (*Roseibium* sp. (15) and *Mameliella* sp. (13)). The remaining bacteria isolates were identified as *Muricauda* sp. (6) from from the phylum Bacteroidetes and *Micrococcus* sp. (1) from the phylum Actinobacteria. *Marinobacter* strain is known for having metabolic potential to utilize various hydrocarbons as alternative N, P, and C sources, which could be responsible for growth enhancement in the dinoflagellate during a bloom event. Meanwhile another species belong to *Roseobacter* clade (*Mameliella* sp.) were frequently observed and known to be involved in dimethylsulfoniopropionate (DMSP) metabolism which is highly produced in dinoflagellates and indirectly implicated in the initiation, maintenance and decline of algal blooms.

This result provided us the important insight information on how the associated bacteria may have related with the production of toxin during a bloom event. The understanding of the bacterial communities associated with toxic HAB species will help reveal their potential function, and further enable researcher to consolidate the data of marine bacteria and database.

**Keywords :** dinoflagellate, saxitoxin, bacteria diversity, harmful algal blooms, 16S rRNA gene



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-14
<b>PEREKA CODE</b>		P0158/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Inorganic Functionalized Biomaterial Substrates Promote Mesenchymal Stem Cells Proliferation, Phenotype and Differentiation: Prolonged in vitro Culture Towards Antisenescent.
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. HOW SIEW ENG
<b>PROJECT MEMBER</b>		Umul Hanim Binti Yusoff,PROFESSOR MADYA DR. HOW SIEW ENG,PROFESSOR MADYA DR. LEE PING CHIN,DR. TEOH PEIK LIN,PUAH PERNG YANG,DR. MOH PAK YAN,PROFESSOR MADYA DR. COSWALD STEPHEN SIPAUT @ MOHD NASRI,shamsi ebrahimi,WARDA BINTI ABDUL AJAK

**Abstract :** A great circulating of human Mesenchymal Stem Cell (hMSCs) practical has drive all over the world by innovative investigators. However, the basic research applications of hMSC resources require novel finding biomaterials interfacially to hMSC highlighted in sustainable the morphology, physiology, multipotent and phenotypically in vitro cultivation. A prominent of biomaterials benefit to hMSCs culture including human Wharton's Jelly derived Mesenchymal Stem Cells (hWJMSC) and Denuded Amnion (hAMMSC) has triggered the multitudinous field especially in regenerative medicine. In order to prevent the diminished of hMSCs stemness especially in senescent effect, purity and potency, the alternative and robust application of cell-substrate culture are essential to be discovered due to it is highly recommended for an abundance biomedical waste.

Objectives: 1. To observe the hMSCs morphology and adherent ability when cultured in vitro prolonged on Graphene Oxide (GO) substrate, scaffold of Hydroxyapatite (Hap) disc, Bioactive glass (BAG) disc and their composites; 2. To screen Graphene Oxide (GO) substrates, scaffold of Hydroxyapatite (Hap) disc, Bioactive glass (BAG) disc and their composites support proliferation potential of hMSCs in vitro prolonged culture; 3. To characterize the surface markers of early and later passage of hMSCs grown on Graphene Oxide (GO) substrate via immunophenotyping and immunocytochemistry analysis in vitro prolonged culture; 4. To determine the differentiation abilities of hMSCs cultured in vitro prolonged on Graphene Oxide (GO) substrates, scaffold of Hydroxyapatite (Hap) disc, Bioactive glass (BAG) disc and their composites via Oil Red O staining and Alizarin Red S staining.

Along the line of concurrent result, the conclusions are: (1) First objective has been achieved whereas human Whartons Jelly derived Mesenchymal Stem Cell (hWJMSCs) and human Amnion derived Mesenchymal Stem Cells (hAMMSCs) are able to adhere on GO substrate and scaffold of Hap, BAG and their composites disc have been maintained the spindle shape or fibroblast like morphology and filopodia structure on the scaffold surface. (2) Subsequently, for the second objective strongly shown the GOy1-hWJMSC has been identified with the highest proliferate number which is comparable against 0.1% gelatin as a positive control and blank glass coverslip by assessment of cell viability, anti-toxicity and growth curve. (3) Phenotypical result has been studied from the selected of top leading biomaterial which are GOy1-hMSC and GOy1-hAMMSC has been positively expressed and retained the MSC surface marker of STRO-1 (endothelial antigen), CD105 (endoglin type 1 membrane glycoprotein) and CD271 (Nerve growth factor receptor) at passage five, P5 and P10 by using assessment of immunocytochemistry. In the same time, the second assessment has been obtained by using flow cytometer, initially showed that the GO-hWJMSC and GO-hAMMSC positively expressed the highest percentage of CD90 and CD105 and negatively highest in CD34, CD19, CD45, HLA-DR and CD11b at the early passage and surprisingly in later passage.

Multi-potency study depicted the differentiation of GOy1-hWJMSCs, scaffolds of HAp disc, BAG disc and their composites at early passage and later passage into adipocytes and osteocytes while using the inductive osteo-differentiation and adipo-differentiation media.

Further study is being conducted to study the protein assay of cell cultured in 3D Hap-, BAG-hMSC and its composites.

The finding of this study enable to enriched the modification of bio-interface inorganic substrates and inorganic scaffolds according to porosity and contact angle character that commence to employed the advancement of regenerative medicine, cell-based therapy and tissue engineering to envisioned better and friendly life style in biotechnology field in future.

**Keywords :** Graphene Oxide substrate, Hydroxyapatite disc, Bioactive Glass disc, APTES functionalization, Piranha functionalization, Spin coating, Wharton's Jelly, Mesenchymal Stem Cell, Proliferation, Differentiation, Immunofluorescence, Flow Cytometry analysis and S



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		RB-15
<b>PEREKA CODE</b>		P0177/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Potential use of acetylcholinesterase from the brain tissue of <i>Monopterus albus</i> for assessment of contaminated river
<b>PROJECT LEADER</b>		DR. MOHD KHALIZAN BIN SABULLAH
<b>PROJECT MEMBER</b>		SITI AISHAH BINTI MUHAMMAD KHALIDI

**Abstract :** Nowadays, most of researcher considers the manipulation of the aquatic organism as a biosensor tool, which is an alternative technique to determine the contamination level in the water samples (Aidil et al., 2013; Zehani et al., 2014; Sabullah et al., 2015b). ChE is the best selection for biosensor development as this enzyme gave a broad effect to many types of contaminant such heavy metals (Aidil et al., 2013), pesticides (Sabullah et al., 2015a), detergent (Shukor and Sulaiman, 2013) and anatoxin (Devic et al., 2002). CB and OP gave stronger effect toward ChE activity by block the metabolization of acetylcholine through the process of carbamylation and phosphorylation, respectively. There is no doubt various ChE species show different characteristic and degree of inhibition toward these compound as mentioned by Coelho et al (2011). Means, more data are needed to obtain the most sensitive ChE for detection of the lowest contaminant concentration. This warning tool would be used as a preliminary screening based on semi-quantitative analysis and the positive result will be subjected for secondary screening using high instrument tool for quantitative data. Our study will extract and purified ChE from the brain and liver tissue of freshwater eel, followed by determination of enzyme parameter (including pH, temperature and substrate specificity), inhibition study (single and different toxicant concentration exposure) and field trial (sampling).

- 1) To purify ChE from the brain tissue extract of freshwater eel; *Monopterus albus* using affinity chromatography.
- 2) To determine the optimum assay condition of freshwater eel; *M. albus* ChE such pH, temperature and substrate specificity.
- 3) To elucidate the inhibition level of freshwater eel; *M. albus*ChE after exposed with CB and OP.
  - 1) Brain tissue of puffer fish; *Diodon hystrix* was dissected out, weight and homogenized using UltraTurax homogenizer; the brain sample containing 0.1 M sodium phosphate buffer with the ratio of 1:5 (w/v). The purification process was carried out starting with ammonium sulphate precipitation, followed by ion exchange chromatography (DEAE cellulose) or affinity chromatography (procainamide-sephacryl 6B). The fraction shows the highest activity will be pool or kept in 4oC for the next study. The calculation of the enzyme activity and protein content by referring to the method of Ellman et al., (1961) and Bradford, (1970), respectively. The purification level will be determined based on the calculation of specific activity and visualized on native-PAGE.
  - 2) Purified ChE will be incubated in a different concentration of selected synthetic substrate; Acetylthiocholine iodide (ATC), butyrylthiocholine iodide (BTC) and propionylthiocholine iodide (PTC), to study the enzyme kinetic and select the most preferable substrate for puffer fish; *Diodon hystrix* ChE. ChE also incubated in different temperature ranging from 15 to 60oC to determine the temperature profile, while optimum pH was determine based on an overlapping buffering system by incubation in acetate buffer (pH 3 to 5.5), phosphate buffer (pH 6 to 8) and tris-HCl buffer (pH 7 to 10).
  - 3) Combination of enzyme parameter will be carry out for inhibition study which ChE was exposed with selected metal ion (Argentum, arsenic, chromium, copper, cadmium, mercury, lead and nickel), CB (Bendiocarp, carbofuran, carbaryl, methomyl and propoxur) and oxonated-OP (Acephate, chlorpyrifos, diazinon, dimethoate, malathion, parathion and trichlorfon) at the final concentration of 1 mg/L or 1 ppm.

ChE from brain tissue of freshwater eel show sensitive towards CB and OP. Thus, maybe it could be replaced with other commercial sources of ChE such *Electrophorus electricus* and *Bos taurus*. ChE can be included in biomonitoring programme, which is work as a preliminary screening to the existence of toxicant in the environment before validation using high tech instrument. There is no doubt this method is easy to handle, much

cheaper as well as generate rapid result semi-quantitatively. *M. albus* ChE could be sensitive towards other types of toxicant such metal ion, detergent, drug, and hydrocarbon thus further study must be implemented to ensure the benefit of *M. albus* ChE for the development of biosensor kit.

This method is useful to various agencies related to environmental agencies such Department of Environment (DOE), Ministry of Health Malaysia, Department of Irrigation and Drainage for all state in Malaysia and Department of Water Supply Malaysia.

**Keywords :** *Monopterus albus*, cholinesterase, metal ion, carbamate, organophosphate



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		IB-01
<b>PEREKA CODE</b>		P0056/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		INNOVATION <b>CLASSIFICATION</b>        BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Strategies for Soluble Protein Production in E. coli using a psychrophilic co-chaperone expression system
<b>PROJECT LEADER</b>		PUAN NUR ATHIRAH BINTI YUSOF
<b>PROJECT MEMBER</b>		Nur Nadiah Binti Jiman, Associate Prof Dr Abdul Munir Abdul Murad, Makdi Masnoddin, Jennifer Charles Labo, Farhan Nazaie, Makdi Masnoddin

**Abstract :** E. coli is the most common host for protein expression, as it provides the simplest system to use and wide choice in expression systems. However, expression of foreign proteins in E. coli often results in various problems with the expressed proteins such as formation of inclusion bodies and degradation by protease. These problems often occur due to improper folding of the expressed proteins, and are frequently encountered in protein function research. In the current market, there are five types of chaperones that have been commercialized which are well-known under a company named TAKARA BIO INC. However, up until now there is no chaperone system that offers small heat shock protein (sHSP) in the expression kit. Hence, we come out with a new innovation of Chaperone Competent cell BL21(DE3) using sHSP from an Antarctic yeast known as Glaciozyma antarctica. This kit is the first to utilize BL21(DE3) strain as the expression host which is mostly used in protein research. We have conducted coexpression of target proteins with the sHSP where we found that it increases recovery of proteins in soluble fraction and less formation of inclusion bodies. BL21 (DE3) Competent E. coli is a widely used T7 expression E. coli strain. Normal routine when performing coexpression of target protein using chaperone plasmid, it usually requires three steps: 1) Transform a host E. coli by chaperone plasmid, 2) Prepare competent cells by using the transformant and 3) Transform the cells by a plasmid, expressing target protein. Our product, however, only requires single transformation to obtain E. coli that coexpresses target protein and chaperone team since it contains competent cells prepared from BL21(DE3) strain transformed by sHSP chaperone plasmid.

Since this is the first and only kit to use sHSP as chaperone co-expression system, this kit offers researchers another option to produce soluble active recombinant proteins in the bacterial expression system

There are many proteins and enzymes that are temperature sensitive, thus this kit offers protein expression in a bacterial expression system at low temperature as low as 4C.

The presence of cold-adapted sHSP in the protein co-expression system is a promising system which allows high catalytic activity at a low temperature which is the best system for energy saving.

**Keywords :** molecular chaperone, chaperone expression system, BL21(DE3), competent cell, small heat shock protein, sHSP, psychrophile, Antarctic yeast



**B : BIOSCIENCE AND BIOTECHNOLOGY**

<b>BOOTH NO.</b>		IB-02
<b>PEREKA CODE</b>		P0063/2018
<b>FPI</b>		IBTP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Anti-microbial Soap from Bornean Traditional Herbal Plant
<b>PROJECT LEADER</b>		ENCIK JULIUS KULIP
<b>PROJECT MEMBER</b>		See-Ye Kang, PROFESSOR DR. CHARLES SANTHANARAJU A/L VAIRAPPAN, DR. TAKASHI KAMADA, Dr. Chin-Soon Phan

**Abstract :** *Micromelum minutum* (G.Forst.) Wight & Arn and common name as lime berry or *Micromelum* belongs to family Rutaceae also categorized as one of the medicinal plants which usually found in Western Australia, Northern Territory, Cape York Peninsula, North East Queensland and southwards to north-eastern New South Wales. This medicinal plant mainly consumed as a spice in the southern part of Thailand and as folk medicine for the treatment of fever and dizziness. Besides that, the leaves of *Micromelum minutum* are traditionally used in the treatment of fever and giddiness while the poultice of boiled root is mainly for ague and ringworm. In order to relieve pain, the leaves of this plant were used and pounded with tamarinds and salt before applied on skin. In addition, this plant has been reported to contain pharmaceutical active agent such as anticoagulants, anti-carcinogens and anti-bacterials. This plant normally found in the hilly parts of the northern half and in the north-west area of Peninsular Malaysia. Therefore, we develop an anti-microbial soap from a medicinal plant *Micromelum minutum*. The plant *Micromelum minutum* has never been used to make product such as soap but was found abundant in our forest. Chemical analysis of *Micromelum minutum* showed presence of excavarin-A, clauslactone S, 3'',4''-dihydrocapnolactone. These organic compounds possessed anti-microbial activities.

Scrubbing body or hands, particularly with soaps, is the first line of defense against bacteria and other pathogens that can cause colds, the flu, skin infections and even deadly communicable diseases. Conceptually, many people consider that an antimicrobial potion of soaps is effective at preventing communicable diseases. Antibacterial soap is any cleaning product with active antimicrobial ingredients added. Today, more than 75 percent of liquid soaps available in our grocery store aisles contain some type of antibacterial ingredient. However, our soap is made from natural products which are considered environmental friendly and no allergy to us. No additives were added in the soap. Hence, the cost of production is less as well the price of the soap itself is cheap. Moreover, we have a local industrial collaborator (Pemborong Mengkab Enterprise) that is very interested in this production and he will support commercialization. Our preliminary survey showed some of the indigenous community fond to this soap.

**Keywords :** Bornean traditional herbal plant, *Micromelum minutum* , natural products, anti-microbial, soap



## B : BIOSCIENCE AND BIOTECHNOLOGY

<b>BOOTH NO.</b>		IB-03			
<b>PEREKA CODE</b>		P0152/2018			
<b>FPI</b>		IPB			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		BIOSCIENCE AND BIOTECHNOLOGY
<b>PROJECT TITLE</b>		Calcium Supplement from Chicken Eggshell Wastes			
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE			
<b>PROJECT MEMBER</b>		Shafiquzzaman siddiquee,Nurfatihah Zamri,Sharifudin Shaarani			

**Abstract :** A simple, eco-friendly and low-cost method has applied for the synthesis of calcium carbonate nanoparticles ( $\text{CaCO}_3$  NPs) from abundant chicken eggshell waste. Almost 94% of chicken eggshell is made up of  $\text{CaCO}_3$ . Mineral calcium is one of the essential nutrients needed by the human body for biological function such as providing skeletal strength, extra- and intercellular signaling, nerve impulse transmission and muscle contraction. The method of  $\text{CaCO}_3$  synthesizing from chicken eggshell waste involves a simple mechanical grinding of the nano-sized eggshell powder in the presence of non-toxic and non-hazardous chemicals. Energy Dispersive X-ray analyzer (EDX) showed that the element composition of the sample is 99.92% of Ca, C, and O with trace amount of Al. The result of TEM showed that the particle size of the synthesis calcium carbonate is in the range of 8.52 To 72.2 nm. Most of the particle size is under 10 nm. The formation of bigger sized particles is due to agglomeration of the particles. The Fourier Transmission Infrared Spectroscopy (FT-IR) result confirmed that the sample synthesis is  $\text{CaCO}_3$  when compared with standard  $\text{CaCO}_3$ . The wavelength of the sample  $\text{CaCO}_3$  has found same with the standard  $\text{CaCO}_3$  and also nontoxic effects found with different dosages of  $\text{CaCO}_3$ . This product can be commercialized as a pioneer of calcite industry in Malaysia. The method of synthesizing  $\text{CaCO}_3$  is simple and a small quantity of non-hazardous chemical uses. Low production cost of calcium supplement because of the utilizing waste eggshell.

**Keywords :** Waste Eggshell, Nanoparticles, Energy Dispersive X-ray analyzer (EDX)

## **C : AGRICULTURE, FORESTRY AND FOOD**



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-01
<b>PEREKA CODE</b>		P0009/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		EFFECT OF WASHING AND COOKING ON PESTICIDE RESIDUES IN SELECTED VEGETABLES FROM KOTA KINABALU MARKET
<b>PROJECT LEADER</b>		PROFESSOR MADYA MARIAM BINTI ABDUL LATIF
<b>PROJECT MEMBER</b>		PROFESSOR MADYA MARIAM BINTI ABDUL LATIF

**Abstract :** This study focused on identification and determination of different pesticides in different vegetables (spinach, mustard green, Chinese celery, cabbage and tomato) collected from Kota Kinabalu market. Different washing and cooking techniques were applied to investigate the level of pesticide residues in sampled vegetables. The analysis was carried out by GC-MS and it was noted that there was no pesticide residues observed in the samples after washing with commercial vegetable detergent and in all samples after being treated with frying and blanching. The highest amount of pesticide residues were observed in the normal samples, without any treatment. The results showed that organothiophosphate concentration is the highest compared to other identified pesticide residues in all the samples. The number of pesticides identified in tomato was observed to be the highest compared to leaf mustard, spinach, Chinese celery and cabbage.

This study was undertaken to investigate more liquid solution that is easy to use and available at home for washing vegetables. Based on the findings of previous studies, it is necessary to carry out a study of some solutions that can be prepared at home and cooking techniques that are commonly used in the home to reduce pesticide residues in vegetables that are commonly consumed in Sabah.

It can be seen that pesticide organothiophosphate residue concentration was the highest compared to other identified pesticides in all the samples. The number of pesticides identified in tomato was observed to be the highest compared to leaf mustard, spinach, Chinese celery and cabbage.

The pesticide analysis has been used to summarise the effects of different washing and cooking treatments on pesticide residue levels in selected vegetables from the local market of Kota Kinabalu, Sabah. The amount of organothiophosphate was found to be the most common pesticide identified in samples, however, the number of pesticides and their quantities were noticed to be reduced upon washing with salted water and sodium bicarbonate. There were no pesticides being detected in GC/MS analysis after washing with commercial detergent, acidic water and frying. The results obtained are comparable with some of the published studies and may be used in cases where there is none or very limited information on processing.

**Keywords :** pesticide, organothiophosphate, frying, blanching



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-02	
<b>PEREKA CODE</b>		P0015/2018	
<b>FPI</b>		FSMP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Edible Active Food Coating based on Biocomposite	
<b>PROJECT LEADER</b>		DR. JOKO SULISTYO	
<b>PROJECT MEMBER</b>		Raja Munirah Binti Raja Chik	

**Abstract :** - - - - - Fresh and minimally processed foodstuffs as well as ready-to-eat meals with fresh components are important market sectors in retail food industry. However, because of their fresh nature, mild processing technologies or increased surfaces as consequence of cutting processes, these products are very sensitive to food quality changes. Deterioration can occur by chemical, physical as well as microbiological processes like water loss, enzymatic based and browning, oxidation, loss of cellular integrity or a growth of microorganisms. Functional edible coatings could be an interesting approach for overcoming some of the mentioned quality losses.

Edible coatings are thin layers of edible materials applied on food products that play an important role on their conservation, distribution and marketing. Some of their functions are to protect the product from mechanical damage, physical, chemical and microbiological activities. Their use in food applications and especially highly perishable products, is based on some particular properties such as cost, availability, functional attributes, mechanical properties, optical properties, the barrier effect against gases flow, structural resistance to water and microorganisms and sensory acceptability. Edible coatings are consumable films, which enable supporting structures and protective layers on food surfaces. By incorporation of suitable matrices and functional additives, food quality changes by moisture transfer, oxidation processes, respiration, loss of volatile flavors or microbial growth can be reduced or even prevented. Combination of modified cassava (MCS) starch and Moringa leaves extract (MLE) is one of the types of edible coating which many function as food preservative. MLE is chosen because of its high antioxidant contents. The goal of this research is to make a film from the composite of MCS and MLE as a food coating and to observe the effect of MCS containing MCE as edible coating to the shrinking of the fruit's weight as well as its antioxidant and antimicrobial activities.

Global edible coatings market includes;

- &bull; A growing focus by food manufacturers on reducing wastage from packaging material
- &bull; Increasing shelf life of products, safety issues, and effective usage of space
- &bull; Rising consumption of convenient food offerings especially in developed regions
- &bull; Governmental initiatives to reduce the carbon foot print in the food sector
- &bull; Alternative uses of edible films and coatings as additives

Packaging accounts for approximately one-third of the world's garbage. Increasing awareness about environmental problems related to disposal of solid waste and reducing the amount of waste generated are major reasons why food manufacturers are focussing on packages that can be recycled, in order to reduce the amount of waste. Edible packaging plays a key role in minimising packaging material wastage from a sustainable materials perspective. Packaging manufacturers and retailers have a key role in making valuable contribution to resolve these problems. Films and coatings that are used in edible packaging are helping manufacturers reduce wastage of raw material.

Lack of local manufacturers and import dependency of edible films and coatings results in a high value of packaging over the present packaging solutions. Recycling cost is lesser against total value required for edible packaging. This, coupled with the restrictions on availability is anticipated to act as a major restraint globally for the growth of the edible films and coatings market over the forecast period.

**Keywords :** Edible coatings, biocomposite, bacterial cellulose, modified cassava starch, Moringa extract



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-03
<b>PEREKA CODE</b>		P0020/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Optimization of fat yield of bambangan (mangifera pajang) kernel using response surface methodology and its antioxidant activities
<b>PROJECT LEADER</b>		DR. MD JAHURUL HAQUE AKANDA
<b>PROJECT MEMBER</b>		DR. MANSOOR ABDUL HAMID,Azzatul,Norazlina,DR. MD JAHURUL HAQUE AKANDA,PROFESSOR MADYA DR. LEE JAU SHYA ,DR. JUMARDI BIN ROSLAN,PROFESSOR DR. SHARIFUDIN MD. SHAARANI ,PROF. MADYA DR. HASMADI BIN MAMAT

**Abstract :** Bambangan is one of the underutilized fruit found in Borneo islands which included Sabah and Sarawak. Research and development of bambangan fruits are economically important for production of functional food, pharmaceutical and nutraceutical products. According to Bakar et al. (2009), the flesh of the bambangan is bright yellow in color with sweet and sour taste, constitutes 60-65% of the total weight; whereas the kernel and peel constitute 15-20% and 10-15% of the total weight. Local indigenous peoples in Sabah normally cook bambangan with fish for a unique flavor or make it into pickle. It is rich sources of fiber, vitamin C, carotenoids, carbohydrates, antioxidants, and phenolic contents. Meanwhile, bambangan pulp and juice powder are used for the production of various types of functional food or beverage due to its high nutritional values. However, optimization resulting from solvent extraction of fat from bambangan kernel and its properties are still unexplored area of research. Moreover, there are no studies have been conducted on the proximate compositions and amino acids, as well as possible utilization of bambangan kernel.

Fats and oils from plant matrix are extracted by several techniques. In this technique, the total oil yield depends on the type of solvents, solvent-to-feed ratio, samples particle size, temperatures, times, and agitation intensity. Response surface methodology (RSM) is an effective and important mathematical and statistical technique to find the optimal conditions for different complex processes. Meanwhile, RSM has been successfully applied in industries, biological, clinical, social, food, physical and engineering sciences. However, to the best of the authors' knowledge, the extraction of bambangan kernel fat (BKF) and the optimum operation conditions of fat yields have not been studied yet.

**Objectives:** To optimize the extraction of fat from bambangan kernel using response surface methodology (RSM); To determine its antioxidant activities and total phenolic contents (TPC); To determine proximate and amino acids in a pursuit to identify an innovative fruit which could be exploited in other food applications.

Bambangan fruit has great potential application in the production of various types of functional food or beverage due to its high nutritional value. Therefore, optimization resulting from solvent extraction of fat from bambangan waste and their properties are important. For the first time, this study optimized BKF and determined their properties. Results obtained in this study have revealed that bambangan kernel is a rich source of crude protein, carbohydrate, and total fat contents. In addition, bambangan kernel contains most essential amino acids. Based on the results, bambangan kernel is a very promising alternative source of food that could be implemented as excellent nutritional supplement particularly for fat and protein. The antioxidant activity of bambangan kernel powder and fat was detected by DPPH and FRAP assay. The results for DPPH radical scavenging and FRAP activities showed a strong correlation with TPCs in both bambangan kernel powder and fat. The high antioxidant capacity and TPCs of bambangan by-products makes it potential for the manufacturing of functional food, nutraceutical, and pharmaceutical products. Vegetable fats and oils are normally obtained from oilseeds such as sesame seed, soy bean, cotton seed, rapeseed, and are widely used in the food, pharmaceutical, cosmetic, and chemical industries. Among these sources, cocoa butter is highly appreciated because of its physical and chemical characteristics. According to the very limited literature, the fat of the bambangan kernel is considered as a new source of the cocoa butter alternative due to its chemical composition.

**Keywords :** Bambangan kernel, bambangan kernel fat, RSM, antioxidant activities, total phenolic contents



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-04	
<b>PEREKA CODE</b>		P0026/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Assessing the Economic Value of Mangrove Conservation as Ecotourism Destination at Marudu Bay, Sabah	
<b>PROJECT LEADER</b>		CIK FAZILAH BINTI MUSA	
<b>PROJECT MEMBER</b>		NORASHIKEEN BINTI MOHD FOZI,PUAN MAZNAH BINTI MUNING	

**Abstract :** The existences of mangrove ecosystems are very crucial by providing a multitude of environmental, economical and social benefits to the coastal communities for sustainable development. In fact, the community-based ecotourism industry is one of the sectors that rapidly developed which is it can contribute towards Malaysia's economics growth. Unfortunately, the economic benefits of mangrove resources are poorly quantified in term of its monetary value due to the lack of awareness and absence of a market for mangrove forest. A campaign to encourage and convince willingness of coastal community to pay from the economic perspective will contribute significantly in proving public welfare in conservation programs undertaken by the local authority. Thus, it can strengthen the potential of coastal community-based ecotourism in parallel to sustain the mangrove ecosystem.

Hence, this study has been initiated to estimate the economic benefits of mangrove forest as ecotourism destination through willingness to pay (WTP) at Marudu Bay, Sabah, Malaysia by using the Contingent Valuation Method (CVM).

This study is using Contingent Valuation Method through directly asked to coastal community about their willingness to pay for mangroves conservation as ecotourism destination. There are five bid prices that were used and randomly distributed to 400 coastal community from five villages (Kampung Tanjung Batu, Kampung Tambun, Kampung Tigaman, Kampung Tanah Merah dan Kampung Taritipan) selected: RM5, RM10, RM15, RM20 and RM30. Logit and linear regression models were applied to estimate the mean WTP by using three different types of models. The first model was the mean WTP with social economic variables, the second model consisted of the same variables with only some variables dropped from the first model and the third model was calculated by using bid price only.

Based on the result, it showed that majority of coastal community were willing to pay for conservation of mangrove forest. Results indicated that the estimated mean WTP for Model 1 (full model), Model 2 (restricted model) and Model 3 are RM12.96/person/year, RM16.08/person/year and RM25.68/person/year, respectively

The Contingent Valuation Method can be used to estimate the economic benefits of mangroves forest as ecotourism destination. The implication of this research can help the Sabah Forestry Department to justify the investment planning of mangroves forest programme for conservation purpose at Marudu Bay in the future. Besides, this research can help the stakeholder and local authority to sustain the mangroves forest areas as a platform to attract the local and international tourist to visit Marudu Bay, Sabah as ecotourism destination. This research can give the information and knowledge to provide additional fund or public fund to conserve mangrove forest for well-managed mangrove forest management in our country. Other than that, this research can help government and policy makers to develop a policy to protect the mangrove forest for sustainable mangrove forest management in Malaysia. Due to non-existence of non-market value for forest goods and services, this research can help our country to develop pricing mechanism of mangrove forest in coastal areas as tourism destination. This research is very significant to increase awareness of community for emphasize the importance of mangrove forest in our life.

**Keywords :** ecotourism, willingness to pay, mangrove conservation, Contingent Valuation Method



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-05	
<b>PEREKA CODE</b>		P0038/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		The growth responses of <i>Jatropha curcas</i> varieties to different NPK fertilizer rates at nursery stage	
<b>PROJECT LEADER</b>		PUAN MANDY MAID	
<b>PROJECT MEMBER</b>		HUONG HOW KAI,WONG POH HOCK,ENCIK JULIUS BIN KODOH,DR. LIEW KANG CHIANG	

**Abstract :** The cultivation of the non-edible oil-bearing crop *Jatropha curcas* L. in Malaysia was initiated due to its potential as a source of cheap biodiesel feedstock and short gestation period. However, the drive for *Jatropha curcas* cultivation has been relatively slow. Past fertilizer experiments on the species focused on plants in the field under different environmental conditions. This study was conducted to gauge the response of potted *Jatropha curcas* varieties to NPK fertilizer rate under a covered net house during the early establishment phase. The experiments were conducted in an RCBD using two months old seedlings of four varieties and four NPK fertilizer rates in three replicates.

Local variety had the lowest height increment while India variety had the lowest diameter increment whether with and without fertilizer treatment. With fertilizer treatment, India variety had the best height increment while Indonesia variety had the best diameter increment. ANOVA was significantly different for mean height increment and mean diameter increment between varieties ( $p < 0.001$  and between NPK fertilizer rate ( $p < 0.001$ ) respectively.

An application of 5 to 10g of NPK fertilizer per *Jatropha* plant was sufficient to induce the best growth response in *J. curcas* seedlings.

**Keywords :** *Jatropha curcas*, NPK rates, growth, nursery stage



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-06
<b>PEREKA CODE</b>		P0065/2018
<b>FPI</b>		FPL
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Honey Characterization Produced by Contract Beekeepers in Various Areas in Sabah
<b>PROJECT LEADER</b>		DR. LUM MOK SAM
<b>PROJECT MEMBER</b>		PROF. MADYA DR. SUZAN BENEDICK, PROFESSOR MADYA DR. HOMATHEVI A/P RAHMAN, DR. LING YEE SOON, DR. JANUARIUS GOBILIK, DR. LUM MOK SAM, Dexter Lee Jiunn Herng, Robin Lim Ah Hee, Mrs. Jamilah Ariffin@Lee Nyuk Choon, Kimberly Ak. Ador, Dr. Haji Amat Kasim

**Abstract :** Honey, defined by Codex Alimentarius standard (2001) as a "natural sweet substance produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant-sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honeycomb to ripen and mature". Due to beneficial properties to the consumer, honey is considered as a superfood and the demand for honey has increased greatly over the years. Production and commercial of honey from western honeybee (*Apis mellifera*) have dominated the market compared to eastern honeybee (*Apis cerana*) due to wide distribution across the globe. However, in the state of Sabah, production of honey has been majorly contributed by *A. cerana* due to its existence and population abundance. In light of its potential to expand and contribute to the state and people's economy, Rural Development Corporation (KPD) collaborates with local beekeepers to harvest honey from *A. cerana* by practising good agricultural methods such as no alteration, fraudulent, adulteration nor pesticide usage in a close proximity of rearing areas. The characterization of honey produced by *A. cerana* reared in the forest has been poorly studied in the past. Most studies on local honey were conducted in agricultural land and thus the effect from nearby floral and addition of foreign chemicals such as fertilizers and pesticides were inevitable. Therefore, the aim of this study is to identify characterize chemical compounds in the honey reared in the forest by beekeepers which potentially serve as quality assurance and quality control of local harvested honey.

This study aim to identify honey properties taken from honeybee reared in the forest using in silico analysis.

Honey samples were collected from northern area of Sabah from beekeepers with assistance of officers from Rural Development Corporation (KPD). Honey collected were kept in the dark and air-conditioned room (24 °C). An aliquot of each honey sample was extracted with MeOH:CH<sub>3</sub>CN:H<sub>2</sub>O (1:1:1 v/v). The supernatant of the mixture was transferred into a sample vial (Agilent Technologies, USA). For quality control (QC) purpose, 100 µL of the supernatant of each sample was taken. The supernatant was introduced to Vanquish™ Horizon UHPLC system (Thermo Fisher Scientific, Waltham, MA, USA) coupled with electrospray ionisation Impact II QTOF-mass spectrometry system (Bruker Daltonics, Bremen, Germany). Compound peak areas were integrated using the Bruker DataAnalysis software (ver. 4.3) and fragmented spectrum were imported to MetFrag to retrieve and to identify by integrating multiple databases for best compounds hit. MZmine 2 (ver. 2.33) was employed to pre-process raw data before multivariable statistical analysis using MetaboAnalyst (ver. 4.0).

The clustering results in the dendrogram (distance measure using Euclidean, and clustering algorithm using ward.D) showed a clear distinction between honey from beekeepers and commercialized honey (sample no. 81). In score plot, Principal component 1 explained 32.8% of the variance and Principal component 2 explained 14.7% of the variance. Honey sampled from beekeepers nested closely to each other. There is a clear separation of commercialized honey (sample no. 81) from other honey beekeepers. Two major groups of similarity between honeys were observed. Analysis of variance (ANOVA) showed significant differences between samples and post-hoc analysis via Fisher's LSD indicated a total of 491 of significant different compounds were found.

The usage of chemoinformatics in food science to identify honeybee properties such as similarity/dissimilarity of compounds, regions, adulteration and fraudulent.

**Keywords :** Honey production, *Apis cerana*, agriculture, honey characterization, adulteration



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-07
<b>PEREKA CODE</b>		P0070/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		DEVELOPMENT OF ELECTROCHEMICAL METHOD FOR THE DETERMINATION OF AZO DYES BASED COLORANTS IN FOOD AND BEVERAGE PRODUCTS
<b>PROJECT LEADER</b>		CIK ROVINA KOBUN
<b>PROJECT MEMBER</b>		CIK ROVINA KOBUN, PROFESSOR DR. SHARIFUDIN MD. SHAARANI ,DR. MD. SHAFIQUZZAMAN SIDDIQUEE

**Abstract :** Development of a rapid and sensitive electrochemical method is important for monitoring synthetic colorants in food and beverage products which caused toxicity and pathogenicity to human health when excessively consumed. Herein, an electrochemical sensor was developed based on the modifications of GCE with chitosan (CHIT), graphene oxide (GO), multi-walled carbon nanotubes (MWCNTs) and gold nanoparticles (AuNPs) for the determination of azo colorants in food and beverage products. The hybrid nanomaterials of CHIT/MWCNTs/GO/AuNPs were effectively enhanced electron-transfer and promoted the current response of azo colorants. The morphological characteristics of nanomaterials were observed high porosity SEM, EDX and transmission electron microscope TEM. Potential peak currents were found in the order of bare GCE > CHIT/GO > CHIT/GO/MWCNTs > CHIT/GO/MWCNTs/AuNPs. The modified-GCE showed optimum response when operated at  $25 \pm 1$  °C at pH 7 of PBS as working solution (0.1 M) for all tested colorants. Meanwhile, the scan rate was found of 0.35 V s<sup>-1</sup> for AM, 0.2 V s<sup>-1</sup> for AR, 0.25 V s<sup>-1</sup> for SY and 0.3 V s<sup>-1</sup> for TZ, within 5, 10, 30 and 50 sec, respectively. Under optimal conditions, the developed sensor was tested with different concentrations of standard AM, AR, SY and TZ in the ranged of 10 to 90 mg mL<sup>-1</sup>. The limits of detection and quantification ranges were found to be 0.032 to 0.5 mg mL<sup>-1</sup> and 0.096 to 0.92 mg mL<sup>-1</sup>, respectively. Sensitivity value of AM, AR, SY and TZ were calculated to be 0.01, 0.02, 0.06 and 0.05 μA/mg mL<sup>-1</sup>mm<sup>3</sup>, respectively. The developed sensor was successfully applied to determine AM, AR, SY and TZ in candy, jelly and soft drinks samples, and good recovery values range from 93.19 to 104.03 %. This simple and sensitive sensor offers low cost and rapid detection of specific colorants without skilled operators and sophisticated instruments.

**Keywords :**



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-08	
<b>PEREKA CODE</b>		P0086/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Antifungal Activity of Seaweed Extracts against Pathogenic Marine Oomycetes	
<b>PROJECT LEADER</b>		DR. MOHAMMAD TAMRIN BIN MOHAMAD LAL	
<b>PROJECT MEMBER</b>		DR. MOHAMMAD TAMRIN BIN MOHAMAD LAL, PROFESSOR MADYA DR. ANNITA YONG SEOK KIAN, SAITO HIROAKI, SURAINI LAJIMIN	

**Abstract :** The problems faced during seed production of marine crustaceans are associated with fungal infection. Fungal infection had hindered crustacean production especially at eggs and zoea stages. The fungus causes crab larvae to be susceptible to other secondary infection. The causative agents are *Lagenidium* spp., *Sirolopidium* spp., *Atkinsiella* spp. and *Haliphthoros* spp. for crabs. Chemical treatments such as trifluralin, formalin and malachite green are effective treatments but are toxic towards mud crab zoea. Seaweed has various secondary metabolites with wide biological activities. Seaweed extracts have shown positive results against human pathogen and other pathogenic fungus, but insufficient study was conducted against aquaculture pathogens.

The objectives of this study are to determine the antifungal potential of different seaweed extract and minimum inhibitory concentration (MIC) of seaweed extract against fungus. Furthermore, the fungicidal effects of seaweed extracts on fungus hyphae and zoospores production were determined. Finally, the toxicity of seaweed extracts were assess on Instar 2 *Artemia* sp.

Two seaweeds species (*Eucheuma cottonii* and *Caulerpa lentillifera*) were collected, washed, dried and grinded into powder form. Ethanol, methanol and water were used to extract seaweeds compounds. Finally, six different extracts were collected and labeled *Caulerpa lentillifera* extracts as C.L-E, C.L-M and C.L-W; while *Eucheuma cottonii* extracts as E.C-E, E.C-M and E.C-W. Each extracts was tested on four fungi strains, *L. thermophilum* IPMB 1401, *L. thermophilum* IPMB 1601, *H. sabahensis* IPMB 1402 and *H. milfordensis* IPMB 1603 for minimum inhibitory concentration (MIC) and antifungal assay.

Minimum inhibitory concentration test and antifungal bioassay conducted in this study concluded that *Eucheuma cottonii* ethanol extract (E.C-E) at 500 ppm is effective against IPMB 1401 and IPMB 1402 as it inhibited the fungal hyphae growth after 4 hours and 12 hours immersion respectively. The zoospore production was also reduced significantly after 12 hours immersion. *Caulerpa lentillifera* ethanol extract (C.L-E) at 750 ppm was able to inhibited fungal hyphae growth after 12 hours immersion and significantly reduces zoospore production after 12 hours immersion. *Caulerpa lentillifera* methanol extract (C.L-M) at 3000 ppm shows positive antifungal effect and reduces the fungal hyphae growth and zoospore production. Furthermore, seaweed extract toxicity test on *Artemia* sp. shows that all extract shows less than 5% mortality after 12 hours immersion. *Eucheuma cottonii* ethanol extract (E.C-E) at 500 ppm, *Caulerpa lentillifera* ethanol extract (C.L-E) at 750ppm and *Caulerpa lentillifera* methanol extract (C.L-M) at 3000 ppm were effective at inhibiting marine oomycetes growth. It is suggested that 12 hours immersion of seaweed extract is a suitable treatment for marine oomycetes in aquaculture.

This study does not only show potential alternative control measures for crab larvae health management, it can also contribute to the sustainable development and food security of Aquaculture industry. Seaweed extracts had shown to have antifungal effect against other pathogenic fungus. The findings of this study acts as a guideline for future study on alternative treatment for mud crab larvae fungal infection.

**Keywords :** Antifungal, Mud crab larvae, Lagenidiales, Seaweed Extracts, Oomycetes infection



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-09
<b>PEREKA CODE</b>		P0095/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		BIOCONVERSION OF LEAFY VEGETABLE WASTE TO AQUAFEED
<b>PROJECT LEADER</b>		DR. SUJJAT AL AZAD
<b>PROJECT MEMBER</b>		Mohammad Tamrin Bin Mohamad Lal

**Abstract :** Leafy vegetables are discarded during harvesting, marketing and processing assumed as non-edible. Generally leafy vegetables waste contained more than 90% of moisture, thus rapidly decomposed and causes threat in environment. These wastes can be converted into with microbes into a value added product with improved quality and quantity of proteins. The bio-processed product can be in aquaculture feed ingredients as supplementary feeds or as pond fertilizers. Thus microbes have high potential to convert agricultural and industrial wastes to produce valuable by-products with reducing waste that pollute the terrestrial ecosystem. Purple non-sulfur bacteria have extraordinary potential in purification of agro and industrial waste to produce single cell protein (SCP). These group of bacteria also contained high proteins, lipids, enzymes, vitamins, carotenoids, and other co-factors which are important for many biotechnology application, especially as feed supplement in aquaculture species. However, there is lack of information about *Afifella marina* strain ME (KC205142) in the utilization of leafy vegetable waste and converted into value added product. So this study will be focused on the efficacy of purple non-sulfur bacterium, *Afifella marina* strain ME on bioconversion of leafy vegetable waste into nutritionally enriched product for aquafeed production.

**Objectives:** To access nutritional status of leafy vegetable waste derived product in the bioconversion process; To evaluate efficacy of derived bio-converted product as aquaculture feed supplement.

Proximate compositions of the biomass of bioconversion leafy vegetable wastes were improved after 6 days with 30% inoculum of *Afifella marina*. In general 11.5% and 11% of increment in protein (%) and ash (%) respectively was obtained in the derived product. On the other hand, the fiber (%) in the bio-converted product was decreased by 23%. However the values of total lipids (%) did not change during the bioprocess. During feeding trial no significant differences were observed in the body weight gained (%), total length (cm), feed intake (g/fish/day), feed conversion ratio and survival (%) among the used diets. However lower feed intake and high feed conversion ratio were obtained while fishes were fed with diet D10 (commercial feed and 10% of the bio-converted product). The higher feed intake and lower feed conversion ratio were observed with diet D0 (only commercial feed) and D5 diet (commercial feed and 5% of the bio-converted product) respectively.

The leafy vegetable waste can be used in the production of single cell protein and value added products derived from the bioconversion of vegetable waste with locally isolated purple non-sulfur bacterium. In feeding trial with fish the bio-converted product has proven its efficacy in formulated feed.

**Keywords :** Leafy vegetable waste, Purple non-sulfur bacteria, Bioconversion, aquaculture feed.



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-10	
<b>PEREKA CODE</b>		P0097/2018	
<b>FPI</b>		FPL	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Development of healthy eggs through feed modification using local medicinal herbs	
<b>PROJECT LEADER</b>		PUAN ROHAIDA BINTI ABDUL RASID @ ABDUL RASHID	
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. NUR HARDY ABU DAUD,PUAN DEVINA DAVID,ENCIK BORHAN BIN ABDUL HAYA @ YAHYA,PROF. MADYA DR. KARTINI BINTI SAIBEH ,DR. JUPIKELY JAMES BIN SILIP,PROF. DR. ABD RAZAK BIN ALIMON,PROF. DR. ABD RAHMAN BIN MILAN,OUI PHAIK SIM	

**Abstract :** Modification of poultry diet by including natural sources such as from herbs and spices has been shown supply antioxidant effects, increase palatability, improve gut functions, and promote growth and hypo-lipidemic effects. It has been shown that the property of garlic (*Alium sativa*) increased egg production, reduced cholesterol content of serum and yolk, and also improved immune respon in layer.

To evaluate the effects of dietary supplementation of the three selected herbs at the level of 1% on performance in laying hens.

A total of 96 Bovans Brown laying hens, 32 weeks old were fed one of the four dietary treatments, (T1) basal diet (control), (T2) basal diet+turmeric rhizome powder (10g/kg), (T3) basal diet+vietnamese coriander powder leaves (10g/kg), and (T4) basal diet+Dayak onion powder (10g/kg). The experiment was conducted for 12 weeks in Completely Randomized Design. Feed and drinking water were given ad libitum. Hen-day egg production, egg mass, egg weight, body weight, feed intake, feed conversion efficiency, and mortality were measured.

Supplementation of the local medicinal herbs in laying hen diet could improve hen-day egg production and egg weight.

The local medicinal herbs not only has potential to improve production performance in animal but can produce a healthy and safe food product for human consumption.

**Keywords :** medicinal herb, supplement, laying hen



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-11	
<b>PEREKA CODE</b>		P0098/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Effects of boat and airplane noise on bird population in Gaya Island.	
<b>PROJECT LEADER</b>		DR. JEPHTE SOMPUUD	
<b>PROJECT MEMBER</b>		Emily A. Gilbert,Rimi Repin,Maklarin Lakim	

**Abstract :** Bird plays significant role to the ecosystem as the pollinator and seed disperser. It relies on its' acoustic signals as the tool for communication of which, can be affected by anthropogenic noise derived from the human activities. Nonetheless, there is still very limited study that looks on the effect of anthropogenic noise on bird population in Gaya Island.

This study aims to measure the effect of boat and airplane noise on bird population in that island.

Data collection was conducted at three sampling sites in the island for 3 months. Standard method of point count sampling and noise mapping were solely used during the surveys.

The Shannon Wiener diversity index and Spearman correlation analysis were used to analyze the obtained data. A total of 422 individuals from 24 species and 16 families were recorded during the survey. The result of the diversity index showed that the diversity of bird at low anthropogenic noise zone is higher with ( $H'=2.559$ ) as opposed to high anthropogenic noise zone with ( $H'=2.558$ ) although there was no significant difference of species diversity between these two zones. Interestingly, the correlation analysis showed that there is a negative correlation of the anthropogenic noise with the abundance and species richness of birds ( $r= -0.076$ ,  $p=0.000$ ) and it is very significant. Therefore, this study indicates that the anthropogenic noise does affect the bird population in Gaya Island.

To be developed as a tool to assess the carrying capacity of island tourism by using bird as a bioindicator.

**Keywords :** Avian community, anthropogenic noise, Gaya Island, Sabah



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-12	
<b>PEREKA CODE</b>		P0104/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Jellyfish Biodiversity and Proposal of a New Species of Chironex (Cubozoa), a Harmful Box Jellyfish in Sabah waters, Malaysia	
<b>PROJECT LEADER</b>		PROF. MADYA DR. BALU ALAGAR VENMATHI MARAN	
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSSITA SHAPAWI, Michael J. Yap, Chuan Chee Ho, Cheong Kai Ching	

**Abstract :** Jellyfish are considered as one of the important components of ecosystems. Jellyfishes, especially scyphozoan (Cnidaria) are members of plankton due to their typically large gelatinous bells. Some species are different in their color patterns that researchers in the past described them as different species, rendering their taxonomy chaotic. Scyphozoan jellyfishes play important roles in marine food webs, acting both as prey and predator of several animal groups. Large population blooms or outbreaks of some species create problem to human activities, such as fisheries, and negatively impact recruitment of fish stocks. Jellyfish aggregations are considered as environmental indicators of global climate change. Conversely, elegant and delicate gelatinous animals, especially medusae, can sometimes be positive for tourism. Several aquariums worldwide invest considerable sums in maintaining popular jellyfish exhibits, which highlight mythological, artistic, fascinating, and disgusting aspects of these beautiful animals. Jellyfishes are a common nuisance to beachgoers and swimmers worldwide. In Sabah, the months coinciding with the dry season are often associated with an increase in jellyfish populations in the coastal areas of the state. The majority of these jellyfish are not dangerous to humans, at most causing irritation and inflammation on the skin. However, the stings of cubozoan jellyfishes can lead to excruciating pain, Irukandji syndrome and in some cases, death. However, information on cubozoan jellyfish in Malaysia is scarce, and records of envenomation incidents involving them even scarcer. The stings of the jellyfish which pose the most danger to humans are those from the genus *Chironex*. However, to this date no members of the *Chironex* have been identified in Malaysia.

**Objectives:** Survey on the diversity and distribution of harmful and harmless jellyfish in Sabah waters; Taxonomical and systematics study to reveal the new species of jellyfish in Sabah waters; Investigate the relationship between jellyfish and associated fauna.

A total of 4 cubozoan specimens were collected and examined. They were identified as *Chironex* based on the structure of the pedialial bends, which have the spike structure associated with *Chironex* species. The pedialial bend of the specimen collected in Kota Kinabalu has a pointed tip with little to no concavity on the inside edge. This is opposed to the rose-thorn or upswept corniculum in *C. fleckeri*, as well as the volcanic shape of *C. yamaguchii* shape and bulbous & spike in *C. indrasaksajiae*. Hence, we propose a new species of *Chironex* (Cnidaria, Cubozoa). We have also identified *Chironex yamaguchii*, which is considered as a new record to Sabah. In addition, we recovered and identified number of jellyfish samples such as *Acromitus flagellatus*, *Aurilia* sp., *Catostylus townsendi*, *Lobonemoides robustus* and *Mastigia papua* (Cnidaria, Scyphozoa) and investigated their biodiversity. The associated fauna are identified as crab, fish, ophiroids, etc. The jellyfish *Anamalorhiza shawi* (Scyphozoa, Rhizostomae) is considered as a new record to Malaysia.

**Keywords :** jellyfish, diversity, distribution, new species, new record, *Chironex*, harmful



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-13	
<b>PEREKA CODE</b>		P0111/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		COMPARISON ON SIZE DISTRIBUTION OF <i>Holothuria scabra</i> BETWEEN HATCHERY AND WILD.	
<b>PROJECT LEADER</b>		DR. NAZIA BINTI ABDUL KADAR	
<b>PROJECT MEMBER</b>		DR. NAZIA BINTI ABDUL KADAR	

**Abstract :** Sea cucumbers or known as Holothurians are from the class Holothuroidea and from the phylum of Echinodermata. It can be found in most of marine waters and environment (Kerr & Kim, 2001). Malaysia is one of the sea cucumber exporters in the world. However the study on length and weight of *Holothuria scabra* in hatchery and wild is still lacking. This study was done to assess the length and weight of *Holothuria scabra* in Sabah from hatchery and wild. A total of 40 individuals of *Holothuria scabra* were collected from UMS hatchery and 51 individuals of *Holothuria scabra* were collected from the wild which was from Kg. Limau-limawan during the study to compare the length and weight. The hypotheses developed for this study were the size of *Holothuria scabra* in hatchery was smaller compared to the wild and factors affect the size distribution of *Holothuria scabra*.

1. To investigate the differences in size distribution of *Holothuria scabra* from hatchery and wild.
2. To determine the environmental factors that influences the size distribution and growth of *Holothuria scabra* between UMS hatchery and wild.

Samples were collected from the wild during low tide by hand picking. *H. scabra* in both hatchery and wild were counted and measured individually for length and weight. Water parameters were measured during the sampling period which were water temperature, dissolved oxygen, salinity and pH of the water using YSI multiparameters.

**Statistical Analysis**

The collected data was entered to calculate the mean and standard deviation of length and weight. The data of length and weight from hatchery and wild were analysed by using t-test to check on the significance difference between populations from hatchery and wild. The length and weight relationship were analysed using power function (Pauly, 1984).

$W = a L^b$ , where  $W$  = weight  
 $L$  = length  
 $a$  = intercept  
 $b$  = slope

The  $b$  value was used to determine the growth pattern of *H. scabra* in the hatchery and wild. If the value of  $b=3$ , then the growth is isometric whereas if the value  $b \neq 3$ , it showed an allometric growth.

- Determination of the environmental factors for the optimum growth and marketable size of sea cucumbers.
- The length-weight relationship of *Holothuria scabra* in the hatchery and wild showed negative allometric growth pattern.

Size distribution is important to study because it establish the management which include the minimum weight and size of capture. It is assume that the heavier the individuals of a given length, the better the physical conditions which the conditions will be used to for the length and weight relationship of the populations.

**Keywords :** *Holothuria scabra*, length-weight relationship, environmental factors, allometric, dissolved oxygen



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-14	
<b>PEREKA CODE</b>		P0117/2018	
<b>FPI</b>		FSMP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Resistant Sago Starch by Combined Modifications	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. LEE JAU SHYA	
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. LEE JAU SHYA ,DR. SIEW CHEE KIONG,PROF. MADYA DR. HASMADI BIN MAMAT,NG JIA QIN,PROFESSOR MADYA DR. PATRICIA @ PATRICIA CLEMENTINA MATANJUN	

**Abstract :** Starch is a major source of carbohydrate in human nutrition, also it is commonly used as thickening and gelling agent in food industry. Starch can be classified into the rapidly digestible starch (RDS), slowly digestible starch (SDS) and resistant starch (RS) based on the rate of digestion. Among these starch fractions, SDS and RS are reported to have important role in human nutrition. RS consumption has been related to the reduced postprandial glycaemic and insulinemic responses, which may have beneficial implications in the management of diabetes. Starch sources, processing treatments as well as modifications are the major factors that had great impact on the digestibility of starch. Various modification techniques such as physical, chemical and enzymatic processes are being explored to produce starches which contain higher RS or low in digestibility. In this study, several modification methods on the digestibility of sago starch were explored and compared. The physicochemical properties changes due to the modifications were also investigated. The ultimate aim was to identify the best combination methods to produce a sago starch with higher degree of undigestible fractions which can be used as a functional food ingredient to produce various kind of high dietary fibre foods. Sago starch was used in this study because it is an underutilized starch produced in Malaysia. This study helps to value-add the starch and diversify its applications particularly in food industry.

This project was aimed to explore and compare several methods in enhancing the enzyme-resistant fractions (low digestible) of sago starch. Among the specific objectives of the project are: a) To study the effect of acid methanol treatment coupled with hydrothermal treatment on in vitro digestibility and estimated glycaemic index of sago starch in both raw and gelatinized state; b) To study the effect of acid methanol treatment coupled with hydrothermal treatment on physicochemical properties of sago starch; c) To assess the effect of autoclaving and storage condition on in vitro digestibility, estimated glycaemic index and physicochemical properties of dual modified sago starch with high RS content.

Combined modification of acid methanol treatment and annealing was found to enhance the thermal stability and crystallinity in addition to the increase in the RS content and reduced GI (Glycaemic Index) of sago starch in both raw and gelatinized form ( $P < 0.05$ ). The enhancement in thermal stability also enable this modified starch to retain higher amount of RS (Resistant Starch) after autoclaving. However, this combined modification severely reduced the pasting viscosities and caused granular surface erosion. Storage after autoclaving increased the relative crystallinity, SDS (Slow Digestible Starch) and RS content of sago starch ( $P < 0.05$ ), in which the increment was more prominent in SDS content than in RS content. Pasting profile and morphology of starch were greatly altered when subjected to autoclaving-storage process. This study demonstrated that acid methanol treatment-annealing in combination with autoclaving-storage reduced the digestibility of sago starch by increasing both SDS and RS content. In a nut shell, this project has successfully identified the most effective method to lower the digestibility of sago starch. The effects of the modifications on the functional properties of the starch were also elucidated.

The low digestible sago starch produced from this project can be use as ingredient in producing various kind of food products. This modified starch offers better health benefit whereby the glycaemic index is lower than normal native sago starch. It can also be used as a food additive (the source of dietary fibre) in various food product.

**Keywords :** resistant starch, pasting properties, crystallinity, thermal behaviour



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-15			
<b>PEREKA CODE</b>		P0122/2018			
<b>FPI</b>		IPMB			
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Harvesting <i>Chaetoceros gracilis</i> by Flocculation Using Chitosan			
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. SITTI RAEHANAH BINTI MUHAMAD SHALEH			
<b>PROJECT MEMBER</b>		Wan Arina Azrinor Yamin, Rossita Shapawi, Ching Fui Fui, Ganesan Kandasamy			

**Abstract :** Flocculation is a method of harvesting microalgae by separating cells from the culture medium using flocculating agents. Ferric Chloride and alum are conventional flocculants that has the disadvantages of toxic residue. In this study, chitosan, a non-toxic flocculating agent is tested on *Chaetoceros gracilis* to determine the effect of culture conditions (salinity and cell density) towards the flocculation efficiency (FE). Marine diatom *C. gracilis* is cultured using Walne Media for 8 days in a temperature controlled room and illuminated for 12 hours. Four different salinities (20, 25, 30, 35 ppt), four different cell densities (0.5, 2, 4, 6 cells/ml), and six chitosan concentration (0, 15, 30, 45, 60, 75 ppm) are the parameters tested in this study. Measuring Cylinder Test method is used to achieve FE while zeta potential measurement is done to assess the surface charge of microalgae. From the results, salinity and cell density affects significantly the FE of the diatom. In 20 ppt culture, the FE was 89% after 50 minutes using 75 ppm of chitosan at a density of  $4 \times 10^6$  cells/ml. Growth conditions of the diatom culture and chitosan have strong influences on the flocculation performances. Chitosan can be an excellent flocculants for concentrating microalgae used in aquaculture and animal feed industry.

**Keywords :** algae growth, aquaculture, salinity, flocculants agent, zeta potential



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-16	
<b>PEREKA CODE</b>		P0124/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		CABARAN PEKEBUN KECIL KELAPA SAWIT DALAM PELAKSANAAN PERSIJILAN RSPO DI SABAH: KAJIAN KES DI DAERAH TELUPID	
<b>PROJECT LEADER</b>		DR. GAIM @ JAMES LUNKAPIS	
<b>PROJECT MEMBER</b>		ELISNA LATIK	

**Abstract** : The increase in demand for certified sustainable palm oil by large companies and the importing countries has prompted the Sabah State Government to follow the procedures set by the world palm oil industry to ensure that Sabah’s palm oil is accepted internationally. For this reason, in 2015, the Sabah Government announced that the Roundtable on Sustainable Palm Oil (RSPO) certification is mandatory for all oil palm producers in the state of Sabah. This include all private palm oil smallholders. To qualify for a palm oil certification, it must follow the principles and criteria that set out in the RSPO certification guidelines. The question remains whether smallholders are quiped to adhear regulations and procedures set by RSPO.

The objective of this study was to:

1. to understand the state of oil palm smallholders in the State of Sabah
2. to identify challenges faced by oil palm smallholders in achieving the certification standards.
3. to analysed ways to overcome challenges

Method used in this study was qualitative using in-depth interview with more then 30 palm oil smallholders in the District of Telupid and secondary data obtained from government departments, RSPO publications, journals and academic books.

Initial findings indicate that land ownership, management skills, financial resources and ability to observed state regulations are some of the main challenges faced by smallholders.

Findings from this reaseach are useful:

1. to gain understanding about the state of palm oil smallholders in the state of Sabah
2. to gain understanding about challenges faced by palm oil smallholders
3. to assist the state to ractify challenges faced by palm oil smallholders and to pave the way to achieving certification process
4. to assist the state to achieve palm oil certification for the State of Sabah

**Keywords** : certification, challenges, oil palm, RSPO, smallholders.



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-17
<b>PEREKA CODE</b>		P0142/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		GROWTH, LENGTH-WEIGHT RELATIONSHIPS AND CONDITION FACTOR OF NORMAL AND STUNTED GROWTH WHITELEG SHRIMP <i>Litopenaeus vannamei</i> CULTURED IN BRACKISHWATER POND
<b>PROJECT LEADER</b>		DR. MOHAMMAD TAMRIN BIN MOHAMAD LAL
<b>PROJECT MEMBER</b>		DR. MOHAMMAD TAMRIN BIN MOHAMAD LAL, MONTIRA LEELAKRIANGSAK, ROCELENE VERAANN RUKIMIN

**Abstract :** The assessment of health and condition of aquatic animals can be done using information obtained from length-weight relationship and condition factor analysis. The study of length-weight relationship and condition factor is well documented for some shrimp species in natural ecosystems, but, very limited at cultural condition.

Thus, the objective of this study is to compare the health and condition of normal and stunted growth shrimp cultured in same pond using length-weight relationship and condition factor.

In first sampling, shrimp sample (n=10) was collected biweekly from February - June 2017. The samples were collected from the same pond start from initial restocking ( 0.5 ± 0.1 cm (TL) and 0.1 ± 0.1 g (WBW)) period until harvest (14.1 ± 0.1 (TL) and 22.2 ± 0.1 g (WBW)). In second sampling, shrimps were randomly collected from different ponds and categorized to normal and stunted growth based on indication by farmer and the apparent size difference between each shrimps (stunted growth shrimp appeared smaller/shorter compared to normal shrimp). The total length (TL) and whole body weight (WBW) of each sample was recorded and analyzed for length-weight relationship and condition factor (K) analysis.

For normal shrimp, the specific growth rate is 5.1454 with b parameter value of 2.6935 and R<sup>2</sup> = 0.894, indicating positive relationship between the length and weight of shrimp. Statistical analysis showed both normal and stunted growth shrimp have positive length-weight relationship but in comparison, there is only significant difference between whole body weight of normal and stunted growth shrimp (p<0.05) and not in total length (p>0.05).

The information from this study provides an important baseline data for shrimp culture in Sabah, Malaysia.

**Keywords :** Shrimp Culture, Whiteleg Shrimp, Length-Weight Relationship



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-18	
<b>PEREKA CODE</b>		P0154/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Isolation of Pathogenic Bacteria <i>Vibrio</i> spp. Associated with Parasitic Copepod of Edible Hard Clam from Sabah, Malaysia	
<b>PROJECT LEADER</b>		PROF. MADYA DR. BALU ALAGAR VENMATHI MARAN	
<b>PROJECT MEMBER</b>		Sera Vaniqi, Ang Chun Yao, Anita Tahir, PROFESSOR MADYA DR. JULIAN RANSANGAN, DR. MOHAMMAD TAMRIN BIN MOHAMAD LAL	

**Abstract :** Among the exploited bivalve resources in Malaysia, clams are by far the most widely distributed and abundant due to realization of high nutritive value and importance in the economy of coastal fishing. The hard clam, *Meretrix meretrix* (Mollusca: Bivalvia, Veneridae) are found in intertidal zone along the coastal areas of Indo-West Pacific from East Africa to the Philippines, north to Japan and south to Indonesia. They feed on plankton and detritus. In Malaysia, after years of efforts contributed by the Malaysian Department of Fisheries in promoting marine bivalve culture, currently only true oysters (*Crassostrea belcheri*, *C. iredalei*), green-lipped mussel (*Perna viridis*) and blood cockle (*Tegillarca granosa*) are commercially farmed in Peninsular Malaysia, supplying to the local and export markets, but not hard clams. It is still in research & culture of hard clams. Parasites are an important tool in studies of ecology and fisheries biology. The examination of parasites at community level not only helps resolve the identification of potentially interacting species but also helps to increase and refine existing knowledge about the biology of both, predator and prey. At the expense of other parasitism often tends to result in demonstrable negative effects in the host. The presence of pathogenic bacteria in the worldwide marine environment raises concerns of human on food safety due to the latter potentially causing disease outbreaks depending on the environmental conditions. The major disease-causing agents of marine bivalves are viruses, bacteria, fungi, protozoans, helminths. In China, Thailand mortality of cultured hard clams were reported. It was due to the parasites and its associated pathogenic bacteria. In suspecting Malaysian environment, to develop the culture feasibility of hard clams, we investigated the presence of parasites and its associated pathogens in bivalves.

**Objectives:** 1. To screen the infestation of parasites on the commercially important edible hard clam *Meretrix meretrix* from Kota Kinabalu, Sabah; 2. To investigate the association of pathogenic bacteria *Vibrio* spp. with hard clams and to identify the pathogens.

The infestation of parasite was revealed through microscopical analysis. The infested parasitic copepod was identified as *Ostrincola portonoviensis* (Cyclopoida) based on its taxonomical features. In four months investigation of hard clams, the presence of these copepods were not much oscillating. In addition, the association of pathogenic bacteria with the parasitic copepod were confirmed with presence of four different isolates of *Vibrio* spp. Specifically *Vibrio tubiashii*, *V. alginolyticus*, *Vibrio antiquaris* and *V. parahaemolyticus* as well as one species of other bacteria namely *Serratia ureilytica* were revealed through microbiological and molecular analyses. 1. This is a first report on the parasitic copepod *Ostrincola portonoviensis* of a bivalve from Malaysia. It could cause deleterious effect to bivalves using its powerful oral appendages; 2. Confirmation of parasitic copepod association with at least five pathogenic bacteria namely, *Vibrio tubiashii*, *V. alginolyticus*, *Vibrio antiquaris*, *V. parahaemolyticus* and *Serratia ureilytica*; 3. This study served as baseline/foundation to understand the prevalence and intensity of infestation of parasite. The associated pathogen could subsequently, affect the growth of bivalves. The immune system of the hard clam could be weakened due to serious infection of parasite and pathogenic bacteria. 4) This study could support emerging concern on the food-borne diseases to human beings especially to fisher-folk communities. 5) This finding can be used to increase awareness in healthy eating habits among public, namely, bivalves must be obtained fresh and cooked properly prior to eat; 6) This finding could strongly support the local aqua farmers on parasites and its association with pathogens. They need to pay lot of attention before the farming of hard clam. Since it is not followed, until now, the culture of hard clam is not successful in Malaysia.

**Keywords :** First record, Parasitic Copepod, Hard clam, Bivalve, Mollusca, Kota Kinabalu, Aquaculture, Pathogenic Bacteria



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		RC-19
<b>PEREKA CODE</b>		P0166/2018
<b>FPI</b>		FPL
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Evaluation of Phenolic Compounds Properties in Honey of Three Species of Stingless Bees: A Comparison with Apis cerana Honey and Sugar
<b>PROJECT LEADER</b>		PROF. MADYA DR. SUZAN BENEDICK
<b>PROJECT MEMBER</b>		DR. JANUARIUS GOBILIK, DR. LING YEE SOON, DR. LUM MOK SAM, Robin Lim Ah Hee, Dexter Lee Jiunn Herna, Kimberly Ak Ador

**Abstract :** Phenolic compounds properties of Three Borneon stingless bee (kelulut) honey varieties (*Heterotrigona* sp., *Tetragonula* sp. and *Lepidotrigona* sp.) were compared with *Apis cerana* (lebah madu) honey and sugar using Vanquish™ Horizon UHPLC system (Thermo Fisher Scientific, Waltham, MA, USA) coupled with electrospray ionisation Impact II QTOF-mass spectrometry system (Bruker Daltonics, Bremen, Germany). Raw honey of stingless bee and honey bee were obtained from the beekeepers in Sabah, Malaysia. Besides sugar, honey was classified into three major groups of those from honey bee (*A. cerana*), Borneo stingless bees (*Heterotrigona itama*, *L. doipaensis* and *T. laeviceps*), and Peninsular Malaysia (*T. laeviceps*) from its phenolic compounds properties using principal component analyses. Although all of the stingless bee species honey was sourced from different locations (Moyog, Sipitang and Sandakan) in Sabah, the *H. itama* (1 and 2), *L. doipaensis* (1 and 2) and *T. laeviceps* (1) showed that its belong to same chemical characterisation. The honey produced by *T. laeviceps* in the Sabah, Borneo was very different from those honey obtained from the Peninsular Malaysia indicating that the geographical barrier also affects the contents of chemical properties in honey for the same species. Natural honey of stingless bees for the same geographical areas, which classified as closely related group. This finding indicates that honey classification by its entomological origin helps in honey identification thus reduces honey fraudulence and adulterated. Please refer to the uploaded document.

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Please refer to the uploaded document.

**Keywords :** Honey characterization, bees, phenolic compounds and entomological origin



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-20	
<b>PEREKA CODE</b>		P0182/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Comparison of Barnacle Epibiotic Load between the different Age Groups of Green Turtle ( <i>Chelonia mydas</i> ) foraging at Brunei Bay	
<b>PROJECT LEADER</b>		DR. RAFIDAH BINTI OTHMAN	
<b>PROJECT MEMBER</b>		Saifullah Arifin Jaaman, DR. JUANITA JOSEPH, DR. NAZIA BINTI ABDUL KADAR, Mohd Hafiz Nain Azman, Mohd Ridzwan Jusidin	

**Abstract :** Sea turtle are the only reptiles that migrate long distances between feeding grounds and hatching beaches. Migration has been demonstrated to have significant physiologic effects, where the turtle encounters many changes including physiological stresses, environments and animal population such as epibiototrophic organisms. The Green sea turtle (*Chelonia mydas*) ranges extend throughout tropical and subtropical seas around the world. Sampling was performed in January, April and August 2018 at seagrass meadow at the Malaysian bay of Brunei, Lawas to determine the rate of barnacle epibiotic load between the three age groups of Green turtle; i) adults, ii) sub-adults and iii) juveniles. Foraging Green turtles were captured (n= 56) by installing a net known as a kabat, which is a traditional fish-catching device, used by the local Malay-Brunei fisherman. Turtle were measured and each individual was classified as juveniles, subadults or adults based on the CCL data following Sterling et al. (2013). Infestations were ranked into 5 categories of infestation; absent, light, moderate, heavy and extremely heavy. Of all 56 Green turtles caught, 29 (49.2%) was classified as adult, 15 (24.4%) as subadults and 12 (20.3%) as juveniles. *Chelonibia testudinaria* was the only barnacle species found on the green turtle in this study. All 56 (100%) green turtles examined were infested by barnacles with the intensity was higher no significantly ( $P > 0.05$ ) in adults (41.52) as compared to subadults (40.87) and juveniles (37.25). While, all groups showed a significantly ( $P < 0.05$ ) higher percentage of turtle with extremely heavy barnacles infestation; 75.0% in juvenile, 66.7% in subadults and 62.1% in adults. Barnacles infestation will indicate the health status of these turtles and it could be suggested that extremely heavy barnacles infestation on turtle to be considered as parasites, instead of commensals.

**Keywords :**



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-21
<b>PEREKA CODE</b>		P0184/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Back to Basic: Economic Benefit and Production Efficiency of Integrated Livestock-Fish Farming Systems
<b>PROJECT LEADER</b>		DR. CHING FUI FUI @ FAIHANA CHING ABDULLAH
<b>PROJECT MEMBER</b>		PROFESSOR DR. SHIGEHARU SENOO, DR. CHING FUI FUI @ FAIHANA CHING ABDULLAH, PROFESSOR DR. ROSSITA SHAPAWI

**Abstract :** Tilapia production is concentrate mainly on Nile tilapia, *Oreochromis niloticus*. *O. niloticus* is the significant species for aquaculture production in many countries (FAO, 2002). This species is favoured by many farmers due to its ability to adapt wide range of environment. This Nile tilapia species is commercially high preference due to its reddish colour and their appearance which look alike with marine species, red sea bream. They have good-tasting flesh, and their consumption is not restricted in religious. Moreover, tilapia reaches sexual maturity faster, which is an advantage in aquaculture industry. For breeding, they breed in captivity without using any sex hormone (Watanable et al., 2002).

Integrated livestock fish farming and monoculture farming are two most common system widely practiced in Tilapia culture across South-East Asian region. Despite of its wide practice, the cost benefit and production efficiency of tilapia reared in both system is remained unknown.

The objective of this study was to compare cost benefit and production efficiency of tilapia reared under two different systems.

The experiment was conducted at the Fish Hatchery, Borneo Marine Research Institute of Universiti Malaysia Sabah (UMS) (Figure 3.1). Red tilapia, *Oreochromis niloticus* were chosen for this experiment with approximately 400 &ndash; 1000 g. The volume of both experimental tank were 20 tonnes, and fish were stocked at 50 tails respectively. The tank A was set as integrated livestock fish farming system, where red tilapia were carefully transferred band a poultry house was set adjacently above the tank A. Poultry house was housed 12 adult chickens. Meanwhile, tank B was the monoculture farming system, where the design, fish and water density were similarly prepared as tank A except poultry farming subsystem. Commercial tilapia grower pellet was used to feed the tilapia in both tanks A and B twice daily at 7:00 h and 16:00 h respectively up to satiation state. The feed intake was measured daily. In-situ parameters included temperature ( $^{\circ}\text{C}$ ), dissolved oxygen (mg/l), pH were recorded twice daily. The concentration of nutrient, total ammonia-nitrogen ( $\text{NH}_3\text{-N}$ ), nitrate ( $\text{NO}_3$ ), nitrite ( $\text{NO}_2$ ), and phosphate ( $\text{PO}_4^{3-}$ ) were tested 4 times in a month. Other than that chemical oxygen demand, COD and total faecal coliform were tested too. As for the ex-situ, water sample was taken from the both system on the seventh day and weekly interval. Total Dissolved Phosphorus (TDP), Total Ammonia Nitrogen (TAN) Analysis, Nitrite ( $\text{NO}_2$ ), Nitrate ( $\text{NO}_3$ ), Chemical Oxygen Demand (COD) were calculated. Faecal Coliforms was also analysed. The overall growth performance and cost analysis were done at the end of experiment.

The survival and body weight gained was found slightly higher in integrated livestock fish farming system with  $92 \pm 0.433\%$  and  $18.52 \pm 0.40\%$ . The larval production was significantly higher in the integrated farming system with  $6565 \pm 129$  tails compared to monoculture system with  $2685 \pm 125$  tails within a month period. Contrastingly, the GSI in monoculture farming system, 3.00 was higher than integrated farming system, 2.49. The condition factor K, obtained from integrated and monoculture farming system were  $2.158 \pm 0.731$  and  $1.898 \pm 0.167$  respectively. Ex-situ parameters, total ammonia-nitrogen ( $\text{NH}_3\text{-N}$ ), nitrite ( $\text{NO}_2\text{-N}$ ), nitrate ( $\text{NO}_3\text{-N}$ ) and total dissolved phosphorus ( $\text{PO}_4$ ) between integrated and monoculture farming system were comparable. The faecal coliforms count was higher in integrated farming system.

Cost effective and practical tilapia farming system to benefit Aquaculture industry

**Keywords :** Integrated livestock-fish farming, monoculture farming, red tilapia, sustainable



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		RC-22
<b>PEREKA CODE</b>		P0146/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Abundance and Diversity of Reef Fishes and Macroinvertebrates in Marudu Bay, Sabah, Malaysia
<b>PROJECT LEADER</b>		ENCIK MUHAMMAD ALI BIN SYED HUSSEIN
<b>PROJECT MEMBER</b>		CIK ZARINAH WAHEED, Mohd Firdaus Akmal bin Nooramli

**Abstract :** Located between two peninsulas at the northernmost part of Sabah, Marudu Bay is a semi enclosed bay shared between three districts: Kudat, Kota Marudu and Pitas. Part of the bay is also located within the Tun Mustapha Park, the largest marine protected area in Malaysia covering almost 900,000 hectares. Most of the reefs in Marudu Bay are fringing reefs with several patch reefs. The reefs and its diversity has not well documented. The local community in the surrounding area depends heavily on the marine resources through artisanal fisheries.

The objective of the study is to determine the abundance and diversity of reef fishes and macroinvertebrates found in Marudu Bay. A preliminary list of species of fish and invertebrate species in the reefs of Marudu Bay and its order of importance was prepared.

Surveys were conducted in August 2015 to determine the abundance and diversity of reef fish and macroinvertebrates within the bay. A total of 14 sites were surveyed between 3 m and 6 m depth using a transect-based Roving Diver method. A 100 m transect line was deployed and the survey was conducted within 5 m width of the transect line. All reef fishes and macroinvertebrates within the 500m<sup>2</sup> area were noted and photographed. Identification was made to the lowest taxa possible, Relative abundance of reef fishes and macroinvertebrates were determined based on the number of individuals estimated in the photographs.

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This will provide baseline information for Marudu Bay which could be utilised by stakeholders and policymakers in decision making which may impact the marine resources and communities dependant on the resources.

**Keywords :** Marine biodiversity, coral reef, Tun Mustapha Park



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-01	
<b>PEREKA CODE</b>		P0014/2018	
<b>FPI</b>		FSMP	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Edible Active Bio-Packaging	
<b>PROJECT LEADER</b>		DR. JOKO SULISTYO	
<b>PROJECT MEMBER</b>		Rafiani Binti Fauzi	

**Abstract :** Biopolymer constitute is an actual alternative for diminishing the use of non-degradable and non-renewable materials in the packaging industry. Among them, bacterial cellulose has been considered as one of the most promising candidates for future materials because of its low price, abundance, and thermoplastic behavior. Bacterial cellulose (BC) is an outstanding polymer extruded by *Acetobacter xylinum* to yield a 3D nanofibrillar pure cellulosic network. BC exhibits high tensile strength, in situ moldability, water holding capacity, biocompatibility and biodegradability. The use of BC as an active and/or intelligent food packaging is virtually unexploited. The concept of study on the use of BC films is to adsorb antimicrobial components to control foodborne pathogenic bacteria, without significantly losing its antimicrobial activity after autoclaving. In order to obtain active food packaging, biodegradable films have been added of functional additives, like antioxidant, antimicrobial and anti-diabetic agents, which may be migrated from the packaging to the food product (or the surrounding headspace) thus to extend the shelf life of food and to improve its safety and quality properties. In particular, antioxidant and anti-diabetic containing films could be used to prevent the oxidation damage of fatty foods. For this purpose, the use of natural compounds instead of synthetic additives is preferred due to the association of the last ones with adverse effects on human health. Polyphenols-rich extracts are considered potent films additives because help to prevent the lipid oxidation of foods and the microbial spoilage. Edible films have been added of polyphenol, flavonoid, or carotenoids extracts as bioactive compounds. The special features which indicates strategies of this work as expected our outcome is creating a novel prototype of edible active biopackaging composite consists of microbial processed elements including hydrocolloids (modified cassava starch and bacterial cellulose and bioactive compound derived from microbial secondary metabolites. With a share of 1.2 million tonnes (2011) compared to 280 million tonnes total plastic production per year, biobased plastics are still only beginning to penetrate the market. However, with increasing availability and a quickly expanding number of products in diverse market segments, biobased plastics will become a significant part of the plastics market in the long run. As an important part of the bioeconomy biobased plastics are a future lead market for the nation to offering job creation, development of rural areas and global export opportunities for innovative technologies. The cost of research and development still makes up for a share of investment in biobased plastics and has an impact on material and product prices. However, prices have continuously been decreasing over the last decade. With rising demand, increasing volumes of biobased plastics on the market and rising oil-prices, the costs for biobased plastics will be comparable with those for conventional plastic prices. Fields of application for biobased plastics and products are increasing steadily. Biobased plastics today are primarily found in the following market segments; (1) Packaging, (2) Food services, (3) Agriculture/horticulture, (4) Consumer electronics, (5) Pharmacy, (6) Consumer goods and household appliances. Currently packaging is the leading market segment. However, agriculture/horticulture are continuously coming up with new biobased plastics applications. Furthermore, biobased plastics will become broadly visible in the sports equipment and toys sectors and first applications are appearing in the pharmaceutical and medical industry.

**Keywords :** bacterial cellulose, modified starch, secondary metabolite, edible active packaging



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-02
<b>PEREKA CODE</b>		P0025/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Thermal properties of bambangan ( <i>Mangifera pajang</i> ) kernel fat and palm stearin blends as cocoa butter alternatives
<b>PROJECT LEADER</b>		DR. MD JAHURUL HAQUE AKANDA
<b>PROJECT MEMBER</b>		CIK NORLIZA BINTI JULMOHAMMAD,Azzatul,DR. MANSOOR ABDUL HAMID,PROFESSOR MADYA DR. LEE JAU SHYA ,DR. JUMARDI BIN ROSLAN,Liew Lee Ping,DR. MD JAHURUL HAQUE AKANDA,Norazlina,PROFESSOR DR. SHARIFUDIN MD. SHAARANI ,PROF. MADYA DR. HASMADI BIN MAMAT

**Abstract :** *Mangifera pajang* is a species of plant in the mango group that grow only in the Borneo Island including Sabah, Sarawak, Brunei and Kalimantan. The kernel of bambangan is about 27% of the total weight of the fruit that contains 9.9% of fat (Jahurul et al., 2018). Blending is a method that helps to modify the thermal and physicochemical properties as well as morphology of fats and oils in order to yield products with desired properties for food applications (Ramli et al., 2014; Jahurul et al., 2014b; Chiavaro, 2015; Bahari & Akoh, 2018). The aim of this study was to investigate the thermal properties of bambangan kernel fat (BKF) and palm stearin (PS) blends and their possibility as cocoa butter alternatives. The triglycerides, thermal behaviors, and crystal morphology of the BKF and PS blends were determined using high performance liquid chromatography (HPLC), differential scanning calorimetry (DSC), and polarized light microscope (PLM). All the blends had three main triglycerides such as 1,3-dipalmitoyl-2-oleoyl-glycerol, 1-palmitoyl-2-oleoyl-3-stearoyl-glycerol, and 1,3-distearoyl-2-oleoyl-glycerol. With the addition of PS, the melting onset temperatures decreased for both non-stabilized (&ndash;8.81 to &ndash;16.80 °C) and stabilized fat blends (&ndash;14.04 to &ndash;22.16 °C), whereas the melting offset temperatures shifted toward high temperatures for both non-stabilized (35.94 to 50.21 °C) and stabilized fat blends (48.35 to 53.16 °C). The crystallization onset temperatures increased for both non-stabilized (14.66 to 23.78 °C) and stabilized fat blends (15.46 to 26.89 °C), whereas the offset temperatures decreased with the addition of PS for non-stabilized (&ndash;15.68 to &ndash;22.02 °C) and stabilized fat blends (&ndash;15.73 to &ndash;22.38 °C). The stabilized fat blends showed highest melting and crystallization peak temperatures than non-stabilized fat blends. In the study of crystal morphology, the fat blends showed small spherulites with the diameter of 10&ndash;100 µm.

Vegetable fats and oils are normally obtained from oilseeds and are widely used in the food, pharmaceutical, cosmetic, and chemical industries. Among these sources, cocoa butter is highly appreciated because of its physical and chemical characteristics. BKF has the potential to provide a low-cost and high quality source of CB alternatives. To the best of the authors' knowledge, the blending effect of BKF and PS have not been studied yet. According to the Malaysian Palm Oil Council (MPOC), PS is obtained by fractionation of palm oil. PS is always traded at a discount compared to any other palm oil products; making it a cost effective ingredient for various applications. Blending of BKF with PS can lower the costs comparative to commercial CB, while having the desired taste of CB. Moreover, this blending method is a feasible alternative to expand the use of Malaysian PS through the development of new CBRs.

**Keywords :** Bambangan kernel fat, triglycerides, melting, crystallization, morphology



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-03
<b>PEREKA CODE</b>		P0064/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Jackittie, A VEGETARIAN MEAT PATTY FOR HEALTHY DIET
<b>PROJECT LEADER</b>		DR. MANSOOR ABDUL HAMID
<b>PROJECT MEMBER</b>		PHELLISIA NICOLE PATRICK,SAHIRAH SAMIRIN,WAN ASMA ANI WAN AZIZI,FELICIA LIU CHAI TSIA,LAU SIN HARN,AMNI AFIFIAH BINTANG OKIT,CHONG WEN XIN,HII HIONG CIEN,DR. AREZOO ERFANIAN,PROFESSOR DR. CHYE FOOK YEE

**Abstract :** JackittieTM is a vegetarian meatless patty made from jackfruit by-products that is serves to satisfy your taste buds with meat like sensation. It is 100% fruit-based product and yet it gives you meaty texture and flavour just like any meat-based patties in the markets. Intrigued by the idea to reduce meat consumption that is often linked to human degenerative chronic diseases, JackittieTM is a perfect choice for diehard carnivore and vegans that could be convinced to substitute a plant-based product that tastes just as good as meat. With veganism on the rise and more people are turning into meat free proteins, JackittieTM ensures people still get adequate protein in their diets to maintain healthy life style. It is packed with adequate protein, fibres and natural flavours.

The idea in developing the meat free patty spearheads the eco-friendly initiative to turn invaluable or underutilized jackfruit byproducts (seed and rinds) to a vegetarian food product as an effort to reduce accumulated byproducts, while at the same time create new and healthy food choice to the consumers. The development of this meatless patty not only encourages the consumption of plant-based food by non-vegetarian but most importantly could improve the experience of vegetarians and vegans towards food other than soy textured proteins.

This product suitable for burger industries with vegetable based ingredients, more healthy and competitive production cost. It also help to utilize the jack fruit part that normally underutilized and indirectly waste environment management.

**Keywords :**



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-04
<b>PEREKA CODE</b>		P0069/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Novel Medium for Cultivation of Ganoderma boninense Fruiting Bodies for Medicinal Benefits
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. CHONG KHIM PHIN
<b>PROJECT MEMBER</b>		Chan Yow San

**Abstract :** Ganoderma boninense is well recognized basal stem rot pathogen which caused severe losses to oil palm industry by reducing the fresh fruit bunches (FFB) yield and death of the infected trees. Nonetheless, recent research reported that G. boninense exhibits strong antimicrobial, antifungal, and antimalaria properties and potential in drug development as in-vivo toxicity studies also show the extracts are relatively safe for oral administration. Hence, the current innovation discloses an unique commercial cultivation medium using wood sawdust polypropylene bag with mineral, polyphenol and sugar-rich specially designed recipes in order to stimulate the growth of mycelium and formation of fruiting body to overcome the slow growth G. boninense. This is the first innovation of commercial cultivation medium of G. boninense for the continuous supply of G. boninense fruiting bodies for research and medicinal purposes.

Artificial cultivation of the Ganoderma boninense is crucial to provide the quantity and quality supply of this species. Although the fruiting bodies of G. boninense can be found in oil palm estates as a pathogen affecting the oil palm trees, but collection from the wild by morphology identification do not guarantee it is a boninense species. Furthermore, the quality of the mushroom may not consistent as the synthesis of the active ingredients in the fruiting body is highly affected by the growing environments. Thus, commercial cultivation is rational to increase the production of fruiting body at the same time achieves standardization of the quality by controlling the growing environments. The commercial potential is not only on the cultivation of the fruiting body, but it also include the development of the products derived from them such as supplement capsule, energy drinks, antimicrobial cream, facial and cosmetic products.

**Keywords :** Ganoderma boninense, fruiting body cultivation, commercial production, agro-industrial residues



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-05
<b>PEREKA CODE</b>		P0080/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		PRODUCTION OF A LOW CALORIE SWEETENER UNDER RECOMBINANT TECHNOLOGY : HEN EGG WHITE LYSOZYME
<b>PROJECT LEADER</b>		DR. CAHYO BUDIMAN
<b>PROJECT MEMBER</b>		HERMAN UMLAU LINDANG,NURZULAIHA ABD KARIM,DR. CAHYO BUDIMAN,PROFESSOR MADYA DR. AZWAN BIN AWANG

**Abstract :** Hen egg white of lysozyme (HEWL) is known to be a low calorie and safe sweetener promising sugar replacer for reduction of diabetes cases. Nevertheless, mass production of HEWL is considerably costly as hen egg is mostly used as daily foodstuff. Recombinant technology, whereby the gene encoding HEWL is expressed in another host cells, is considered as an alternative strategy to address this issue. However, HEWL is known so far to be functionally expressed in eukaryotic cells, which requires much higher cost than bacterial cells. Expression of HEWL in bacterial cells, particularly in *Escherichia coli*, is limited by at least two issues. Firstly, the compatibility of HEWL gene, which is originated from different kingdom, to be expressed in *E. coli*. Secondly, HEWL exhibits antibacterial activity, which leads to the death of *E. coli* upon the production. This innovation is dealing with these two issues to allow safe and success production of HEWL under recombinant system. The issue on gene compatibility was addressed through gene optimization focusing on improvement on ratio of GC content, frequency of codon usage and codon adaptation index. The improvement is aimed to align with the expression requirement of *E. coli*. In addition, the issue in bacterial activity was addressed by mutation on the active site of HEWL so that the activity was extremely reduced less than 1% of WT. This mutation was based on previous report that activity and sweetness of HEWL are independent. Altogether, mutated optimized HEWL gene, so-called as mo-HEWL, was then chemically synthesized, cloned into pET-system and expressed under *E. coli* system. The mo-HEWL was successfully expressed under *E. coli* and believed to elicit sweetness responses as WT. This demonstrates that mo-HEWL is considerably a promising innovation for mass-scale production of this sweet protein as a sugar replacer.

HEWL produced under this innovation has potency to share the current market of sugar in Malaysia. Malaysia's sugar demand is forecast to exceed 1.9 million tonnes a year by 2020 compared with 1.4 million tonnes presently, as the growth in the country's economy and population spurs consumption of sweeteners for food and beverage products. The current market price of sugar in Malaysia is about 1.50 - 2.00 RM/kg. The competitiveness of HEWL under this innovation lies into two issues : (1). market price for HEWL is likely to be lower due to efficient and less cost industrial production; (2). Campaign of healthy life style whereby reduction of sugar consumption is considered as unhealthy practices.

**Keywords :** hen egg white lysozyme; sweeteners; sugar; protein recombinant; diabetes



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-06	
<b>PEREKA CODE</b>		P0100/2018	
<b>FPI</b>		FSMP	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Chilli-Slice	
<b>PROJECT LEADER</b>		DR. MANSOOR ABDUL HAMID	
<b>PROJECT MEMBER</b>		PROFESSOR DR. CHYE FOOK YEE ,DR. AREZOO ERFANIAN,KHAIRUL BASYARIAH ABDUL RAHMAN SIDDIK,NURSYAHIDA BADRUL HISHAM,MUHAMMAD KAMIL ZAKARIA,FARAH LIYANA MOHD SAID,NUR ADILLA ABDURAHMAN,NURUL SYAHIRA JALI,AZA AZLIN SUPARMAN,FARAH NADIATUL SHAKILA AMIRUDDIN	

**Abstract :** Malaysian food is a unique melting pot of Asian kitchen that build with diverse and complex flavors of tastes and spiciness. Hot and spicy is often a branding that reflects consumer demands on the specialized tastes, open up the door for unlimited innovation. For this reason, chili sauce has been widely used in various types of cooking and preparation of daily meals. However, due to its semi liquid and viscous suspension form, it has limited application in foods such as overflow and causing food becomes soggy as well as difficulty to handle once it is opened. Chili-Slice is a new innovation of sauce that appears in solid slice form, making it convenient and mess free to be used. It is a perfect choice for outdoor activities such as picnics, barbeques, or even camping due to its self-stable characteristics. Chili-Slice is made from fresh chilies and 100% natural ingredients. It features convenient and easy to use anywhere that adds layer to the taste of our foods. This innovation provides a better choice of using spicy sauce for trendy consumers and revolutionizes how sauce to be applied in preparing meals. chili sauces industries can produce innovative product that more convinent and practical such as cheese slices. Each product as uniform spreadability of chili sauces, avoid messy problem and difficuluty to apply. this product benifical to burger and sandwiches industries. easy to handle for outdoor activities.

**Keywords :** silce chili sauce, low moisture content,drying process, no preservative, convinent



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-07
<b>PEREKA CODE</b>		P0101/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		I-Juice Bambang
<b>PROJECT LEADER</b>		DR. JUMARDI BIN ROSLAN
<b>PROJECT MEMBER</b>		DR. JUMARDI BIN ROSLAN,Sahirah binti Samirin,ENCIK AHMAD RIDUAN BIN BAHAUDDIN,PUAN SURYANI BINTI SAALLAH,Siti Rahimah binti Shahfee,DR. MD JAHURUL HAQUE AKANDA

**Abstract :** Bambang (Mangifera pajang) is an underutilized fruit that is found in the area of Malaysia (Sabah and Sarawak), Brunei, and Indonesia (Kalimantan). The bambang fruit size is three times larger than commercial mango (Mangifera indica). Fresh bambang fruit is perishable and cannot be stored over long periods. Production of fruit juice is a great effort to increase its utilization. The consumption of the fruit juices is increasing rapidly as they are convenient, nutritious and ready-to-drink. However, the availability of the bambang fruit is limited throughout the year. To meet the demand of the market, bambang juice can be converted into powder using spray dryer and thus could be stored for longer periods of time. The production of high quality bambang powder is required. Therefore, this study was aimed to investigate the quality of spray dried bambang powder in terms of the chemical and physical properties, as well as microstructural characteristics. Moisture content, water activity, bulk and particle density, porosity, color and particle morphology of the bambang powder which was prepared under optimum spray drying conditions were analyzed. Bambang powder exhibited low moisture content (4.54%) and water activity (0.31%). The bulk density, particle density and porosity of the spray dried powder were found to be 0.48 g/mL, 1.91 g/mL and 74.87%, respectively, indicating good powder stability. The bambang powder has bright color as regarded to the L\* (Brightness) and b\* (Yellowness) of 95.06 and 19.52, respectively. The dried powder exhibited smooth particle surface morphology with spherical shape as revealed by scanning electron microscopic analysis. The results obtained indicate that good quality bambang powder was successfully produced by spray drying which demonstrate the great potential of such product to be used in the food industry.

The development of the process that result in new product, preserving nutritional and some fruit sensory (flavor) characteristics is important to create alternative for adding value and helping in reducing post-harvest losses. Spray drying is a technique that can be applied to produce bambang powder with good functionality and characteristics. Besides having a much longer shelf-life due to considerable reduction in water content and less handling and transport costs, bambang powder also offers the flexibility for innovative formulation and new markets. For example, it can be used as a convenient replacement for juice concentrates and shelf-stable ingredients for health drinks, baby foods, sauces, marinades, confectionary, yogurt, ice cream, baked food and cereals. Development of high quality of bambang powder may match the demand for more natural flavored beverages and meet the great demand for natural fruit powders by the pharmaceutical industry.

**Keywords :** spray drying; bambang juice; bambang juice powder; chemical and physical properties; morphology



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-08
<b>PEREKA CODE</b>		P0107/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Moringa olifera an Alternative Diet for Harpacticoid Copepod Euterpina acutifrons
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. SITTI RAEHANAH BINTI MUHAMAD SHALEH
<b>PROJECT MEMBER</b>		SHIGE HARU SENOO, CHING FUI FUI, TAY RUI JING

**Abstract :** ABSTRACT

Harpacticoid copepod *Euterpina acutifrons* is a potential live feed for marine fish larvae due to its high nutritional profile and the broad range of sizes throughout their life stages. However, the mass production of this species remains exclusive due to its culture technique are not well establish and the knowledge gap on the biology and ecology. In this study, four different types of diets are tested to determine the effects of each diet on the population growth. The copepods used are isolated from Sepanggar Bay, Kota Kinabalu, Sabah. Pure cultures of the copepod are maintained in laboratory at temperature 25±20C. Marine diatom *Chaetoceros gracilis*, rice bran, spirulina powder and moringa powder are tested for the best diet for the copepod. The result shows that copepod fed with moringa powder has the highest population density (217±15) while spirulina powder shows the lowest with a population of only 40±5 individuals. In addition, there is no significant difference ( $P > 0.05$ ) between moringa powder and live microalgae *C. gracilis* in the effects on the population growth. As for the specific growth rate, moringa also shows the highest mean growth rate (0.308±0.018 day<sup>-1</sup>). This is probably due to the nutritional value of moringa powder that can meet the nutrient requirements of *E. acutifrons*. The protein and lipid content in moringa powder are 26% and 5% respectively. This work has proven that moringa powder that is locally abundant can be used as an alternative feed for *E. acutifrons* and replacing live microalgae that is expensive to produce.

Moringa powder could be used in aquaculture industry as supplement for live feed and as protein source in formulated diet (animal feed).

**Keywords :** Drumstick tree, zooplankton, aquaculture, nutrition, economic



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-09	
<b>PEREKA CODE</b>		P0113/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Trichoderma-Enriched Formulation from Food Wastes	
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE	
<b>PROJECT MEMBER</b>		Azriah Asis	

**Abstract :** Our Trichogreen formulation produced from food wastes using locally isolated effective two Trichoderma Strains (11B and SICCI) through newly designed economical bioreactor for microbial biomass production. The product has conducted several experimental assay such as physio-chemical changes (temperature, pH, moisture content, electrical conductivity, NPK, C;N) during the Trichoderma formulating process of food wastes which effectively converted as organic formulation called "Trichogreen formulation" requiring within 7 days which is extremely cheaper and faster than some of the conventional methods presently available. Our proven technology had shown that Trichogreen formulation costs only less than 1 RM per 1000 mL product.

After applying of Trichogreen formulation in field trail, we found several advantages such as best solution for acidic soils (initially a slightly acidic afterward alkaline; pH 4.10 to 7.5), balance the biological micro flora in soil (increased of 72% Trichoderma propagules in the soils), increase micronutrients values, plant root development and high yield production. These bioformulation materials are easy to degrade, and eco-friendly in nature and are categorized under nutrient-enriched.

The green technology of Trichogreen formulation is able to produce above 1080 Kg each month through our newly designed cost effective bioreactor (spending amount RM 12K for 600 L of biomass) with formulated suspending medium for maintaining the viability and stability of Trichoderma inoculant as compare to the existing commercial available fermentation bioreactors (750K). Adoption of this technology would enable to provide opportunity to create a new core of business, which is Trichogreen formulation, hence positively contribute to their income and also enhanced soil properties. Scientifically, adoption this technology would also provide an excellent opportunity to provide scientific evidences on the impact of industry and solved environmental issues.

**Keywords :** Trichoderma; Biofungicide; Food wastes; Biomass



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-10
<b>PEREKA CODE</b>		P0134/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		FUNCTIONAL DRINK FROM CUCUMIS SATIVUS L. (TIMUN JEPUN) ADDED WITH TUALANG HONEY
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. AMIR HUSNI BIN MOHD SHARIFF
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. AMIR HUSNI BIN MOHD SHARIFF, CIK UMI HARTINA BINTI MOHD RAZALI, NUR AQILAH BINTI ABDULLAH, MUHAMMAD YAZID BIN SAMATRA, PUTERI NOR ZULAIKHA BINTI MEGAT MOHAMED, NURELYSSA AZWA BINTI HAINUS, AIN NADHIRAH BINTI MOHD HASHIKIN

**Abstract :** The plantation of Cucumis sativus L. (cucumber) in Malaysia spreads on 4641Ha of land, has 4359Ha of harvest area and produces 97,621Mt according to Department of Agriculture Peninsular Malaysia in 2016 report totalling its production value to RM159,122. Specifically in Ranau, Sabah the cucumber plantation covers up to 14Ha of planted area which produces 164.70Mt of cucumbers. This causes an excess which go to waste at large portions. This project is the development of cucumber juice with honey. Particularly cucumber juice, it is mostly homemade yet to be commercialised in the Malaysian market. This will help the community in Ranau, Sabah to generate more income and prevent post-harvest loss of cucumbers. The benefits of cucumber is the ability to regulate blood pressure. Cucurbitacins present in Cucumis sativus L. exhibit cytotoxicity and anti-cancer activity. Then, cucurbitacins also exhibit wide ranges of in-vitro and in-vivo pharmacological effects and used as purgative, anti-inflammatory and anti-fertility agent. Plus also has excellent potential for cooling, healing and soothing irritated skin, whether it is caused by the sun, and effects of a cutaneous eruption. Cucumbers have the same pH level as our skin, a fact that helps repair our skin's protective and natural acid mantle. Honey contains antioxidant molecules that help in preventing dangerous diseases. It also helps to regulate our cholesterol in our body by lowering LDL cholesterol and significantly raising HDL which known as good cholesterol. When incorporated with cucumber as a juice it will provide a radical scavenger activity which will destroy ROS (Reactive oxidative Species) that will cause cancer and regulate our cholesterol level. Therefore, the hope of developing this "Cucumber Juice with Honey" as a functional drink will provide consumers with a product that will improve their wellbeing parallel with helping the community in Ranau to improve their state of economy. This product will be offered to the private sector for commercialisation and or individuals to penetrate the Malaysian market. We want this product to be sold as vendor drink for local and tourist consumption in the open market too. The local planters in Kundasang, Sabah will benefit too from the sales of their raw materials.

**Keywords :** Cucumis sativus L., Madu Tualang, Functional drink, Mineral-riched



**C : AGRICULTURE, FORESTRY AND FOOD**

<b>BOOTH NO.</b>		IC-11
<b>PEREKA CODE</b>		P0143/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Yak Gelatin-A Potential Source of Halal Alternative Ingredient
<b>PROJECT LEADER</b>		CIK UMI HARTINA BINTI MOHD RAZALI
<b>PROJECT MEMBER</b>		QHAIRUL ANNUAR HASBI, MUHAMMAD NAZRUL BIN MOHD YUSOFF, PROFESSOR DR. SHARIFUDIN MD. SHAARANI, ENCIK MOHD HAZIM BIN MOHD YUSOP, DR. NOR QHAIRUL IZZREEN BINTI MOHD NOOR, DR. JUMARDI BIN ROSLAN

**Abstract :** Owing to its remarkable qualities, widening scope of gelatin applications has been observed and this has provided lucrative growth of the gelatin market worldwide. Limitations pertaining to safety and religious issues with regards to traditional source of gelatin has increased attempts to search for alternatives. It is interesting to explore a group of bovine, known as unpolluted animal and regarded as green food, which is Yak, to be a new source of gelatin. This study is an attempt to evaluate the extractability and properties of gelatin obtained from the bones of Yak. The Yak bones are by-products of Yak meat processing from a major producer of Halal Yak meat and meat-based products in Gansu Province, China. Presently, the bones are commonly used for low value applications such as fertilizer. Therefore it is of great benefits to produce a high value ingredient such as gelatin from these by-products. Enzymatic extraction process was employed to increase the yield of gelatin and the gelatin was evaluated for its physico-chemical properties to determine the quality. The extracted gelatin properties were then compared with commercial gelatin from bovine source. Based on the findings, the Yak gelatin is seen to be potential to serve as functional ingredient in many food applications.

The raw material for gelatin production is supplied by a local company that marketed Halal Yak meat imported from their counterpart in China. This smart partnership opens up opportunity for local researchers and entrepreneurs to explore technology and processing for the production of gelatin locally and internationally. As a versatile hydrocolloid, growing demand of gelatin market yearly is driven by its multifunctional applications in food industry as gelling agent, stabilizer, thickener, emulsifier, encapsulation agent as well as film-forming agent. Production of local halal gelatin is of great importance to cater the needs of such applications.

**Keywords :** Gelatin, Yak bone, Halal ingredient



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-12			
<b>PEREKA CODE</b>		P0155/2018			
<b>FPI</b>		IPB			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Glucosamine Supplement from Waste Chicken Eggshell Membrane			
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE			
<b>PROJECT MEMBER</b>		Shafiquzzaman Siddiquee			

**Abstract :** Joint pain is a worldwide common complain among elderly and also young people specially sportsmen and travel trailers. Joint pain can be affected by many factors including arthritis, injury, tendinitis, break-down of the cartilage in the kneecap, infection of the bone and overuse of a joint. Chicken eggshell membrane (CEM) exhibited unique characteristics such as high porosity, good moisture retention and air permeability and also possesses good antibacterial and anti-inflammatory properties. CEM contained glucosaminoglycan including chondroitin and hyaluronic acid that can support joint comfort and flexibility. Besides, CEM also contained collagen (types I and IV) and other beneficial protein. Glucosaminoglycan from waste chicken eggshell membrane is produced by treating the membrane with non-hazardous chemical. The nano-sized of the CEM supplement helped maintaining overall joint health by providing a highly bioavailability source of glucosaminoglycan. The production of the nano-sized membrane applied a simple method without any use of hazardous chemical. Low production cost of glucosamine supplement and environmental friendly

**Keywords :** Waste Egg membrane, Glucosaminoglycan, Nanoparticles



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-13
<b>PEREKA CODE</b>		P0157/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Beauty Bar Soap from Waste Chicken Eggshell and Sabah Medicinal Plant
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE
<b>PROJECT MEMBER</b>		Shafiquzzaman Siddiquee, Nurfatihah Zamri, Ima Kasmita Mohd Bustaman

**Abstract :** Skin is the outer layer and the first defence of human body. It interacts readily with an oxidative environment and affecting skin aging such as UV light, stress, pollution and some genetic factors. The accumulation of the skin stress commonly changed skin structure and function. In the new generation, high demands for functional cosmetic including whitening, anti-wrinkle, and UV-light protection are increasing to counter oxidative stress in skin. Chicken Eggshell membrane inhibited skin aging and reduced the damage induced by UV-light and inflammation. The CEM is insoluble protein keratins which hold high resistance toward physical, chemical and biological reactions. Besides, collagen contain in eggshell membrane boost up the water content in stratum corneum and skin viscoelasticity. Soursop (annoba muricata) is a native plant to the tropical region and widely cultivated in Sabah. It is an evergreen broad leaves tree in which every part of the tree is useful and has medicinal properties. Soursop leaves are the most beneficial parts of the tree as it contains beneficial compounds that have ability to kill cancer cell and exhibit antimicrobial properties, parasitic infections, hypertension, rheumatism and even sedative. This beauty bar soap gives softness to your skin, antioxidants that keep free radicals properties that damage your skin at bay, whitening, good moisturiser and anti-antimicrobial properties. The beauty soap can be commercialized as functional cosmetic as eggshell membrane and traditional medicinal plant extract may benefit in reducing oxidative stress in skin. Low production cost and simple way produced beauty soap. Its raw materials are available throughout Malaysia.

**Keywords :** Medicinal Plant, Waste Eggshell, Bar Soap, Collagen



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-14
<b>PEREKA CODE</b>		P0162/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		M-BRImelain : Safe and low cost meat tenderizer
<b>PROJECT LEADER</b>		DR. CAHYO BUDIMAN
<b>PROJECT MEMBER</b>		DR. CAHYO BUDIMAN, PROFESSOR MADYA DR. VIJAY KUMAR A/L SUBBIAH, RAFIDA RAZALI

**Abstract :** Tenderness is one of the major factors contributing to consumers' perception of meat taste and tenderized meat can fetch better price in the market. It brings satisfactory to the consumer as it is easy to eat and more palatable. Different studies have made the use of calcium chloride, salts, phosphates and enzymes and reduce the amounts of detectable connective tissue chemically and physically. Bromelain is one of the known meat tenderizer that belongs to a group of protein digesting enzymes obtained from the stems and the fruits of pineapple. It can be an ideal meat tenderizer as it has specificity for collagen and elastin in connective tissue to tenderize the meat. Traditional knowledge leads people use pineapple or papaya leaf for tenderising meat which are currently not efficient anymore. Bromelain based- meat tenderisers are indeed commercially available in, mostly, powdered forms. However the products are quite expensive as the enzyme was produced from native pineapple through lengthy purification process. This innovation involves production of bromelain under heterologous expression system and prepared in "easy-to-use" form as a meat tenderiser. The effectiveness of this product for tenderising the meat was also confirmed through some experiments using beef confirming the applicability of this innovation.

M-BRImelain produced under this innovation has potency to share the current market of other meat tenderizer in Malaysia as it is an ideal meat tenderizer would be a proteolytic enzyme with specificity for collagen and elastin in connective tissue at the relatively low pH meat which would act either at low or high temperatures.

**Keywords :** bromelain, meat tenderizer, recombinant system, pineapple



## C : AGRICULTURE, FORESTRY AND FOOD

<b>BOOTH NO.</b>		IC-15
<b>PEREKA CODE</b>		P0194/2018
<b>FPI</b>		FSMP
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		AGRICULTURE, FORESTRY AND FOOD
<b>PROJECT TITLE</b>		Mulberry Collagen Powdered Drink Mix
<b>PROJECT LEADER</b>		CIK UMI HARTINA BINTI MOHD RAZALI
<b>PROJECT MEMBER</b>		MOHD IKRAM ABDULLAH,DR. NOR QHAIRUL IZZREEN BINTI MOHD NOOR,CIK AZNIZA BINTI MAHYUDIN,DR. FIFFY HANISDAH BINTI SAIKIM,DR. NOORAKMAR BINTI AB. WAHAB,PROFESSOR MADYA DR. AMIR HUSNI BIN MOHD SHARIFF

**Abstract :** Powdered drink mix of mulberries and collagen peptide was developed using local mulberries grown organically in Kg. Tudan, Sabah. It is prepared using syrup of mulberry fruits and collagen peptide of fish origin. The blended juice was then made into powdered drink mix by spray-drying. Production of powdered drink is a way to extend the shelf life of beverage products, thus increase its commercial value and allow ease of handling of product during packaging, storage and transportation. Development of this convenience functional drink is in line with current trend of consumer preference of healthy, beneficial and convenient food products. Mulberry is a source of iron, calcium, Vitamin A, C, E and K, folate, thiamine, pyridoxine, niacin and fiber. The antioxidants found in mulberry repairs free radicals and resveratrol, an antioxidant, is found plentiful in mulberries helps to promote heart health. In recent years production of collagen drink has becomes popular due to the well-promoted health and beauty benefits of such product. Collagen is predominantly rich in amino acid glycine, proline, hydroxyproline and lysine which support body metabolic functions and are essentials for the formation and repair of connective tissues, bone matrix and joint surfaces, as well as support of healthy skin. The incorporation of mulberry and fish collagen peptide as a drink provides abundance benefits as mulberry contains high amount of vitamin C that works in synergy with collagen to achieve all the mentioned health benefits. The powdered mix mulberry collagen drink is available as ready to drink beverages and can be kept longer for consumer convenience.

Powdered beverages are used mainly as convenience foods and have prolonged shelf life at room temperature. The rich in health benefits mulberry collagen powdered drink mix has huge market potential both locally and internationally. This local product would be added as one of Sabah locally produced and could contribute to boost up Sabah tourism. The product is regarded as high value, thus could increase the economy of local manufacturers. In addition this product can be marketed as local halal products and promoted to global halal market.

**Keywords :** Powdered drink, Mulberry, Fish collagen peptide

# **D : ENVIRONMENT, ENERGY AND ECOCAMPUS**



## D : ENVIRONMENT, ENERGY AND ECOCAMPUS

<b>BOOTH NO.</b>		RD-01
<b>PEREKA CODE</b>		P0002/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		GREEN ROOF PERFORMANCE STUDY USING RUBBER CRUMB, OIL PALM WASTE MATERIAL AND NATURAL FIBRES FOR STORMWATER RUNOFF MITIGATION
<b>PROJECT LEADER</b>		CIK SALINAH BTE DULLAH
<b>PROJECT MEMBER</b>		DR. SITI JAHARA BINTI MATLAN, DR. ASLINA BINTI BAHARUM, PUAN JANICE LYNN AYOG, DR. HARIMI DJAMILA, Nurul Shahadahtul Afizah bt. Asman, CIK SALINAH BTE DULLAH, DR. HIDAYATI BTE ASRAH

**Abstract :** The purpose of this study is to investigate the hydrological performance made from natural fibres (rubber crumbs, oil palm shell, polyfoam) as a filter and waste materials (coconut fibre, oil palm fibre, sugarcane fibres) as drainage layers in the green roof to mitigate stormwater runoff. The data were collected from different test bed under simulated rainfall with intensity of 200 mm/h and for slope (0%, 2%, 6%). Green roof layers design consists of waterproofing, drainage, filter, substrate and a vegetation layer. The plant used in the green roof is *Arachis pintoi*. Physical properties of materials were analysed to determine the diameter of fibres, density of materials and, water absorption. The result indicates that materials the water retention percentages are higher as the slope increases and after the layer is added. Green roof made from natural fibres and waste materials on hydrological performances showed that the water retention are within the range of 31.92% to 87.09% and peak attenuation of 55.85% to 94.83%. In conclusion, oil palm shell and sugarcane fibres combinations perform the best hydrologically on flat green roof. The roof slope of 6% will give the best hydrological performance compared to the roofs laid flat or on 2% slope.

The main goal of this study is to investigate the hydrological performance investigation of green roof for stormwater runoff mitigation under a rainfall simulator. In order to achieve the goal of the research, it was divided into three specific objectives. The objectives are as stated below:

- i. To investigate the hydrological performance of natural fibres as a filter and waste materials as drainage layers in the green roof.
- ii. To investigate the effects of roof slope on the hydrological performance of green roofs for all natural fibres and waste materials.
- iii. To determine the weights during dry and wet conditions of the green roofs of all natural fibres and waste materials as live loads on supporting beams.

The result indicates that materials the water retention percentages are higher as the slope increases. For all simulation testing of green roofs made from NF and RWM on hydrological performances, the water retention (RPI) are within the range of 31.92% to 87.09% and peak attenuation (PDPI) of 55.85% to 94.83%. In conclusion, oil palm shells and sugarcane fibres combinations perform the best hydrologically compared to other combinations on flat green roof. The roof slope of 6% will give the best hydrological performance compared to the roofs laid flat or on 2% slope. From the investigations of green roofs made from natural fibres and recycled waste materials, it can be concluded that it is possible to further develop the green roofs system for stormwater runoff mitigation.

Potential use:

1. External and internal thermal reduction using green roofs for thermal comforts in residential buildings
2. New roof gutter design criteria for green roof in the Malaysian Urban Stormwater Manual
3. The potential of using green roofs for rainwater harvesting in tropical regions.
4. Green roofs in reducing noise and air pollutions in urban catchments.

**Keywords :** green roof, natural fibre, waste material, hydrological performances



## D : ENVIRONMENT, ENERGY AND ECOCAMPUS

<b>BOOTH NO.</b>		RD-03
<b>PEREKA CODE</b>		P0037/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Temporal variation of phytoplankton community in the coastal waters of Kota Kinabalu
<b>PROJECT LEADER</b>		DR. TERUAKI YOSHIDA
<b>PROJECT MEMBER</b>		Brian Chong Wei Khong, DR. TERUAKI YOSHIDA

**Abstract :** Seasonality of phytoplankton community in temperate coastal waters is well documented due to distinct and predictable seasonal cycle of environmental parameters. However, phytoplankton succession in tropical regions are still poorly understood. Although changes in physical parameters are not as distinct seasonally as in temperate waters, tropical regions experience two seasons: the Northeast monsoon (NEM) and the Southwest monsoon (SWM), which are distinguished by the variation in rainfall.

The objectives of this study were: (1) to examine the diversity of the phytoplankton species, and (2) to examine the changes in their community composition in relation to the seasonal changes in environmental parameters.

Samples were collected off the coast of Kota Kinabalu at bi-weekly intervals from August 2017 to April 2018, covering the end of the SWM (August to September), the NEM (November to March) and the inter-monsoon periods (IMPs) in October and April.

The phytoplankton communities were identified to the lowest taxonomic level possible and cell densities were obtained, via stereomicroscopy.

A total of 30 diatom taxa from 17 genera, 18 taxa of dinoflagellates from 10 genera and one species of silicoflagellate were identified. Mean cell densities for diatoms and dinoflagellates during the SWM were 342 cells L<sup>-1</sup> and 8,011 cells L<sup>-1</sup>, respectively, while they were 2,949 cells L<sup>-1</sup> and 1,552 cells L<sup>-1</sup>, respectively during the NEM. Mean cell densities between the monsoons of diatoms were not significantly different ( $p = 0.302$ , one-way ANOVA) whereas that of dinoflagellates were significantly different ( $p = 0.002$ , one-way ANOVA). There was a shift from a dinoflagellate-dominant community observed between the end of August 2017 and early December 2017 (coinciding with a period of higher rainfall) to a diatom-dominant community observed between mid-December 2017 and April 2018 (coinciding with a period of lower rainfall). Principal component analysis (PCA) identified diatom abundance was positively associated with salinity whereas dinoflagellate abundance was positively associated with light intensity and temperature. Cluster analysis of the phytoplankton composition further revealed two characteristic community patterns: a dinoflagellate-dominant and a diatom-dominant community. The results of this study implicate that the changes in environmental parameters during the transition of the monsoons brought about the shift in the phytoplankton community composition.

Phytoplankton form the base of the marine food chain and determines the overall productivity of the ocean. Since phytoplankton ecology is still poorly studied in tropical regions, this study would contribute to the understanding of seasonal and annual variation of the phytoplankton community in tropical coastal waters.

The results from this study would also enable production estimates of commercially important fish, as well as predicting the seasonality of toxic harmful algal bloom species occurrences.

1. Enables establishment of estimation methods for overall fishery production in the region.
2. Enables establishment of early detection or prediction models for potentially harmful HAB species occurrences so that early mitigation measures could be taken before a bloom develops, thus preventing massive fish kills and threats to human health.
3. The study, therefore, contributes to the betterment of the fishery, aquaculture and tourism industries in the region.

**Keywords :** phytoplankton community, monsoonal variation, Sabah



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>	RD-04
<b>PEREKA CODE</b>	P0047/2018
<b>FPI</b>	PPST
<b>CATEGORY</b>	RESEARCH <b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>	DEVELOPMENT OF ALGORITHM FOR IMPROVING THE PERFORMANCE OF LASER LIGHT SCATTERING (LLS) SENSOR FOR PARTICULATE MATTER MONITORING
<b>PROJECT LEADER</b>	ENCIK JACKSON CHANG HIAN WUI
<b>PROJECT MEMBER</b>	ANGELO SEAN FRANCIS TIWON, PROFESSOR MADYA JUSTIN SENTIAN, PROFESSOR MADYA DR. JEDOL DAYOU, DR. CAROLYN MELISSA PAYUS, DR. CHEE FUEI PIEN

**Abstract :** Particulate matter (PM) mass concentrations is one of the key element in air quality assessment. Conventionally, this mass concentration is obtained through the gravimetric method which is also known as the Federal Reference Method (FRM) by the US Environmental Agency (EPA). While being known to accurately measure the PM mass concentration, the gravimetric method is known to be time consuming and not cost friendly as it requires high operating and maintenance cost. Due to this, interest towards optical based instrument for PM monitoring has risen in recent years as it is more cost friendly aside from having the ability to report real time PM concentration. However, previous studies have shown that these optical sensor may have few uncertainty hindering accurate estimation of particulate mass concentration. In this study, we have developed an algorithm to improve the performance of LLS instrument for particulate matter monitoring.

1. To Construct Particulate Matter Monitoring System Based on Laser Light Scattering Method.
2. To develop algorithm to improve the performance of Light Scattering Method for Particulate Matter Monitoring.
3. To monitor the spatial and temporal concentration of Particulate Matter in KK city.

This research study is conducted by firstly, developing a particulate Matter Monitoring System Based on Laser Light Scattering Method using low cost Consumer off the Shelf (COTS) electronics. Once the system is constructed, its performance will be tested in laboratory to evaluate its limit of detection, effect of particle size and composition as well as temperature and humidity on its performance. An algorithm will then be constructed to improve the overall performance of the PM monitoring system. The final stage of this study is to evaluate the system side by side with the Federal Equivalent Method (FRM) in field. This will validate the accuracy of the develop system.

A Particulate Matter Monitoring System Based on Laser Light Scattering Method was constructed and applied with improvement algorithm which were obtained through field and laboratory assessment.

This research is useful to improve the performance of existing low cost particulate matter sensor by applying the developed algorithm.

**Keywords :** particulate matter, algorithm, PM concentration, laser, light scattering



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-05	
<b>PEREKA CODE</b>		P0076/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Enhanced Mechanical Properties of Oil Palm Empty Fruit Bunch/ Poly(vinyl alcohol) Composite by Using Seawater Treatment	
<b>PROJECT LEADER</b>		DR. MOHD SANI BIN SARJADI	
<b>PROJECT MEMBER</b>		Siti Ayu Binti Aziz	

**Abstract :** Particularly, Malaysia and Indonesia are stated to be a producer of the most important crops of oil palm. However, most of the residues from the palm plantation are burnt instead of being used efficiently; hence affect the eco-system. As an alternative, oil palm fibre can be used as a filler in biocomposites.

The aim of this study is to characterize the mechanical, thermal, chemical and morphological effects of the seawater treated of oil palm empty fruit bunch single fibres and composites.

This study focused on a seawater treatment to enhance the mechanical properties of biocomposites in terms of the tensile strength. The biocomposites was characterized by using Universal Tensile Machine, Thermogravimetric analysis, Fourier Transform-Infrared Spectrophotometry and Scanning Electron Microscopy. In this research, seawater from Pulau Gaya and Pulau Tiga were carried out and used as nature treatment medium.

Based on the study, the optimization period for the seawater treatment were carried out on day-10, day-20, day-30 and day-40. The seawater used at different geographical areas known as Pulau Tiga and Pulau Gaya. The fibres of oil palm empty fruit bunch has been treated from day-3 until day-30, the different filler loading of 1%, 3% and 5% of untreated and treated composites were prepared using casting method.

Research goal is to create a biocomposites matrix, which is both financially and thermo-mechanically stable in line with conventional thermoplastic.

**Keywords :** Oil palm empty fruit bunch, seawater treatment and poly(vinyl alcohol).



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-06	
<b>PEREKA CODE</b>		P0083/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Global Warming: A surge in potential disease-causing bacterial strains	
<b>PROJECT LEADER</b>		PROFESSOR DR. CLEMENTE MICHAEL WONG VUI LING	
<b>PROJECT MEMBER</b>		Chua Chuen Yang, Prof. Dr. Cheah Yoke Kqueen	

**Abstract :** Global warming has led to increases in global surface temperatures by 0.6 degC since the late 19th century. This is expected to further increase by about 0.2 degC per decade, depending on greenhouse gas emissions. It remains unclear how an increase in environmental temperature would affect terrestrial bacteria, which are involved in various environmental processes such as biogeochemical cycling. This study therefore aims to determine soil bacterial diversity in the tropical regions and how they would respond towards one year of simulated warming using open top chambers. Three OTCs were set up at the sites in Kota Kinabalu, Sabah with control and treatment plots. Simulated warming using OTCs resulted in an increase in soil temperature by 0.81 to 1.15 degC. Based on the sequencing results obtained, soil bacterial diversity from the three sites in Kota Kinabalu was similar at phylum level, but differed slightly at the genus level. Potentially pathogenic bacteria groups were detected in the 0-month sampling of all three OTC sites. In terms of potentially pathogenic bacteria, Chlamydiae were detected at phylum level, while Bacillus and Mycobacterium spp. were detected at the genus level. After 12 months of simulated warming, there was a net increase in relative abundance of Chlamydiae by almost threefold (285.21%) at Site 1. As for Bacillus and Mycobacterium spp., both genera responded positively towards simulated warming with net increases in relative abundance at all OTC sites. Further monitoring will be required to determine whether a surge in the population of these bacterial groups will lead to an outbreak of diseases in the tropics. Overall, the results of this study provided an overview of soil bacterial diversity in Kota Kinabalu and how potentially pathogenic bacteria from this region would respond towards temperature rise.

Objectives: 1. To determine the effects of simulated warming on the diversity and relative abundance of soil bacteria from the tropics; 2. To determine the relative abundance of potentially pathogenic bacteria in tropical soils and how they respond towards simulated warming.

The results of this study showed that the soil bacterial diversity from the three sites in Kota Kinabalu, Sabah was similar at phylum level, but differed when compared at the genus level. Potentially pathogenic bacteria such as Bacillus and Mycobacterium spp. were shown to respond positively towards simulated warming, where both bacterial genera displayed net increases in relative abundance after 1 year. Further monitoring will be required to determine whether a surge in the population of these bacterial groups will lead to an outbreak of diseases in the tropical region.

**Keywords :** Global Warming, Tropical Soil, Open Top Chamber, Soil Bacterial Diversity, Pathogenic Bacteria



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-07	
<b>PEREKA CODE</b>		P0109/2018	
<b>FPI</b>		IPB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Electrochemical Sensor for Heavy Metal detection in Water	
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE	
<b>PROJECT MEMBER</b>		Gilbert Anak Ringgit	

**Abstract :** Zinc, manganese and aluminium are heavy metals found naturally in the environment and the toxicity spreading around the world. Because of the unpredictable of concentrations are involved by human activities (mining, pollution, etc.) and climate change. The excessive of heavy metals are resulted of various cancers due to high accumulation of heavy metals in the body known as bioaccumulation. Various detection techniques are available to detect the heavy metal ions with more complicated, well-trained, long time consuming and high maintenance cost.

The main objective of the study is to immobilize the heavy metal ions such as zinc, aluminium and manganese with gold modified electrode based on chitosan (CS), graphene oxide (GO) and gold nanoparticles (AuNPs) through cross-linking method. The purpose of study is to determine, the sensitivity, selectivity, storage stability, limit of detection (LOD) and linear concentration of range (LCR).

The development of electrochemical sensor method is aggregated with gold nanoparticles, graphene oxide (GO) and chitosan (AuNPs-GO-CS) in the presence of three heavy metal ions that measured by the current signal behaviors in cyclic voltammetry (CV) and differential pulse voltammetry (DPV).

The unmodified gold electrode able to detect 3 mg/L with linear concentration ranged from 2&ndash; 10 mg/L of zinc. The proposed detection methods were applied to detect the trace metal ions in drinking water based on drinking water quality standards such as 3 mg/L for zinc, 0.1 mg/L for manganese, and 0.2 mg/L for aluminium, respectively.

This research able to give the positive impact by increase the public awareness about the presence of hazardous trace elements in daily life.

**Keywords :** Heavy Metals; Drinking water; Electrochemical sensor; Cyclic Voltammetry



## D : ENVIRONMENT, ENERGY AND ECOCAMPUS

<b>BOOTH NO.</b>		RD-08	
<b>PEREKA CODE</b>		P0115/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Acidogenic batch fermentation of food waste at different organic loading rate for Phosphorus recovery	
<b>PROJECT LEADER</b>		DR. NEWATI WID	
<b>PROJECT MEMBER</b>		Rafidah Selaman, DR. NEWATI WID, PROFESSOR DR. MARCUS JOPONY	

**Abstract :** Anaerobic batch digestion is an attractive waste treatment practice in which both pollution control and nutrient recovery can be achieved. Acidogenic fermentation is one of the process that involves in anaerobic digestion. It occurs where the soluble substrates are converted to volatile fatty acids which in fact contribute to the phosphorus removal from substrates cell. Anaerobic digestion of food waste has been widely investigated for biogas recovery but limited study was performed on phosphorus recovery. Organic loading rate is one of the parameter in anaerobic digestion in an attempt to recover phosphorus as it highly influences the production of organic acids during acidogenesis. Therefore, this study was carried out to investigate phosphorus recovery at different ratio of organic loading rate (3.0, 3.5, 4.0, 4.5, 5.0) throughout the digestion process. The main substrate used in the anaerobic digestion was food waste which was segregated into different composition namely carbohydrates rich-food waste, fiber rich-food waste and protein rich-food waste. Palm oil mill effluent (POME) sludge was used as the inoculum to boost up the anaerobic digestion. The phosphorus recovery was performed using anaerobic batch digester at mesophilic (35±1°C) condition and pH6.0 for 15 days. The results indicate that 4.0 g/V.S/L was the optimum organic loading rate of phosphorus recovery from all composition, where protein rich-food waste shows the highest phosphorus recovery with 40.2%, followed by carbohydrate rich-food waste and fibre rich-food waste with 31.8% and 28.0%, respectively. This study is very significant in resources recovery from wastes as it provides information on a new approaches for phosphorus recovery from food waste.

To investigate phosphorus recovery at different ratio of organic loading rate (3.0, 3.5, 4.0, 4.5, 5.0 g volatile solids/L) throughout the acidogenic fermentation process.

Food waste (FW) was collected from nearby restaurant after lunch hour and then kept in a freezer at 4 °C prior to use. FW sample was ground to small size before the physicochemical properties were analysed. POME sludge was collected from oil palm factory located in Beaufort, Sabah. POME also kept in an incubator at 35 °C prior to use.

The samples of food waste and POME sludge were mixed at ratio of 1.0:2.0, where 1.0 for substrates (CRFW, FRFW and PRFW) and 2.0 for the inoculum (POME sludge). The mixed solution was put in a 1L of blue cap reagent bottle. The mixed sample was prepared with different of organic loading rate (OLR) as follow:

CRFW + POME sludge (OLR = 3.0, 3.5, 4.0, 4.5 and 5.0 g VS/L)

FRFW + POME sludge (OLR = 3.0, 3.5, 4.0, 4.5 and 5.0 g VS/L)

PRFW + + POME sludge (OLR = 3.0, 3.5, 4.0, 4.5 and 5.0 g VS/L)

The samples 1 to 3 are all prepared in duplicates.

The AD experimental was set-up using Duran bottle (Reactor) with a volume of 1L. The digestion tests was performed in a water bath at mesophilic conditions 35 °C (±1) for 15 days. Inoculum (POME sludge) was added at ratio 1.0:2.0 (substrates: inoculums) to boost up the co-AD process. Each of reactors was charged with CRFW with POME sludge at different values of OLR (3.0, 3.5, 4.0, 4.5 and 5.0 g VS/L), and repeated with FRFW and PRFW. The study ratio used VS percentages (%) for both substrates. The pH value controlled at value pH 6.0 which is the optimum pH for acidogenic digestion. The determination was performed for 15 days digestion time. At the same time, the supernatant about 5 mL collected from day 1 till 15 in order to determine the P values.

Figure 1 presents the results obtained from the study of CRFW at different OLR. The results show that CRFW at OLR= 4.0 recover the highest P with 4301.94 mg/L, followed by OLR = 4.5 and OLR= 5.0 with 4261.22 mg/L and

4200.67 mg/L, respectively. While the lowest by OLR = 3.5 and 3.0, managed to recover 4155.34 mg/L and 4011.01 mg/L, respectively. The optimum time to digest CRFW, FRFW and PRFW ranged between day 10-11. In Figure 2, FRFW with OLR = 4.0 show the highest of P recovery with values about 3780.93 mg/L. While, the second highest of P recovery was from OLR = 4.5 with values 3751.98 mg/L. Next, was the OLR = 5.0 (3740.65 mg/L). Followed by OLR = 3.5 and 3.0 with values 3721.37 mg/L and 3701.88 mg/L, respectively. Digestion range for all reactor were between day 8 to 10. As shown in Figure 3, the PRFW-X (OLR= 4.0) reported significantly higher of P values (5431.61 mg/L) compared to other compositions. Followed by PRFW-Y (OLR=4.5) (5408.89 mg/L) and PRFW-W (OLR=3.0) (5401.78 mg/L). While the lowest P recovery were in batch reactors PRFW-Z (OLR=5.0) (5393.34 mg/L) and PRFW-V(OLR=3.0) (5382.06 mg/L). The optimum digestion day were between day 7 to 10.

The recovered phosphorus can be precipitated in the form of struvite (magnesium ammonium phosphate), an organic slow-release fertiliser.

**Keywords :** Anaerobic batch digestion, Food waste, POME, Phosphorus recovery, Organic loading rate



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>	RD-09
<b>PEREKA CODE</b>	P0123/2018
<b>FPI</b>	FKJ
<b>CATEGORY</b>	RESEARCH <b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>	Energy Efficiency through Building Envelope in Malaysia and Singapore
<b>PROJECT LEADER</b>	DR. HARIMI DJAMILA
<b>PROJECT MEMBER</b>	

**Abstract :** The optimisation of fossil fuel consumption for generating electricity for building cooling is among the objectives set by most of the countries in the world. Currently, the American and European standards are among the most referred standards in the world. However both standards do not reflect climate specifications of some countries such as those located in the humid tropics. Therefore, it is important to address energy efficiency in a building under Malaysian Climate.

1. To address selected issues on energy efficiency through building envelope in Malaysia and Singapore.
2. To develop a new procedure for the estimation of OTTV.
3. To suggest some recommendations for the improvement of Malaysian and Singaporean energy efficiency standards.

The applied methodology to achieve objective 1 and 3 is based on extensive review on building energy efficiency in Malaysia, Singapore, few Asian countries, European and American standards. Two practical courses on energy efficiency for green building in Malaysia were also considered. A methodology for estimating OTTV was developed from the critical review.

1. The OTTV applies only to commercial and office buildings buildings. However, no standard is available for residential buildings.
2. In the estimation of OTTV, the whole window assembly should be considered.
3. The NFRC U-values, the ISO and EN U-values are modelled at very low outdoor temperature. This will result in lower window U-values in Malaysia and Singapore..
4. The ignorance of solar absorptance in the ETTV calculation may overestimates the overall envelope thermal performance of commercial buildings in Singapore.
5. The development and the validation of Test Reference Year (TRY) for both Malaysia and Singapore are of prime importance. TRY should be developed in Malaysia via climate zones.
6. A new procedure was developed for the estimation of OTTV.

The evaluation of factors affecting energy efficiency in air conditioned building will assist the government, managers and campus administrators to strategize their efforts towards optimizing the electricity usage in a building. The generated results from this study are expected to benefit greatly research community, GBI Malaysia, GreenRE Manager Malaysia, BCA-SGBC Green Building in Singapore. Design consultants will certainly benefit from the outcome of this study

**Keywords :** OTTV, ETTV, Malaysia, Singapore, Energy Efficiency, Heat Transfer, Building Envelope, Standards, ASHRAE, ISO



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-10	
<b>PEREKA CODE</b>		P0140/2018	
<b>FPI</b>		FKJ	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		The Effect of Weather Conditions, Dust, and Shade on the Performance of the Solar Panel in Kota Kinabalu, Malaysia	
<b>PROJECT LEADER</b>		DR. HARIMI DJAMILA	
<b>PROJECT MEMBER</b>		Noraima Afifah Binti Masak, Dk. Kursiah Rambarng Bt Abd. Halim, Ruszaimi Bin Kamsah	

**Abstract :** In recent years, solar panel has become popular in producing electricity. This effort has become great solution to overcome the finite fossil fuel and to mitigate environmental damaging problems. However, there are several factors that have affected the power output of the solar panel and degraded its performance. Solar panels are exposed to the outdoor environment to capture solar energy from the sun. Thus, dust will accumulate over solar panels. The solar panel needs also to be placed at the suitable location to prevent the shade and maximize solar panel performance. However, this is not possible due to land constraint. Besides, the solar insolation and other climatic factors also affect the performance of solar panel. Therefore, it is necessary to identify the output of solar panel system under various conditions.

The main objectives are as stated below:

1. To assess the effect of solar radiation, air temperature and relative humidity on the performance of polycrystalline solar panel.
2. To assess the effect of shading on the performance of polycrystalline solar panel.
3. To assess the effect of dust accumulation on the performance of polycrystalline solar panel.

The selected location to conduct this research study was at the parking lot in front of the main entrance of FKJ, UMS, Kota Kinabalu. Polycrystalline solar panel was used. The climatic data were collected from Sabah Meteorological station. The solar panel was placed in horizontal position for the prediction and evaluation of the performance of solar panel under various climatic conditions. In addition to that, several experiments were made by controlling the percentage of shading. In order to quantify the thickness of the dust layer, a clear plastic sheet was placed on the solar panel for surface protection. The dust was distributed evenly on the plastic sheet. The thickness of dust layer was estimated by using the Scanning electron Microscope (SEM). All experiments were executed by measuring the output voltage and current produced by solar PV using VOM Multimeter.

The solar radiation has a strong positive association with the efficiency of the solar panel of 0.97. In several cases, solar radiation reached its highest values when air temperature reached its maximum. The correlation coefficient was 0.91. The situation is reversed with relative humidity having negative correlation coefficient of -0.97.

The efficiency of solar panel reduced considerably due to shad. The power output of the solar panel at about 17% produced 2.3W, it decreased to 1.1W when solar panel was fully shaded. The correlation between the power output and shading ratio was about 0.79.

When the dust was evenly distributed all over the solar panel, the efficiency of solar panel due to solar radiation was 70% to 87%. It was found that dust affected little the performance of solar panel when solar radiation reached its minimum. The effect of dust accumulation in the presence of dust was not significant.

The evaluation of factors affecting the efficiency of PV helps in managing the electricity generated by solar panel according to the weather conditions. The generated results from this study are expected to benefit design consultants of solar panel in Kota Kinabalu and research community.

**Keywords :** Solar Panel, efficiency, Polycrystalline, Weather, Shad, Dust, Kota Kinabalu



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-11	
<b>PEREKA CODE</b>		P0167/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Classifying natural water with Forel-Ule colour index and its correlation with water clarity and suspended particulate matter.	
<b>PROJECT LEADER</b>		DR. MADIIHAH BINTI JAFAR SIDIK @ JAFFAR	
<b>PROJECT MEMBER</b>		Nurzaliah Ali	

**Abstract :** Colour of seawater is an essential tool in understanding the surface water of marine ecosystem and its processes. The colour of the water in coastal water depends upon the optical properties of water and of the materials dissolved and suspended in the water column. Suspended particulate matter (SPM) consists organic particulate (plankton) and inorganic matter. The inorganic fraction of SPM or known as mineral particulate matter (MSS) is optically significant seawater constituent influencing the colour of seawater in coastal water. Forel-Ule (FU) color comparator scale is a traditional method that has been used to classify the colour of natural waters like seas, lakes and rivers since the end of the 19th century. The robustness of FU colour comparator scale made it still applicable globally and intensively in classifying color of seawater. A Forel-Ule Index (FUI) scale is used to distinguish the apparent colour of different natural water masses.

1. to investigate the relationship between Forel-Ule index with suspended particulate matter (organic and inorganic component) in study area.
2. to investigate the relationship between water clarity with suspended particulate matter (organic and inorganic component) in study area.

The study area is in Salut-Mengkabong Lagoon, where known as aquaculture activities area of oyster farming. Correlation analyses between FUI with water clarity (Secchi depth) and SPM (Chlorophyll and MSS concentration) have been conducted on May, June and July 2018 during spring tides at 15 stations throughout Salut-Mengkabong Lagoon.

Based on 3-month average of measured parameters, FUI showed strongly exponential correlated with Secchi depth, which is a proxy of water clarity ( $R^2=0.97$ ). SPM has a good correlation with Secchi depth and FUI compared to MSS and chlorophyll concentration.

In conclusion, the MSS concentration showed more manipulating the colour of water and its water clarity in Mengkabong Lagoon area. FUI value measured in the study area can be used to formulating regional algorithm to classify water quality based on colour of the water.

**Keywords :** Forel-Ule colour comparator scale, suspended particulate matter, Secchi depth, chlorophyll, mineral suspended sediment



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		RD-12	
<b>PEREKA CODE</b>		P0175/2018	
<b>FPI</b>		IPMB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Nematode descriptors as a new approach for the classification of ecological quality (EcoQ) of the Malaysian coasts	
<b>PROJECT LEADER</b>		DR. CHEN CHENG ANN	
<b>PROJECT MEMBER</b>		DR. CHEN CHENG ANN, DR SOO CHEN LIN, Professor Dr MARIA BALSAMO, DR FEDERICA SEMPRUCCI	

**Abstract :** Free-living marine nematodes were employed in ecological studies and were proven to be suitable bioindicators of pollution-induced effects on the benthic domain. This study represents the first attempt to use nematode descriptors in order to assign ecological quality (EcoQ) status to areas along the Sarawak coasts, thus integrating the methods actually applied by the Department of Environment (DOE). Three nematode parameters, i.e. colonizer persistence percentage, maturity index (MI), and Shannon diversity index (H'), were used, as they are recognized as the best descriptors of EcoQ status in coastal habitats. The thresholds applied to the nematode parameters for the Sarawak study sites showed predominantly moderate and bad EcoQ status, with the exception of the Similajau site, which being close to a national park was found to have good EcoQ. The sites with the worst EcoQ were characterized by low salinity values, suggesting riverine inflows as a primary source of pollution, likely from the discharge of untreated wastes. This was confirmed by both the H and MI indices, which showed a close positive relation with salinity.

Results obtained for the Niah site may suggest that traces of pollution were left in the nematode assemblages that could not be detected from other parameters of the water column. This investigation shows that analysis of nematode descriptors could be effectively applied to ecological assessment criteria within environmental policies of rapid growth countries such as Malaysia. Furthermore, it certainly suggests the need for management and conservation actions in the Sarawak coasts aimed at more sustainable use of the marine resources to prevent the loss of biodiversity.

**Objectives:** 1) to use nematode descriptors in order to assess EcoQ status of the Sarawak coastal area from the Punang to the Sematan rivers; 2) to offer a possible new tool for evaluating the anthropogenic impact in Malaysian ecosystems; and 3) to calibrate the nematode descriptors for tropical regions.

**Potential use:** 1. Identify the potential nematode species for the usage in aquaculture industry; 2. Usage of nematode descriptors could be effectively applied to ecological assessment criteria within environmental policies of rapid growth countries such as Malaysia.

**Keywords :** meiobenthos, nematode, Malaysia, pollution, EcoQ



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		ID-01
<b>PEREKA CODE</b>		P0045/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		AUTOMATED WASTE IDENTIFICATION AND SEGREGATION USING PROXIMITY PRINCIPLE
<b>PROJECT LEADER</b>		DR. CHEE FUEI PIEN
<b>PROJECT MEMBER</b>		ENCIK JACKSON CHANG HIAN WUI, PROFESSOR MADYA DR. JEDOL DAYOU, DR. ASMAHANI BINTI AWANG, MUHAMMAD IZZUDDIN BIN RUMALING

**Abstract :** Solid waste segregation is not something new to our society; in fact, it's a must in every particular area. The solid waste disposal, assortment and sorting are major issues in several developing countries including Malaysia. Malaysia produces a lot of solid wastes every day while the combined solid wastes are gathered from offices, households, commercial and premises don't seem to be well-handled. In Malaysia, disposal of wastes is commercially done by dumping as most of the individuals inactive to recycle for the explanation that they feel it is an excessive work for them to try and do. Due to the limitation of the cost, promoting the microcontroller solid waste segregation is therefore crucial. The main motivation for this project is to create an automotive system that capable to sort out five type of elements including plastic, paper, ferrous tin, aluminum tin and glass. This developed system is an integration of proximity sensors while the mechanical part of this project involves the transportation of the refuses is operated by a conveyor system together with the servo motors. The developed system offers a low cost alternative for solid waste segregation technology and convenience to every user. Current waste segregation system for recycling is costly and requires a lot of manpower. In order to curb these problems in waste disposal, building a low-cost automated solid waste segregation system is very crucial. This system is an automatic and low-cost alternative to replace the current waste segregation system. Different proximity sensors are installed to identify different types of solid waste. These sensors work based on various properties of solid wastes such as capacitance, transparency, and ferromagnetism. By identifying the solid wastes, it can be transported automatically to respective bins using conveyor belt and servo motors.

**Keywords :** Waste segregation system, proximity principle, low-cost, automatic



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		ID-02
<b>PEREKA CODE</b>		P0128/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		INNOVATION <b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		ACTIVE ZONE-YIELD COMPOSTER
<b>PROJECT LEADER</b>		DR. ABU ZAHRIM BIN YASER
<b>PROJECT MEMBER</b>		DR. SARIAH BINTI SAALAH,Ahmad Fathuddin Fikri Mohamad ,DR. MARIANI BINTI RAJIN,PUAN AZREEN BINTI IBRAHIM

**Abstract :** ACTIVE ZONE-YIELD COMPOSTER IS AN ENCLOSED SYSTEM TO CONVERT FOOD WASTE INTO SOIL CONDITIONER. THE ENCLOSED SYSTEM WILL PREVENT THE PROCESS FROM RAT, BAD WHEATHER AND ODOUR THE COMPOSTER CONSISTS OF TWO COMPARTMENTS FOR TURNING PROCESS (ACTIVE ZONE COMPARTMENT) AND A COMPARTMENT FOR MATURING PROCESS (YIELD COMPARTMENT). &quot;YIELD&quot; COMPARTMENT ALSO USEFUL FOR FURTHER DEGRADATION OF NON-ODOUROUS MATERIAL. EACH COMPARTMENT IS EQUIPPED WITH HOLE TO INDUCE PASSIVE AERATION. DUAL AERATION MECHANISM I.E. ACTIVE TURNING AND PASSIVE AERATION COULD ENHANCE THE BIODEGRADATION OF FOOD WASTE WITH MINIMUM HUMAN ENERGY FOR TURNING PROCESS.

THE ACTIVE ZONE-YIELD COMPOSTER COULD BE INSTALLED TO PRIVATE HOUSES, CAMPUS, SCHOOL AS WELL AS RESTAURANT.

**BENEFIT:**

- ODOUR FREE PROCESS
- ENCLOSED SYSTEM, FREE FROM RAT AND BAD WHEATHER
- NO EXTERNAL INNOCULANT NEEDED

**Keywords :** ACTIVE ZONE-YIELD COMPOSTER, SOIL CONDITIONER



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		ID-03
<b>PEREKA CODE</b>		P0136/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Pet food: a Solution for Food Wastes Management in Penjara Pusat Kota Kinabalu
<b>PROJECT LEADER</b>		DR. MD. SHAFIQUZZAMAN SIDDIQUEE
<b>PROJECT MEMBER</b>		Shafiquzzaman Siddiquee,Ummi Afiqah Silon,Radhzlee Bin Roslee,Blue Ocean Hibrid Penjara Pusat Kota Kinabalu

**Abstract :** Food wastes become a major concern in Penjara Pusat Kota Kinabalu when improperly managements, due to faster rotten and released unpleasant smells in the surrounding of Penjara area. It is bothersome especially when involving large scale cooking preparation for above 3000 male prisoner's food. There are approximately 600 kg of food wastes received per day including raw wastes nearly 200 kg from fish, 150 kg from vegetables, 100 kg from fruit and above 150 kg from cooked wastes. The kitchen and cooked food wastes normally thrown away into the dumpster, it has arisen environment problem because of produced faster rotten smells and created unhealthy environment. So it is needed a faster method to solve the current issue. In this circumstance our research teams came an innovative idea turn the wastes into pet food so it can an edible for the animal. Food wastes always collected and cleaned thoroughly before process of cooking for producing animal feed. This feed contained has essential nutrient values suc as carbohydrate from the rice, protein and calcium from meat, fish, chicken and their bone and also fibre and vitamins from fruits and vegetables. We are successfully produced the pet food; it is not only benefited the animal feeds but also creating healthy environment in the prison area (no need dealing with the rotten smells that come from wastes material). In addition, no hazardous chemicals are involved in the process of making the pet food so it will not harm to cats, dogs and fish. This food wastes became a valuable pet food and maintained all essential nutrient values that can make animal healthy. After conducting all the necessary analysis, this pet food has high nutrient value that should be sold in the market under the brand name of " Alphamate". This pet food can be consumed by cats, dogs as well as fish.

**Keywords :** Food wastes; Animal feeds; balance diet; Essential nutrient values



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>		ID-04
<b>PEREKA CODE</b>		P0183/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>		Low Cost Facility Monitoring Using Internet of Thing (IoT)
<b>PROJECT LEADER</b>		ENCIK NORDIN SAAD
<b>PROJECT MEMBER</b>		ENCIK NORDIN SAAD, DR. AZALI BIN SAUDI, PUAN SHALIZA HAYATI A. WAHAB, Hanif Rahaizat Ramli

**Abstract :** The ESP8266 or Wemos D1 Mini is an amazing Wi-Fi chip that can be used in several home automation applications. In this writing, we are using it to control a lamp remotely via Wi-Fi through a system and display DHT11 temperature and humidity sensor data on the web-based system. By using a local web server and a running web-based system on my computer to control devices remotely. Here, we are going to use the onboard processor of the ESP8266 with a relay shield and DHT11 sensor shield to send data and control the lamp over wireless network, that will serve a responsive and user-friendly interface system page from which allowing the user to will be able to control the lamp. And we will even make this interface responsive, so it can also be used with multiple different type of devices such as phone or tablet and be able to access the system and control the prototype remotely over wireless network from anywhere

Can be marketed to the sectors that requires low cost solutions in facility monitoring. It also serve the purpose for achieving eco-campus or environment.

**Keywords :** Internet of Things, eco-campus, facility monitoring



**D : ENVIRONMENT, ENERGY AND ECOCAMPUS**

<b>BOOTH NO.</b>	ID-05
<b>PEREKA CODE</b>	P0204/2018
<b>FPI</b>	IPMB
<b>CATEGORY</b>	INNOVATION <b>CLASSIFICATION</b>   ENVIRONMENT, ENERGY AND ECOCAMPUS
<b>PROJECT TITLE</b>	Taking land-based IMTA to the sea: saving energy and resources, & reducing the carbon footprint
<b>PROJECT LEADER</b>	DR. ABENTIN BIN ESTIM
<b>PROJECT MEMBER</b>	DR. ABENTIN BIN ESTIM, DR. SUJJAT AL AZAD, Mohd Syukrie Ahmad, PROFESSOR DR. SALEEM MUSTAFA

**Abstract :** Food production is the source of one-third of gas emissions. Reducing the carbon footprint of agriculture is now considered as central to limiting the climate change (Thornton, 2012). With food security remaining one of the biggest challenges in the world today, food production will have to increase. The concern is that it will accelerate the climate change by adding more than level of 9,800–16,900 megatonnes of carbon dioxide equivalent that the world has been releasing into the atmosphere (Gilbert, 2012) which will limit its growth. Switching over to farming practices is the option available for food security. In this context aquaculture assumes importance, and the model suggested is sea-based Integrated Multi-Trophic Aquaculture (IMTA). This study was based on an IMTA design that combined: Tiger grouper x giant grouper hybrid (as fed species), green mussel (as organic extractive) and seaweed (as inorganic extractive). This system emulated the mechanisms that nature uses to produce seafood using renewable energy and natural resources.

Aquaculture has a significant economic contribution in Malaysia, especially Sabah where seafood supports local consumption, caters to tourist demand and promotes export earnings. Since the decline of capture fisheries, aquaculture has assumed a new meaning in food security. Of all the species, groupers are the most popular farmed fish. However, the high-value and environmental concerns are associated with grouper farming. This study improves the economic viability of aquaculture by stimulating production using renewable energy and natural resources. The harvests of grouper, green mussel and seaweed meet the organic requirements and the criteria that can earn premium price. The farming module is simple and can be assembled by using locally available components. Furthermore, it is easy to transfer knowhow to indigenous farmers. By working together over a few weeks, farmers learn the whole range of grow-out techniques.

**Keywords :** Sea-based IMTA; Renewable energy; Waste recycling; Carbon footprint

# **E : HUMANITIES, ARTS AND PYSCHOLOGY**



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-01	
<b>PEREKA CODE</b>		P0012/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Impak Perlaksanaan Boat and Fisheries ordinance 1914 Kepada Komuniti Bajau Di Pantai Timur Borneo Utara (1915-1939)	
<b>PROJECT LEADER</b>		DR. MOSLI BIN TARSAT	
<b>PROJECT MEMBER</b>			

**Abstract :** Boat and Fisheries Ordinance,1914 telah diisytiharkan oleh C.W.C. Parr (Gabenor ke-12, British North Borneo Company) pada tahun 1915 berhubung kait dengan perihal peraturan-peraturan perikanan dan perahu yang digunakan oleh komuniti Bajau dalam aktiviti-aktiviti menangkap ikan dan hasil-hasil laut yang lain. Tujuan ordinar ini diisytiharkan bukan sahaja untuk mengenalpasti perahu dan jenis-jenis peralatan yang digunakan oleh komuniti Bajau tetapi juga lebih bertujuan untuk memperolehi hasil pendapatan daripada pembayaran lesen dan cukai yang dikenakan. Titik tolak daripada pelaksanaan ordinar ini telah memberi impak yang besar kepada komuniti Bajau dari tahun 1915 hingga tahun 1939 seperti penguatkuasaan sistem lesen ke atas perahu dan peralatan tangkap ikan, kebergantungan kepada sistem kredit tauke Cina, kredit native atau loan to native dan isu pengecualian lesen dan cukai ke atas perahu-perahu kecil. Akhirnya satu peraturan baru digubal dan diisytiharkan semasa C.R. Smith yang dikenali sebagai Boat and Fisheries (Amendment) Ordinance, 1939. Oleh itu, kajian ini akan membincangkan secara komprehensif mengenai impak Boat and Fisheries Ordinance, 1914 kepada komuniti Bajau di pantai timur Borneo Utara.

Kajian ini mempunyai tiga objektif utama iaitu: 1) Untuk meneliti isi kandungan dan pelaksanaan Boat and Fisheries Ordinance 1914 di Borneo Utara. Penelitian ke atas isi kandungan seperti mana yang dicatatkan dalam ordinar ini dianalisis selari dengan perkembangan ekonomi kelautan pada waktu itu. Pelaksanaannya ordinar ini dilihat melalui tiga tahap iaitu pemerintah, pelaksana dan pengeluar sebagai aktor utama dalam pembangunan ekonomi ini; 2) Untuk menilai impak Boat and Fisheries Ordinance 1914 kepada komuniti Bajau di pantai timur Borneo Utara dari tahun 1915 hingga tahun 1939. Objektif ini menjadi intipati kajian mengenai impak pelaksanaan ordinar yang diperkenalkan dan dikuatkuasakan oleh BNBC di Borneo Utara kepada kedudukan sosio ekonomi komuniti Bajau; 3) Untuk membincangkan isu perlesenan dan bayaran cukai ke atas perahu-perahu kecil dan pengisytiharan Boat and Fisheries (Amendment) Ordinance, 1939 sebagai penyelesaiannya. Selepas ordinar ini dikuatkuasakan, isu timbul ialah bayaran cukai ke atas perahu-perahu kecil yang dimiliki oleh orang Bajau yang menjalankan tangkap ikan secara kecil-kecilan sahaja dan tidak mampu membuat bayaran.

**Keywords :** Undang-undang Perikanan, Komuniti Bajau, Borneo Utara



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-02
<b>PEREKA CODE</b>		P0016/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		THE APPLICATION OF GIS FOR THE PATTERN AND DISTRIBUTION OF THE ETHNOGRAPHIC CHARACTERISTICS AMONG THE KADAZAN DUSUN COMMUNITIES IN TAMBUNAN
<b>PROJECT LEADER</b>		DR. OLIVER VALENTINE EBOY
<b>PROJECT MEMBER</b>		PATRIECIA AUDREY FUNG, DR. OLIVER VALENTINE EBOY, PROFESSOR DR. JACQUELINE PUGH-KITINGAN, KONG TECK SIENG, LAURENTIUS KITINGAN

**Abstract :** Cultural heritage is important in influencing our feelings, identity, loyalty, and behavior. It will affect individuals identity, pride and relationships with others. Culture can be represented by building objects, paintings, monuments, and non-material manifestations such as language, dance, song, cuisine, customs, religion, landscape, literature, art, philosophy and television programs. Cultural heritage consists of physical culture (material) and cultural values (not material) that are inherited by generation. John J. Macionis (2001), stated that culture in the form of material is all things created by society such as building, art, equipment, game tools, print media, and electronic media and other objects. While the culture in the non-material form refers to the unrealistic and unclear human creation such as the norms, laws and beliefs of a community group.

Now, in keeping with the government's development and modernization process, preserving ethnographic features such as language, technology systems, economic systems, social organizations, knowledge systems, arts and religious systems of the Kadazan Dusun community in Sabah would be difficult if steps are not taken to maintain the traditional heritage. In fact, many heritage properties are significantly affected by national development and this will be a loss to the country. Additionally, the creation of new values that replace ethnographic features have resulted in a decrease in cultural identity and legacy gradually. Furthermore, the attitude of the local community, which is less sensitive to the importance of cultural preservation, makes the application of ethnographic features difficult for them. Thus, the efforts to preserve the heritage of the Kadazan Dusun are important so that it will not disappear in the ages.

Objectives: a) Identify the variation of ethnographic characteristic of the Kadazan Dusun communities in Tambunan; b) Spatial and attribute database development of the ethnographic characteristic of the Kadazan Dusun communities in Tambunan using GIS; c) Analyze the pattern and distribution of the ethnographic area of the Kadazan Dusun communities in Tambunan using GIS analysis.

The flow map output divided into two, namely the density of inflow migrations (current village receive migration from various origin village) and the density of outflow migration (origin village provide migration to various current village). The density of migration flows reflects the distribution of ethnographic features in the area in which the density value indicates the number of migration flows received from the origin village or distributed to the current village. In other words, the higher the density value, the higher the spread of ethnographic features in Tambunan.

Based on the ethnographic characteristic density map pattern, it shows that a large group of high density pattern is concentrated in the Tambunan's central area. This may be influenced by the high population located at Tambunan town situated in the central part of the Tambunan area. Other than that, the high density area involved villages such as Piasau, Noudu, Tondulu, Lubang, Nambayan, Toboh and Kuala Kaingaran. While in the northern part of the Tambunan district, the density of the ethnographic features is only a few with villages such as Kirokot, Libang, Garas and Tontolob Liwan is located there. Furthermore, the southern and eastern regions of Tambunan have less density or no ethnographic characteristics with high variation. The pattern is more scattered around the area which includes villages such as Tikolod, Kuala Monsok and Ulu Monsok. Ultimately, based on the analysis conducted, the ethnographic feature of development seems to have a significant influence on the high density area in Tambunan. Ethnographic features such as homestay, factories, sewing shops and others are not much in

the vicinity of Tambunan. This causes the pattern of high density area size to be small compared to medium density and low density.

**Keywords :** Ethnographic, mapping, Geographical Information Systems (GIS)3, Kadazan Dusun, Spatial Databases, flow map, Patterns, Density



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-03
<b>PEREKA CODE</b>		P0049/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Enhancing Fish Cage Production Through the Adaptation of Local Knowledge Among Fishing Communities in Marudu Bay, Sabah, East Malaysia.
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN
<b>PROJECT MEMBER</b>		NIVASINI A/P TAMOTHRAN,PROFESSOR DR. ROSAZMAN BIN HUSSIN

**Abstract :** This socio-economic dimension of aquaculture project supports the sustainable development of the fish cage sector rests on environmental, social, and economic pillars. It is clear that higher productivity in the fish cage industry can be achieved by the action research, science technology, and society approaches. Therefore, this project helps to understand the local fisher’s practice of aquaculture by adopting new perspectives to suit local conditions.

1. To identify the process of adaptation of local knowledge in fish cage operation at Marudu Bay.
2. To identify the influence of adaptation of hybrid knowledge on the fisher’s socioeconomic status at Marudu Bay.
  1. In-depth interviews
  2. Focused group discussion
  3. Participation Observation

The study shows the fishers are willing to accept scientific developments by innovative elements of local knowledge as a means of livelihood and food security. The reason for the fisher’s acceptance being due to declining catch rates in the past. The whole process of improving the production of the fish cage industry is based on trial and error. The adaptation of both traditional as well as scientific knowledge is known as “hybrid knowledge”. The applications of hybrid knowledge improved the productivity and sustainability of the fish cage industry. Furthermore, it increased the fishers’ socioeconomic status.

Adaptations of local and scientific knowledge help to understand the characteristics of the hybrid knowledge that enhance the production of the fish cage industry and improved the coastal resource management in a sustainable context.

**Keywords :** Fish cage industry and hybrid knowledge



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-04	
<b>PEREKA CODE</b>		P0050/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Security issues and new sea designated route in Sebatik island	
<b>PROJECT LEADER</b>		ENCIK RAMLI BIN DOLLAH	
<b>PROJECT MEMBER</b>		ENCIK RAMLI BIN DOLLAH, Amir Shah , ENCIK EKO PRAYITNO JOKO, DR. MD SAFFIE BIN ABDUL RAHIM, DR. MARSITAH BINTI MOHD RADZI, PUAN SALMIE JEMON @SUHAINA, ENCIK AMRULLAH BIN MARAINING, ENCIK MAHADIRIN AHMAD, ENCIK WAN SHAWALUDDIN WAN HASSAN, Abdul Hadi Alimuddin, Siti	

**Abstract :**

Malaysian waters, especially in the eastern coast of Sabah in Sebatik island is a porous and most vulnerable area for transnational crime because of constant threats from foreign elements, be it traditional or non-traditional forms. Therefore, despite high allocation of expenditure and the introduction of several policies to counter these activities, border intrusions, smuggling activities, environmental security and other detrimental activities continue to threaten Malaysia's national security in this area. Therefore, this study seeks to identify current security issues in Indonesia-Malaysia border in Sebatik island; to critique the existing sea route and its implication to Malaysia's National Security and Human Security and to suggest a new sea designated route from Indonesia to Sebatik in order to address several security issues in Malaysia-Indonesia border.

1. To identify current maritime security issues in Indonesia-Malaysia border in Sebatik island
2. To critique the existing sea route and its implication to Malaysia's National Security and Human Security
3. To suggest a new sea designated route from Indonesia to Sebatik in order to address several security issues in Malaysia-Indonesia border

This project combines various research methods. It emphasizes on ethnographic methods and collecting data through observation, interviews and questionnaires.

This study discovered that this a new sea designated route from Indonesia to Sebatik or vice versa are needed to minimize security issues in Malaysia-Indonesia border in Sebatik.

**Keywords :** Security, Sebatik, Designated route, Indonesia, Malaysia



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-05
<b>PEREKA CODE</b>		P0058/2018
<b>FPI</b>		FPP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		The Relationship between Exercise, Spirituality, and Gratitude and Job Satisfaction among Lecturers
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. BALAN A/L RATHAKRISHNAN
<b>PROJECT MEMBER</b>		SAKTHIVEL BATUMALAI,PROFESSOR MADYA DR. BALAN A/L RATHAKRISHNAN,DR. SOON SINGH A/L BIKAR SINGH

**Abstract :** Several studies have proved that there is a significant relationship between Exercise, Spirituality, Gratitude, and Job Satisfaction. A number of studies have been conducted to find the relationship between these aspects. The purpose of this study is to find out the relationship between these aspects, which is experienced by the University Malaysia Sabah lecturers. A study was conducted on 273 lecturers chosen randomly from University Malaysia Sabah. The survey design was adopted using validated instruments including Baecke Questionnaire for Measurement of a Persons Habitual Physical Activity, Spiritual Leadership Theory questions, The Gratitude Questionnaire-Six Item Form (GQ-6) and Job Satisfaction Survey (JSS). The findings indicated a good reliability and validity of the questionnaire that is being adapted. This study shows that there is a positive relationship between variables. Exercise ( $r=.662, p<.01$ ), spirituality ( $r=.834, p <.01$ ) and gratitude ( $r=.834, p<.01$ ) with job satisfaction. The findings are consistent with past studies and literature that support the concepts presented here. There are several objectives that will be accomplished by doing a study and to get a better insight on the job satisfaction that is being experienced by the lecturers. The general objective of these study is to find the relationship between exercise, spirituality, and gratitude towards the job satisfaction that is experienced by the lecturers. The specific objectives are as follows: 1. To identify the relationship of exercise and job satisfaction. 2. To identify the relationship of spirituality and job satisfaction. 3. To identify the relationship of gratitude and job satisfaction.

According to the obtained result, indicates that the correlation between the variables is strong. This study shows that there is a positive relationship between variables. Exercise ( $r=.662, p<.01$ ), spirituality ( $r=.834, p <.01$ ) and gratitude ( $r=.834, p<.01$ ) with job satisfaction. These results which were obtained is consistent with other similar studies that has been done in other setting (Awang, Ahamd and Zin, 2010, Danner, Snowdon and Friesen, 2001, Harrigan (1997), and Eyupoglu and Saner, 2009). Exercise and job satisfaction showed a positive correlation with job satisfaction. This result is in consistent with an earlier research done by Kelly 2011 titled Differences in Job Satisfaction Between Exercise Science and Non-exercise Science Faculty. According to Kelly, the members who involve themselves in more exercise achieve a higher correlation of job satisfaction. Spirituality can help individuals manage their physical and emotional health. A study by Chawla et al., (2010) shows a positive relationship between job satisfaction and spirituality at work among sales professionals, which provide the relevance of spirituality at work to salespeople. Kumar's study reveals the importance of Vipassana meditation to orient the students with better physique and psychosocial state that helps them to become good professionals with focused managerial aptitude.

**Keywords :** job satisfaction, exercise, spirituality and gratitude



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-06	
<b>PEREKA CODE</b>		P0089/2018	
<b>FPI</b>		PPIB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Political Dynamics of Dusun Kimaragang in Sabah (1967-2013)	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. LAI YEW MENG	
<b>PROJECT MEMBER</b>		DR. MAUREEN DE SILVA, Manual Damilan	

**Abstract :** The study of political dynamics of the Dusun Kimaragang community focuses on the question of the extent to which the sentiments and political decisions of the society change based on political dynamics as well as selected political issues throughout the year 1967 until 2013. The discussion revolves around how the political dynamics and issues acted as drivers of the Dusun Kimaragang community's political support to candidates during the elections in the Tandek state constituency in chronological order from the era of the USNO administration up to the UMNO-BN period. This study uses data from primary sources such as the Sabah State Assembly's hansard report and those of the Parliament of Malaysia, newspaper and official reports related to Kota Marudu as well as secondary sources. Elite interviews were also conducted with individuals from various backgrounds, such as former Members of Parliament, former State Legislative Assembly members, former government employees, ordinary citizens and young people. The study found that popular groundswell/sentiments and political decisions of the Dusun Kimaragang community during the period of the study were influenced by particular dynamics and local political issues which tended to shape their support for candidates and / or political parties competing in various elections. Among the prominent political dynamics were primordialism or ethno-religious sentiment, governance, socio-economic, political development and parochialism. Meanwhile, local political issues included the "Islamisation" of local residents, autocratic administration and abuse of power, the Labuan issue, and so on.

To identify and describe the political dynamics and issues that tend to affect the sentiment and political decisions of the Dusun Kimaragang community; and

To assess the extent to which the various political dynamics and related issues affected the sentiment and political decisions of the Dusun Kimaragang community, during specific time periods and political context.

This study utilises historical research methods where data are derived and collected using several methods of data collection, namely through library and archival research as well as elite interviews. Primary sources such as government reports, newspapers, and Sabah State Assembly debates are obtained through from the archive, while secondary materials such as books, journal articles, and encyclopedias are obtained through library search. As stated, elite interviews were also conducted with former State Assemblymen and Members of Parliaments, former electoral candidates, political party members, and local residents/voters in the Tandek state constituency, to supplement the primary and secondary data collected, for a more comprehensive and in-depth analysis of the subject matter.

The findings of this study are divided into the respective administrative eras, as follows:

USNO &ndash; the major political dynamic affecting the Dusun Kimaragang people was primordialism, where religion became most salient in shaping the community's rejection of USNO, while ethnicity was central to promoting support for the UPKO. Issues affecting the rejection of USNO by the Dusun Kimaragang community were the alleged rampant "Islamisation" agenda and the weaknesses of the USNO administration in terms of governance.

BERJAYA &ndash; the key political dynamics were good governance, socio-economics and personality of candidates. Meanwhile, the salient political issues were the Islamisation agenda, administrative weaknesses and the Labuan cession issue. During BERJAYA, increase in special provisions saw greater infrastructural development in the Kota Marudu district, which helped it secure Kimaragang support. However, by 1985, BERJAYA's popularity declined following poor governance, resulting in the cession of Labuan to the federal government. BERJAYA's image in Tandek was also affected by the personality of its candidate who did not appear to prioritize local interests.



PBS - good governance was the salient dynamic affecting Dusun Kimaragang community's support towards PBS in Tandek. The BERJAYA administration, especially during its second term, showed weakness in governance, which was further compounded by the ongoing "Islamisation" policy and the ceding of Labuan to the federal government. Additionally, primordialism reinforced the support of the Dusun Kimaragang community towards PBS based on their perception of PBS being a predominantly Dusun-centric party, even though PBS declared itself to be multi-ethnic.

UMNO-BN &ndash; PBS's return to BN witnessed the reinstatement of development allocations to Kota Marudu, especially in the Tandek constituency, which allowed PBS to continue enjoying the support of the Dusun Kimaragang community. Additionally, the "low-profile" personality of the PBS leadership in Anita Baranting was another reason why PBS remained strong in Tandek.

1. To enrich the corpus of knowledge on the political history of Sabah, which has had previously been overly inclined towards the politics of the Kadazan Dusun community.
2. To pave the way for more extensive and expansive studies on the Dusun Kimaragang community, especially in the field of politics
3. To enhance the awareness of the members of the Dusun Kimaragang community regarding the importance of learning the political history of their ethnic community and also as a way to promote greater appreciation regarding the political roles, struggles and contributions of this ethnic group in Kota Marudu.
4. To foster greater recognition amongst local Sabahans regarding the salience of ethnic identities, and their roles and contributions. More specifically, such studies will further enlighten the peoples of Sabah on the roles and contributions of the various ethnic communities in shaping the political, economic and social developments of the state.
5. To promote awareness amongst members of the Malaysian society especially in Peninsular and Sarawak regarding the existence of the sub-ethnic group called Dusun Kimaragang, and also their recognition of the roles and contributions of the political society in Sabah, which do not only derive from the dominant ethnic groups but also ethnic minorities.

**Keywords :** Dusun Kimaragang; Political Dynamics; Elections; Sabah Politics



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-07
<b>PEREKA CODE</b>		P0092/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		PULAU SEBATIK: ANALISIS FENOMENOLOGIKAL MASYARAKAT SEMPADAN
<b>PROJECT LEADER</b>		ENCIK MAHADIRIN AHMAD
<b>PROJECT MEMBER</b>		HAJI MUSTAPA BIN ABD. TALIP,PUAN SALMIE JEMON @SUHAINA,ENCIK RAMLI BIN DOLLAH,DR. NORDIN SAKKE,DR. MD SAFFIE BIN ABDUL RAHIM,DR. MARSITAH BINTI MOHD RADZI,ENCIK EKO PRAYITNO JOKO,ENCIK FAUZIE BIN SARJONO, AMRULLAH BIN MARAINING,ENCIK WAN SHAWALUDDIN WAN H

**Abstract** : Kajian terhadap komuniti/masyarakat sempadan merupakan sesuatu yang unik dan mencabar disebabkan cirinya yang melibatkan perkongsian antara beberapa buah negara. Antara keunikan tersebut ialah melibatkan pergerakan manusia dan pergerakan barangan serta perkhidmatan.

Dari aspek politik pula masyarakat sempadan dikawal oleh lebih dari satu sistem pemerintahan yang akan turut mempengaruhi sikap dan pemikiran mereka. Keadaan ini menyumbang kepada isu berkaitan keselamatan antarabangsa sekiranya wujud konflik seperti isu pertindihan hak, isu imigresen dan isu penyeludupan barangan. Berdasarkan kepentingan tersebut, pelbagai kajian telah dilakukan dan menghasilkan pelbagai penjelasan berkaitan keunikan masyarakat yang tinggal di persempadanan. Namun begitu, analisis untuk menjelaskan berkaitan makna masyarakat sempadan masih kurang dilakukan.

MEMBENTUK MAKNA SEBATIK SEBAGAI KERANGKA UTAMA DALAM KAJIAN MASYARKAT SEMPADAN. Oleh itu, kajian ini bertujuan untuk membentuk (construct) satu makna khusus bagi menjelaskan berkaitan masyarakat di sempadan.

Analisis terhadap temubual dengan beberapa orang responden: Second Order Construct.

Analisis terhadap kajian-kajian lepas berkaitan masyarakat sempadan.

Perkataan SEBATIK memberikan makna kepada dirinya sendiri iaitu akronim kepada tiga tema besar iaitu Sempadan, BANgsa dan patrioTIK.

Berdasarkan dapatan tersebut, makna perkataan SEBATIK berpotensi untuk dijadikan sebagai kerangka konseptual (modul) kepada kajian-kajian berkaitan masyarakat di sempadan. Dengan itu, akan memberi nilai tambah kepada Pulau Sebatik terutamanya dalam perkembangan ilmu pengetahuan sejagat dan kesan lain dari aspek pembangunan ekonomi, sosial dan budaya.Terdapat dua potensi iaitu:1) PRAKTIKAL - Pulau Sebatik sebagai makmal hidup bagi kajian masyarakat sempadan yang dibezakan berdasarkan tiga tema iaitu sempadan, bangsa dan patriotik. 2) KONSEPTUAL - Konsep SEBATIK dapat dijadikan asas dalam kajian lain terutamanya dalam lapangan Sains Sosial dan Kemanusiaan kerana ia melibatkan manusia iaitu ciri luaran, ciri dalaman dan persekitaran manusia itu sendiri.

**Keywords** : Pulau Sebatik, Sempadan, Bangsa, Patriotik, Masyarakat Sempadan, Bandar Sempadan, Tawau Sabah.



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-08
<b>PEREKA CODE</b>		P0094/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		DEMOGRAPHIC MATTERS: TRAVEL DEMAND, MOBILITY, AND TRANSPORT USAGE AMONG IMMIGRANTS IN KOTA KINABALU
<b>PROJECT LEADER</b>		DR. HARIFAH BINTI MOHD. NOOR
<b>PROJECT MEMBER</b>		SARAVANAN A/L SUNDARA SAKARAN ,DR. JURRY FOO @ JURRY BT. F. MICHAEL,PROFESSOR MADYA DR. JABIL BIN MAPJABIL,DR. OLIVER VALENTINE EBOY

**Abstract :** People in Kota Kinabalu rely heavily on travel in their everyday lives. Whether it’s for work, shopping, visiting friends, eat outside or recreation, the ability to get around is a fundamental part of the local’s well being. However group-specific analyses of travel behaviour are essential for future policy and planning. The presence of immigrants is often associated with various economic, social and physical implications. Their demographic characteristic such as income, age, and employment status has profoundly influence transportation issues particularly on the travel behaviour, the level of mobility, and the usage of the different mode of transportation. Understanding the immigrant’s travel behaviour will be impacts of projects and policy on different population groups in Kota Kinabalu.

This study examines the demographic characteristics of immigrants and the resulting differences in their travel behaviour, the level of mobility, and the usage of the different mode of transportation.

Based on purposive sampling, the number of targeted respondents (immigrants) in this study is 119 respondents, and the data was collected through questionnaires which are distributed around Kota Kinabalu. The collected data was analyzed using descriptive methodology and inferences through frequency, the average means score, and chi-square.

The finding has shown public transport and walking remains the primary mode of transport for most immigrants. Walking is the most popular mode of transportation and will use others mode of transportation if the destination distance is more than 3 km. Public transportation or rented vehicle is their best choice for a long distance trip. Activities such as groceries shopping, recreation, and leisure are carried out within the distance lower than 3 km from the residence. Such findings proved that their mobility level is low, and the priority of their daily routine is the trip to a workplace. Characteristic such as income, age, and employment status have a significant relationship between the level of their mobility and the usage of transport.

This situation has shown also challenged the local authorities and transportation planning to provide sustainable transportation services that foster efficiency and economic development. This study is expected to give a projection on the usage trend of public transportation and the extent to which the presence of immigrants contribute and influence the usage trend of public transportations for Kota Kinabalu community. Understanding the immigrant’s travel behaviour will be the impact of the project and policy on different population groups in Kota Kinabalu.

**Keywords :** Immigrants, mode of transportation, public transport, walking, mobility



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-09
<b>PEREKA CODE</b>		P0119/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		MEMBACA SUMBER MENULIS SEJARAH: SURAT-SURAT ZAKARIA GUNN SEBAGAI BAHAN PENELITIAN PARTI KEBANGSAAN MELAYU SABAH (PKMS)
<b>PROJECT LEADER</b>		ENCIK EKO PRAYITNO JOKO
<b>PROJECT MEMBER</b>		JASMI MHD NASIER, ENCIK RAMLI BIN DOLLAH, ENCIK SAAT BIN AG. DAMIT, PROFESSOR MADYA DR. BILCHER BALA, ENCIK MOHAMAD SHAUKHI MOHD RADZI, DR. NORDIN SAKKE, MOHAMAD HAZIQ IKHSAN MOHD RUDZAINOOR

**Abstract :** Keinginan manusia untuk mengungkapkan kembali masa lalu dalam upaya memahami masa lalu tersebut bukanlah suatu perkara baru. Keadaan ini disebabkan, keberadaan masa lalu hanya dapat diungkapkan melalui pengumpulan sumber sejarah. Dalam hal ini, sumber memainkan peranan penting untuk menjelaskan berkenaan sesuatu peristiwa berdasarkan penemuan daripada sumber sejarah. Keberadaan sumber sejarah akan memungkinkan sejarawan menghasilkan penulisan yang tepat dan lebih objektif sifatnya. Oleh sebab itu, sejarawan harus mencari, mengumpul dan memastikan sumbernya kerana dengan sumber sejarawan berharap dan dengan sumber juga sejarawan mendapatkan fakta untuk menghasilkan penulisannya. Kebergantungan sejarawan kepada sumber dalam menghasilkan penulisannya dapat diperhatikan apabila telusuran terhadap perkembangan politik awal Sabah selepas Perang Dunia Kedua diperhatikan keberadaannya. Ternyata, tempoh masa terbabit adalah kesenjangan nyata dalam memahami dan mengungkapkan kembali perkembangan politik awal di Sabah sehinggakan timbul kenyataan daripada sarjana Barat bahawa selepas Perang Dunia merupakan zaman ketandusan politik masyarakatnya. Walau bagaimanapun, kenyataan ini tampaknya dapat direkonstruksi semula bersandarkan kepada surat peribadi Zakaria Gunn yang membuktikan bahawa sudah terdapat penentangan secara berorganisasi dalam kalangan masyarakat Sabah yang terpengaruh dengan perkembangan politik di Tanah Melayu dan Brunei untuk memerdekakan negeri mereka daripada British. Justeru itu, kajian ini akan mengangkat kepentingan sumber dalam mengungkapkan masa lalu khususnya perkembangan politik awal Sabah selepas Perang Dunia Kedua. **OBJEKTIF:** 1. Mengangkat kepentingan sumber primer dalam penulisan sejarah Sabah yang sekian lama kurang didokumentasi sejarah mengenainya; 2. Merekonstruksi sejarah nasionalisme awal di Sabah yang dikatakan sebagai negeri tanpa politik selepas Perang Dunia Kedua melalui surat-surat Zakaria Gunn; 3. Mengetengahkan kedudukan Zakaria Gunn sebagai salah seorang tokoh nasionalis awal di Sabah, tetapi kurang diketahui oleh masyarakat kebanyakan. **PENEMUAN:** Penulisan sejarah politik Sabah yang dihasilkan oleh para sarjana Barat seperti K.G Tregonning dan M.C. Roff menyatakan zaman sebelum Perang Dunia Kedua dan tahun-tahun awal selepas Perang Dunia Kedua merupakan zaman ketandusan politik di negeri terbabit. Anggapan ini sebenarnya kurang tepat, tetapi diterima sebagai suatu kebenaran buat sekian alam kerana ketiadaan sumber-sumber baru yang ditemui. Oleh sebab itu, sejarawan harus mencari, mengumpul dan memastikan sumbernya kerana dengan sumber sejarawan berharap dan dengan sumber juga sejarawan mendapatkan fakta untuk menghasilkan penulisannya. Kebergantungan sejarawan kepada sumber dalam menghasilkan penulisannya dapat diperhatikan apabila telusuran terhadap perkembangan politik awal Sabah selepas Perang Dunia Kedua diperhatikan keberadaannya. Ternyata, tempoh masa terbabit adalah kesenjangan nyata dalam memahami dan mengungkapkan kembali perkembangan politik awal di Sabah sehinggakan timbul kenyataan daripada sarjana Barat bahawa selepas Perang Dunia merupakan zaman ketandusan politik masyarakatnya. Walau bagaimanapun, tesis ini tampaknya dapat direkonstruksi semula bersandarkan kepada surat peribadi Zakaria Gunn yang membuktikan bahawa sudah terdapat penentangan secara berorganisasi dalam kalangan masyarakat Sabah yang terpengaruh dengan perkembangan politik di Tanah Melayu dan Brunei untuk memerdekakan negeri mereka daripada British. Justeru itu, artikel ini akan mengangkat kepentingan sumber dalam mengungkapkan masa lalu khususnya perkembangan politik awal Sabah selepas Perang Dunia Kedua.

**Keywords :** Sejarah Sabah, Nasionalisme, Parti Kebangsaan Melayu Sabah, Zakaria Gunn



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-10	
<b>PEREKA CODE</b>		P0120/2018	
<b>FPI</b>		FPP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Prevalence of Musculoskeletal Disorders among Secondary School Children in Sabah	
<b>PROJECT LEADER</b>		DR. PETER VOO SU KIONG	
<b>PROJECT MEMBER</b>		DR. ISMAIL BIN MAAKIP, PROFESSOR MADYA DR. AZIZI BIN YAHAYA, DR. SHARON KWAN SAM MEE, NURKHAIDARATUL BINTI ABDUL HALIK	

**Abstract** : Musculoskeletal disorders (MSD) is a phenomenon that has received greater attention in both developed and developing countries particularly due to its prevalence and the corresponding burden to the society. Musculoskeletal disorders are one of the most common causes of disability for people around the world (Vos et al., 2012). Musculoskeletal disorder should be considered as 3 distinct entities that are the neck, upper back and lower back pain and thoracic pain are being more prominent in younger children (Panicker & Sandesh, 2014). Apart from working population, MSD is also experienced by school children (Chiang et al., 2006). Previous studies reported that MSD caused limitations in carrying out activities, school absenteeism and the reduction or ceasing of physical activities in school children (Shamsoddini A.R, Hollisaz, M. T and Hafezi. R (2010).

The objective of this study was to determine the prevalence Musculoskeletal Disorder among Secondary School Children in Sabah.

This study was conducted in Sabah in which secondary students were recruited as respondent using convenience sampling technique. 235 respondents comprising 135 males and 100 females participated in this study. This study employed a cross-sectional design that used Standardized Nordic Questionnaire (SDQ) that had been translated into Malay as main tool in obtaining data on MSD symptoms of different body sites among school children in Sabah.

Descriptive statistics were generated and analyzed in which the MSD symptoms prevalence rate were calculated from the resulted SDQ based on the body parts. Analysis of the data was done by using IBM SPSS Statistic 25 software.

The statistical analysis of the participants (N=235) showed that the mean age was 14.48. The results from SDQ on the prevalence of MSD indicated that foot pain/disorder had the highest prevalence of MSD with 59%, followed by shoulder pain/disorder (55.3%), knee pain/disorder (55%), hand pain/disorder (51.1%), thigh and elbow pain/disorder each with 51% and 48.5%. Upper back pain/disorder with 48% and low back pain/disorder (46%), 80 of males and 58 of females suffered from foot pain/disorder, followed by 76 of males and 54 of females experienced shoulder pain/disorder. Further, 73 of males experienced knee pain/disorder compared to only 57 of females. Likewise, 64 of males and 56 of females reported to have hand pain/disorder; whilst 65 of males and only 55 of females had to endure thigh pain/disorder. In addition, 62 of males and 52 females have experience upper back pain/disorders; and lastly 59 of males and 49 of females suffered from low back pain/disorder.

The findings suggest the need for MSD intervention program and guidelines for school children to improve their health and well-being especially Secondary School Children in Sabah.

**Keywords** : MSD, School Children



## E : HUMANITIES, ARTS AND PYSCHOLOGY

<b>BOOTH NO.</b>		RE-11
<b>PEREKA CODE</b>		P0121/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		THE SABAH SOCIETY: SEBUAH PERTUBUHAN YANG PEDULI
<b>PROJECT LEADER</b>		ENCIK EKO PRAYITNO JOKO
<b>PROJECT MEMBER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE, ENCIK SAAT BIN AG. DAMIT, PUAN SITINURBAYU BINTI MOHD. YUSOFF, DR. NORDI BIN ACHIE, MOHAMAD HAZIQ IKHSAN MOHD RUDZAINOOR, JASMI MHD NASIER

**Abstract** : Penyelidikan ini bertujuan meneliti dan mengetengahkan peranan yang telah dimainkan oleh pertubuhan The Sabah Society dalam memelihara dan memulihara kekayaan flora dan fauna yang terdapat di Sabah. Umumnya, kehadiran pertubuhan ini adalah disebabkan kekhawatiran golongan Eropah akan lenyapnya khazanah berharga mengenai sejarah, budaya dan alam semulajadi Sabah akibat pembangunan yang akan dihadapinya kelak. Keadaan ini disebabkan, sejak era kolonial hingga awal selepas kemerdekaan dicapai, tahap kesedaran akan keperluan memelihara dan memulihara khazanah berharga tersebut sangat kurang memberangsangkan. Masalah ini diberatkan lagi apabila ketiadaan tempat penyimpanan khazanah berkenaan yang dirasakan perlu dimunculkan dalam memastikan generasi terkemudiannya mengetahui akan sejarah, budaya dan alam sekitar yang dimiliki oleh generasi sebelumnya. Justeru itu, tindakan pertubuhan The Sabah Society dalam usaha melestarikan khazanah ini adalah dengan mengilhamkan kemunculan Arkib Negeri Sabah dan Muzium Negeri Sabah yang fungsinya menyimpan dan memulihara maklumat berharga mengenai masyarakat dan negeri Sabah. OBJEKTIF: 1) Meneliti peranan pertubuhan The Sabah Society dalam memastikan khazanah berharga Sabah berkaitan flora dan fauna kekal terpelihara; Mengetengahkan aktiviti yang dilakukan oleh pertubuhan The Sabah Society dalam memastikan khazanah berharga Sabah berkaitan flora dan fauna kekal terpelihara. 2) >Menelusuri masalah yang dihadapi oleh pertubuhan The Sabah Society dalam memastikan khazanah berharga Sabah berkaitan flora dan fauna kekal terpelihara.

Sabah sememangnya diakui kaya dengan khazanah alam dan sejarah pembentukannya, namun dikhuatiri akan pupus sekiranya tidak direkodkan melalui pendokumentasian. Dengan kepelbagaian alam semulajadi dan etniknnya telah menjadikan negeri ini kaya dengan warisan budaya dan sejarahnya. Namun, pada awalnya kebanyakan masyarakat Sabah tidak mempunyai kepakaran untuk mendokumentasi dan menghargai warisan sejarah mereka. Dalam keadaan ini yang akhirnya memunculkan sekumpulan bangsa Eropah melalui pertubuhan The Sabah Society untuk memelihara dan memulihara khazanah berharga tersebut dan berusaha meningkatkan kesedaran masyarakat tempatan untuk turut sama melakukan aktiviti terbabit. Hal ini kerana, ahli The Sabah Society menganggap, Sabah sebagai sebuah negeri yang pesat membangun perlu mengetahui asal usulnya dan juga memahami persekitaran fizikalnya. Oleh sebab itu pelbagai aktiviti telah dilakukannya yang meliputi penerbitan buku, jurnal, newsletter dan aktiviti ceramah yang difikirkan bukan sahaja mampu melestarikan khazanah berharga tersebut, tetapi juga memperkenalkan Sabah itu sendiri kepada masyarakat luar. Dengan kesungguhan dan aktiviti yang dilakukan oleh The Sabah Society, maka adalah tidak berlebihan untuk mengatakan bahawa pertubuhan ini adalah sebuah pertubuhan yang peduli! Namun, disebalik kejayaan tersebut pelbagai cabaran terpaksa dilalui oleh pertubuhan ini yang merangkumi masalah kewangan, sokongan daripada masyarakat kebanyakan dan juga kemudahan infrastruktur yang tidak cukup untuk tujuan mendokumentasi dan mengadakan ceramah berkenaan aspek warisan Sabah.

**Keywords** : Sejarah Sabah, Pertubuhan The Sabah Society, Pengurusan Warisan Sabah



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-12	
<b>PEREKA CODE</b>		P0126/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Capacity Building as a Mechanism of Empowering Rural Women in Seaweed Cultivation: Case Study In Semporna, Sabah	
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN	
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN,Aisah Binti Hossin	

**Abstract :** In the context of development, women empowerment is one of the government goals to help the rural women to be competitive and benefit from development. There are two factors playing a vital role in increasing women’s ability. First, "internal factors" are more focused on the individual’s desire to seek initiative by enhancing their own capabilities, e.g. by involving in a development program implemented in their area. While the "external factors" focus on social conditions and assistance which are provided by direct or indirect influences from the involvement of the rural women in any development program introduced by the government, for example, aids in the form of equipment and training courses. This study focuses more on the rural women empowerment by identifying their efforts through the external factors, e.g. Estate Mini and Cluster projects. Those two projects are based on the application of the concept of "smart partnership" that combines the traditional community-knowledge with new technology by the expertise from both the government and private sectors in expanding the seaweed industry in Sabah. Through the partnership of expertise, the private company (Green Leaf Company) and community-based cooperatives received the government support and assistance such as seaweed seedlings, platforms, and ropes to catalyze the involvement of active fishers community in Pulau Selakan and Pulau BumBum and enhance their ability in seaweed culture activities.

The main objective of this study is to identify the influence of the implementation Estate Mini and Cluster System by the government (Pulau Bumbum) and private companies (Pulau Selakan) on the number of the rural women's participation in the seaweed culture activities which are dominated by men. In addition, this study also examined the extent level of this development project in increasing the production of seaweed and overcome from the hardcore poverty line.

1. In-depth interviews with 13 respondents
2. Participation observation
3. Survey - face to face interviews

The findings show that technique and technology that were introduced in the seaweed cultivation industry through the Estate Mini and Cluster System provide a new perspective and opportunities by improving the active rural area women’s efforts. In addition, the concept of the capacity building is also seen as a mechanism to catalyze the empowerment of the rural women to be more competitive by being actively involved in the seaweed cultivation industry to generate income without neglecting their responsibilities as a wife, mother and, housekeeper in their household.

Application of capacity building program to empower the rural women in the seaweed industry by the governments and private sectors.

**Keywords :** Empowerment, capacity building, women and seaweed cultivation



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-13	
<b>PEREKA CODE</b>		P0129/2018	
<b>FPI</b>		PPIB	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Comparison of linguistic elements in French-Malay present tense verbs	
<b>PROJECT LEADER</b>		DR. MOHD NOR AZAN BIN ABDULLAH	
<b>PROJECT MEMBER</b>		Dr. Jeannet Stephen, PM Dr. Saini Ag. Damit, Dr. Musirin Mosin	

**Abstract :** Comparative linguistics is one of the linguistic branches that studies the relationship between languages. Comparative science includes the study of the similarities and differences of linguistic elements of the language. The comparison includes the grammatical comparison studied as well as examining the differences or similarities, especially the relationship of the languages (Jean Dubois et al: 2002). This study focuses on the comparison of linguistic elements in the present tense verbs of French and Malay. French originates from the Indo-European language family while Malay from the Austronesian. Both languages ??of these different families reflect the differences and similarities of the verbs morphological elements, particularly in verbal construction. Construction of verbal morphology for both languages ??is bound by the pronoun that follows it. French is a flexible language while Malay is an agglutinative language. The objective of the comparative study of language is to identify and dismantle the constructive structure of the linguistic elements as well as express the functions of the morphological elements in the formation of verbs. The findings can be used for the purpose of teaching and learning French or Malay language. Understanding the differences and similarities of the verbs morphological elements can facilitate the learning process of the language concerned. The methodology of the study is qualitative. Library materials were sourced in the forms of books and grammar documents for both languages.

**Keywords :** Comparative linguistics, linguistic elements, verbs, present tense, French, Malay



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-14	
<b>PEREKA CODE</b>		P0131/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Tahap Pembangunan Ekonomi Pulau Sebatik: Impaknya	
<b>PROJECT LEADER</b>		DR. MD SAFFIE BIN ABDUL RAHIM	
<b>PROJECT MEMBER</b>		ENCIK RAMLI BIN DOLLAH, DR. NORDIN SAKKE, ENCIK MAHADIRIN AHMAD, ENCIK EKO PRAYITNO JOKO, HAJI MUSTAPA BIN ABD. TALIP, ENCIK WAN SHAWALUDDIN WAN HASSAN, PUAN SALMIE JEMON @SUHAINA, DR. MARSITAH BINTI MOHD RADZI, ENCIK AMRULLAH BIN MARAINING, ENCIK FAUZIE BIN SARJO	

**Abstract :** Pulau Sebatik berkeluasan 41,437 hektar dibahagikan kepada dua hak pemilikan iaitu Malaysia dan Indonesia. Masyarakat Pulau Sebatik hidup dalam situasi "Kehidupan 1 Pulau, 2 Negara". Jelasnya, masyarakat Indonesia di Sebatik terlibat dalam kegiatan ekonomi selain ramai yang bekerja di estet milik pemodal tempatan di Malaysia. Sementara masyarakat Malaysia pula mendapatkan bahan mentah seperti sayur-sayuran, buah-buahan dan barangan keluaran kilang Indonesia dari masyarakat wilayah Indonesia. Faktor jarak perjalanan dan kos pengangkutan yang mahal menjadi sebab utama kawasan persempadanan menjadi pilihan untuk masyarakat setempat menjalankan kegiatan ekonomi. Jelasnya, pasca 1990-an, pembangunan sosioekonomi di wilayah Malaysia di Pulau Sebatik tidak menunjukkan sebarang perubahan. Peluang pekerjaan adalah amat terhad dan pembangunan kemudahan asas masih sukar untuk diperolehi. Sebaliknya kawasan milik wilayah Indonesia terus mengalami perkembangan yang pesat. Keadaan ini telah menarik penduduk Malaysia untuk mengurus niaga di Indonesia.

Justeru kertas kerja ini bertujuan menganalisis tahap pembangunan sosioekonomi masyarakat Malaysia yang menetap di perbatasan pasca 1963. Turut dibincangkan bagaimana tahap pembangunan tersebut mempengaruhi lokaliti kegiatan ekonomi di pulau berkenaan.

Kajian ini menggunakan reka bentuk kajian kualitatif dengan merujuk sumber primer, sekunder dan lisan. Sumber-sumber ini kemudiannya dianalisis secara induktif dan deduktif.

Hasil kajian ini mendapati masyarakat Malaysia yang menetap di perbatasan Pulau Sebatik masih lagi bercirikan masyarakat tradisional iaitu kuasa politik terletak di tangan pemilik tanah dengan kegiatan ekonomi terhad yang hanya tertumpu kepada bidang tradisional berdaya pengeluaran rendah. Daya pemikiran masyarakatnya masih terikat dengan adat resam sehingga mempengaruhi corak kehidupan mereka. Berdasarkan tahap pembangunan sosioekonomi sedemikian, beberapa penempatan di Pulau Sebatik yang dari factor Figure-Ground, Linkage dan Places dilihat sangat berpotensi dijadikan sebagai tempat kegiatan ekonomi yang baik. Tempat-tempat tersebut antaranya Sungai Melayu, Sungai Limau dan Wallace Bay.

Penemuan ini secara tidak langsung membolehkan usaha pembentukan "Bandar Sempadan" boleh dilaksanakan yang seterusnya mampu memberi keuntungan sosioekonomi kepada Malaysia dan Indonesia.

**Keywords :** Pembangunan ekonomi, Kegiatan ekonomi, Pulau Sebatik



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-15
<b>PEREKA CODE</b>		P0132/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH <b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Model Bandar Sempadan: Pusat Perdagangan Sempadan (PPS) Di Kampung Sg. Melayu, Pulau Sebatik Sabah
<b>PROJECT LEADER</b>		DR. MARSITAH BINTI MOHD RADZI
<b>PROJECT MEMBER</b>		ENCIK MAHADIRIN AHMAD, Abdul Rahman Mad Ali@Abang, ENCIK RAMLI BIN DOLLAH, DR. NORDIN SAKKE, ENCIK EKO PRAYITNO JOKO, PUAN SALMIE JEMON @SUHAINA, DR. MD SAFFIE BIN ABDUL RAHIM, HAJI MUSTAPA BIN ABD. TALIP, ENCIK FAUZIE BIN SARJONO, ENCIK MAHADIRIN AHMAD, DR. MARSIT

**Abstract** : Model Bandar Sempadan dikemukakan bertujuan untuk membangunkan sebuah bandar di persempadanan Malaysia-Indonesia bagi merealisasikan aktiviti ekonomi kedua buah negara yang sudah terjalin semenjak sempadan antarabangsa belum diwujudkan oleh Inggeris dan Belanda pada tahun 1824. Kewujudan bandar sempadan ini khususnya bertujuan untuk me legal kan aktiviti ekonomi yang illegal selama ini. Di samping itu juga, ianya dapat membangunkan penduduk kedua-dua negara yang agak terkebelakang daripada segi pembangunan sosioekonomi, khususnya bagi daerah-daerah di sebelah Malaysia yang agak ketinggalan dalam pembangunan berbanding dengan wilayah Indonesia yang berada di persempadanan. Justeru itu, Kampung Sungai Melayu telah dipilih untuk menjadi bandar sempadan, memandangkan kedudukannya yang strategik dan juga bentuk topografinya yang sesuai bagi membangunkan sebuah bandar di persempadanan bagi kedua negara yang boleh digunapakai bersama. Hasil daripada siri kerja lapangan yang dijalankan di beberapa kampung di kawasan persempadanan Malaysia Indonesia, antaranya Kampung Sg. Melayu, Kampung Sungai Aji Kuning, Kampung Sg. Pukul, Kg. Pisak-Pisak dan Kampung Sungai Limau mendapati kewujudan bandar sempadan adalah langkah terbaik dalam membangunkan wilayah sempadan yang dianggap halaman belakang yang terbiar daripada segi pembangunan dan sekaligus berkemampuan membenters masalah penyeludupan dan dapat menjamin keselamatan di wilayah-wilayah persempadanan.

**Membentuk Model Bandar Sempadan**  
 Dalam membentuk Model Bandar Sempadan, beberapa siri kajian telah dilakukan di beberapa kampung yang kedudukannya bersempadanan dengan Indonesia. Antara kampung-kampung yang terlibat dalam kerja lapangan ini adalah Kampung Sg. Melayu, Kampung Wallace Bay, Kampung Sg. Aji Kuning, Kampung Sg. Limau, Kampung Sg. Nyamok, Kampung Sg. Pukul dan Kampung Sg. Tongkang. Temubual intensif telah dilakukan dengan penduduk di kampung-kampung tersebut bagi mengenalpasti kesesuaian kawasan untuk membangunkan bandar sempadan. Di samping itu juga, pemimpin-pemimpin lokal turut ditemubual bagi mendapatkan pandangan mereka tentang keperluan membangunkan bandar sempadan di Pulau Sebatik. Pemerhatian telah dilakukan secara terperinci di kawasan-kawasan kajian untuk membandingkan kawasan-kawasan kampung daripada segi topografi, demografi dan aksesibiliti kawasan-kawasan tersebut apabila dibangunkan bandar sempadan. Hasil kajian mendapati Kampung Sg. Melayu adalah kawasan yang paling sesuai apabila ianya menepati ciri dan kriteria yang membolehkan bandar sempadan dibangunkan. Terbangunnya bandar sempadan di kawasan ini, dijangkakan akan memberi manfaat kepada kedua-dua negara Malaysia dan Indonesia dalam menjalinkan kerjasama ekonomi, sosial dan politik khususnya dalam aspek keselamatan secara dua hala.

- Model Bandar Sempadan ini boleh digunakan untuk:
1. Membangunkan sebuah bandar yang akan menjadi pemangkin untuk pembangunan Pulau Sebatik Sabah.
  2. Meningkatkan pembangunan ekonomi penduduk.

**Keywords** : Bandar, Pemabangunan, Sebatik, PPS, Malaysia



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-16
<b>PEREKA CODE</b>		P0144/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		RE-CONCEPTUALIZING JOINT CONSULTATIVE COMMITTEES IN THE PUBLIC HIGHER EDUCATION SECTOR IN MALAYSIA
<b>PROJECT LEADER</b>		PUAN BADARIAH BINTI AB RAHMAN
<b>PROJECT MEMBER</b>		DR. DZURIZAH IBRAHIM, PROFESSOR DR. ROSAZMAN BIN HUSSIN

**Abstract :** Employee Participation (EP) enhances the quality of decision-making by broadening inputs, promotes commitment to the outcomes, improved motivation, co-operation and communication in the workplace. EP also may reduce workloads of supervisors, encourage skill development in the workforce and can contribute to improved employee relations. There are two forms of EP; direct and indirect. Joint Consultative Committee (JCC) is the most preferred indirect mechanism of workers representation in the UK and other English spoken country such as Australia, New Zealand and the US In the developed countries, the Work Council, a similar structure as JCC can be found in the Netherlands is the most effective workers representation in EU following the EU Directive 2002 for Information and Consultation (ICE). The ICE has been extended to the UK which has boosted the interest on JCC). However, the JCC system and practices in public higher education sector in Malaysia remained to be unknown. This paper discusses on the system and practices of JCC in a public higher education sector in Malaysia. The authors focused on three aspects: what, why and how JCC formation in the public higher education sector, their limitation, evaluation and improvement. The research findings indicate that JCC in public higher education sector was ineffective and re-conceptualizing of the JCC Model is required urgently in order for JCC to be relevant and effective. Therefore, certain modification to the JCC Model is essential to suit the public higher education sector environment in Malaysia.

**Keywords :** nature, joint, consultative, committee, public universities

To explain the process of the Academic JCC formation and implementation in the public universities

To explore the role and function of the Academic JCC in public universities, to address their limitation and subsequently to evaluate for improvement.

The methodology applied was qualitative case study approach. Over a period of 10 weeks, senior officers at the university level and a cross sectional of JCC participants were interviewed and observed; interviews were transcript and compiled. In addition various documents were also analysed in which was added to the overall empirical report.

Lack of information, communication and consultation between the management and the JCC

Lack of confidence and trust between management-JCC-members

Lack of confidence and trust to the leadership of JCC

Lack of capacity to influence the decision making process

Lack of support from the senior staff

To re-conceptualize the JCC Model by adding the 'culture' component to the model

**Keywords :** employee participation, public sector, decision making, Malaysia



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-17	
<b>PEREKA CODE</b>		P0145/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		The Archaeological Reconstruction of Long Pasia's Dolmens.	
<b>PROJECT LEADER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE	
<b>PROJECT MEMBER</b>		Nurul Mardhiah Binti Ahmad Lotfee	

**Abstract :** Kajian ini adalah mengenai rekonstruksi (pembina semula) tiga fitur dolmen yang diketemukan di Long Pasia dalam kondisi runtuh sepenuhnya. Ketiga-tiga tapak dolmen ini merupakan tinggalan Tradisi Megalitik yang berfungsi sebagai tapak pengebumian sekunder bagi masyarakat Lundayeh purba di kawasan Long Pasia suatu ketika dahulu. Dua buah tapak merupakan tapak yang diketahui kewujudannya sejak pembukaan semula Long Pasia di awal abad ke-20 dan sebuah tapak baru ketemukan pada tahun 2017 oleh penyelidik UMS. Kondisi ketiga-tiga dolmen yang runtuh sepenuhnya menerbitkan pelbagai pandangan dalam kalangan masyarakat tempatan mengenai asal usul dan fungsinya. melalui kajian yang telah dilakukan, rekonstruksi dalam bentuk ilustrasi telah berjaya dilakukan.

1. Mendokumentasi data arkeologi berkaitan dengan tapak dan fitur dolmen.
  2. Menjelaskan asal usul, fungsi dan keberadaan tapak dolmen dalam konteks kebudayaan masyarakat Lundayeh dan Tradisi Megalitik Borneo.
  3. Merekonstruksi binaan fitur dolmen yang runtuh bagi mendapat gambaran sebenar struktur binaannya.
- Kajian ini adalah berasaskan metodologi arkeologi yang menggunakan pendekatan "non-destructive methode" iaitu:-
1. Survei Arkeologi Primer.
  2. Surveri Arkeologi Sekunder.
  3. Analisis dan Interpretasi.
  4. Ilustrasi Pelan dan Rajah.
1. Struktur binaan ketiga-tiga dolmen di Long Pasia mempunyai keunikan dan identiti tersendiri berbanding dengan tapak yang serupa yang diketemukan di Sarawak dan Kalimantan Utara.
  2. Terdapat elemen ukiran pada tiang dolmen yang tidak dimiliki oleh mana-mana dolmen baik di Borneo atau pun di bahagian negara lain sama ada di kawasan Asia lain ataupun Eropah.
  1. Menjadi panduan utama dalam bentuk pelan dan gambarajah untuk proses rekonstruksi insitu dilakukan untuk ketiga-tiga tapak dolmen di Long Pasia bagi tujuan restorasi, konservasi dan pemeliharaan bagi tujuan perlindungan tapak warisan Tradisi Megaltik Sabah dan Malaysia umumnya.
  2. Menjimatkan masa dan kos dalam Projek Rekonstruksi Insitu Tapak Dolmen jika dilakukan di masa hadapan oleh pihak pengurusan warisan negeri dan persekutuan.
  3. Memberi penjelasan dan gambaran berilustrasi sebenar kepada para malim pelancong Long Pasia dan masyarakat tempatan mengenai reka bentuk dan fungsi sebenar tapak dolmen yang selama ini difahami dalam konteks yang kabur dan kurang tepat.

**Keywords :** Tradisi Megalitik, Dolmen, Rekonstruksi, Long Pasia, Borneo.



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-18
<b>PEREKA CODE</b>		P0148/2018
<b>FPI</b>		FKAL
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		A Novel Hybrid Multi-Criteria Decision Making Methodology to Improve Students' Satisfaction in Malaysian National Youth Skills Institutes
<b>PROJECT LEADER</b>		DR. ANATH RAU KRISHNAN
<b>PROJECT MEMBER</b>		CIK MINAH ANAK JAPANG

**Abstract :** Deciding the finest possible strategies to improve students' satisfaction regarding the services offered by the national youth training institutes (Institut Kemahiran Belia Negara&ndash;IKBNs) is easier said than done; it entails the consideration of multiple criteria that not only carry varied priorities, but at the same time are entangled via some complex relationships. Unfortunately, none of the past empirical studies involving TVET institutes, including IKBNs have simultaneously measured both the priorities and relationships associated with the satisfaction criteria. In other words, there is a necessity for a specific study that applies alternate quantitative approaches to supply such useful information to the decision makers of IKBNs.

The first objective of the research is to structure the IKBN student satisfaction according to their actual, independent dimensions.

The second objective is to prioritise the elicited dimensions.

The third objective is to identify the relationships held by the satisfaction criteria mapped to each dimension.

In this methodology, we performed a Delphi evaluation, involving a panel of experts to help finalise the list of criteria for satisfaction, elicited from past literature. A collection of data from 636 IKBN students were then factor analysed to organise the criteria into fewer independent dimensions. Subsequently, a slightly modified, group based Analytical Hierarchy Process was used to prioritise the extracted dimensions, while the DEMATEL method was applied to uncover the existing causal relationships between the criteria associated with each dimension.

The results suggest that IKBNs should primarily aim at serving the students, with technologically consistent workshop tools, concise training notes, flawless internet facilities, efficient feedback-response mechanisms, and instructors with ample subject matter knowledge, if they wish to significantly boost their students' satisfaction.

From the practical viewpoint, the solutions proposed in this study can actually be considered for real-time implementation by the key players of the IKBNs to significantly improve their students' satisfaction. And obviously, these solutions could be executed with minimal hesitancy as they were carefully devised by adhering to the quantitative evidences derived from the proposed hybrid methodology.

**Keywords :** Delphi; Analytical Hierarchy Process; DEMATEL; Students' satisfaction; Experts' opinions



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-19
<b>PEREKA CODE</b>		P0156/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		MOD PENGANGKUTAN ALTERNATIF : SATU KAJIAN TERHADAP PENGGUNAAN PERKHIDMATAN 'GRABCAR' DI BANDARAYA KOTA KINABALU
<b>PROJECT LEADER</b>		DR. HARIFAH BINTI MOHD. NOOR
<b>PROJECT MEMBER</b>		DR. JAKARIA BIN DASAN,SARAVANAN A/L SUNDARA SAKARAN

**Abstract :** Perkhidmatan GrabCar adalah salah satu mod pengangkutan awam yang popular di Kota Kinabalu kerana dikatakan mempunyai tahap mobiliti yang tinggi. Mod pengangkutan ini menjadi alternatif kepada pengangkutan awam masa kini, terutamanya bas mini dan bas berhenti-henti. Ketidakberkesanan perkhidmatan pengangkutan awam sedia ada menyebabkan GrabCar menjadi pilihan pengguna. Kemudahan Grabcar yang dikenali sebagai "ride-hailing" memainkan peranan penting dalam bidang pengangkutan awam dengan perkembangan teknologi seiring dengan IR 4.0. Selain daripada mobiliti yang tinggi, GrabCar dikatakan selesa, dan perkhidmatannya boleh dipercayai. Faktor sosioekonomi memainkan peranan yang penting dalam pemilihan mod pengangkutan khususnya dalam perkhidmatan Grabcar yang semakin dikenali ini. Namun sepertimana mod pengangkutan lain, terdapat cabaran dan permasalahannya dalam perkhidmatannya GrabCar di Bandaraya Kota Kinabalu.

Kajian ini mengenal pasti peranan penggunaan GrabCar, dan pengaruhnya terhadap faktor sosioekonomi dalam kalangan pengguna di bandaraya Kota Kinabalu. Kajian ini juga mengenal pasti permasalahan yang wujud dalam perkhidmatan GrabCar di Bandaraya Kota Kinabalu.

Borang kaji selidik diagihkan terhadap 407 orang awam di sekitar Bandaraya Kota Kinabalu berdasarkan pensampelan rawak mudah dan temu bual tidak berstruktur turut terhadap enam orang informan. Sumber sekunder seperti bahan bacaan dari pelbagai sumber digunakan dalam kajian ini. Kaedah deskriptif dan inferensi menerusi frekuensi, skor min purata dan khi kuasa dua digunakan untuk menganalisis data dalam kajian ini.

Penemuan menunjukkan golongan wanita mendominasi penggunaan perkhidmatan GrabCar yang kebanyakannya berusia 30 tahun ke bawah dengan pendapatan bulanan di bawah RM1,500 sebulan. Penggunaan GrabCar turut menjadi pilihan dalam kalangan pelajar perempuan di institusi pengajian tinggi. Majoriti daripada pengguna GrabCar tidak memiliki kenderaan persendirian. Tambang yang lebih tinggi daripada bas awam tidak menjadi halangan disebabkan tahap ketersampaian dan keselesaan GrabCar yang tinggi. Ketersampaian adalah faktor utama, diikuti faktor keselesaan dan seterusnya faktor kebolehpercayaan menjadikan GrabCar pilihan alternatif terhadap mod pengangkutan awam. Walau pun pengguna GrabCar masih berisiko terhadap isu keselamatan, namun ianya dianggap kes terencil dan boleh diabaikan dalam kalangan pengguna.

Faktor sosioekonomi mempengaruhi penggunaan perkhidmatan Grabcar di Bandaraya Kota Kinabalu, Sabah dari aspek jantina, umur dan pendapatan bulanan. Walaupun Grabcar mendapat tentangan daripada segelintir pihak namun ia menjadi pilihan pengguna dalam dunia IR 4.0 dengan adanya teknologi pintar menyebabkan manusia pintar dalam membuat pilihan mod pengangkutan sama ada memilih pengangkutan awam seperti bas atau teksi atau pengangkutan alternatif seperti Grabcar.

**Keywords :** GrabCar, Sosioekonomi, mod pengangkutan, Bandaraya Kota Kinabalu.



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-20	
<b>PEREKA CODE</b>		P0163/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Community Participation in the Tourism Recovery Program Post EarthQuake Disaster In Mesilou Village Kundasang Sabah	
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN	
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN,AFRIZAL ANWAR @ TEUKU AFRIZAL,RAIHAN ANAS	

**Abstract :** This study focuses on the participation of the local communities (mostly are Dusun) in the tourism recovery program from post-earthquake disaster in Kampung Mesilou, Kundasang Sabah. Community-Based Tourism (CBT) is a form of cooperative that is introduced by the government and run by the villagers. The role of CBT is to promote the local communities’ products such as homestay that help them to generate income. However, in June 2015, the earthquake incident on Mount Kinabalu affected the tourism activities in Kampung Mesilou. Therefore, the local communities had to find an alternative to recover their tourism activities since the government aids focused on the restoration of Mount Kinabalu.

The main objective of this research is to examine the local community participation in the tourism recovery program post-earthquake disaster in Mesilau Village.

1. In-depth interview with 7 informants
2. participation observation
3. Survey & face to face interviews with 40 respondents

This study shows the local community in Kampung Mesilau is actively involved in the tourism recovery program. This program is identified as a mechanism to recover and regenerate the household income of the participants. On the other hand, this program also introduced new idea to the participants in rebuilding tourism product. This tourism recovery program helps in reopening the previous tourist services that have been stopped due to the earthquake.

Application of tourism recovery program can be used as a reference in the implementation of policy and blueprint of the government.

**Keywords :** earthquake disaster, recovery program, tourism rehabilitation, community participation, post-disaster, sustainable tourism



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-21
<b>PEREKA CODE</b>		P0164/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		MASYARAKAT DI BAWAH DUA BENDERA DI PULAU SEBATIK: ANTARA 'KEFAHAMAN' SEJARAH DAN 'KEHENDAK' PEMBANGUNAN
<b>PROJECT LEADER</b>		ENCIK EKO PRAYITNO JOKO
<b>PROJECT MEMBER</b>		ABDUL HADI ALIMUDDIN,ADI JAFAR,ENCIK RAMLI BIN DOLLAH,ENCIK WAN SHAWALUDDIN WAN HASSAN,DR. MARSITAH BINTI MOHD RADZI,PUAN SALMIE JEMON @SUHAINA,HAJI MUSTAPA BIN ABD. TALIP,DR. NORDIN SAKKE,ENCIK MAHADIRIN AHMAD,ENCIK AMRULLAH BIN MARAINING,DR. MD SAFFIE B

**Abstract :** Terdapat beberapa permasalahan yang sering timbul apabila membicarakan persoalan pembangunan dalam kalangan masyarakat sempadan di Pulau Sebatik khususnya identiti bernegara yang dipercayai rencam, janus, dan cair sifatnya (Zaini, Ramli, Marshitah, Amrullah dan Ramlah). Permasalahan yang timbul bukanlah suatu yang baru dihadirkan dalam kalangan masyarakat sempadan di Pulau Sebatik, tetapi telah bermula sejak era negara bangsa menjadi matlamat akhir kedua-dua buah negara. Kerencaman identiti bernegara masyarakat di ini dapat difahami dengan mengembalikan permasalahan tersebut kepada persoalan sejarah yang menjembatangi masyarakatnya merangkumi konsep sempadan tradisi, ikatan etnik, budaya dan sejarah. Maka dengan itu, berkemungkinan besar ikatan primodial yang pernah wujud dan meresapi akal-budi masyarakatnya masih mendasari sistem pemahaman budaya politik moden mereka sehingga timbulnya istilah &quot;garuda di dadanya, harimau di perutnya&quot;. Sekiranya permasalahan ini tidak dijernihkan, sudah pasti akan merencatkan matlamat menghadirkan Bandar Sempadan di Pulau Sebatik. Oleh sebab itu, salah satu saluran terbaik untuk membentuk identiti bernegara dalam kalangan masyarakat sempadan di pulau ini adalah melalui penekanan kepada subjek pendidikan sejarah. Kepentingan sejarah untuk membentuk jati diri masyarakat dalam konteks negara bangsa, terlihat jelas melalui kenyataan R.G Collingwood (1985) yang mengangkat kepentingan sejarah sebagai hakikat kepada kesinambungan sesebuah masyarakat serta panduan bagi memastikan perjalanan masa depan menjadi lebih terarah. Begitu pula dengan tanggapan yang dikemukakan oleh Voss (1997) menekankan bahawa sejarah dapat dijadikan medium mendidik masyarakat mengenai nilai-nilai murni melalui refleksi pengajaran manusia pada masa lepas untuk pembinaan semula kedudukan dan kekuatan sesebuah negara bangsa. Bersandarkan kepada wacana sedia ada yang menggambarkan identiti bernegara mereka yang &quot;cair&quot;, maka penulisan ini akan mengetengahkan kedudukan pendidikan sejarah dalam mengubah &quot;kefahaman&quot; masyarakatnya bagi merealisasikan &quot;kehendak&quot; membangunkan Bandar Sempadan di Pulau Sebatik.

1. Mengetengahkan keperluan membangunkan bandar sempadan di Pulau Sebatik sebagai suatu kehendak perlu disusuli dengan pemahaman sejarah masyarakatnya.

2. membincangkan berkenaan persoalan sejarah yang masih melingkari kehidupan masyarakat sempadan di Pulau Sebatik yang tidak berjaya dihapuskan oleh pembentukan sempadan negara Malaysia - Indonesia.

Metodologi yang digunakan melibatkan secara (i) abstrak dan (ii) empirikal. Metodologi secara abstrak diperolehi melalui penulisan sedia ada yang membincangkan berkenaan persoalan teori, konsep dan model berkaitan negara bangsa dan bandar sempadan manakala metodologi secara abstrak menggunakan kaedah pengedaran borang soal selidik, temubual dengan responden terpilih dan pemerhatian secara langsung di kawasan kajian.

Masyarakat di Pulau Sebatik bukan sahaja termarginalisasi dan mundur kehidupannya, tetapi juga diujahkan oleh saintis sosial sebagai rencam, cair dan janus sifat identiti bernegara mereka. Menyedari akan permasalahan yang sedang berlangsung di pulau tersebut, maka ahli politik dan saintis sosial yang menjadi &quot;lidah&quot; kepada masyarakatnya menyarankan agar dibangunkan sebuah Bandar Sempadan beracukan barter trade. Usaha ini yang merupakan &quot;kehendak&quot; untuk merubah kehidupan masyarakat dan membangunkan ruang wilayah Pulau Sebatik tampaknya tidak mudah dilakukan kerana kejayaannya sangat ditentukan oleh peranan daripada masyarakatnya sendiri. Sedangkan masyarakat pulau ini yang diujahkan kurang menanamkan &quot;harimau di dadanya&quot; akan mengganggu kejayaan Bandar Sempadan yang dibangunkan menyebabkan isu-isu seperti

pencerobohan manusia dan barangan akan tetap berlaku. Oleh sebab itu, permasalahan berkaitan identiti ini perlu ditelusuri juga melalui 'kefahaman' sejarah dengan menggunakan aspek pendidikan khususnya subjek sejarah sebagai wadah dalam pembentukan negara bangsa Malaysia. Kekuatan pendidikan sejarah yang dipercayai dapat menanamkan benih integrasi dan patriotisme perlu dijadikan landasan terbaik oleh kerajaan setelah sekian lama gagal menghadirkannya walaupun telah banyak wang yang dibelanjakan. Walau bagaimanapun, silibus pendidikan sejarah harus dibangunkan semula agar bersifat demokrasi dengan menampilkan peranan daripada setiap kaum-etnik dalam membangunkan negara. Dengan itu kelak, sikap kekitaan, toleransi dan saling mempercayai dalam kalangan masyarakat Malaysia termasuklah masyarakat sempadan di Pulau Sebatik dapat dikecapi kelak selari dengan gagasan 1 Malaysia yang diperkenalkan oleh Perdana Menteri Malaysia, Dato Seri Najib Tun Razak. Akhirnya, usaha menjayakan pelaksanaan Bandar Sempadan dapat berjalan kerana masyarakat di pulau ini meletakkan keutamaan terhadap negara berbanding keetnikan.

Membantu Dalam Pembentukan Bandar Sempadan Di Pulau Sebatik Yang Sudah Dicadangkan Sejak Tahun 1980-An.

2. Membantu Kerajaan Dalam Membentuk Polisi Pembangunan Yang Selari Dengan Persoalan Sejarah Masyarakat Sempadan Di Pulau Sebatik.

3. Meningkatkan Ekonomi Masyarakat Sempadan Di Pulau Sebatik Melalui Pembentukan Bandar Sempadan.

**Keywords :** Bandar Sempadan, Masyarakat Sempadan, Pulau Sebatik



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-22	
<b>PEREKA CODE</b>		P0169/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		COSMOLOGY AND CUSTOMARY LAND OWNERSHIP OF THE NATIVE PEOPLE OF SABAH: CASE STUDY OF SINUMAGANG-TINUMAN TOKI.	
<b>PROJECT LEADER</b>		DR. GAIM @ JAMES LUNKAPIS	
<b>PROJECT MEMBER</b>		ERWINA BINTI NUAR	

**Abstract :**

Customary land is one of the privileges of indigenous peoples in Sabah. The biggest and most current issue in Sabah is the recognition of traditional use of their land, property, customs, culture and beliefs (Madeline Henry Luyan & Gaim James Lunkapis, 2016). Customary land status is often disputed because of differences in understanding between land ownership through customary adat and through state law. The Native peoples are considered unique because of a distinctive systems of trust and management systems through the adat systems. They have a unique cosmological system in land management, especially in the customary and prohibited aspects inherited from their ancestors such as customary practices when opening new land for agricultural, hunting, forestry and much more. Unfortunately, most of these customs and traditions are not recognised through state laws.

The objective of this research were:

1. To understand the concept of native land of indigenous people in Sabah
2. To document native land systems of indigenous peoples in Sabah
3. To analyze issues and conflicts concerning customary land faced by indigenous people Sabah

This research uses qualitative research using key informant, with in-depth interviews with people who know what is going on regarding land issues among the Native peoples of Sabah. Two side of key informants were selected. The first one was from and among the Native communities and the second was from the state especially State Departments that directly deal with land matters. The purpose of this key informant interviews was to collect information from the opposing perspectives who have first hand knowledge about land ownership and other related land matters.

The main finding from this research span around three themes. The first theme span around better understanding regarding land ownership system based adat and land ownership system based on the state definition. The second theme was centered around the consequences of the opposing definition of land ownership systems between the Adat system and the state system. The third theme was on examples of state initiatives to accommodate the adat land ownership systems and ways where native communities initiative to adapt the state systems of land ownership.

Finding from this research are useful as reference point for the state land office to mediate land ownership dispute between the Native communities and the state agencies. Finding also useful for the native to gain understanding on how government land administration work and useful as reference point on how adat systems govern the way of life, livelihood and property ownership among native peoples/communities

**Keywords :** adat system, cosmology, land ownership, native communities,



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-23
<b>PEREKA CODE</b>		P0172/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		CYCLING ACTIVITIES: A CATALYST FOR MAINTAINING CAMPUS SUSTAINABILITY
<b>PROJECT LEADER</b>		DR. HARIFAH BINTI MOHD. NOOR
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. JABIL BIN MAPJABIL,PUAN MARJA AZLIMA BT. OMAR,SARAVANAN A/L SUNDARA SAKARAN

**Abstract :** Maintaining a sustainable campus is one of the challenges in the life of campus citizens. Universiti Malaysia Sabah (UMS) has paved the way to practice the concept of Ecocampus living since the year 2013. The use of bicycles was introduced as the catalyst to promote 'greening UMS campus' initiative. However, does bicycle has the potential to become an alternative mode of transportation for those who live on campus?

This study sought to identify the various factors that affect the use of an alternative mode of transportation amongst UMS students.

Based on stratified random sampling, a total of 300 questionnaires were distributed to students from various residential colleges, faculties in different stages/year of their study. The collected data was analyzed using descriptive methodology and inferences through frequency and average mean score and Chi-Square. The finding showed that most of the female students that lived on campus and in their final year (undergraduate) dominated the use of bicycles on campus.

The bicycles were mainly used for leisure activities; only a small percentage of usage was for going to the library. The use of bicycles for going to lectures is still at the minimum level. Health awareness is the primary factor that encourages the use of bicycles on campus, followed by environmental awareness and accessibility. On the other hand, weather conditions, security issues and lack of facilities are identified as the main hindrances for bicycles to become an alternative mode of transportation on campus.

Increase in the percentage of cycling activity in the campus is still a challenge to university management. An increased effort to improve infrastructure and the initiatives to intensify promotional campaigns would increase the use of bicycles on campus and hence contribute to maintaining UMS as a sustainable campus.

**Keywords :** alternative mode, bicycle, cycling activity, ecoCampus, environment, sustainable campus,



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-24
<b>PEREKA CODE</b>		P0173/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Empowering Rural Poor Communities: From the Duck Farming Project to the Bird Nest Project at Kampung MESEJ Kiangut, Pitas, Sabah.
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN, DR. AFRIZAL ANWAR @ TEUKU AFRIZAL, Nor Rawiyani Binti Dollah

**Abstract :** "E-Kasih" is a development program that introduced by the government to empower the rural communities who are under the poverty line. The projects introduced are Duck farming project and Bird Nest project. Hence, poverty eradication projects through Duck farming and Bird Nest farming assist the selected eKasih participants in improving their socioeconomic status by increasing their household income and empower in economic, social, political and psychological context. Consequently, Duck farming and Bird Nest farming projects are seen as a barometer in empowering the hardcore poverty among the eKasih participants who involved in the development project (Duck Farming and Bird Nest Farming).

This study intends to highlight the extent of the poverty eradication project from Duck farming to Bird Nest farming.

This study also applied the indicator from Scheyvens to evaluate the stages of empowerment of eKasih participants who were involved in Duck farming and Bird Nest projects.

In-depth interviews with 20 informants of eKasih participants for Duck farming project and Bird Nests project at Kampung MESEJ Kiangut Pitas, Sabah.

The results of the study show that the failure of the participants in implementing the Duck farming project made the gauge to the success of Bird Nest farming Project. This is because the inadequacy of capital has led to a Duck farming project fail since the participants involved are inexperienced in Duck farming. Hence, the failure of the first phase project has prompted eKasih participants to seek and find alternatives to develop the Bird Nest farming projects so that Bird Nest farming projects help to empower the selected eKasih participants. Therefore, the communities (ekasih participants) that are involved in Bird Nest farming are seen as unfit to fulfill the criteria of empowerment that are proposed by Scheyven. The result identified that only three aspects of empowerment proposed by Scheyvens are achieved, which are social, psychological and political aspects.

The results of this study help in assisting the development agencies such as the Ministry of Rural Development, District Animal and Livestock Industry Office, Implementation Coordination Unit (ICU), Prime Minister's Department and Economic Planning Unit to get a clear picture of the implementation of development projects primarily on the formulation of policies or development planning policies to eradicate poverty especially in Sabah. In addition, this study can also be used as a reference for policymakers in the Rural Development sector particularly in streamlining and improving existing policies in Sabah.

**Keywords :** Empowerment, Poverty, eKasih, Community Participation, Hardcore Poverty



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-25	
<b>PEREKA CODE</b>		P0176/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		The History of North Borneo Steamship (1881-1963).	
<b>PROJECT LEADER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE	
<b>PROJECT MEMBER</b>		Mohamed Aliff Bin Rosli	

**Abstract :** Kajian ini adalah mengenai sejarah kapal wap yang beroperasi di Borneo Utara antara tahun 1881 hingga 1963 berkaitan dengan aspek rekabentuk, kuasa dorongan dan fungsi kapal. Sejarah aspek ini kurang diberi perhatian dalam sejarah perkapalan dan pelayaran yang melibatkan penggunaan kapal wap baik di Malaysia dan Asia Tenggara. Fokus kajian terhadap dua aspek kejuruteraan kapal ini memberi kefahaman sejarah bukan sekadar mengenai manusia semata-mata tetapi juga berkaitan budaya benda khususnya inovasi perubahan teknologi yang melibatkan aspek mekanikal berkaitrapat dengan perubahan fungsi kapal wap sejak seabad vessel ini digunakan. Borneo Utara tidak terkecuali kerana akses maritim yang meluas yang didorong oleh pelbagai faktor sosio-ekonomi sejak pentadbiran NBNC pada tahun 1881. Kajian ini berjaya membuktikan kapal wap yang beroperasi di Borneo Utara sehingga tahun 1963 telah mengalami perubahan dari segi reka bentuk, kuasa dorongan mekanikal dan fungsi kapal yang amat jelas sesuai dengan perkembangan semasa iaitu tidak mengalami fenomena "sampah teknologi barat".

1. Mengkaji penggunaan kapal wap dalam industri perkapalan di Borneo Utara.
2. Menganalisis reka bentuk, kuasa dorongan dan fungsi kapal wap yang digunakan.
3. Memahami perubahan fungsi kapal wap bersesuaian dengan perubahan teknologi kapal wap.
  1. Kajian arkib dan perpustakaan.
  2. Kajian atas talian pengkalan data kapal wap.
    1. Aspek kejuruteraan binaan kapal wap menentukan penggunaan kapal wap di Borneo Utara dalam aspek reka bentuk, struktur kapal, saiz, berat dan kelajuan.
    2. Fungsi kapal wap mengalami perubahan bersesuaian dengan perubahan teknologi pembinaan sesebuah kapal wap.
    3. Fungsi kapal wap menentukan jumlah kapal wap yang beroperasi di Borneo Utara dan bagaimana bentuk sumbangannya dalam aspek pembangunan sosio-ekonomi khususnya melibatkan mobilasi eksport dan import pada zaman kolonial.
      1. Memberi kefahaman mengenai sejarah kapal wap dalam konteks sejarah kejuruteraan bagi aspek pembinaan kapal wap yang pernah beroperasi di Borneo Utara.
      2. Sebagai rujukan kepada kajian sejarah perkapalan dan kejuruteraan kapal pada kajian selanjutnya.
      3. Menjadi medium pendidikan kepada golongan akademia dan masyarakat umum bahawa kajian sejarah perkapalan dan maritim umumnya bahawa aspek inovasi amat penting difahami dan dihubungkan bagi mendapatkan pemahaman yang lebih tepat bagaimana fenomena sosio-ekonomi berlaku. pemberatan terhadap elemen manusia dalam sejarah sebagai pelaku utama dalam peristiwa harus dikikis kerana budaya benda juga bertindak sebagai pelaku sejarah khususnya yang mempunyai "nama" diberikan seperti pada sesebuah kapal wap dan jenis dorongan yang lain.

**Keywords :** Steamship, mechanical, function, North Borneo.



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-26	
<b>PEREKA CODE</b>		P0178/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Tambun Island, Marudu Bay from Heritage Perspective.	
<b>PROJECT LEADER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE	
<b>PROJECT MEMBER</b>		Any Farina Manzes	

**Abstract :** Kajian ini adalah mengenai keberadaan sebuah pulau kecil yang terpinggir dalam konteks sejarah dan pembangunan di Teluk Marudu. Kewujudan pulau ini adalah antara pulau yang terawal dicatatkan dalam peta moden Borneo yang dihasilkan oleh pemeta Eropah. Penemuan semula pulau ini dalam konteks sejarah dan warisan telah mendedahkan keberadaannya yang mengalami ancaman kepupusan budaya dan semulajadi. Kajian ini turut membuktikan bahawa wujud beberapa pulau lain di Teluk Marudu yang mengalami nasib yang sama. Fungsi semulajadi dan budaya telah mengalami perubahan akibat dari ancaman yang dialami. Justeru kajian ini diharapkan menyedarkan pihak berkepentingan khususnya kerajaan negeri menyelamatkan pulau ini dan pulau yang lain melalui pembangunan lestari yang memberi manfaat kepada ekosistem Teluk Marudu dan komuniti tempatan.

1. Mengkaji kewujudan pulau-pulau kecil dalam perairan Teluk Marudu dalam konteks sejarah dan warisan.
2. Menilai keberadaan Pulau Tambun berdasarkan sumber sejarah dan konteks kebudayaannya.
3. Mengesahkan maklumat yang dicatatkan pada peta awal mengenai Teluk Marudu.
  1. Kajian arkib dan perpustakaan.
  2. Kajian lapangan di kawasan tapak kajian dengan menggunakan teknik survei arkeologi.
  3. Temubual dengan komuniti Pulau Tambun.
    1. Pulau Tambun telah pun direkodkan dalam peta awal Teluk Marudu pada tahun 1770 oleh pemeta Eropah. Fakta ini membuktikan penamaan dengan nama tempatan dan keberadaannya dalam konteks komuniti yang tinggal di sekitar Teluk Marudu telah wujud sejak 3 abad lalu.
    2. Persekitaran fizikal Pulau Tambun telah mengalami perubahan yang drastik dan diancam penenggelaman.
    3. Penerokaan pulau ini oleh komuniti Melayu Brunei telah wujud sejak 200 tahun lalu yang dikaitkan dengan industri kulit bakau sebagai bahan pewarna. Penemuan ini dapat menjelaskan kenapa komuniti ini menetap di luar konteks kebiasaan bentuk penempatan mereka. Begitu juga penjelasan kepada kewujudan sebuah penempatan serupa dalam kalangan komuniti ini di Pulau Tanjung Aru, Sandakan.
    4. Pulau ini telah ditinggalkan oleh komunitinya atas faktor ancaman semulajadi dan menjadi penyebab kepada wujudnya penempatan di Kampung Tambun Darat, Kota Marudu pada hari ini.
      1. Menjadi rujukan kepada pengurusan dan pembangunan sosio-ekonomi pulau-pulau kecil di Teluk Marudu oleh pihak berkepentingan khususnya kerajaan Negeri dan Badan Bukan Kerajaan.
      2. Penjelasan sejarah mengenai keberadaan komuniti Melayu Brunei di Sabah khususnya diluar konteks kebiasaan proses pergerakan dan pembukaan penempatan komuniti ini.
      3. Memberi kesedaran pihak berkepentingan seperti institusi permuziuman, arkib dan IPTA/S untuk mendokumentasi aspek sejarah dan warisan Pulau Tambun dan pulau senasib dengannya bukan sahaja di Teluk Marudu tetapi juga di kawasan perairan lain di negara ini.
      4. Membuka laluan kepada kajian pelbagai disiplin mengenai fenomena pulau tenggelam dalam kalangan pulau-pulau kecil yang selama ini terpinggir kerana pengetahuan tentangnya masih kurang diperolehi.

**Keywords :** Tambun Island, Marudu Bay, Heritage, Submerged Island.



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-27
<b>PEREKA CODE</b>		P0187/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Program Gerakan Daya Wawasan (GDW): Issues And Challenges Faced by the Dusun Community in Kampung Bayangan, Keningau, Sabah, Malaysia
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN,AFRIZAL ANWAR @ TEUKU AFRIZAL, Norhaya Jamalong

**Abstract :** In essence, the goal of development is to improve the living conditions of the community and enable them (communities) to use the potential for changing living standards. Hence, the Program Gerakan Daya Wawasan (GDW) is a mechanism for forming a community of proactive, resilient, initiative, independent, knowledgeable, and disciplined communities. Therefore, this programmes aims to bring &quot;paradigm&quot; changes among local communities so that they can develop their own communities and villages without relying on the government

This study attempts to highlight issues and challenges faced by the community under the implementation of the GDW program by making Kg.Bayangan, Keningau as a case study.

This is because the issues and challenges faced by the community on this program are less emphasized by previous researchers either from the Peninsular or Sabah

The qualitative research approach was used in this study through in-depth interviews with 20 respondents.

The results of the study found that the challenges faced by the community under the implementation of the program GDW in Kg. Bayangan, Keningau, Sabah are shadow after winning the award of the excellent village in 2004. This is an out-of-the-ordinary community.

The findings of this study are expected to enable relevant development agencies, especially the Ministry of Rural and Regional Development (KKLW), Ministry of Rural Development, Ministry of Information, Ministry of Arts and Tourism, Ministry of Land and Co-operative Development, Ministry of Unity, Ministry of Development Human Resources, KEMAS, INFRA, and Ladang Pertubuhan Lembaga get a clear, accurate and comprehensive picture of the issues and challenges that the community faces after benefiting from the program. Such information is particularly useful for program planners in order to respond to problems faced by the community to ensure that the GDW program is successful in eradicating rural poverty

**Keywords :** Program Gerakan Daya Wawasan (GDW), Rural Community, Paradigm Change, Anti Climax



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-28
<b>PEREKA CODE</b>		P0189/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Exploring Production of Commercial Shrimp Farming and Local Entitlements in Kampung Sungai Eloi, Pitas, Sabah, Malaysia
<b>PROJECT LEADER</b>		PROFESSOR DR. ROSAZMAN BIN HUSSIN
<b>PROJECT MEMBER</b>		NIVASINI A/P TAMOTHRAN,PROFESSOR DR. ROSAZMAN BIN HUSSIN,Joeyimin Min

**Abstract :** A recent large-scale of shrimp farming development project has been initiated in Kampung Sungai Eloi, Pitas (involved Tombonuo communities) to fulfill extensive market demand, and it is the largest shrimp farm in Malaysia (Pitas Department of Fisheries Pitas, 2014). It is made possible with the assistance of farm management expertise from Thailand.

It has resulted in the conversion of the mangrove ecosystem into large-scale commercial shrimp farming and led to deterioration because of mangrove encroachment. This caused loss of local livelihood, food source and cultural practices (rituals) (Fieldnotes, January to March 2016).

Commercial shrimp farming activities are considered new in the research area and located in the midst of villages. Moreover, social acceptance of shrimp aquaculture varies because of its high technological requirements, ecological and socioeconomic context that differ widely. (Chowdhury, 2006).

To add, most shrimp farming research in Sabah is in the form of technical reports such our water quality and modern technology uses in producing commercial shrimp. In relation to this, this paper tries to explain from the sociological perspective and focussing on the sense of locals entitlement (property right) towards their mangrove area and its effect on commercial shrimp farming.

1. To examines the implications of the change in property rights to the mangrove area for poor local communities.
2. To identify the importance of local entitlement for local towards natural resources that contain pre-existing and socio-cultural systems.

The qualitative method includes in-depth and informal interviews, household survey through the questionnaire, and observation

Brackish-water shrimp farming (P. Monodon and P. Vannamei species) in Kampung Sungai Eloi, Pitas is known as the largest commercial aquaculture activity in Malaysia which said brings beneficial impacts to locals. Thus, this research focussing on the beneficial impact of the commercial aquaculture activity on local's socio-economic well-being. However, the research findings show that the commercial activity not only didn't bring any economic opportunity to local, it also has degraded their mangrove resources which for livelihood use (dietary, traditional medicine, construction, and handicraft materials) for generations. In order to sustain their dependency on the mangrove resource which their cultural identity, Tombonuo community in the research area use their local knowledge to manage the remaining mangrove area due to the degrading impact of commercial shrimp farming. This study shows the importance of local socio-ecological systems for livelihood can be viewed through an entitlement lens that confers property rights upon some actors, for certain uses and denies them to others especially locals.

Any land development could be straightforward and trouble free if a better commitment from both the state, developers and locals.

**Keywords :** Local Entitlements and Shrimp Farming



**E : HUMANITIES, ARTS AND PYSCHOLOGY**

<b>BOOTH NO.</b>		RE-29	
<b>PEREKA CODE</b>		P0203/2018	
<b>FPI</b>		FKSW	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HUMANITIES, ARTS AND PYSCHOLOGY
<b>PROJECT TITLE</b>		Penglibatan Pekerja Kurang Upaya dalam Program Return To Work (PERKESO) di Kota Kinabalu, Sabah	
<b>PROJECT LEADER</b>		PUAN SALMIE JEMON @SUHAINA	
<b>PROJECT MEMBER</b>		Nur Aziyan Sima, ENCIK MOHD. SAFRI BIN SAIMAN, ENCIK FAZLI BIN ABD. HAMID	

**Abstract :** Berdasarkan kajian Pertubuhan Kesihatan Dunia (World Health Organisation) 2011, dianggarkan seramai satu bilion iaitu kira-kira 15 peratus penduduk dunia mengalami kurang upaya. Di peringkat global, kajian lepas menunjukkan bahawa masalah terbesar yang dihadapi oleh OKU bukanlah secara spesifik kepada ketidakupayaan yang mereka alami tetapi lebih kepada kekangan aksesibiliti kepada sumber seperti pendidikan, pekerjaan, rawatan kesihatan serta sistem sokongan sosial dan perundangan. Sekaligus ini meletakkan golongan OKU dalam kategori miskin memandangkan mereka tidak mempunyai sumber pendapatan sendiri untuk kelangsungan hidup (United Nation, 2011). Bagi mengatasi kekangan ini, maka perundangan dan polisi berkaitan anti diskriminasi merupakan titik awal bagi menggalakkan kemasukan OKU dalam sektor pekerjaan. Dalam konteks ini, majikan sewajarnya menyediakan peluang dan ruang yang sesuai kepada OKU &ndash; misalnya akses dari segi proses pengambilan dan pemilihan pekerja, adaptasi ruang bekerja, pengubahsuaian masa bekerja &ndash; yang mana usaha ini akan mengurangkan diskriminasi pekerjaan, meningkatkan akses ke tempat kerja dan seterusnya mengubah persepsi tentang keupayaan OKU menyumbang sebagai pekerja produktif. Kajian lepas jelas menunjukkan terdapat keinginan pekerja OKU untuk kembali bekerja. Namun demikian, data sehingga tahun 2012 di seluruh dunia mencatatkan 40 hingga 60 peratus pekerja kurang upaya masih tidak mempunyai pekerjaan berbanding bukan pekerja kurang upaya (Magdalene, 2012). Hal ini berpunca daripada majikan yang mempunyai persepsi atau tanggapan negatif terhadap kemampuan pekerja kurang upaya ini (Rohany, 2010). Sebagai contoh, majikan beranggapan pekerja kurang produktif, mudah jatuh sakit dan melibatkan kos yang tinggi bagi penyediaan persekitaran kerja kerana keadaan fizikal yang tidak sempurna. Selain itu, pekerja kurang upaya ini disisihkan disebabkan sifat mereka yang tidak sempurna (Siti Suhaila et. al., 2013). Tanggapan-tanggapan negatif ini membawa kepada kurangnya pengambilan pekerja kurang upaya untuk kembali bekerja walaupun terdapat dalam kalangan mereka yang telah berkhidmat lama di dalam organisasi (Laaksonen & Gould, 2015). Kehilangan keupayaan sewajarnya bukan menjadi penghalang kepada pekerja kurang upaya kembali bekerja.

Objektif kajian adalah:

1. Mengenalpasti faktor-faktor yang menyebabkan pekerja OKU kembali bekerja melalui RTW
2. Meninjau persepsi setiap aktor hubungan industri (dalam konteks ini, pekerja OKU, Majikan dan agensi pelaksana) terhadap program RTW, khususnya di Sabah.

Pendekatan kualitatif secara kajian kes telah digunakan melalui temu bual mendalam responden kajian yang terlibat dalam program RTW. Seramai 12 orang responden terdiri daripada enam orang pekerja kurang upaya, empat orang majikan daripada organisasi yang berbeza dan dua orang pengurus kes unit RTW, Perkeso.

Berdasarkan kajian terhadap organisasi terpilih di Kota Kinabalu menunjukkan terdapat tujuh faktor pekerja kurang upaya menyertai program RTW ini antaranya pendapatan, penyesuaian kerja dengan keupayaan fizikal, sikap, tahap kesihatan, hubungan sosial di tempat kerja, kemudan fizikal di tempat kerja dan masa bekerja. Dalam kajian ini menunjukkan persepsi yang positif ditunjukkan oleh ketiga-tiga aktor dalam pelaksanaan program RTW. Walaupun, ketiga-tiga aktor ini mempunyai matlamat yang berbeza yang ingin dicapai dalam program ini tetapi objektif mereka adalah sama iaitu membantu pekerja kurang upaya untuk kembali bekerja dengan mudah dan cepat

Dapatan kajian boleh digunakan sebagai sokongan kepada penambahbaikan program RTW sedia ada. Kajian bersabit pekerja OKU dan program RTW ini penting kepada organisasi, pekerja OKU dan agensi pelaksana kerana ia berupaya menyumbang kepada kesejahteraan masyarakat melalui pembangunan polisi keselamatan sosial pekerja yang mengambilkira konteks empirikal semasa di Malaysia.

**Keywords :** Pekerja, Return To Work, Orang Kurang Upaya, Keselamatan Sosial

## **F : COMPUTING AND MATHEMATICS**



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		RF-01
<b>PEREKA CODE</b>		P0017/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Improved Local Search Approaches to Solve the Post Enrollment Course Timetabling Problem
<b>PROJECT LEADER</b>		ENCIK GOH SAY LENG
<b>PROJECT MEMBER</b>		ENCIK GOH SAY LENG, CIK SUAINI BINTI SURA, PUAN HADZARIAH BINTI ISMAIL, ENCIK TEONG KHAN VUN, DR. CHUNG SENG KHEAU @ UNTUNG BIN NGEN FUI

**Abstract :** University course timetabling problems involve assigning a set of courses to a limited set of time slots, and rooms, whilst satisfying a set of constraints (Lewis, 2008). It is an NP-complete problem, meaning that approaches which are guaranteed to provide an optimal solution are often too time consuming so that heuristic and meta-heuristic approaches are often utilized. Assigning courses to time slots alone is equivalent to the graph coloring problem which is also NP-complete. de Werra shows the reduction of timetabling to graph coloring problem (de Werra, 1985). Timetabling construction has also been shown to be NP-complete in several other ways (Cooper & Kingston, 1996). Timetabling has an increased level of difficulty as courses have to be assigned to rooms in addition to time slots. In this work, Tabu Search with Sampling and Perturbation (TSSP) is used to find feasible solutions. The feasible solution is then improved in terms of soft constraint violations by using an enhanced version of Simulated Annealing (SA) called SAR which eliminates the need for tuning as is often the case for a conventional SA. We do not use Tabu Search (TS) to improve the soft cost of the solutions in stage 2 as we feel TS is too restrictive and may affect the connectivity of search space. The proposed method is tested on three benchmark datasets for university course timetabling problems and the results are compared with other state of the art methods.

- 1) To design a world class optimization algorithm for the university course timetabling problems.
- 2) To design an easy-to-use optimization algorithm that requires less manual parameter setting compared to the existing methodologies found in the scientific literature.

The timetable is constructed by employing a two stage approach. In stage 1, a feasible solution is built constructively by using Tabu Search with Sampling and Perturbation (TSSP). Only if a feasible solution is found, is it passed to the next stage. In stage 2, we improved the feasible solution in terms of soft constraint violations by using a method called Simulated Annealing with Reheating (SAR). The method is inspired by the idea that when the current cost is high, the search should explore more and when the current cost is low, the search should exploit more. In SAR, we rely on the current cost to determine the initial temperature (rigorous setting of the initial temperature is bypassed) and how much to reheat when the search is stuck. In fact, we also rely on the current cost to determine whether the search is stuck in a local optima (inactive current cost through Markov chains indicates the search is stuck). As the temperature is reheated when a local optima is estimated at a certain low temperature, the setting of an end temperature as required in conventional SA is omitted. If the search is still stuck after the previous reheating, a higher temperature is applied for the next reheating. We estimate whether the search is still stuck in the previous local optima by utilizing the current and best cost. The approach is novel as the closest cost based reheating in the literature is based on the best cost and specific heat (Abramson et al., 1999).

Our method performed generally faster on average time (especially instances 10, 19, 23 and 24 of ITC07) than the Improved PARTIACOL by Lewis and Thompson (2015) while being equally effective (100% feasibility) in finding feasible solutions.

In terms of soft constraint violations, SAR outperformed (best results are in bold) all the other solvers for all Socha instances. It is interesting to note that our averages are far better than the best produced by other solvers over all instances. We found optimal solutions for 9 out of the 11 instances. For ITC02 instances, we have managed to beat the results of the best method. Our results are competitive or better than the other solvers on all the instances. In fact, we managed to get optimal solutions for 7 out of 20 instances in comparison to the best method.

For ITC07 instances, our results are competitive compared to the other solvers. We managed to obtain optimal solutions for 15 out of 24 instances.

The SAR algorithm is also shown to be scalable as the best and average cost improved significantly when the run time is extended. In fact, we managed to obtain the best known results for the instances. It is important to note that we simply reset the run time in the algorithm without tuning any parameters, as is often required in a conventional SA e.g. decay rate.

The optimization algorithm can be applied not only for course timetabling problems but also other combinatorial optimization problems as previously mentioned. In future, the improved algorithm can be utilized for course timetable construction in UMS as well as other universities in Malaysia.

**Keywords :** Timetabling, Combinatorial Optimization, Local Search, Tabu Search with Sampling and Perturbation (TSSP), Simulated Annealing with Reheating (SAR)



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		RF-02	
<b>PEREKA CODE</b>		P0033/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Russell's 4-Quadrant Emotion Classification In Virtual Reality using Wearable EEG and Machine Learning	
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. JASON TEO TZE WI	
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. JASON TEO TZE WI, Nazmi Sofian bin Suhaimi, DR. JAMES MOUNTSTEPHENS	

**Abstract :** Emotion analysis can be conducted from a variety of methods to identify the state of a person is in. Methods include facial expressions and human speeches (gestures and motions). However, are we really capable of identifying the state of a person is in if a person is unable to express or show their emotions or if they are hiding their true feeling by faking expressions or gestures to mislead psychologists or interrogators?

From recent technological advancements, machines are now capable of retrieving sensitive signals that was considered impossible or expensive back then. Physiological devices such as Electrocardiogram (ECG), Heart Rate Variability (HRV), Galvanic Skin Response (GSR) and Electroencephalography (EEG) are some of the common devices used to detect the state of a person is in.

Recent researches that was conducted for the classification of emotion were commonly applied on music, music-video and video that were simply showed to the participants on a fixed monitor screen or through earphones or both at the same time while sitting statically to avoid any unnecessary/additional artefacts (static noises coming from blinking, muscle movements etc) induced to the system.

The approach towards this research is use Virtual Reality (VR) contents to show to the users while allowing the users to have the freedom of movement to provide a deep immersion of experience so that the evocation of emotion is truer in the brainwave signal.

Non-invasive EEG signal device from Consumer-Off-The-Shelf (COTS) such as Muse will then be use to acquire the brainwave signal of the user and the dataset will then be fed to the Classifiers such as KNN and SVM from machine learning language to train and predict the accuracy of the emotion classification.

To stimulate emotions of users through the use of Virtual Reality contents

To record the brainwaves of the stimulated users

To run tests and prediction of the emotions of the brainwave signals using machine learning language

To link the objectives with the methodology, steps 1-3 are for addressing objective 1, steps 4-5 are for addressing objective 2, and steps 6-7 are for addressing objective 3.

Virtual reality contents were gathered from 3rd party sources to accommodate the Russel's 4 quadrants of the Arousal Valence Space Model (AVS)

The VR contents were sliced and stitched for 20 seconds per video for maximum impact of the targeted quadrants.

The stitched contents are then shown to the user using VR headset and Earphones for immersive experience

The brainwave signals will be recorded using Commercially-off-the-shelf (COTS) Electroencephalography (EEG) device.

The recorded brainwave signals is then fed into the classifiers for classification of emotions using machine learning language.

There are two approach towards obtaining the accuracy of the classifiers. Firstly, is using Inter-Subject Variability and secondly using Intra-Subject Variability.

The results obtained from the classification will then be further discussed in the findings.

Current findings of the accuracy for each quadrants shows an average of 88.62% - 95.29% for Inter-Subject Variability. While Intra-Subject Variability obtained an average of 97.05% - 98.33%.

The results here shows that predicting human emotion using VR is obtainable using consumer grade EEG device.

In term of medical perspective, psychologist will be able to assist in identifying the psychological condition of their patients from the patterns of their brainwave signals

From entertainment sector, the continuous evaluation of the players condition performing intensive game would be able to adapt the scenarios of the environment by dynamically restructuring its difficulty level

From military perspective, it will reduce the deployment cost of the military training and assessment of the soldiers by integrating virtual environment and EEG assessment to understand the psychological condition of their personnel. This will also help harden the soldiers and better prepare in tough conditions

**Keywords :** Affective computing, EEG, virtual reality, machine learning



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		RF-03
<b>PEREKA CODE</b>		P0034/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Tabu-Search Biased Ranking (TSBR) Hyperheuristic for Fixed and Dynamic Expensive Function Optimization
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. JASON TEO TZE WI
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. JASON TEO TZE WI, Ong Jia Hui

**Abstract :** Hyper-heuristic has proven to be problem independent and early researchers have used hyper-heuristic mostly in discrete optimization problems. Hyper-heuristic was rarely used in continuous optimization problems especially in expensive optimization problems. Research before this has proven that hyper-heuristic can be used in continuous optimization problems without involving complex configurations when porting the hyper-heuristic to a different continuous optimization problem. In this research, the flexibility of hyper-heuristic is further extended by adding a hybrid heuristic selection mechanism called Tabu-search Biased Ranking (TSBR). This selection mechanism was compared against other conventional heuristic selections mechanism. The performance of TSBR is further tested in dynamic optimization problem under limited evaluation constraint.

To compare the performance of Tabu-search Biased Ranking (TSBR) against other conventional heuristic selection mechanism and to study the performance of TSBR in dynamic optimization problem under limited evaluations.

TSBR is used by pairing with only improving move acceptance (OI). Comparison of TSBR against conventional heuristic selections method is done by comparing TSBR with random permutation, choice function, greedy, random permutation descent, tabu search, and simple random search. All these heuristic selection methods are then tested with expensive optimization problems and three sets of evaluation limits are used which is 100, 250 and 500. The performance of TSBR is then tested again in dynamic optimization problems against Differential Evolution (DE), Genetic Algorithm (GA), Co-variance Matrix Adaptation Evolution Strategies (CMA-ES), Particle Swarm Optimization (PSO), Mean Variance Mapping Optimization (MVM0).

By using the flexibility and biased nature of TSBR, the best performing heuristic in the first half of the search was able to take control of the second half of the search and produced better results as compared with the conventional heuristic selection mechanism. TSBR has shown good results in dynamic optimization problems against Differential Evolution (DE), Genetic Algorithm (GA), Co-variance Matrix Adaptation Evolution Strategies (CMA-ES), Particle Swarm Optimization (PSO), Mean Variance Mapping Optimization (MVM0).

One of the real-world problems such as rocket launching and landing by SpaceX needs optimization results in a matter of seconds, other real-world problems such as weapon targeting system, NASA space mission, and unmanned aerial vehicles are some of the examples that required quick solution searching due to the constraint of budget and time. In real-world condition, noisy and dynamic environment will affect the searching process and makes it even hard to get good results in a short time frame. Hence hyper-heuristic can help in reducing the time needed to tailor a specific algorithm for a specific problem with its flexibility and portability nature. Hyper-heuristic can prove to be useful in getting optimal solution and yet required much lesser time to tweak and tailored when it is used in different optimization problems with a flexible heuristic selection mechanism in place. This will cut down the time, budget and expertise needed to deal with dynamics severely limited evaluations' optimization problems.

**Keywords :** Hyperheuristics, function optimization, expensive optimization, heuristic selection methods



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		RF-04	
<b>PEREKA CODE</b>		P0041/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Computational study of meta-heuristic approaches for UMS course timetabling	
<b>PROJECT LEADER</b>		DR. JOE HENRY OBIT	
<b>PROJECT MEMBER</b>		TAN SHENG YIN, LEE KIEN HANG	

**Abstract :** This research will focus on the University Course Timetabling Problem (UCTP) of University Malaysia Sabah Labuan International Campus (UMSLIC). A lot of researches have been conducted with the use of different Meta-heuristic methods, these methods have been studied and some selected methods are applied in order to produce more satisfactory course timetables.

Meta-heuristic approaches such as, Genetic Algorithm (GA) is one of the widely praised and used method in UCTP as it can be used to solve NP-hard and optimisation problems. Besides GA, other approaches such as Tabu Search (TS), Great Deluge (GD), and Simulated Annealing (SA) were also used in various UCTP researches.

In order to produce the best solution for course timetabling problem, all the hard constraints must be satisfied and soft constraints should be fulfilled as much as possible. Therefore, the aim of this research is to compare and obtain the most optimal way for course timetabling by satisfying all the hard constraints and minimizing soft constraints as much as possible in order to obtain better quality timetables.

There are two objectives in the research,

1. Improve the quality of timetable by making a comparison between Simulated Annealing and Great Deluge
2. To automatically pre-process dataset in order to speed up the pre-processing process.

In this research, we obtained information such as the hard constraints, soft constraints, course information, size of each room, and student registration information from BPA staff who is in charge of course timetabling and is stationed in University Malaysia Sabah Labuan International Campus.

Furthermore, the database are designed to store the following information:

- Students' Information, including registered course.
- Lecturers' information, including courses that they will be lecturing.
- Venues' information.
- Courses' information.
- Timetable generated.

This expert system will then read all these raw data from MySQL and turn it into numeric format for faster pre-processing as compared to pre-processing it manually. Hence, achieving the second objective.

The research will utilized three algorithms, which are:

- 1) Constructive Heuristics Algorithm
  - This algorithm was used in order to generate a feasible solutions.
- 2) Simulated Annealing Algorithm
  - Simulated Annealing was applied in order to improve the quality of the solution. And the result are recorded and are later used to compare with Great Deluge Algorithms.
- 3) Great Deluge Algorithms
  - Both linear and non-linear Great Deluge were applied in the research in order to improve the quality of the solution as well as to compare with Simulated Annealing Algorithm.

By using these algorithm, we generate solutions using different algorithms to pitch against each other to determine which algorithm produce better results.

Running under 300 seconds, Non-linear Great Deluge algorithm is the best performer out of the 3 algorithms applied with a 65.84% improvement as compared to Simulated Annealing with a 63.48% improvement, followed by linear Great Deluge algorithm with a 52.79% improvement.

Furthermore, from the research, we found that Non-Linear Great Deluge best performs in 300 seconds, while Simulated Annealing are found to be efficient in 600 seconds while Linear Great Deluge requires a 900 seconds in order to produce a highly improved solution.

The expert system can be used to replace university staff from manually assigning timetable for each course that requires a long period of time and unable to considered students who will be retaking the subjects. Furthermore, the expert system can be used by any university/school that has all the information required in the database.

**Keywords :** Timetable, meta-heuristic and optimisation



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		RF-05	
<b>PEREKA CODE</b>		P0088/2018	
<b>FPI</b>		FKAL	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		An alternate method to determine $\lambda^0$ –measure values prior to applying Choquet integral in a multi-attribute decision making environment	
<b>PROJECT LEADER</b>		DR. ANATH RAU KRISHNAN	
<b>PROJECT MEMBER</b>		CIK SITI NUR AQILAH BINTI AB WAHAB	

**Abstract :** Determining  $2^n$  values of fuzzy measure prior to applying Choquet integral usually turns into a complex undertaking, especially when the decision problem entails a large number of evaluation attributes,  $n$ . Many patterns of fuzzy measure have thus been suggested to deal with this complexity.  $\lambda^0$ -measure is one such pattern. However, the original  $\lambda^0$  –measure identification method is found to be unsuccessful in providing clear-cut indications on the relationships held by the attributes. A revised version of the method was then introduced to cater this issue, but unfortunately it demands large amount of initial data compared to the original procedure. In short, there exist a need for an alternate  $\lambda^0$  –measure identification method that synchronously compensates the shortcomings associated with each existing technique.

The first objective of this reseach is to develop an alternate  $\lambda^0$  –measure identification method that not only uses minimal amount of initial data, but at the same time able to feed clearer information to the decision makers about the relationships shared by the evaluation attributes.

The second objective is to illustrate the feasibility of the proposed method.

The thrid objective is to compare the usability of the proposed  $\lambda^0$ –measure identification technique over the existing methods.

The proposed method uses interpretive structural modelling (ISM) to uncover the actual relationships held by the attributes. The outputs of ISM (i.e. digraph, driving power and dependence power) are then utilised to determine the inputs required to identify the complete set of  $\lambda^0$ -measure values. A supplier selection problem was used to demonstrate the feasibility of the method. Also, the usability of the method is compared over the existing ones mainly based on the types and amount of initial data required by each technique, and the types of quantitative results delivered by them.

This study has introduced an alternate yet improved version of  $\lambda^0$  –measure identification method to the field of MADM that not only requires minimal amount of initial data, but at the same time able to offer clearer information regarding the relationships shared by the evaluation attributes, thereby helping the decision makers to formulate more effective strategies to enhance the performance of the alternatives or targets. Through a simple experiment, we managed to establish that the initial data requirement of the proposed method is less than the revised method. To be precise, the proposed alternate method only requires twice the amount of initial data required by the original method, unlike the revised one which demands thrice. In short, the proposed method has partially, if not completely, compensated for the shortcomings associated with each existing identification method.

As demonstrated in this study, the use of the proposed method could be extended to many real supplier evaluation problem, but certainly by incorporating a more inclusive set of evaluation attributes.

However, in general, the proposed  $\lambda^0$ –measure identification method is useful for dealing with any MADM problems that involve the presence of multiple attributes, that are entangled by some complex relationships.

**Keywords :** Choquet integral; fuzzy measure; multi-attribute decision making



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		RF-06
<b>PEREKA CODE</b>		P0090/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Social Media Sentiment analysis ROJAK Lexicon in monitoring Sensitive Topics
<b>PROJECT LEADER</b>		ENCIK KHALIFA CHEKIMA
<b>PROJECT MEMBER</b>		ENCIK KHALIFA CHEKIMA

**Abstract :** With the recent growth of social media (SM) as a new staple in modern culture, SM has emerged as a growing threat to national security. As the Internet and SM are constantly growing and changing, national security has lagged behind. Yet, despite the potential threat that SM might poses, SM also has the potential to strengthen national security by providing important information that can assist government in recognizing first signs of any hostile or potentially dangerous activity that could be a danger to a country's security. The challenge here is the lack of resources and tools to analyze social media messages as these text was written in informal Malay text using more than one language, in most cases is a combination of Malay language, English language, local dialect, Bahasa SMS and emoticons, which made it one of the most challenging informal language in the world. Despite the research potential posed, yet, less attention from researchers has been received by Malay language. In this research, we address this gap by introducing a framework that analyzes SM messages written in Malay language. We utilized the advancement and wide availability of English resources and tools to make them as an advantage in contributing to our research. As result, we managed to construct a list of Malay stop words, which helps in cleansing Malay text by eliminating noise/unwanted words. Secondly, we manage to construct Malay sentiment dictionary called RojakLex which consists of Malay sentiment words, English sentiment words, Neologism and Emoticons. Thirdly, we manage to identify certain features (Valence features) that contributes towards sentiment analysis accuracy. Among these features are negation detection, contrast detection and question lemma detection. Lastly, we manage to identify a suitable prediction method that can predict positive from negative sentences/messages.

The aim of this research is to propose standard framework to perform sentiment analysis for Malay formal and informal language. In order to achieve our aim, we have identified main objectives. First, constructing Malay stopwords list. This is the first step in text analysis, as removing this words can improve the accuracy of text processing as this words are viewed as a homogenously distributed noise signal that should be filtered from a text, as these words have no discriminative values. The second objective is to create non-English sentimental dictionary called RojakLex that is suitable to handle informal Malay language (Bahasa Rojak). RojakLex lexicon contains a combination of Malay sentiment words, English sentiment words, neologism, Bahasa SMS and emoticons. The third objective is to identify features that can improve Malay sentiment analysis. Among these features is the valence shifter. Example of valence shifter includes Negation Detection, Question Lemma, Contrast Detection and etc. The fourth objective is to identify proper prediction method by not only relying on Majority Voting alone.

There are two approaches adopted by most researchers while dealing with SA, namely machine learning approach also known as supervised approach and lexicon based approach also known as unsupervised approach. Supervised approach reported to reach a high accuracy in detecting the polarity of a text on domains that they are trained on, however, their performance drops precipitously when the same classifier is used in multiple domains (word ambiguity). On the other hand, it is reported that, even though lexical approach does not invariable outperform machine learning method, yet its overall track record is better. Furthermore, lexicon based method are robust, resulting in good cross-domain performance, and can be easily enhanced with multiple sources of knowledge. In this research, the unsupervised approach is adopted.

The methodology adopted as follows, first, noise/unwanted words are removed from messages. To achieve this, we construct Malay stopwords by aggregating three different techniques namely, statistical method, data distribution method and data entropy method. Next, we identified words with polarity of being negative or positive. The is achieved by mapping words from messages with words from our Malay lexicon, if a word from text message exists in the lexicon, a value will be assigned based on that word's polarity value. We developed the

Malay lexicon through a propagation technique by using synonyms and antonyms on list of golden words which their polarities values are know, for instance the word 'baik' (good) and 'buruk' (bad). Next, we check the text messages against features such as valence shifter, example the word "tidak" may change the positive word 'baik' to negative 'tidak baik'. If valence shifter exists, we change the word's polarity to its opposite value. Finally, we predicted the message polarity using simple prediction method by taking into account the features presented here (Valance shifter).

The stopwords constructed showed to be more reliable with wider noise coverage compared to the existing Malay stopwords. The RojakLex shows a high accuracy which is comparable to human being, with 87% agreement between lexicon and human annotator compared to existing one (developed by k.chekima, and R.Alfred, 2016) which resulted 81% only.

This framework can be used to analyze almost any text (Formal or informal) written in Bahasa Malaysia or in Bahasa Rojak including text from newspapers, from social media such as comments, news, etc. It also ca be used as social media monitoring tool that benefits many parties including government while monitoring country's security, companies as they track their customer's reviews on their products, it can be used as survey responses analysis, competitors monitoring, and in many other applications involving natural language processing related to Malay language.

**Keywords :** Sentiment analysis, Malay Informal Text, Natural language processing, Lexicon based approach



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		RF-07
<b>PEREKA CODE</b>		P0099/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		Enhancing the Performance of Elliptic Curve Digital Signature Algorithm (ECDSA) in Named Data Networking (NDN)
<b>PROJECT LEADER</b>		DR. LEAU YU BENG
<b>PROJECT MEMBER</b>		Lee Ren Ting, PROFESSOR YONG JIN PARK

**Abstract :** The research is about an enhancement of the existing security mechanism which contributes to the future internet architecture, Name data Networking (NDN), a type of Information Centric Networking (ICN) architecture. It establishes a new path of transmission in the Internet toward the content distribution architecture. The deployment of security mechanism over existing NDN network is complex, heavy and it consumes many resources upon establishing a connection. The research enhanced the effectiveness of existing security mechanism to lower the processing time and the resources consumptions while the strength of security has remained the same.

To identify the parameter of complexity, processing period and resources usage level of the existing data-centric security for NDN in ICN.

To enhance the identified parameters over existing asymmetrical security algorithm based on public key cryptography to adapt into NDN's security module.

To validate and verify the performance of modified asymmetrical security algorithm in terms of complexity, processing period and resources usage level.

Modified security mechanism is based on Montgomery reduction algorithm which is mathematical proven and applied in cryptography processing algorithm. The execution of modified codes will be based on NDN v2 library under security module for ECDSA. All the connections for the executed security mechanism will be banded within NDN environment and without abandon the existing security strength. Deployment of modified ECDSA algorithm over the key generation and signing. Besides, the implementation will adapt in nodes establish totally with modified security algorithm to validate the performance and resources usage via processing period logging as well as records of memory usage over the deployed nodes based on H4S1 (which is an NDN experiment setup). The experiment will first proceed with existing ECDSA and then the modified ECDSA.

The enhanced security mechanism is able to reduce the overall processing period of NDN application which is a service on top of an extremely powerful architecture to support them. The deployment can be more beneficial to various security mechanisms that running in portable and mobile devices which require low processing power and resources allocation.

Most of the security mechanisms are using existing published algorithm which will be getting heavy and slow processing period across portable and lightweight devices. By applying the enhanced security mechanism with modified algorithm, processing period can be reduced and the resource consumption can be minimized.

**Keywords :** Named Data Network (NDN), Elliptic Curve Digital Signature Algorithm (ECDSA), Montgomery Reduction, Digital Signature



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		RF-08	
<b>PEREKA CODE</b>		P0102/2018	
<b>FPI</b>		FKI	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		A General Framework of Multi-agent System for Complex Combinatorial Optimization Problems	
<b>PROJECT LEADER</b>		DR. JOE HENRY OBIT	
<b>PROJECT MEMBER</b>		TAN LI JUNE, KUAN YIK JUNN	

**Abstract :** Scheduling is the process of assigning various tasks or events into the resources. The scheduling process in complex optimization problems is a NP-hard problem whereby the assignment of tasks are complex due to heavy constraints and increasing the difficulty to solve across polynomial time. The method of using Multi-Agent System (MAS) in scheduling has been proposed by many researchers due to its robustness and effectiveness. A MAS is a network agents which collaborate together in order to solve problems which are beyond the individual agent's capability. Hence, MAS is proposed in this study due to its potential in cooperating with one another to accomplish their objectives.

In this research, we investigate the scheduling domains in Universiti Malaysia Sabah Labuan International Campus (UMSLIC) such as University Course Timetabling Problem (UCTP), Examination Timetabling Problem (ETP) and Hostel Space Allocation Problem (HSAP). We take into consideration of hard constraints and soft constraints in respective domains in order to produce a feasible and good quality of solutions.

1. To investigate the algorithm performance by developing mathematical models for respective problem domain.

The models are developed based on the list of hard constraints and soft constraints in the problem domain.

2. To investigate the mechanism in meta-heuristics to release the solution from being stuck in local optima.

A number of heuristics will be constructed and tested out in real-world instances and draws a general conclusion based on the heuristics performance.

3. An investigation of generality in cooperative search hyper-heuristics framework using Multi-agent Systems (MAS). The application of MAS for scheduling in complex combinatorial problem should be integrate with the following key points:

Definition of the autonomous agent architecture which assist the scheduling in timetabling and hostel scheduling.

The communication between the agents.

The gap in existing model of framework is identified in the preliminary stage of this research. The framework is analysed thoroughly and proposed a new approach which could fill in the gap in existing framework. In order to validate the generality of the proposed approach, a qualitative analysis is used whereby several interviews are conducted with respective departments and some important datasets have been obtained. The datasets are preprocessed and adjusted in order to be suits well and readable by the system.

The algorithms are designed based on the sets of constraints identified from the interviews and the formal Multi-agent framework is developed in the next stage. The proposed framework is then tested using benchmark and real-world instances and the results are recorded and analysed. Several adjustment is made in terms of parameter tuning and introducing new techniques into the framework. In the final stage, the results in terms of performance between proposed framework and existing meta-heuristics proposed in the literature is discussed.

The proposed framework is tested on real-world instances of University Course Timetabling Problem in Universiti Malaysia Sabah Labuan International Campus. In real-world instances, the framework manage to produce good solution in two different semesters and outperform other meta-heuristics implemented in the previous studies such as Great Deluge and Simulated Annealing algorithms. Meanwhile, the proposed framework is able to produce competitive results in some of the benchmark instances such as datasets obtained from Socha.

The findings in this research can be well applied into the field of Artificial Intelligence in any optimization problems such as scheduling of timetable in institution, hostel management, task allocation, airport scheduling, inventory management, logistic, transportation, nurse rostering, etc.

**Keywords :** Multi-agent Systems, Complex Combinatorial Optimization, Meta-heuristic



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		IF-01
<b>PEREKA CODE</b>		P0006/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		DeColourAR: An Augmented Reality Colouring Book for UMS Aquarium and Marine Museum
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. NG GIAP WENG
<b>PROJECT MEMBER</b>		PROFESSOR DR. ROSSITA SHAPAWI, PROFESSOR MADYA DR. AG. ASRI BIN AG. IBRAHIM, DR. MUZAFFAR BIN HAMZAH, ANGELINE LEE LING SING

**Abstract :** With advancement of technology, Augmented Reality (AR) has come into picture to be implemented into educational purpose for assisting students in their learning process. In this project, an interactive real time colouring tool, named DeColourAR using AR technology has been developed to provide a more interactive and interesting real time colouring environment for students. Besides, it also helps students to visualize abstract concept while learning thus improve their colouring skills. This DeColourAR allows students to view the information that they colour including the animated 3D models based on their colour choices. Since students often face problems in visualizing the colouring of the objects, especially to understand concepts which are abstract and not visible in our daily life, hence this real time interactive AR colouring tool has its own potential in aiding learning processes of student because of its characteristic which allows user to visualise an object in 3D space.

The AquaRiUMS will enable visitors to interact and experience several different species of aquatic animals in real-time environment. Furthermore, visitor also allows doing interaction with combine two different species animal together into the order that had been arranged and form interactive animation between both 3D models. This research also will do an evaluation based on the effectiveness and efficiency of the AR mobile AquaRiUMS application developed. The evaluation is only focusing on the technical aspect. Based on this project, our primary targeted market is parents and their children (ages 5-15 to 54). With that in mind, we intend to design our facilities to address this primary market, while keeping in mind the secondary markets such a teens and young adults. Our main keys to success include:

- Providing popular and wide-ranging events and entertainment activities in UMS
- Indoor and outdoor activities for year round events and entertainment in UMS
- The use of state-of-the-art technology like Augmented Reality, Virtual Reality, 2D/3D, and etc.
- Easy access
- Target high traffic areas for maximum public exposure
- Design facilities to curb overcrowding
- Seasoned management team especially for advertisements and marketing purposes

Commercialization:

- Borneo Marine Research Institute
- Information Broadcasting Network (M) Sdn Bhd
- Sabah Tourism Board

**Keywords :** Augmented Reality, Colouring



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		IF-02
<b>PEREKA CODE</b>		P0168/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		UMS HopIn! - UNIVERSITI MALAYSIA SABAH BUS TRACKING MOBILE APPLICATION
<b>PROJECT LEADER</b>		DR. NORAZLINA BINTI KHAMIS
<b>PROJECT MEMBER</b>		DR. NORAZLINA BINTI KHAMIS, PROFESSOR MADYA DR. JASON TEO TZE WI, DR. LEAU YU BENG, KELLY KONG KAI LI

**Abstract :** Universiti Malaysia Sabah (UMS), Kota Kinabalu campus is very large where most students uses buses to get around the university. This project aims to develop mobile application with the concept of hybrid application, where the mobile application can be run on both Android and iOS platform. Lastly, this project will evaluate the functionality and user acceptance of the improved system. This project consists of two mobile application (UMS HopIn! and UMS HopIn! Driver) and a web application for system management (UMS HopIn! Admin). The mobile application UMS HopIn! basically function as bus tracker which gives user the real time location of buses and let users know the estimated time of arrival of buses. The app aslo provide other function such as giving real time bus schedule, retrieve announcements from the bus service provider, make bus reservation and create report regarding the bus service. On the other hand, UMS HopIn! Driver mobile application, who the user are the bus drivers, is very important as it is required to upload the real time location of the bus. The UMS HopIn! Admin web application are for officers or administrators of the UMS bus service provider, where they can use the web application to manage the whole UMS HopIn! system. This application has a potential to be commercialised especially to be used in public university or any bus management system

**Keywords :** Bus tracking system, mobile applications, eco campus, sustainable development



## F : COMPUTING AND MATHEMATICS

<b>BOOTH NO.</b>		IF-03			
<b>PEREKA CODE</b>		P0190/2018			
<b>FPI</b>		FKI			
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>		COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		TravelGaze Labuan			
<b>PROJECT LEADER</b>		PUAN HADZARIAH BINTI ISMAIL			
<b>PROJECT MEMBER</b>		Sagguneswaraan a/l Thavamuni			

**Abstract :** TravelGaze Labuan is a mobile application that is aimed to help tourists plan their trip as obtaining information regarding their trip can sometimes be difficult. The objectives of this project are to help tourists plan their trip to Labuan by providing an itinerary planner, to help tourists plan their trip by suggesting places to visit based on rating and reviews by users and to allow administrators to update information of popular events held in Labuan which can be viewed by all users.

TravelGaze Labuan is a mobile application which can greatly aid traveller who are planning their trip to Labuan. It can help them by creating a travel itinerary as well as showing important information regarding top tourist spots.

**Keywords :** Mobile, tourist, itinerary planner



**F : COMPUTING AND MATHEMATICS**

<b>BOOTH NO.</b>		IF-04
<b>PEREKA CODE</b>		P0191/2018
<b>FPI</b>		FKI
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		COMPUTING AND MATHEMATICS
<b>PROJECT TITLE</b>		RTFaceDeep: A Real Time Multiple Faces Recognition for Video Surveillance Using a Deep Learning Architecture
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. RAYNER ALFRED
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. RAYNER ALFRED, RAYNER HENRY PAILUS

**Abstract :** Multiple Faces Recognition (MFR) systems for video surveillance (VS) applications attempt to accurately detect the presence of several target individuals over a distributed network of cameras. In video-based MFR systems, facial models of target individuals are designed a priori during enrollment using a limited number of reference still images or video data. These facial models are not typically representative of faces being observed during operations due to large variations in illumination, pose, scale, occlusion, blur, and to camera interoperability. Specifically, in still-to-video MFR application, a single high-quality reference still image captured with still camera under controlled conditions is employed to generate a facial model to be matched later against lower-quality faces captured with video cameras under uncontrolled conditions. Current video-based MFR systems can perform well on controlled scenarios, while their performance is not satisfactory in uncontrolled scenarios mainly because of the differences between the source (enrollment) and the target (operational) domains. Most of the efforts in this area have been toward the design of robust video-based MFR systems in unconstrained surveillance environments. This work presents a deep learning architecture for the still-to-video Multiple Face Recognition (MFR) system for video surveillance (VS) application. This is important as deep learning algorithms are robust and are able to produce high accuracy with fast learning rate compared to other machine learning algorithms. The proposed work can be applied to build prototypes for the video surveillance for security, smart tracking system for individual and also a robust and intelligent attendance system.

The proposed work can be applied to build a prototype for the following applications

- 1) Video Surveillance for Security
- 2) Smart Tracking System for Individual
- 3) Robust and Intelligent Attendance System

**Keywords :** Real Time Face Recognition, Multiple Faces Recognition, Distributed Network of Cameras

## **G : HEALTH AND MEDICAL SCIENCES**



## G : HEALTH AND MEDICAL SCIENCES

<b>BOOTH NO.</b>		RG-01
<b>PEREKA CODE</b>		P0024/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		High prevalence of Japanese encephalitis virus in Kota Kinabalu, Sabah
<b>PROJECT LEADER</b>		DR. DAISUKE MORI
<b>PROJECT MEMBER</b>		Shahnaz Irwani Binti Sabri, Saliz Mazrina Binti Shaharom, PROFESSOR DR. KAMRUDDIN AHMED, Mya Myat Ngwe Tun, Jecelyn Leaslie John, DR. FONG SIAT YEE @ ALISON, Hidekatsu Iha, Kouichi Morita

**Abstract :** Japanese encephalitis (JE) is responsible for 30,000–50,000 cases every year and 10,000 deaths in eastern Asia. This virus causes central nervous system (CNS) disease in human and horses. The virus is also responsible for abortion and weakness in swine and fatalities in human and horses. Wading birds and bats act as a reservoir hosts, pigs as amplifying agents, and humans and horses as dead-end hosts.

JEV belongs to the Flavivirus genus, under the family of Flaviviridae. JE cases have been identified in Asian countries including Japan, China, South Korea, Taiwan, Vietnam, Malaysia, India, Myanmar, Cambodia, Laos, the Philippines, and Sri Lanka. JEV is classified into five genotypes based on the viral envelope gene; JEV (GI), JEV (GII), JEV (GIII), JEV (GIV) and JEV (GV). All five genotypes have been isolated in the Malaysia-Indonesia region. JE in Malaysia is considered an important disease among children. However, JE is not considered a serious public health problem in Malaysia, except Sarawak. There have been four main outbreaks of JE reported in Malaysia over the years: 1974 in Pulau Langkawi; 1988 in Pulau Pinang; 1992 in Serian Sarawak; and 1998–1999 in Perak and Negeri Sembilan. Some clinical studies in Malaysia showed that JE cases are probably more prevalent than what is reflected in the national figures. However, the true incidence of JE in Malaysia is unknown and almost certainly underestimated in different states. In Sabah state the burden of JE is not known. Sporadic cases of JE continue to occur in Sarawak, indicative of endemic activity, with an average of greater than 40 recognized cases occurring throughout the year, with peak occurrences from October to December. JE continues to be a public health problem in Sarawak.

To obtain a better picture of JEV's distribution among the population this study was performed in Kota Kinabalu, the capital of Sabah state in Malaysian Borneo. To identify the possible source of the virus to formulate preventive strategies.

We performed a cross-sectional study using serum from volunteer blood donors during August 2016 and July 2017. A total of 660 serum samples were tested using an in-house JE IgG indirect ELISA, according to the following methods.

The JEV antigen were diluted at 250 ng/100 mL with coating buffer (0.05M carbonate-bicarbonate buffer, pH 9.6), coated the 96-well microplates and were then incubated either at 4°C overnight. Blockace (SnowBrand, Sapporo, Japan) was added to all the wells and incubated for 1hr at room temperature. The plate was washed three times with PBS containing 0.05% Tween 20 (PBS-T), and then test sera and control serum were diluted at 1:1000 in PBS-T+10% Blockace and added in duplicate to the plates. After incubation at 37°C for 1hr, the plate was washed three times and 100 mL/well of 1:20,000-diluted horseradish peroxidase-conjugated antihuman IgG goat IgG (American Qualex, San Clemente, CA) in PBS-T+10% Blockace was added to the plate. The plate was incubated at 37°C for 1hr, the plate was washed three times and 100 mL/well of substrate solution. The substrate solution consisted of 5mg of O-phenylenediamine dihydrochloride (Sigma Chemical, St. Louis, MO) and 0.03% hydrogen peroxide in 10mL of 0.05M citrate-phosphate buffer at pH 5.0. The plate was incubated at room temperature for 1hr in the dark and then the reaction was stopped by addition of 100 mL/well of 1N hydrochloric acid. A standard curve was prepared using the OD492 values of the JEV-positive control serum starting with a 1000-fold dilution, followed by serial twofold dilutions up to 1:212 in PBS-T+10% Blockace. Then, the IgG titers of patient sera were determined from the positive standard curve. A sample titer equal to, or greater than, 1:3000 (cut-off value of positive IgG was at 1:1000+3 standard deviations) was considered IgG-positive for JEV virus.

Of 660 serum samples 278 (42.1%) were positive for JEV antibody; the gender distribution showed that 43.0% (224/521) of male, 38.8 (54/139) of female were positive. the male;female ratio was 1.1:1. JEV positive sample

distribution based on ethnicity showed that 57.8% (37/64) were Bajau, 41.9% (18/43) Dusun, 40.0% (40/100) Kadazan, 41.1% (72/175) Chinese, and 34.8% (62/178) Malay.

This is the first report of human seroprevalence of JEV in Sabah. We determined that about two-fifth of the population living in Sabah are positive for anti-JEV antibody, which might be considered as high. However, JE IgG ELISA has cross-reactivity with anti-dengue and other flavivirus IgG. Therefore, JEV neutralization test should be done in future to determine the exact seroprevalence of JEV in Sabah.

The JE vaccination was introduced in July 2001 to reduce the number of JE cases in Malaysia. However, the vaccination has been only introduced in Sarawak. The formalin-inactivated mouse derived JE vaccine (Biken, Japan) is used in Malaysia. The vaccine is given at 9 and 12 months followed by boosters at 18, 54, 96, 132 and 180 months. Therefore, the results of this study will be a critical tool to guide JE vaccination control practices in Sabah.

There are several factors that can contribute to the prevalence rate of JEV in Malaysia. Pig farms in Malaysia are normally far away from residential areas and situated in rural areas which are not close to paddy cultivation areas. JEV exposure to pigs can be decreased by not allowing paddy cultivation areas around pig farms. *Culex* spp. mainly breed in paddy areas around rural areas. They are characterized as zoophilic species also considered as primary vector for JEV.

In Sarawak, the human JE cases were reduced after introduction of JEV vaccination among children. This may be raising a strong surveillance with a good immunization program. Execution of a vaccination program for children as well as improved vector control, isolation of pig farms from paddy cultivation areas and residential areas, and agricultural activities can decrease JE cases in Malaysia. Although the JEV infection is not a critical issue in Sabah, Malaysia. This seroprevalence of JEV study will be important for future research.

**Keywords :** Japanese encephalitis virus, epidemiology, seroprevalence, ELISA, Kota Kinabalu



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		RG-02	
<b>PEREKA CODE</b>		P0044/2018	
<b>FPI</b>		FPP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		Psychosocial Factors, Depression and Musculoskeletal Disorders Among School Teachers	
<b>PROJECT LEADER</b>		DR. ISMAIL BIN MAAKIP	
<b>PROJECT MEMBER</b>		DR. PETER VOO SU KIONG, Ng Yi Ming, Ng Yi Ming, DR. ISMAIL BIN MAAKIP, PROFESSOR MADYA DR. AZIZI BIN YAHAYA, DR. SHARON KWAN SAM MEE	

**Abstract :** One of the occupations that suffered from musculoskeletal disorder (MSD) is teaching profession. Although there has been a health and safety issues on teachers, few studies that related with somatic health problems of teachers were actually published particularly studies conducted in Malaysia itself. Viewing from this perspectives, it is clearly demonstrates the need and the importance to investigate psychosocial factors, and MSD with depression as mediator among school teachers. The data collected from the study could aid in the setting up an intervention program in minimizing MSD problem that occurred among teachers.

The study aimed to determine the prevalence of MSD in the past 6 months among primary school teachers in Kuala Lumpur. Second, the study aimed to examine the relationships among psychosocial factors, depression and MSD among teachers. Third, the study aimed to explore depression as mediator.

This cross-sectional study of a group of primary school teachers (n=367) in Kuala Lumpur school tested the hypothesis that depression mediate the effect of psychosocial factors on MSD. Information on demographic, psychosocial factors, depression and MSD was collected using a self-administered questionnaire.

The prevalence of MSD in the past 6 months was 80.1% (95% CI: 75.8% &ndash; 84.2.2%), with 80.5% of female and 77.5% of male teachers reporting discomfort in the preceding six months. There were significant relationships between psychosocial factor, depression, and MSD. Depression was a partial mediator in the relationship between psychosocial factors and MSD.

The psychosocial factors and depression are significant agents of MSD among teachers; given this an understanding of this relationship is valuable and will help those teachers in planning, designing, or implementing preventive intervention programs to reduce the risk of MSD. This study also provides awareness for teachers and those parties in the issues of MSD.

**Keywords :** Musculoskeletal disorders; psychosocial factors; depression; school teachers



## G : HEALTH AND MEDICAL SCIENCES

<b>BOOTH NO.</b>		RG-03
<b>PEREKA CODE</b>		P0066/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		Appraising the students view on activities that empower the habit of curiosity in medical education
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. MAHER FOUAD SEFEIN BESHAY
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. TIN SABAI AUNG,DR. CAROLINE SUNGGIP,DR. SADIA CHOUDHURY SHIMMI,DR. TIN TIN THEIN,DR. NANG KHIN MYA,PROFESSOR DR. MOHAMMAD SAFFREE BIN JEFFREE,DR. M. TANVEER HOSSAIN PARASH,PROFESSOR MADYA DR. HELEN BENEDICT LASIMBANG,DR. FAIRRUL BIN MA

**Abstract :** The trend of promoting habits of inquiry is essential in designing the curricula , but there are few kinds of research that studied the implication of this trend in designing the medical curricula.

In this research, we appraise the students' opinion on introducing the activities that enhance students' curiosity. The analysis of these results will identify some parameters of better curriculum design.

Two competitions were designed to challenge the students' curiosity with the same theme . E-poster competition was run in teams. The competitors identified one medical problems and creatively planned how to solve it. Each eposter was evaluated from different points of view : creativity, critical thinking, ability to analyze the problem .

On-line Quiz competition aimed to challenge their curiosity and critical thinking through different levels of questions. Online & students feedback was obtained as a requirement for participation.

In eposter competitions . 10 teams had contributed. The number of teams and audience was increased in relevant to last year . In the students' feedback, they strongly agreed that the competition challenged their curiosity, sharpened their creativity and communication skills.

In on-line & quiz: 163 students participated, 55% of students agreed that the competition was highly enhanced their knowledge. 50 % found the question moderately challenged ( grade 3/5). All participants found on-line quiz enjoyable, knowledgeable and fruitful.

Sustainability of the creative activities increased the awareness curiosity which expressed in high contribution. Accordingly, we suggest introducing these activities as informal curriculum or as a co-curriculum to get the maximum benefit.

The high-quality graduates who developed in a culture of creativity, curiosity will be able to adapt faster to the daily changes in the medical service field. Accordingly, the society will get better quality service which will be cost effective also.

Inserted: -

**Keywords :** creativity- curiosity - interesting - benefit -curriculum



## G : HEALTH AND MEDICAL SCIENCES

<b>BOOTH NO.</b>		RG-04
<b>PEREKA CODE</b>		P0096/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		Genetic characterization of Sabah variant Zika virus
<b>PROJECT LEADER</b>		PROFESSOR DR. KAMRUDDIN AHMED
<b>PROJECT MEMBER</b>		Jiloris Julian Frederick Dony, DATUK DR. MOHD. YUSOF HJ IBRAHIM, PROFESSOR DR. MOHAMMAD SAFFREE BIN JEFFREE, DR. TAKAAKI YAHIRO, Norsyahida Md Taib, Joel Judson Jaimin, Arthur Constantine Dominic, Joel Judson Jaimin, DR. NELBON GILOI, PROFESSOR DR. ZAINAL ARIFIN B

**Abstract :** Zika virus (ZIKV) is the public health challenge whole over the world and Malaysia is not an exception. Although, it can cause severe diseases such as microcephaly, Guillain-Barre syndrome, and encephalitis, however, about 80% of ZIKV infection are asymptomatic. The situation is disturbing with the absence of ZIKV specific antiviral agent, vaccine, and rapid test.

ZIKV belongs to the genus Flavivirus and is transmitted among humans by Aedes mosquito species. However, this virus can be transmitted by other routes, such as transplacental, blood transfusion, and sexual intercourse. The virus is a single-stranded positive sense RNA virus with a 10.7 kb genome encoding a single polyprotein that is cleaved into three structural proteins (C, prM/M, and E) and seven nonstructural proteins (NS1, NS2A, NS2B, NS3, NS4A, NS4B, and NS5).

The virus was discovered in 1947 in a rhesus monkey from the Zika forest, Uganda. In 1951, ZIKV was first detected outside Africa in Aedes aegypti from Malaysia and in 1977/78 first human cases were detected in Indonesia. Previous seroepidemiological studies have provided evidences of ZIKV infections in humans and also in orangutans in Sabah. These results indicate the possible presence of a sylvatic cycle in non-human primates and risk of human exposure to ZIKV.

The first ZIKV infection in human in Sabah was reported in a German tourist who travelled Sabah in 2014, fortunately no ZIKV infections has been reported from Malaysia until the last outbreak in Singapore in 2016. In 2016, three autochthonous case of ZIKV infection was detected in Kota Kinabalu. These raised concern whether ZIKV invaded recently or an indigenous variant has been circulating in Sabah. Therefore, this study was undertaken to genetically characterize ZIKV detected in Sabah to determine their origin.

To genetically characterize the ZIKV in Sabah and find relationship with strains detected in other parts of Malaysia and the world.

The study has been registered and ethical clearance has been obtained from the National Medical Research Register (NMRR-17-795-35053). The present study included the cases that occurred in Sabah by December 2016. The case definition for ZIKV infection was according to the guideline of WHO. Serum and urine samples were collected for ZIKV detection from the local patients. Patients were tested for ZIKV by reverse transcription-polymerase chain reaction (qRT-PCR).

ZIKV genomic RNA was extracted from samples using QIAamp Viral RNA Mini Kit (QIAGEN GmbH, Hilden, Germany) according to the instruction of the manufacturer. ZIKV was detected by amplifying the NS5 and envelope protein genes by RT-PCR. Samples were also subjected to universal flavivirus primers which amplifies NS5 gene by RT-PCR.

The nucleotide sequences of the amplicons were determined by Sangers sequencing. Phylogenetic tree was constructed by Mega 5.05 using neighbor-joining method. Bootstrap analysis of 1,000 replicates was done to find the significance of branching of the constructed tree. Demographical and epidemiological results were recorded using Microsoft Excel software for analysis.

The first case was a 61 years old male and the ZIKV detected in this patient was designated as SZ1-2016. The second case was a 60 years old female and the ZIKV detected in this patient was designated as SZ2-2016. The

third case was 57 years old female Taiwanese tourist, the ZIKV (KY126348.1 Malaysia/2016/1609Tw) was detected in a lab in Taiwan and gene sequence was obtained from GenBank.

Phylogenetic analyses of the partial nucleotide sequences of NS5 (232nt) and envelope protein (365nt) gene showed that the ZIKV from Sabah belongs to Asian lineage. In the NS5 tree, SZ1-2016 and SZ2-2016 were in a big cluster containing recent outbreak strains from Americas, Singapore, Haiti, Thailand, and French Polynesia, indicating that the Sabah ZIKV shares a common ancestor with these strains. However, SZ1-2016 and SZ2-2016 were not close to each other. The nucleotide and amino acid identities between SZ1-2016 and SZ2-2016 were 98% and 100%, respectively. Sabah strains shared 99% nucleotide and 100% amino acid identities with strains from Brazil, China and Columbia.

The envelope protein gene from all three ZIKV strains from Sabah formed an independent cluster with strains detected in 2013 and 2010 from Thailand and Cambodia, respectively. The Sabah strains were very close to each other and shared 97&ndash;99% and 100% nucleotide and amino acid identities, respectively. Our strains shared 97&ndash;99% nucleotide and 100% amino acid identity with 2016 outbreak strains from other parts of Malaysia (MyH318\_JB, MyH326PL\_JB, and MyH334PL\_Sar) and Singapore (SG-108, and SG-117). These strains shared 97&ndash;100% and 100% nucleotide and amino acid identity among themselves.

In the present world, infections spread at speeds that challenge the most stringent control mechanisms. Furthermore, climate changes are affecting considerably the habitat shift of animals and mosquitoes. Sabah is endemic for ZIKV but the situation was not clear till this study. We consider that the current circulating ZIKV in Sabah belongs to Asian lineage and of indigenous variants. The virus is related to the strains in other parts of the world but not exactly same as the recent outbreak strains in the Americas, Singapore or Johor Bahru. These results will help Malaysian policy makers for formulating policies on ZIKV control such as developing and introducing future ZIKV vaccine in Sabah. Experiences gained in this project can be used in improving public awareness for ZIKV infections and establishing national ZIKV surveillance system in Malaysia.

**Keywords :** Zika virus; Sabah; genetic characterization; phylogenetic analysis; capsid gene



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		RG-05	
<b>PEREKA CODE</b>		P0103/2018	
<b>FPI</b>		IBTP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		New Record of Freshwater Snail Borne Helminth (Trematode: Digenean) Parasite in Sabah	
<b>PROJECT LEADER</b>		DR. LIEW THOR SENG	
<b>PROJECT MEMBER</b>		Jasrul Dulipat, DR. LIEW THOR SENG	

**Abstract :** Freshwater gastropods are the first intermediate host for trematode parasites that cause snail-borne helminth diseases, and which infect more than 300 million people worldwide. There has been a paucity of freshwater snail parasitology research conducted in Malaysia especially in Sabah, in particular that relating to trematode parasite infection, in comparison to neighboring countries. In fact, the only study of parasite infection of freshwater snails in Sabah was published about three decades ago.

Therefore, in this study, we study the association between freshwater snails and parasites at 14 rivers located around the Crocker Range Park, Sabah.

Sampling was conducted in rivers located around the Crocker Range Park, Sabah from July 2017 to February 2018. Snails were examined for parasite infection by two different techniques which are emerging and crushing techniques. Parasites were then identified by both morphology and molecular,

A total of 11 species of parasites belonging to five morpho-types of trematode parasites were extracted and determined based on morphological and genetic data from 1709 individuals of freshwater snails collected. All of the recorded parasite species are new records which have never been recorded and described in Sabah before. Two species of parasites are known to pose a risk to human health and three species known as important parasites that can cause livestock loss.

Hence, it is imperative to update and increase our knowledge of the freshwater snail parasitology of Malaysia so that we can better understand the association between the trematode parasite and human and animal life, as well as the implications for public health and wildlife management.

**Keywords :** Parasitology, freshwater snail, trematode, public health, wildlife management



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		RG-06
<b>PEREKA CODE</b>		P0180/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		SERO-SURVEILLANCE OF ANTIBODIES TO DENGUE ARBOVIRUS AMONG HEALTHY INDIVIDUALS FROM SABAH, MALAYSIA
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE,ZULINA MAZLAN,PROFESSOR MADYA DR. HELEN BENEDICT LASIMBANG,PROFESSOR MADYA DR. VIJAY KUMAR A/L SUBBIAH

**Abstract :** Background: Dengue is an arthropod-borne viral disease which is a global public threat in tropical and subtropical regions. This endemic disease can be transmitted by blood transfusion. Malaysia is one of the severe dengue-endemic country in Southeast Asia with the presence of all four serotypes (DENV1, DENV2, DENV3, DENV4). Secondary infection of DENV infection by different DENV serotype from primary infection increases the risk of DHF and DSS. Blood transfusion safety is essential for the dengue patient due to wide use of blood or blood product in clinical situation. Objectives: Periodical seroprevalence study can be used to understand the real burden of dengue in Malaysian population since many cases of dengue is unreported and also can be used for the vaccine implementation according to WHO recommendation. The objective of the study is to determine the rate of dengue seroprevalence among healthy adult’s population from Sabah, Malaysia. Methodology: A prospective cross-sectional study was conducted on blood donor samples from December 2016 to August 2017. This research was approved by the Medical Research & Ethics Committee (MREC), Ministry of Health, Malaysia and Research and Ethical Committee, University Malaysia Sabah. Serum samples from 364 eligible blood donors were collected from Sabah Women and Children Hospital (SWACH) age 18-61 years and examined for the presence of dengue-specific immunoglobulins G (IgG) using enzyme-linked immunosorbent assay (ELISA) according to manufacturer’s protocol. The ABO group of the blood donor were identified by agglutination test. Data were entered and statistically analyzed by SPSS, Version 24 (IBM) for gender, age, ethnicity, localities, blood grouping and the results of dengue IgG. Results: Majority of the subjects having previous dengue infection belong to the age group of 18 to 61 years was 36.5% (N=133, 95% Confidence interval [CI] = 0.059-0.117%). Dengue antibodies IgG prevalence increased with age with the lowest in 16-26 years of age group (30.5%) and the highest is in 56-65 years age group (73.3%). There are no significant differences for dengue seroprevalence seen when comparison is made according to gender, localities, ethnicity and ABO blood group. Potential Applications: Detection of seroprevalence in study area could be an important approach in the preventive measure of disease progression. To prevent increasing numbers of severe clinical outcomes during dengue outbreaks by predicting health support. It will also help to understand the vaccine design according to WHO.

**Keywords :**



## G : HEALTH AND MEDICAL SCIENCES

<b>BOOTH NO.</b>		RG-07
<b>PEREKA CODE</b>		P0181/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		RISK FACTOR ANALYSIS FOR the DEVELOPMENT OF HEALTH CARE ASSOCIATED CLOSTRIDIUM DIFFICILE INFECTION
<b>PROJECT LEADER</b>		PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE
<b>PROJECT MEMBER</b>		NUR NASHYIROH BINTI MASTOR,PROFESSOR MADYA DR. SHAMSUL BAHARI BIN SHAMSUDIN,PROFESSOR MADYA DR. MOHAMMAD ZAHIRUL HOQUE,ZULINA MAZLAN

**Abstract** : Background : Clostridium difficile is a Gram-positive, anaerobic, spore forming bacillus causing antibiotic associated infectious diarrhoea for the patients. Clostridium difficile Infection (CDI) has emerged as a Health Care Associated (HAI) global public health problem. There have been multiple published report on the risk factors for CDI which includes antibiotic usage, prolong hospitalization, advanced age, immunosuppression and presence of comorbidity. Objectives: Currently there is paucity of information on the risk factor associated with Clostridium difficile infection in Sabah, Malaysian Borneo. The present study aims to investigate the risk factor associated with the development of clostridium difficile among hospitalized patients in Sabah. Methodology: A total of 1475 of adult stool sample were examined from Queen Elizabeth Hospital Kota Kinabalu Sabah from January 2016 to May 2018 and 137 were conformed CDI after investigation with either the two commercial test kit (VEDA LAB /ALERE) according to the instruction of manufacturers protocol. The results were analysed using Microsoft Excel Version 16 and SPSS version 24.0(IBM, USA). This research was approved by the Medical Research Ethics Committee (MREC), Ministry Of Health, Malaysia (No. NMRR-16-1163-30925) and Research and Ethical committee University Malaysia Sabah No. (UMS) JKEtika 2/16(8). Results: From the total studied stool samples, 137 out of 1475 were diagnosed positive for Clostridium difficile. Our data showed 87.7% of patients were being treated with antibiotic and more than 50% of the patient took more than two antibiotics during the period of hospitalization. The episodes of CDI arising for positive CDI elderly patients age more than 65 years old and 98.3% were diagnosed with multiple commodities. Potential Applications: Improve pathogen detection method will help government policy makers to decide on the health care related financial budget. It will save long term hospitalization with expensive antibiotic treatment for the patients. Impact on Society, Economy & Nation: Long term surveillance is essential to understand the epidemiology of the dangerous emerging health care associated infection. The results can be disseminated to the policy makers and has impact in health sector.

**Keywords** : Clostridium Difficile, Risk factor, Health care associated infection



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		IG-01
<b>PEREKA CODE</b>		P0054/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		NOLASICHOL (NOVEL LAPAROSCOPIC SIMULATOR FOR CHOLECYSTECTOMY)
<b>PROJECT LEADER</b>		DR. NIK AMIN SAHID BIN NIK LAH
<b>PROJECT MEMBER</b>		DR. NIK AMIN SAHID BIN NIK LAH, DR. MOHD FIRDAUS BIN MOHD HAYATI, DR. NORNAZIRAH BINTI AZIZAN, DR. FAIRRUL BIN MASNAH @ KADIR, MOHAMMAD ASH SHAFHAWI ADZANAN

**Abstract :** The prevalence of gall stone is approximately 25% in women and 12 % in men. Out of this 10% will cause problem to the patient which require surgical intervention. This high burden of cases requires a surgical trainee to be familiar and expert in performing this procedure. However it take a long learning curve time. majority start performing this procedure when entering year 4 or 5 of training. There is none ideal training tools which give almost similar feels with the real operation especially when dissecting the peritoneal layer where the most of error occur.

We invent a simulator model to give the surgical trainee the opportunity to be familiar with the associated anatomy of laparoscopic cholecystectomy operation, give them the best tactile sensation during the mock operation thus it will reduce the learning curve time as well as indirectly reduce the morbidity and mortality associated with the procedure.

High potential for commercialization as a training aid for surgical institution.

**Keywords :** LAPAROSCOPIC CHOLECYSTECTOMY SIMULATOR



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		IG-02
<b>PEREKA CODE</b>		P0060/2018
<b>FPI</b>		FPSK
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		NOVEL EXPANDABLE WATER SPLINT(NEW SPLINT)
<b>PROJECT LEADER</b>		PROFESSOR DR. KHIN MAUNG OHN @ ARIF
<b>PROJECT MEMBER</b>		DR. FAIRRUL BIN MASNAH @ KADIR,PROFESSOR DR. KHIN MAUNG OHN @ ARIF,DR. MAY HONEY OHN,PROFESSOR DR. SHAHRIL BIN YUSOF

**Abstract :** A fracture is a break in the continuity of the bone. Fracture splints are the methods and materials to immobilize the fracture for transport when fracture or break in the bone can result from an injury. Fracture occurs when a force acts on bone and bone can not effectively resist the force and gives way. The fracture can result from a substantial injury or may occur after a trivial injury depending upon bone strength.If the fracture site is not splinted more soft tissues could be damaged which could significantly prolong healing.A splint helps the injured limb by

- &ndash; Providing rest to the injured area
- &ndash; Preventing further displacement of the bone fragments
- &ndash; Protect underlying vessels and nerves from the fracture fragments

Splinting provides stabilization of the injury, some amount of pain relief and prevention of further injury. Splints are often applied as a temporary measure until more definitive orthopedic care is initiated. Now the team developed a water splint for the fracture treatment

It is very useful for the stabilization of fractures and by using cold water can reduce the swelling and also the pain. It has high commercialization potential and now in the stage of negotiation and discussion. Plan to use for Borneo Saferi 4WD competition by MERT team, medical emergency response team.

**Keywords :** water splint,fracture stablization,fracture treatment



## G : HEALTH AND MEDICAL SCIENCES

**BOOTH NO.** | IG-03  
**PEREKA CODE** | P0130/2018  
**FPI** | FKJ  
**CATEGORY** | INNOVATION      **CLASSIFICATION** | HEALTH AND MEDICAL SCIENCES  
**PROJECT TITLE** | VERSATILE & SUSTAINABLE MOBILE CLINICAL HEALTHCARE CENTER

**PROJECT LEADER** | PROFESSOR DR. YEO KIAM BENG @ ABDUL NOOR

**PROJECT MEMBER** | PROFESSOR DR. YEO KIAM BENG @ ABDUL NOOR ,PROFESSOR DR. ZAINAL ARIFIN BIN MUSTAPHA,DATUK DR. MOHD. YUSOF HJ IBRAHIM,DR. MALEHAH MOHD NOH,DR. LOO JIANN LIN,ENCIK CHOONG WAI HENG,DR. MOHD KAMAL MOHD SHAH,ENCIK YOONG HOU PIN,ENCIK NORDIN SAAD

**Abstract :** Accessibilities to general hospital or medical center seeking for healthcare or treatment by rural communities have been a major constraint. Remote inaccessible locations, low or non-income earners, or lack of public transportation are some of the difficulties faced by rural communities who are in need of seeking or to be provided the basic healthcare attention. Patients and Doctors cannot effectively help each other to overcome the rural environment. An innovative solution that could alleviate rural constraints is by developing a "Versatile & Sustainable Mobile Clinical Healthcare Center" aimed to enhance the accessibility of healthcare services to rural communities, especially in Sabah rural area.

The mobile unit can be built light (less than 2 tonnes), compact in size (standard 20ft shipping container, 1164 cubic ft), and expandable or transformable (volume expansion >2300 cubic ft, expansion can be easily carried out by 02 person). The mobile healthcare unit can be designed transportable on 20 feet trucker. The Mobile Clinical Healthcare Center is designed to provide basic primary care or wellness services such as prenatal care, provision of immunizations, minor surgical treatment, and so forth. The mobile unit is also very cost effective as compared to permanent foundational structures that cannot be effectively relocated to serve other remote communities. The mobile unit is not only limited to healthcare service applications, but also very versatile as temporary accommodation or workshop or office. The unit operation power source can be a hybridized solar power, generator powered, and air-conditioned.

The ultimate objective of this innovation is to alleviate the needs of Community Healthcare Service personnel and Doctors of Faculty of Medicine and Health Science, Universiti Malaysia Sabah, for providing routine and regular services to the rural communities.

The mobile healthcare unit is potentially a commercial product. Being versatile and highly mobile, the unit can also serve a wide range of applications such as temporary site office or accommodation (mobile home) or temporary shelter. It can also be loaded on 20 feet length trucker; the unit weight is less than 3 tonnes. The basic commercial unit can cost as low as RM 30,000 excluding the fixtures and equipment.

**Keywords :** Rural Communities, Healthcare Services, Versatile, Mobility



**G : HEALTH AND MEDICAL SCIENCES**

<b>BOOTH NO.</b>		IG-04	
<b>PEREKA CODE</b>		P0199/2018	
<b>FPI</b>		FPSK	
<b>CATEGORY</b>		INNOVATION	<b>CLASSIFICATION</b>   HEALTH AND MEDICAL SCIENCES
<b>PROJECT TITLE</b>		SMART FACIAL MASK	
<b>PROJECT LEADER</b>		DR. MAY HONEY OHN	
<b>PROJECT MEMBER</b>		DR. MAY HONEY OHN, PROFESSOR DR. KHIN MAUNG OHN @ ARIF, PROFESSOR DR. D. KAMARUDIN D MUDIN	

**Abstract :** The facemask has been used since the origins of anaesthesia and it remains an essential and versatile piece of equipment. It offers a simple, non-invasive method for delivering both oxygen and anaesthetic gases and vapours to the patient and it is widely used for both induction and maintenance of general anaesthesia. It is an effective way to ventilate the unconscious patient. and therefore also has a major role during resuscitation. Every anaesthetist should be confident in using this piece of equipment. We introduce a new type of face mask which has suction property and easy to stay at the face with secure suction. It has a full potential for commercialisation

**Keywords :** suction mask, face mask, anaesthesia

## **H : BUSINESS AND ECONOMICS**



## H : BUSINESS AND ECONOMICS

<b>BOOTH NO.</b>		RH-01
<b>PEREKA CODE</b>		P0028/2018
<b>FPI</b>		FPEP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		RELIGIOSITY AND ITS CONSEQUENCES IN HALAL FOOD PURCHASING BEHAVIOR (An Empirical Evidence From Tarakan, Indonesia and Tawau, Malaysia)
<b>PROJECT LEADER</b>		PUAN HASLINDA BT. HASSAN
<b>PROJECT MEMBER</b>		MARSO

**Abstract :** This study is conducted to test structural relationship between religiosity, attitude, and behavioral intention toward purchasing Halal products. A convenience sample of participants from various universities in Tarakan (Indonesia) and Tawau (Malaysia), resulting on 299 usable questionnaires, was employed to test the model. Employing SEM-PLS approach, this research data was analyzed using SmartPLS Professional 3.0 software. The findings demonstrated that religiosity directly and significantly influenced attitude; religiosity directly and significantly influenced intention; attitude directly influenced behavioral intention; and the mediating role of attitude toward the influence of religiosity on behavioral intention is partially mediated. Theoretically, these findings affected the development of consumer behavior theory through Value-Attitude-Behavior (VAB) Hierarchy Model; while its managerial implications rested in its use to plan marketing strategy for food products in Muslim-majority countries, such as Indonesia and Malaysia.

1. To measure the influence of religiosity toward purchasing Halal food
2. To measure the influences of attitude toward purchasing Halal food
3. To examine how religiosity influences behavioral intention toward purchasing Halal food

This research sampled active university students in Tarakan (Indonesia) and Tawau (Malaysia). This sample used non-probability sampling, which is convenience sampling. This method was selected, because there was no data about the number of Halal food's consumers, both in Tarakan and Tawau. The second reason was because university students were assumed capable in thinking rationally; thus, their responds for each questionnaire items can be accounted for. To achieve the research objectives, PLS-SEM approach was employed to test the hypotheses using SmartPLS Professional 3.0 software (Ringle et al., 2015). PLS-SEM could be utilized for research aimed to predict target variables and using latent variable values in the subsequent analysis (Hair et al., 2014, p.19). PLS was an iterative combination between the analysis of main components and regressions to explain construct variants in a model (Chin, 1998). PLS allowed researchers to avoid biased and inconsistent parameter estimation; hence, it served as an effective analysis tool to test the interaction by reducing Type II error and allowed analysis for small sample (Chin et al., 2003; Hair et al., 2014, p.19). A structural model developed with PLS-SEM did not need to be evaluated with GoF, because it would be sufficient to merely measure measurement model and structural model (Hair et al., 2014, p.186).

The measurement of research variables employed reflective approach. Destination image variable was measured multidimensionally; while satisfaction and loyalty intention were measured in unidimensional way. The evaluation results of structural model illustrated that two out of three developed paths in the structural model, namely religiosity to attitude and attitude to behavioral intention recorded significant coefficients ( $p=0.000$ ); while the path coefficient of religiosity to behavioral intention was also significant ( $p=0.001$ ). The explicable change variation was the change occurred on each predictor and possessed a high predictive power, because its  $R^2$  is greater than 0.20 (Hair et al., 2014, p.175). Inter-variable relations in the model also had predictive

relevance, because Q2 value of every endogenous latent variable was marked positive (Hair et al., 2014, p.184).showed that all variable indicators in this research had more than 0.50 loading factor. Moreover, every latent variable recorded more than 0.70 composite reliability value; more than 0.50 Average Variance Construct (AVE); and higher level of AVE's square root than correlation of each variable. Therefore, the measurement model fulfilled both convergent and discriminant validity.

This finding shows that religiosity influences attitude and in turn, attitude influences behavioral intention toward purchasing Halal food. Therefore, a strategy needed by marketer of Halal food should be started by targeting religious consumers; then guaranteeing product quality from the aspect of Halal labelling provided by an official and government-recognized organization, such as Indonesian Ulema Council &ndash; Majelis Ulama Indonesia (MUI) in Indonesia and Department of Islamic Development &ndash; Jabatan Kemajuan Islam Malaysia (JAKIM) in Malaysia

**Keywords :** Halal, Religiosity, Attitude, Intention behaviour, Malaysia, Indonesia



## H : BUSINESS AND ECONOMICS

<b>BOOTH NO.</b>		RH-02
<b>PEREKA CODE</b>		P0040/2018
<b>FPI</b>		FPEP
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		IN WITH EDU-TOURISM AND OUT WITH CONSERVATION: THE FUTURE OF KAMPUNG SAYAP.
<b>PROJECT LEADER</b>		DR. CAROLINE GEETHA A/P B. AROKIADASAN
<b>PROJECT MEMBER</b>		DR. SIDAH BT IDRIS, CIK DG SAFRINA AG BUDIN, ENCIK ROSLE @ AWANG BIN MOHIDIN, PROFESSOR MADYA DR. RAMAN B. NOORDIN, DR. CAROLINE GEETHA A/P B. AROKIADASAN, DR. TINI MAIZURA MOHTAR, ENCIK LIM THIEN SANG

**Abstract :** Sabah is a state in Malaysia located in the East of Malaysia in the Island of Borneo. Sabah's uniqueness in its biodiversity attracts the nation all around the world to come here for their vacation. It has a lot of endemic species that makes it a gem of Borneo. No doubt tourism is one of the main economic activities, but there are many areas in terms of location or activity that was yet to be explored in Sabah. One of the efforts currently taken by the communities in Sabah is to introduce edu-tourism to the visitors. Edu-tourism can benefit the local communities in many ways. It helps the local community to sustain the ecological system. It helps them to discover their history and heritage which they feel proud to pass down to their younger generation. The history develops the personality and makes them a diverse ethnic. They explore their culture and way of live and try to maintain their uniqueness. They can also use the plants around their area to make local cuisines. These local cuisines can be modified in terms of texture and taste to suit travelers and tourists from within Malaysia and also overseas. In addition these plants are also believed to have some medicinal properties. Thus, it can be said that maintaining the uniqueness leads to sustainability. Edu-tourism should be enhanced in Sabah to create sustainable tourism which leads to sustainable biodiversity and ecological system for the future generation.

The overall objective of the study is make Kampung Sayap an edu-tourism hub for Sabah. The specific objectives of the study is as follows:-

- a. To gather the information on the history of Kampung Sayap.
- b. To obtain the socioeconomic profile of Kampung Sayap
- c. To determine the tourism product and convert it into commercial products in Kampung Sayap.
- d. To identify the flora and fauna uniqueness in Kampung Sayap
- e. To determine the business opportunities in Kampung Sayap
- f. The issues and challenges faced by the villagers in Kampung Sayap

A qualitative study was conducted. The villagers of Kampung Sayap was interviewed by the researchers from Universiti Malaysia Sabah. The interview aimed to collect information on the history of Kampung Sayap, determine their socioeconomic status as well as identifying their potential tourism products in the village. The identification of the tourism products was carried out using NGO, experts from the wild life as well as the lecturers from the universiti. Discussion was made on how to convert the tourism products into commercial products that could be used by the villagers to increase their purchasing power. Universiti Malaysia Sabah lecturers gave hands on training together with the help of the Parents Teachers Association of SK Kampung Sayap. The findings helped to create modules that was used to upgrade the services in Kampung Sayap.

The findings are as bellow:-

The name Kampung Sayap was once known as Kampung "Minangkob". Minangkob means a valley surrounded by hills. After a few years, the name changed due to an incident involving a British officer who came to the village. The officer was resting by the river that was covered by dry leaves because of dry weather. The river was invested by many types of fish species which made it very beautiful. The officer asked the villagers what were the name of the dry leaves that covered the river in the local language to the people who were passing by the river where the officer was resting. One of the villagers informed the officer that the dry leaves gathered at the base of the river is called "sahap" in the local Dusun language. Unfortunately, the British officer could not pronounce the name "sahap" but in contrast said "sayap". In time, the kampung formerly known as Kampung Minangkob changed its name to Kampung Sayap. Kampung Sayap is also unique for its myths, beliefs and rituals.

There is gender equality among the head of the family. Most of the head of the family can be grouped as youth who are 40 years old and below with an average of lower secondary level of education. There are also gender equality among the children. Majority are still in their process of attaining higher secondary education. Moreover the standard definition of poverty cannot be applied to Kampung Sayap because majority of the household owns house and land.

The tourism products identified in Kampung Sayap is the unique flora like the Borneo Wild Orchids, Rafflesia and the fauna such as the hornbill frog and slow loris. Activities like hiking, organic farming and so on.

1. The history of Kampung Sayap is gathered with its myth, beliefs, custom and rituals.
2. The socioeconomic profile provides the information on their assets, economic activity and their source of income. The age structure is also important to design the tourism activity in the village.
3. Many tourism products were identified with the experts to enhance the product and the service into commercial products.
4. Training provided by the experts in converting the village into an edu-tourism hub.

**Keywords :** edu-tourism, conservation, Kampung Sayap, Sabah



**H : BUSINESS AND ECONOMICS**

<b>BOOTH NO.</b>		RH-03	
<b>PEREKA CODE</b>		P0087/2018	
<b>FPI</b>		FPEP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		Redefining the meaning of work and work-family-personal life balance from the Malaysian medical professionals perspective	
<b>PROJECT LEADER</b>		DR. OSCAR DOUSIN	
<b>PROJECT MEMBER</b>		Dr. Oscar Dousin, Associate Professor Ngan Collins	

**Abstract :** The issues of balancing work, family and personal life and the meaning of work has emerged to become an important dimension in contemporary HRM. These issues have received a significant attention from several key stakeholders including employers, academic researchers and general communities. The Malaysian healthcare industry is still facing the issues of the shortages of manpower with the changes in the social-economic environment which demanded medical professionals to experience a high work pressure and demand. Therefore, this study explored this issue through insights from 42 medical professionals in East Malaysia states. It investigates the central research of "how does medical professional achieve adequate work-family-personal life balance and its' impact on their meaning of work?"

To explore the influence of work, family and personal life balance to individuals meaning of work. The interpretivist paradigm was chosen to guide this study by implementing an in-depth interview in a semi-structured format.

The result of this study highlighted the importance of the mentoring system and the collectivist work culture to improving employee well-being in the high-intensity work environment. In addition, it also expands the concept of 'calling' and 'careers' of the meaning of work from the Malaysian perspective.

Theoretically, this study expands Western interpretations of work-family and personal life balance to include the East-Malaysian collectivist culture which mitigate the stress of high-intensity work for medical professionals. In addition, doctors and nurses perceived their professions as a 'calling' which conforms to their notion of the meaning of work. The HR contributions of the study are important, underscoring the significance of developing and cultivating work-family-personal life balance practices in the workplace to attract, motivate and retain talented employees.

**Keywords :** Work-family-personal life balance, The meaning of work, Malaysia, Healthcare industry, Doctors, Nurses



**H : BUSINESS AND ECONOMICS**

<b>BOOTH NO.</b>		RH-04	
<b>PEREKA CODE</b>		P0093/2018	
<b>FPI</b>		FPEP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		Old Wine in the New Bottle: Employee’s Dress Code in Malaysia Hotels	
<b>PROJECT LEADER</b>		PUAN ANDI TAMSANG BINTI ANDI KELE	
<b>PROJECT MEMBER</b>		PUAN ANDI TAMSANG BINTI ANDI KELE,PUAN SHARIJA CHE SHAARI,CIK ROSENI BINTI ARIFFIN	

**Abstract :** The female workforce in Malaysia has increased tremendously over the years, but ironically, despite placing Islam is the official religion in Malaysia and the number of Muslim women is increasing in the workplace, there is still limitation for Muslim women who work in the hotel industry to wear hijab. In the hospitality industry, employees who deal directly with the guests are required to obey specific grooming, hygiene and appearance standards and this is usually done through a clearly defined dress code policy. However, employees' dress code standards are usually challenged due to different treatment based on religion or sex.

Hence this research aims to determine the management's acceptance towards employees who adhere to their religious requirement by wearing hijab.

A qualitative approach utilising 15 in-depth interviews among the human resource managers of four-star and five-star hotels in Malaysia was adopted to gain an understanding of underlying reasons and opinions regarding this issue. Theoretical thematic analysis was applied to identify, analyse and report themes and patterns within the qualitative.

Normalisation, hotel's grooming standard and leader's role had been identified as themes that influence the hotel management's acceptance towards religious requirement of employees' dress code.

The outcome of this research can be used as a basis for the policymakers should any modification for any relevant legislation to be carried out in future.

**Keywords :** Employee Dress Code, Grooming Standard, Hotel Management, Women, Hijab, Malaysia



**H : BUSINESS AND ECONOMICS**

<b>BOOTH NO.</b>		RH-05	
<b>PEREKA CODE</b>		P0093/2018	
<b>FPI</b>		FPEP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		ASSESSING THE POTENTIAL OF CULTURAL ROUTE IN KOTA BELUD AND KUDAT DISTRICT, SABAH	
<b>PROJECT LEADER</b>		DR. AWANGKU HASSANAL BAHAR BIN PENGIRAN BAGUL	
<b>PROJECT MEMBER</b>		MOHD NAS HAFIZEE BIN ABDULLAH, DR. AWANGKU HASSANAL BAHAR BIN PENGIRAN BAGUL, ENCIK KAMARUL MIZAL BIN MARZUKI, DR. TINI MAIZURA MOHTAR, ENCIK YUZAINY JANIN	

**Abstract :** Cultural routes represent a very crucial element in shaping the travel pattern & to attract tourists especially in search of new experience. Despite the visual promotion of Sabah’s cultural diversity, cultural tourism development lags behind. This study attempts to identify the potential of cultural tourism trail as a tool to promote economic development (rural area) along the Kota Belud – Kudat Cultural Route (KBKCR), which the location has a wide range of cultural resources that can provide a unique and distinct tourist experience. The main objective of this study is to explore the potential for further development of cultural tourism trail/route as a tool for rural economic development and providing a unique tourist experience in the existing Kota Belud – Kudat Cultural Route (KBKCR). The methodology employed for this research is qualitative with face-to-face semi-structured interview based on Cultural Tourism Evaluation Model (CREM) supported by Market Appeal Model (inventory, auditing and mapping cultural resources). The research results suggested that the proposed cultural route developed from this study could spread economic benefits, provides additional employment and income, expanding the tourist market and their average length of stay.

**Keywords :** Cultural tourism, Cultural Tourism Evaluation Model, tourism trail, cultural route



## H : BUSINESS AND ECONOMICS

<b>BOOTH NO.</b>		RH-06	
<b>PEREKA CODE</b>		P0125/2018	
<b>FPI</b>		FPEP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		Homemade Cakes: A Case Study of Entrepreneurial Motivation	
<b>PROJECT LEADER</b>		PUAN SHARIFAH MILDA BINTI AMIRUL	
<b>PROJECT MEMBER</b>		PUAN RINI SURYATI BINTI SULONG, CIK SORAYAH BINTI NASIP	

**Abstract :** Entrepreneurial activity or self-employment is a diverse and multi-faceted form of economic activity that can support the development of a country's formal and informal economic sector. This qualitative study is constructed with the aim of observing and analysing real world experiences of young entrepreneurs in the informal sector. This study will focus on exploring personality traits, entrepreneurial motivations as well as the issues faced by young entrepreneurs pursuing businesses in the informal sector. It has been stated by previous scholars that a robust informal sector can supply jobs, boost entrepreneurial activity and assist in alleviating poverty; which in turn can contribute to the overall economic development of a country. Hence, this study centers on understanding the personality traits, entrepreneurial motivations supporting the growth of the informal sector in addition to assessing the issues faced by those participating in this sector.

This study aims to examine what motivates a person to conduct informal entrepreneurial activities.

This study was conducted via in-depth interviews and participation-observation to identify and assess motivation factors as supported entrepreneurial motivation theories. It is based on single entrepreneur based in Labuan, from which deep analysis was conducted,

### About the Entrepreneur

Mrs. Sarinah Sidup, 52 years old, is married and a mother of two. She has been doing business, specifically selling cakes, for almost 11 years. She started with selling various cakes (e.g. kek lapis, kuih raya, kek coklat) during the holidays, usually due to orders made by friends. But Mrs, Sarinah did not only sell one type of cakes. She always changes the type of products she sells. She now also sells bahulu, a traditional snack or mini cakes, as well as layered-cakes (kek lapis) on order basis. Most orders are made through the use of social media. Her daughter, sisters and nieces help promote her cakes on the internet, through Instagram and facebook and whatsapp.

Mrs. Sarinah's passion for baking and her ability to create new products through personal effort (trying out new recipes) can be categorized as a 'pull factor', because her passion pulled her into starting a business. entrepreneurship research agrees with this analysis as most studies have supported the idea that entrepreneurial characteristics allows an entrepreneur to obtain and use the necessary knowledge to create or exploit opportunities, hence pulling them into business endeavors.

Therefore, our concluding remark is an entrepreneur is someone that possess the unique qualities that allows her/him to adapt and identify opportunities created by the changes in the environment thus able to sustain his business.

For young entrepreneur , the finding from this study could be a potential use for self employment & wealth creation.

As for policy makers, it would be great to give more attention to those entrepreneurs who are involved in informal business activities as there is an opportunity for growth by providing various assistances such as fund, training and etc.

**Keywords :** Entrepreneur, Motivation, Informal Sector



## H : BUSINESS AND ECONOMICS

<b>BOOTH NO.</b>		RH-07
<b>PEREKA CODE</b>		P0135/2018
<b>FPI</b>		IPMB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		Attitude towards implementation of Integrated Multi-Trophic Aquaculture (IMTA) system among aquaculturist in Sabah
<b>PROJECT LEADER</b>		DR. ABENTIN BIN ESTIM
<b>PROJECT MEMBER</b>		DR. AZAZE @ AZIZI BIN HAJI ABDUL ADIS, MILENNIE VIALANTINE SUMBING, PROFESSOR DR. SALEEM MUSTAFA, DR. ABENTIN BIN ESTIM, MOHD HELMI BIN ALI HASSAN

**Abstract :** Improper aquaculture activities such as traditional monoculture contribute water pollution especially unethical farmers or aquaculture businesses where they tend to release aquaculture wastage directly to river or sea without proper treatment. Integrated Multi-Trophic Aquaculture (IMTA) is one of the solution to combat the problem where the byproduct of the cultured species becomes a source of food for another species. The application of IMTA will improve socio-economic of Sabahan aquaculturists.

To examine the relationship of product-specific attitude, environmental attitude, subjective norms, availability, willingness to pay, health orientation, sensory appeal, perceived usefulness and intention to use of IMTA system.

To examine the significant relationship of attitude towards IMTA system and intention to use of IMTA products.

The purpose of the research is to investigate whether the connection of independent variables such as product-specific attitude, subjective norms, availability, willingness to pay, health orientation, sensory appeal, and perceived usefulness have direct effects on dependent variable of intention to use of IMTA system mediates with attitudes towards IMTA system among Sabahan aquaculturists. The personal interview research using judgmental sampling to collect the data from 250 farmers/aquaculturist. A set of questionnaire was developed using structures questions based on previous study. This study also guided by the theory of Technology Acceptance Model (TAM) as a theoretical framework.

The result of the study will give significant positive relationship between independent variables namely product-specific attitude, environmental attitude, subjective norms, availability, willingness to pay, health orientation, sensory appeal, perceived usefulness with dependent variable of intention to use of IMTA system and mediates with attitude towards IMTA system.

The finding of this study will provide information of the application of Integrated Multi-Trophic Aquaculture (IMTA) system among Sabahan aquaculturists. The application of IMTA will improve environment sustainability and as well as to enhance aquaculturists/farmer's income.

**Keywords :** Integrated Multi-Trophic Aquaculture (IMTA), Technology Acceptance Model (TAM), Willingness-To-Pay (WTP), Subjective Norms, Perceived Usefulness



**H : BUSINESS AND ECONOMICS**

<b>BOOTH NO.</b>		RH-08	
<b>PEREKA CODE</b>		P0151/2018	
<b>FPI</b>		FPEP	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		The Rise of Gig Economy: The Case of Social Media Influencers in Malaysia	
<b>PROJECT LEADER</b>		CIK ROSTIKA BINTI PETRUS BOROH	
<b>PROJECT MEMBER</b>		ROSTIKA PETRUS BOROH, OSCAR DOUSIN, ANDI TAMSANG ANDI KELE	

**Abstract :** The explosion of the gig economy is congruent with the rise of social media. The two have grown side by side, and both have forever changed the way we work, live, and play. The social media influencers play a significant role in various industries. These group of individuals is defined as someone who use social medias a platform to establish credibility in any industries. They are known by two significant traits (i) the ability to affect or influence people purchasing decision and (ii) huge followers in a specific niche that they are engaging with. With the rise of gig economy in Malaysia, it challenges existing business models and rise a concern toward future labour environment. Thus, this research aims to shed light on one of the vital aspect of gig economy from the perspective of the social media influencers in Malaysia.

To explore the phenomena of gig economy through the lens of social media influencers in Malaysia Interpretivist paradigm was chosen to guide this study. Yin (2013) highlighted the suitability of this paradigm because it focuses on subjectivity by exploring the views, experiences, meaning and perceptions of participants. This study implemented an in-depth interview in a semi structured format. There were 13 social media influences interviewed and thematic analysis was implemented to analysed the data.

This study revealed four themes that explains the influence an individual interests to become a social media influencer, namely: financial pressure, millennials personality, digitalization and social pressure. This study also highlighted inconsistency of opportunity, no employment benefits and potential career diminished as drawbacks of the gig econom

Theoretically, this study expands Western interpretations on the influence of gig economy towards social media influencers in the context of Malaysia. In addition, this study also highlighted the importance of employment benefits to some individuals and potentiality of diminishing careers due to the uncertain trends in the future of work.

**Keywords :** Gig economy, social media influencer, Malaysia, future of work



## H : BUSINESS AND ECONOMICS

<b>BOOTH NO.</b>		RH-09
<b>PEREKA CODE</b>		P0179/2018
<b>FPI</b>		FKSW
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		BUSINESS AND ECONOMICS
<b>PROJECT TITLE</b>		The Heritage Tourism of Long Pasia Animal Effigy Mounds.
<b>PROJECT LEADER</b>		ENCIK BASZLEY BEE BIN BASRAH BEE
<b>PROJECT MEMBER</b>		Jaswin Jalinus

**Abstract :** Kajian ini adalah mengenai tapak guar effigi haiwan di Long Pasia dalam bentuk buaya yang dikenali dalam kalangan komuniti Lundayeh setempat dan Borneo sebagai Ulung Buayeh. Kajian pada tahun 2017 ini adalah lanjutan kajian telah dilakukan oleh kumpulan pengkaji UMS antara tahun 2009 hingga 2016 dengan kerjasama Jabatan Warisan Negara, Jabatan Muzium Negeri Sabah dan penduduk setempat. apak sedia ada yang diketahui sejak penerokaan Long Pasia oleh komuniti Lundayeh dan penemuan baru telah mencecah jumlah lebih dari 15 buah tapak. Perkara ini menjadikan Sabah sebagai wilayah di Borneo yang paling banyak memiliki tapak dan masih dalam keadaan yang terpelihara. Kesemua tapak ini boleh diakses sama ada melalui denai dan sungai. Keunikan tersendiri tapak ini menjadikannya sangat sesuai untuk dieksplotasi secara lestari sebagai produk pelancongan warisan. Pengunjung mempunyai pilihan untuk melihat secara insitu kepelbagaian saiz binaan guar dan rupa bentuk tanpa perlu bermalam di hutan. Ringkasnya, produk adalah warisan berharga bukan sahaja untuk komuniti Lundayeh setemoat tetapi juga negeri Sabah kerana nilai sosial dan ekonominya.

1. Memperincikan dokumentasi mengenai tapak guar effigi haiwan ULung Buayeh yang diketemukan dalam kajian lepas dan menambah rekod baru berikutan dengan penemuan tapak terkini.
2. Mengkaji kepelbagai tapak guar effigi haiwan di Long Pasia dari aspek saiz, reka bentuk, kondisi dan kebolehan akses pengunjung.
  1. Survei arkeologi primer.
  2. Survei arkeologi sekunder.
  3. Analisis dan interpretasi arkeologi.
    1. Penemuan tapak baru yang berlainan dari tapak yang diketemukan dalam kajian sebelum ini dari segi konteks struktur binaan, saiz dan fungsi budaya.
    2. Prospek tapak guar effigi haiwan yang dikenali sebagai Ulung Buayeh sebagai produk pelancongan warisan yang bernilai sosial dan ekonomi bagi negeri Sabah.
      1. Menjadi panduan kepada pihak berkepentingan khususnya kerajaan negeri untuk membangunkan secara lestari kawasan tapak yang diketemukan tapak guar effigi haiwan di sekitar kampung Long Pasia.
      2. Meningkatkan industri pelancongan di kampung Long Pasia dan negeri Sabah dalam bentuk kepelbagaian produk warisan dengan keistimewaan yang tersendiri.
    2. Produk pelancongan warisan yang mempunyai keunikan tersendiri berbanding dengan tapak ULung Buayeh yang serupa diketemukan di Sarawak dan Kalimantan Utara.
    4. Memberi kesedaran kepada komuniti setempat di Long Pasia untuk menjejak dan memelihara tapak baru yang boleh dijadikan produk pelancongan warisan.

**Keywords :** Animal Effigy Mound, Crocodile Mound, Ulung Buyahe, Long Pasia, Lundayeh.

# I : ENGINEERING AND PHYSICAL SCIENCE



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-02
<b>PEREKA CODE</b>		P0011/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		REMOVAL OF CHLORINATED PHENOL FROM AQUEOUS SOLUTION UTILIZING ACTIVATED CARBON DERIVED FROM PAPAYA(CARICA PAPAYA) SEEDS
<b>PROJECT LEADER</b>		PROFESSOR DUDUKU KRISHNAIAH
<b>PROJECT MEMBER</b>		M.SUNDANG,DR. S.M. ANISUZZAMAN,DR. COLLIN GLEN JOSEPH A/L ANTHONY JOSEPH,PROFESSOR DUDUKU KRISHNAIAH

**Abstract :** Activated carbons (ACs) were prepared from papaya seeds with different dry weight impregnation ratios of zinc chloride ( $ZnCl_2$ ) to papaya seeds by using a two-stage self-generated atmosphere method. The papaya seeds were first semi-carbonized in a muffle furnace at 300 °C for 1 h and then impregnated with  $ZnCl_2$  before activation at 500 °C for 2 h. Several physical and chemical characteristics such as moisture, ash, pH, functional groups, morphological structure and porosity of prepared ACs were studied and presented here. AC<sub>2</sub>, with the impregnation ratio of 1 : 2 (papaya seeds:  $ZnCl_2$ ), yielded a product that had the highest adsorption capacity, 91.75%, achieved after 180min contact time. The maximum Brunauer, Emmett and Teller (BET) surface area of AC<sub>2</sub> was 546m<sup>2</sup>/g. Adsorption studies indicated that AC<sub>2</sub> complied well with the Langmuir isotherm ( $q_m=39.683mg\ g^{-1}$ ) and the pseudo-second-order ( $q_e=29.36mg\ g^{-1}$ ). This indicated that chemisorption was the primary adsorption method for AC<sub>2</sub>. The intraparticle diffusion model proved that the mechanism of adsorption was separated into two stages: the instantaneous stage and the gradual adsorption stage. Overall, this work demonstrated the suitability of using papaya seeds as a precursor to manufacture activated carbon.

1. Preparation of activated carbon from papaya seeds.
- 2.Characterization of prepared activated carbon.
- 3.Determination of adsorption capacity of activated carbon.
4. Estimation of kinetic parameters.

### 1. Sample Preparation

Papaya seeds from carica papaya species were used as a raw material to produce the AC. The papaya seeds as the precursor material were washed with distilled water several times to remove the dirt and slime covering the seeds. The seeds were then dried in an oven for 24 h at 110 °C before being stored for the next step in the process of preparing the ACs.

### 2. Two-stage Activation Process

There were two main processes in preparation of the AC: the semi-carbonization and chemical activation in the self-generated atmosphere [37]. In the semi-carbonization process, the papaya seeds were heated to 300°C for about 1h under self-generated atmosphere and cooled to room temperature in the muffle furnace. The resulting material was labelled as semi-carbonized carbon (SCC). The SCC was then subjected to chemical activation [23]. The SCC was



agitated with aqueous solution of 200mL of zinc chloride ( $ZnCl_2$ ) according to the (wt:wt) of  $ZnCl_2$  :SCC from 1:1 to 5:1 (samples AC1-AC5) [24]. The chemical activating agent and precarbonized carbon were homogeneously mixed at 85 oC until the solution was completely dried. The resulting samples were then placed back into the muffle furnace for activation under self-generated atmosphere at the optimum temperature of 500 oC for 2 h before cooling [38].

### 3. Washing Process

The activated sample was washed with a 0.01M of HCl solution, then with hot water, at 85 oC for 30 min [38,39]. The pH of each of the samples was recorded. The washed samples were dried for 24 h at 110 oC to obtain the final product.

Papaya seeds, which are agriculture waste with no economic value, proved to be very suitable as precursors for the preparation of high adsorption capacity AC. High percentage yields were achieved, which ranged from 32.39% to 38.85%, the moisture content of the AC was below 7.03% while the ash content was below 14.84%, and the pH of the AC was between 5 and 7, indicating that this material is a suitable precursor for AC production. The surface functional groups of the papaya seeds and the ACs were compared; some of the C=O, O-H functional groups were absent in ACs due to the activation process that evolved the volatile matters. The morphology studies indicated that the presence of honeycomb-like structure indicated rich pores were present in the AC compared to the raw papaya seeds. The maximum BET surface area of the optimized AC (AC2) was 546m<sup>2</sup>/g and its adsorption efficiency of the 2,4-DCP was 91.75%. The adsorption process of the 2,4-DCP by AC2 fitted well in Langmuir isotherm model, which yielded an R<sup>2</sup> of 0.9946, while adsorption kinetic data fitted the pseudo-secondorder with R<sup>2</sup> of 0.9992. This indicated that the adsorption process was a chemisorption occurring on the monolayer of the adsorbent. The intraparticle diffusion model proved the mechanism of adsorption was separated into two stages: the instantaneous stage and the gradual adsorption stage.

This study opens a new possibility of employing papaya seeds for the production of activated carbon and would generate a waste to wealth opportunity for enterprising individual.

**Keywords :** activated carbon, papaya seeds two stage activation, 2,4 dichlorophenol



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-03	
<b>PEREKA CODE</b>		P0027/2018	
<b>FPI</b>		FSSA	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		HEAT REFLECTIVE COMPOSITE GLASS CONTAINING RICE HUSK	
<b>PROJECT LEADER</b>		DR. ASMAHANI BINTI AWANG	
<b>PROJECT MEMBER</b>		PROFESSOR MADYA DR. JEDOL DAYOU, Siti Nur Hajrah Binti Piara	

**Abstract :** Glass is an amorphous material. Its molecules are random in their configuration but not arranged in a regular and specific pattern like crystalline materials. Glass is hard, brittle, transparent and having no definite melting point (Matori et al., 2013). Significantly, rice husk is a by-product of the agriculture industry which contains high amount of silicon dioxide. According to previous studies demonstrated by various researchers, rice husk facilitates the production of sustainable concrete (Mahmud et al., 2016). In additional, rice husk ash can help in increasing the compressive strength of the concrete compare to the concrete without rice husk ash (Ramezaniapour et al., 2009). Indeed, the incorporation of rice husk in the building designs growing faster.

However, being the weakest building component in terms of heat insulation, windows have always been the main target for improving energy efficiency. A large number of researchers have been carried out to improve insulation of windows (Berkin, 2008). There are plenty of modern glasses being modified for better application and purposes. Tuscharoen and co-workers demonstrated the physical, optical and radiation shielding properties of BaO:B2O3: Rice husk ash glass system with high addition of BaO concentration. They found that the radiation shielding properties is better than commercial window and ordinary concrete (Tuscharoen et al., 2013). In this study, we propose to incorporate the rice husk ash with varying sizes into glass matrix in order to stimulate the modification in structural and optical properties. The modifications in these properties potentially contribute to the heat reflective properties.

1) To fabricate a series of heat absorbing tellurite glass containing rice husk fiber with composition of  $70\text{TeO}_2\text{-}20\text{ZnO}\text{-}9\text{Na}_2\text{O}\text{-}1\text{Er}_2\text{O}_3\text{-}(x)$  rice husk prepared by using melt-quenching technique, where x is the size of rice husk fiber with varying sizes in range of x = 45 micrometer, 63 micrometer, 125 micrometer, 250 micrometer, 500 micrometer, 1 millimeter and 2 millimeter.

2) To determine the range of size of rice husk fiber which give an optimum heat reflective properties of glass.

3) To correlate the effect of varying sizes of rice husk fiber with reflective properties of glass by using ultraviolet visible spectroscopy (UV Vis), X-ray diffraction (XRD), Fourier Transform Infrared spectroscopy and scanning electron microscopy and energy dispersive X-ray spectroscopy.

(1) Extraction of rice husk consists of a few steps (i) winnow process to remove the stones, sand and dust (ii) cleaning process using distilled water (iii) treatment with the 1% of  $\text{Na}_2\text{CO}_3$  solution and rinsed using distilled water and dried under sunlight (iv) burning process in a furnace with temperature of 400 °C for 20 minutes. The rice husk are subjected to sieving process with different size of 45 micrometer, 63 micrometer, 125 micrometer, 250 micrometer, 500 micrometer, 1 millimeter ad 2 millimeter.

(2) Fabrication of glass with composition of  $70\text{TeO}_2\text{-}20\text{ZnO}\text{-}9\text{Na}_2\text{O}\text{-}1\text{Er}_2\text{O}_3\text{-}(x)$  rice husk fiber by using melt-quenching technique, where x is the size of rice husk fiber. A platinum crucible containing the glass constituents are placed and heated in an electrical furnace (Model: Carbolite Aston Lane, Hope Sheffield S30 2RR, England) up to 900 °C for 25 minutes before the melt is poured in a brass mould. Subsequently, the sample are transferred to an annealing furnace and kept for 3 hours at 295 °C to remove the thermal and mechanical strains. The samples are rapidly cooled down to room temperature before cutting and polishing process.

(3) Characterization on structural and heat reflective properties by using X-ray diffraction (Xpert Pro diffractometer (PANalytical B. V., The Netherlands) with Cu Ka radiations (wavelength = 1.54 Å;) at 40 kV and 40 mA, scanning electron microscopy (Quanta FEG 650 (Fei Brand)) which uses field emission electron gun, and operates at the range of accelerating voltage (1 - 30 kV) with the range of magnification of 50x-350,000x and Fourier Transform Infrared spectroscopy (Perkin Elmer Spectrum 100 FTIR spectrometer) with ATR accessories in

range of wavenumber (400 - 4000  $\text{cm}^{-1}$ ). Characterization on optical properties using ultraviolet-visible near infrared spectroscopy (Schimadzu UV-3101 PC scanning spectrophotometer from Kyoto Japan).

From the thermal point of view, windows represent the weak link between the internal and external ambient of a room. Excess solar radiation penetrating through windows during the day can cause the interior of homes and buildings to become hot, thus increasing the cooling loads. The use of heat reflecting glass is one of the potential solutions to overcome this problem. In this work, heat reflecting glass is fabricated by incorporating rice husk into the composition of tellurite glass. Reflection refers to the light that is returned to the exterior part of the glass surface. Glass containing rice husk shows the highest overall reflectance. This indicates that more heat is reflected from the glass surface, preventing it from entering the interior part.

Beneficial features of heat reflective properties tellurite glass contribute to the design, building application and lowering the energy consumption. This situation gives benefits to the industrial and society.

**Keywords :** composite, glass, heat, reflective properties, surface morphology



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-04
<b>PEREKA CODE</b>		P0057/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Immobilization of barium titanate nanoparticle on carbonized rice husk
<b>PROJECT LEADER</b>		DR. MELVIN GAN JET HONG
<b>PROJECT MEMBER</b>		Zhipeng Wang, Qing-Qing Ni, DR. MD MIZANUR RAHMAN

**Abstract :** Rice husk (RH) can be classified as an agro-based waste, mainly produced from by-product of rice milling industries. RHs play a great role as an alternative material to be derived into valuable carbon materials, due to their low cost and abundancy, in contrast to conventional carbon material sources. Feasible carbonization process of them can be conducted by using heat treatment. Furthermore, their functionality can be added by immobilizing nanoparticles onto their surface. Barium titanate (BTO) is one of the widely used materials for electric ceramics and has been applied for wide range of applications. In this study, the RHs were carbonized at high temperature of 2500°C (CRH). Then, the BTO nanoparticles (sol-gel method) were immobilized onto the surface of CRH to fabricate CRH/BTO nanocomposites. Their structure, morphology, elemental composition and crystallization were evaluated and discussed. This type of material can be exploited for various applications, such as electromagnetic wave absorber, dielectric materials, electronic devices, and so on.

The objectives are to fabricate carbonized rice husk/barium titanate nanocomposites and characterize their structure, morphology, elemental composition and crystallinity.

The rice husks were carbonized at 2500°C. Then, the barium titanate nanoparticles were immobilized onto the surface of carbonized rice husks during sol-gel process to fabricate carbonized rice husk/barium titanate nanocomposites.

The samples were observed using scanning transmission electron microscopy and transmission electron microscopy operated at 200 kV. X-ray diffraction was conducted to characterize the crystal structure. Raman spectroscopy measurement was conducted on a Raman spectrometer with 532 nm laser excitation. X-ray photoelectron spectroscopy was performed to characterize the elemental composition.

Barium titanate (BTO) nanoparticles were fabricated by using sol-gel method and then immobilized onto the surface of rice husks carbonized at 2500°C (CRH), which consist of few- and multi-layer graphene. The BTO nanoparticles exist in spherical shape and successfully immobilized onto the surface of CRH. The average crystalline size of BTO nanoparticles were calculated to be 16.5 nm. Mixture of cubic and tetragonal phase is expected from the BTO nanoparticles. CRH/BTO nanocomposites can be exploited by utilizing both properties from separate material for various applications.

Electromagnetic wave absorber, dielectric material, electronic devices, etc.

**Keywords :** Rice husk, Carbon, Barium titanate, Nanocomposite



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-05
<b>PEREKA CODE</b>		P0105/2018
<b>FPI</b>		IPB
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Screening, Characterization and Optimization of Lignin Degrading Microbes from Sabah Mega Biodiversity for Optimum Bioconversion of Oil Palm Waste
<b>PROJECT LEADER</b>		DR. CLARENCE M. ONGKUDON
<b>PROJECT MEMBER</b>		Prof. Minami Matsui, Dr. Clarence M. Ongkudon, Dr. Mailin Misson, Dr. Kenneth Francis Rodriguez, Intan Nazirah Mohammad, Abygail Lorna Eric, Adznila Eberahim

**Abstract :** Malaysia is one of the biggest palm oil producers in the world with a total of 12% and 27% of oil and fat production (MPOC, 2016). However, those extensive productions produced a high amount of solid waste and water waste which causes environmental issues and health problem arise from the improper disposal (Novianti et al., 2014). Hence, scientists have come into a solution to promote these wastes into more profitable products such as animal feeds, bio-fuels and bio-fertilizers. Oil palm empty fruit bunch (EFB) is a major lignocellulose material comes from the extraction of palm oil. Despite that, EFB is being disposed due to its low commercial value (Chang, 2014). Although EFB is treated as wastes material but it has a potential to be utilize as raw material to produce biofuel due to its high cellulosic content and availability in Malaysia. However, due to the high content of lignin, the production of commercial biofuel from EFB is currently unachievable. Therefore, the aim of this study is to discover locally isolated microbes that capable to degrade lignin.

To screen new lignin-degrading fungi or bacteria.

2. To characterize the lignolytic activities of these fungi or bacteria.
3. To design and optimize lignin degradation systems harboring lignin degrading enzymes from bacteria and/or fungi and/or termite

The samples were collected from decayed woods, decayed sites, oil palm frond and cow manure from Sabah. The microorganisms in these samples were grown in lignin enrichment broth prior isolation of the lignin degrading microorganisms. Fungi and bacteria isolates were screened for their ligninolytic potential by using the remazol brilliant blue R (RBBR) assay as preliminary screening. Selected isolates will be identified and further analysed for their ligninolytic potential by using both qualitative and quantitative ligninolytic assays. Finally, the selected isolates/combination of isolates will be used to treat EFB and optimize their ligninolytic potential.

Soil, decayed wood, oil palm frond and cow manure samples were collected from Sabah. So far, 76 fungi and 8 bacteria isolates have been successfully isolated and screened for their ligninolytic capability by using remazol brilliant blue R (RBBR) assay. Preliminary screening results showed that there are 50 fungi isolates that capable of decolorize the blue dye in RBBR assay thus exhibit their ligninolytic potential. However, further analysis is required to assess their ligninolytic capability.

1. Bioethanol production through the utilization of biomass waste (EFB)
2. Conversion of lignin into useful renewable bio-plastic

**Keywords :** Lignin, Bioethanol, Oil Palm Waste,



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-06
<b>PEREKA CODE</b>		P0106/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		RESEARCH
		<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Investigation of Damage Mechanism of n-ZnO/CuGaO <sub>2</sub> diode due to neutron and Gamma Radiation for Flexible Electronic in Space Application
<b>PROJECT LEADER</b>		DR. CHEE FUEI PIEN
<b>PROJECT MEMBER</b>		MIVOLIL DUINONG ,PROFESSOR MADYA DR. SAAFIE SALLEH,ENCIK JACKSON CHANG HIAN WUI

**Abstract :** Space electronics based on invisible circuitry requires both transparent n-type and p-type oxide based semiconductor materials as active channel layers to make circuit design more flexible. However, in space, semiconductor devices are vulnerable to various effect of high energy level of radiation causing single event upsets (SEU), damaging or altering the lattice structure. In this work, n-ZnO/p-CuGaO<sub>2</sub> was selected due to its relatively wide bandgap and a visibility transmittance up to 80% as a potential semiconductors device capable of withstanding harsh radiation environment. n-ZnO/ P-CuGaO<sub>2</sub> thin films were deposited by using RF powered sputtering method on indium tin Oxide (ITO) substrates at 250°C deposition temperature and annealed at 300°C. Structural morphology, optical properties of device was investigated before and after irradiation. Fabricated samples were then irradiated at Nuclear Agency Malaysia at SINAGAMA facility. The samples were irradiated using Cobalt-60, gamma-ray with a dose ranging from 10KGy-200KGy and another batch was irradiated under neutron irradiation. The structural properties show the CuGaO<sub>2</sub> and ZnO films shows a diffraction peak at  $2\theta = 44.0510$  (015) and  $2\theta = 34.0712$  before irradiation and retains it's properties with a slight change in the broad wave diagram. The optical properties of deposited CuGaO<sub>2</sub> thin film, exhibits approximately 75% optical transmittance in the invisible region and post-irradiation results shows a decrease of optical transmittance of 55% and ZnO thin films exhibits an optical transmittance of 65% from 85%. The decrease in transmittance with irradiation is due to the formation of colour centres in the thin film which causes it to be darkened in comparison to the unirradiated samples, while the decrease in band gap could be attributed to the formation of localized states due to structure defects therefore decreasing the transition probabilities into the extended state, reducing the band gap of irradiated samples.

The objectives of this research are:

1. To evaluate the reliability and stability of n-ZnO/p-CuGaO<sub>2</sub> induced by ionizing radiation.
2. To determine effective strategy to strengthen the reliability of n-ZnO/p-CuGaO<sub>2</sub> in the harsh radiation environments.

In order to achieve the objectives, Indium tin oxide (ITO) glass is used to fabricate the ZnO thin film heterojunction using the magnetron sputtering, Torr model. The ITO glass substrate will undergo multiple cleaning process before it is sputtered using ZnO ceramic target to ensure that no foreign impurity is present for the deposition process. The fabricated ZnO thin film at initial stage will be characterized under three aspects, structural properties of the TFTs, electrical properties, surface profile to analyse the pre-irradiation performance of the deposited ZnO. After analyzing the characteristic of each deposited ZnO, the favorable deposition parameter is determined and selected as the deposition parameters for fabrication ZnO heterojunction diode. Once the ZnO is deposited onto the substrate, a 2nd layer of CuGaO<sub>2</sub> is deposited on top of it followed by an Aluminium contact. Fabricated samples will then be exposed to ionizing radiation. The ionizing radiation used are neutron and gamma, two of the highest ionized radiation in space radiation which are subsets to cosmic rays. Neutron that are emitted by cosmic radiation are known as cosmogenic radiation that usually passes through most material while gamma-rays, with over 10,000 times more energy than visible light photons prolong exposure may cause significant damage to exposed target (Parker,2016; Nasa,2013). The damaging effects induced in the devices might be transient or continuous depending on the total flux. The structural, surface profile and electrical properties of n-ZnO/p-CuGaO<sub>2</sub> at post-irradiation will be examined. The pre-irradiation of n-ZnO/p-CuGaO<sub>2</sub> data, will be compared to pre-characterization data to determine an effective strategy to strengthen the reliability of TFTs in the harsh radiation environments.



--- Optical energy Gap/Transmittance ---

It was observed that all of the prepared diode thin films (pre-irradiation) were light-yellow to the eye and has a good transparency of 75%. At a dose of 10Kgy, no observable change is noticed and shows the same parameters to the unirradiated samples. However, dose rate ranging from 50Kgy shows a decrease in the optical transmittance. The decrease in transmission with irradiation is due to the formation of colour centres in the diode thin film which causes more darkness to the diode thin films in comparison to unirradiated samples. From the optical transmittance, calculation on the optical energy gap ( $E_g$ ) was done. After irradiation with doses of 10Kgy, 50Kgy, 100Kgy, 150 Kgy and 200 Kgy, the band gap was decreased for all samples except for dose of 10Kgy. The changes in band gap could be attributed to the formation of localized states due to structure defects thus leading to the decrease in the transition probabilities into the extended state decreasing the band gap.

--- I-V Current-Voltage (Turn-On Voltage) ---

Based on the I-V curve obtained, it is shown that turn on voltage is decreased with the increase of irradiation. The decrease in the turn-on voltage for the irradiation case can be explained by electron&dash;hole pair generation. The exposure of the thin film diode with gamma radiation generates electron&dash;hole pairs in the channel layer. These electrons become trapped in the interface states (which are simultaneously generated during irradiation: the degradation of sub-threshold swing with irradiation supports this point), resulting in substantial increase in the electron&dash;hole recombination time.

Space electronics circuitry application

**Keywords :** Gamma-ray, Neutron flux, radiation damage;



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-07			
<b>PEREKA CODE</b>		P0153/2018			
<b>FPI</b>		FKJ			
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Effect of interactive adsorptive characteristics of 2-acetyl-pyrroline and moisture effluent from the paddy drying for recirculating system			
<b>PROJECT LEADER</b>		DR. JIDON @ ADRIAN BIN JANAUN			
<b>PROJECT MEMBER</b>		Carla Goncalves			

**Abstract :** This project is related to the industrial scale up of paddy drying recirculating system. The effluents emerging out the drying are: 2-acetyl pyrroline and moisture are to be removed by adsorption with an adsorbent to minimize the energy requirement in the overall process. The objectives of this project are; to prepare the active adsorbent at desired temperature; to design of fixed bed absorber for breakthrough studies; to investigate the interactive adsorption capacity of 2AP and moisture; and to develop the adsorptive models to interpret the equilibrium adsorptive data.

Basic work will be to review the literature on the interactive mechanism, adsorption properties and regeneration methods. This project requires, controlled experiments and hence an experiment is set up with properly designed calculations. Data are collected in the experiments are statistically analyzed, interpreted and tabulated and conclusions are drawn from it.

**Keywords :**



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-08	
<b>PEREKA CODE</b>		P0171/2018	
<b>FPI</b>		FKJ	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Network Coding Schemes with MIMO-NOMA for Two-Way Relay Networks	
<b>PROJECT LEADER</b>		DR. ALI FARZAMNIA	
<b>PROJECT MEMBER</b>		IR. DR. MURALINDRAN MARIAPPAN, Ngu War Hliang	

**Abstract :** In wireless communication research field, the role of cooperative communication through relays is the most popular topic. To develop the network's throughput and capacity, the network coding must be applied. The physical-layer network coding (PNC) using Compute and Forward (CF) method has the advantages of changing the interference to design the two-way, multi-ways relay network and MIMO channels. To the best of our knowledge, PNC or CF has not designed in NOMA. In this research work, we investigated the PNC (two source nodes and one relay) with convolutional coded NOMA and 2x2 MIMO-NOMA over AWGN and Rayleigh fading channels. The system performance is compared by evaluating the bit error rate (BER). The major contributions of this work are the network coding and second is on the power domain with investigating the spectral efficiency and energy efficiency of system. The combination of MIMO-NOMA approach has been considered as an assuring multiple access for 5G) technology to improve network capacity & efficiency of spectrum. In this paper, network coded MIMO-NOMA which applies PNC in two-way relay networks. In this paper, convolutional codes and the Soft Decision Viterbi algorithm is used to encode and decode the information bits. The coded MIMO-NOMA gives the less bit error rate compared to coded NOMA alone. Moreover, spectral & energy efficiency, user fairness and sum capacity & transmission rate of NOMA and MIMO-NOMA are analyzed.

To improve the transmission rate during data transmission

To enhance the probability error rate performance during transmission

To develop Convolutional Coded MIMO-NOMA system and compare with coded NOMA system in Two-way Relay Networks

To investigate Energy & Spectral Efficiency of the Systems

There are two phases in two-way relay model. In phase 1, all the source nodes will transmit their information bits to the relay in first time-slot. The relay will broadcast the information bits from each source node and extract their original information signals in second time-slot in phase 2. The relays make new information bits by using XORing the two source messages which gives the possibility to increase network throughput and decrease transmission time. The rate half convolutional encoding is used in this paper. To decode the convolutional codes, Viterbi decoding is applied. To design a NOMA, superposition coding is applied at transmitter and successive interference cancellation (SIC) is used at the receiver in order to apply the same spectrum for all users. By considering a cell as a circular shaped with the base station at the center and two users, the user 1 is closer to the base station than user 2. On the other hand, the far user doesn't need to perform SIC because the near user signal is of low power and will provide little interference at the far user. Therefore, the far user treats the near user signal as noise. The signals will pass through the AWGN and Rayleigh fading channel. The ZF equalizer is employed with SIC to eliminate the received signals of interfering users. Furthermore, the MRC is applied to combining the information from multiple copies of the received symbols in receiving diversity case. Later, relay detection will be applied all coded source bits. The information bits are transmitted from source nodes to relay link. Then, they are decoded at relay nodes and sent back to source nodes. Finally, the information exchange process is successfully done in the two-way relay network.

The convolutional coded NOMA scheme in two-way relay network has been simulated. To compare the effectiveness of this scheme, we adopted the un-coded NOMA. scheme. We observed that coded NOMA scheme has lower bit error rate than un-coded NOMA. Moreover, we can say that if the coding is applied in NOMA, the bit error rate is almost same in user 1 and user 2. Then, the 2x2 MIMO-NOMA coded scheme was investigated to obtain better system bit error rate performance. MIMO-NOMA scheme can be compared with NOMA scheme. It

showed that adopting MIMO in NOMA with two-way relay coded scheme gives better bit error rate performance than NOMA scheme alone. We explored about the EE and SE achieved by two users in NOMA and MIMO-NOMA scheme. It can be seen that the 2x2 MIMO-NOMA achieves better spectral efficiency and energy efficiency than NOMA scheme. Moreover, we can notice that the increasing the number of users, the more SE and EE can be achieved. The EE-SE relationship are linearly proportional with a positive slope of  $R_T/P_{total}$  in which increasing SE with increasing EE. In simulation results, the MIMO-NOMA gives higher energy efficiency than NOMA scheme. The rate pair of user 1 and user 2 in 2x2 MIMO-NOMA obtains the better transmission rate than NOMA scheme. We observed the fairness of the system capacity is shared among the different numbers of users. The results showed that the increase the number of users, the fairness will be increased. When the fairness index is near to 1, it means each user has the almost same amount of the system capacity.

Communication using Network Coding can be modelled and optimized for future 5G mobile communications. This scheme can be embedded into a computer aided software to simulate before implementing on hardware.

**Keywords :** NOMA, MIMO, Convolutional Codes, Turbo Codes, Bit Error Rate, Viterbi Decoding, Relay



**I : ENGINEERING AND PHYSICAL SCIENCE**

<b>BOOTH NO.</b>		RI-09
<b>PEREKA CODE</b>		P0174/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		Network Coding Schemes using Different Encoding Techniques with OFDM for Multiple Two-Way Relay Networks
<b>PROJECT LEADER</b>		DR. ALI FARZAMNIA
<b>PROJECT MEMBER</b>		IR. DR. MURALINDRAN MARIAPPAN, Ngu War Hlaing

**Abstract :** The project is to OFDM based net-work code to improve the error performance of the system when the messages are transmitted from user to receiver. The XOR network coding is the recent field of information theory. It is an archetype in which intermediate nodes are allowed to create new packets by combining (XORing) the incoming packets which provides the possibility to maximize network throughput and reduce number of transmissions. The XOR coded bit aids redundancy to achieve the transmit diversity gain. The diversity gain improves the error performance of the two-way relay network. There are two phases in two-way relay model. In phase 1, all the source nodes will transmit their information bits to the relay in first time- slot. The relay will broadcast the information bits from each source node and extract their original information signals in second time-slot in phase 2. In the proposed schemes, Xor coding is implemented in the communication system aided with network code and two-way relay networks. OFDM schemes are encoded by using different encoding schemes which are Convolutional, Reed-Solomon and Turbo encodings and decoded by Viterbi for Convolutional Codes, Reed-Solomon and Turbo decoding. To reduce the transmission time, the encoded serial data streams are converted to parallel data stream and two-way relay is applied in receiver side. The proposed schemes achieved better BER performance for the user to transmit SOS message at the urban area.

- To improve the transmission rate during data transmission
- To enhance the probability error rate performance during transmission
- To implement Convolutional Codes, Reed-Solomon codes and Turbo codes in Multiple Two-way Relay Networks with OFDM Systems.

The two encoded messages and exclusive-or coded message will be modulated with grey mapped QPSK modulation. The modulated messages are operated through IFFT in parallel messages. By inserting the cyclic prefix, the signal overlapping can be prevented. Then, parallel signals are converted to the serial streams. Then, cyclic prefix is removed. The serial streams are converted to parallel streams. Afterwards, the signal goes through a FFT operation and QPSK demodulation technique. To maintain the orthogonality in the OFDM transceiver and to avoid any interference, FFT algorithm is important. Then, cyclic prefix insertion is operated ISI effect reduction. This is the copying method of a cyclic extension and inserting it at symbol head. To convert OFDM symbols to the original form, he received parallel base band OFDM signals need to remove the appended cyclic prefix. In OFDM transceiver, the last step to perform is symbol demodulation. The de-mapping is used to regain the input binary information that went through all these steps on both sides of the system. The output of XOR coded packets will apply redundancy at the transmission level. These information bits go through modulation and OFDM system. For all coded source bits, the soft decisions are produced by the detection. Then, they are transmitted on source nodes to relay link and they come after the decoding of source bits at each relay nodes. Finally, the information exchange is successfully done in the two-way relay network. The simulation with MATLAB will be done with frequency selective Rayleigh fading channel of unity power throughout the simulations. The log-likelihood ratios (LLRs) detection rule will be employed in this paper for the coded information bits from sources to relay.

it can be noticed that (QPSK) modulation gives better performance than QAM. The simulation results for the no redundancy scheme and redundancy scheme at source and relay in OFDM systems proved that the overall performance for the redundancy scheme is better than the performance of no redundancy scheme. The relationship between diversity order and FER is tested through and it showed that by increasing the diversity order, the probability of error that occurred during transmission is decreased. The multiple relaying schemes are

implemented and simulated and it showed that the error rate becomes decreased when the number of relays is increased. The BER result for the 3 and 4 information packets with using different numbers shows that the performance for the larger number of relays is better compared with the smaller number of relays. And the number of increasing packets gives the bigger BER values. The Reed-Solomon code RS (255,223) with 8-bit symbols are simulated. Although compared with the convolutional XOR coding scheme, Bit Error Rate (BER) for Reed-Solomon codes is not good as convolutional codes and the Reed-Solomon coding scheme does not perform considerably well as convolutional coding scheme, but the Reed-Solomon codes are used to correct burst errors and the coding rate is very high for Reed-Solomon code thus it is applicable in data storage and transmission. The turbo codes using different block lengths 64 and 256 are applied and the larger block length has better error performance than smaller one. The performance for the turbo coding scheme with relaying scheme gives better bit error rate than without relaying scheme. Moreover, the three relay scheme shows the better bit error rate than the two relay scheme. Thus, to have better reliable communication system, the more number of relays can be used.

Cellular Networks Communication using Network Coding can be modelled and optimized during natural disaster. This method can be embedded into a computer aided software to simulate before implementing on hardware.

**Keywords :** OFDM, Convolutional Codes, Turbo Codes, Reed-Solomon Codes, Bit Error Rate



**I : ENGINEERING AND PHYSICAL SCIENCE**

<b>BOOTH NO.</b>		RI-10	
<b>PEREKA CODE</b>		P0195/2018	
<b>FPI</b>		FKJ	
<b>CATEGORY</b>		RESEARCH	<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		INDOOR ENVIRONMENT DEVICE-FREE WIRELESS POSITIONING USING IR-UWB RADAR	
<b>PROJECT LEADER</b>		DR. RAZAK MOHD. ALI LEE	
<b>PROJECT MEMBER</b>		Terence Jerome Daim	

**Abstract :** Indoor environment device-free wireless positioning is an emerging positioning technique that can approximate the presence and location of a person or object in passive manner without the obligation of any attached tracking devices. Such positioning technique has emerges as an area of interest with various applications such as emergency rescue and security monitoring. In emergency rescue scenario such as fire rescue situation fire fighters can employ device-free object positioning estimation system to facilitate in accessing possible hazard threats inside a building or room prior launching counter measurement action or rescue operation. Consequently minimizing the risk of loss of life and increase operation success rate. In security monitoring scenario such as within a building, any motion of intrusion in low light condition such as night time can be effectively monitored since an indoor environment device-free wireless positioning system can cover larger area compare to other systems such as vision based system and works well in smoky and dark conditions. To date, there are numerous studies currently focusing on using wireless technologies such as wireless local area network (WLAN), Bluetooth, Zigbee and Radio Frequency Identification (RFID) to enable indoor environment device-free wireless positioning. One of the emerging and promising wireless technology is Ultra-Wideband (UWB) transmission technology. Impulse Radio Ultra-Wide Band (IR-UWB) radar is one of the recent radar technology leveraging on UWB transmission technology that uses an exceedingly wide bandwidth low power impulse signal to continuously transmitting and receiving the impulse signal for object detection within a range. The exceedingly wide bandwidth and short pulses waveforms can facilitate in minimizing the effect of multipath interference, good signal penetration through obstacles such as walls and object.

To model and simulate Indoor environment device-free wireless positioning using IR-UWB radar system model in various indoor wireless channel fading conditions.

To propose an improve Indoor environment device-free wireless positioning algorithm in comparison to existing algorithm in terms of coding efficiency and execution rate.

To implement simulated system model and algorithm migration to system hardware and conduct experimental measurement in both control and open environments.

To assess the overall developed Indoor environment device-free wireless positioning using IR-UWB radar system in terms of target object estimation error and identification rate.

**System Modelling**

The first step is to study and formulate a system model of an object positioning estimation for indoor environment using IR-UWB radar.

**Algorithm Development**

By employing and experimenting various algorithms from existing techniques, a new algorithm will be devised. Many alternatives will be evaluated in order to produce the most optimized algorithm.

**Prove of Concept Development**

The algorithm developed will be coded and embedded on IR-UWB radar system hardware in order to perform actual experimental scale test.

**Testing and Evaluation**

To perform quantification of performance metrics in a use case and comparison with existing method. Tests will be performed in both controlled (using EMC/Microwave anechoic chamber) and open environments.

A 50m x 50m x 10m three dimensional space and a range of randomly positioned IR-UWB radars are defined for positioning to occur. 20 IR-UWB radars are randomly positioned within the defined space. Two experiments with simulated data and only one target object within the defined space have been conducted. The first experiment



is to evaluate the system model positioning accuracy with respect to a range of randomly positioned IR-UWB radars starting from a minimum number of  $n=4$  until  $n=20$  IR-UWB radars. For each IR-UWB radar, its randomly generated position are then distorted by an unbiased Gaussian noise  $N$  with mean  $\mu_N=0$  and a fixed standard deviation of  $0.1m$ . The second experiment seek to evaluate the system model positioning accuracy with respect to varying magnitudes of noise added to a fixed  $n=4$  randomly generated IR-UWB radar position. The position are then distorted by an unbiased Gaussian noise  $N$  with mean  $\mu_N=0$  with varying standard deviation  $\{0.1m \cdot \dots \cdot 1m\}$ . From Experiment 1, the object positioning estimation error is in a downward trend as the number of IR-UWB radars deployed increased. In essence, by employing the system model introduced in this study, the more IR-UWB radars being deployed the more accurate the system model calculate the estimated position of the target. However when referring to the result from Experiment 2, the object positioning estimation error is in an upward trend as the magnitude of noise is increased. In other words the positioning capability of the system model is gradually degraded as the magnitude of noise increased.

The outcome of this research work will be able to be implemented in various application such as:

- Smart building and manufacturing automation;
- Intelligent transportation;
- Emergency rescue;
- Security monitoring;
- Context awareness services

**Keywords** : Impulse Radio, Ultra-Wide Band, Device-free Object Positioning



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		RI-11
<b>PEREKA CODE</b>		P0197/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		RESEARCH
<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		An Engineering Approach For Health Assessment Based On Electrophotonic Image
<b>PROJECT LEADER</b>		DR. RAZAK MOHD. ALI LEE
<b>PROJECT MEMBER</b>		Janifal Alipal

**Abstract :** New techniques based on digital analysis and more precise visualisation in monitoring of individual health status can improve the accessibility and reliability of healthcare services. An innovation in capturing a human's biofield energy level using Electrophotonic Imaging (EPI) is seen as a breakthrough approach to healthcare service.

This non-invasive imaging approach produces an image known as the Kirlian image in digital form to aid visualization and probe for disease identification. The diagnosis and treatment process are fast, reproducible and cost-effective. EPI technique works based on computational models of human health state commonly before and after a course of treatment or meditation. The reliability and efficacy of EPI are validated by the physician's perceptions using biomedical measurements. At the same time, the algorithms developed by engineers embedded in the imaging system have advanced gradually with the help of clinical data from physicians.

To close the gap between engineering and medicine, the field of research known as 'Biomedical Engineering' (BME) has been established to merge engineering principles with medicine in order to advance diagnosis, treatment, and monitoring, which will in turn improves quality of life of mankind. An engineering approach is used to study on how the captured image indicates the energy level of human's biofield. This research introduces a pre-processing procedure to extract the effects texture. The image indicates the radiation energy level based on its most significant glow (region of interest) and is used for biomarker in biometrics and health analysis.

This finding simplifies the procedure of blob extraction for EPI image digitally. Four promising parameters are introduced as the image 'digital signature'. Through the parameters, the energy level of electrodermal activity (EDA) from human's fingertips is verified. Subsequently the human's biofield energy levels can potentially be used as an alternative approach to health assessment in future clinical practice.

- i. To investigate the descriptive correlations of Kirlian phenomenon with body's electromagnetic field,
- ii. To generate significant features from Kirlian image to represent the energy state of the event digitally using image processing technique,
- iii. To verify the energy level of digital "Kirlian effect" from generated parameters in (ii) by comparing the results with Bio-Well analysis to indicates the state of health condition of the subject.

Data extraction is the morphological process, where a special pre-processing algorithm, as an absolute arithmetic process to extract the significant ROI of Kirlian image from 16 subjects is performed; healthy, acute psychosis, anxiety, retarded, hypertension and stress. As an output, generated four (4) parameters will provide the data of cumulative energy level for each subject using the following formula; (Korotkov, 2018).

A special pre-processing analysis for the Kirlian image is introduced. The process is based on the implementation in sequence of image morphology techniques to extract and analyse the properties in the region of interest (ROI) of the Kirlian image. An overall proposed technique is performed using IPVC 2017 in Scilab 6.0.

The research findings are:

1. Number of the closed isolines doesn't pose any energy level. This parameter is use to analyse the protuberences pattern, gaps and discharge marks on the image;
2. Foam coefficient and foam deviation are use to indicates the spectrum stability and sensitivity. Average value of foam deviation that lower than 0.12 shown less sensitivity and foam coefficient that lower than 0.02 shown the unstable form of the ROI;

3. The energy level less than 0.15 Joules considered in a threshold of subject is in a risk of having mental health problem.

#### EPI as a Mental Health Scanner

As stated from previous researches, the capabilities of EPI in disease diagnosis and monitoring health are scientifically proved in both prime and alternative medicine. Among other established imaging technique, EPI is the only technique attempting into analysing human biofield levels. This brings a potential corresponding into a way of us visualized the effect of alternatives medical service nowadays.

Malaysia is an oriental country which its folks depends not only on western medicine but in energy medicine too such as massage, rolfing, hijama and other locals medicine. This alternative treatment plays a big roles into human mental health status. By implementing EPI as a scanner before and after treatments, both parties, practitioners and patients will have visual references on the effect of the service that being delivered.

On the other side of medical practice in Malaysia, to asses mental health of a patient in an early stage still becomes big challenges. Above many reasons, one part of the challenge is the cost of treatments and the limited access to the professional service in rural area. In average, a session with private psychiatrist charge almost RM500 for an hour visit, but mostly there is nothing to action except whether to come back for another session. This is not economically saved. To save the cost, EPI can be a device to scan the status of patients' mental health before a psychiatry treatments.

By time, the basic understanding of energy level in Kirlian image is discovered through this research and its capability to illustrate mental health state is proven usefull for early stage detection of the diesese. This scientific data by means is a calling to other researchers in Malaysia from many deciplines to investigate the technology promising capabilities as a Mental Health Scanner.

**Keywords :** Electrophotonic Imaging, Kirlian Image, Human Biofield



**I : ENGINEERING AND PHYSICAL SCIENCE**

<b>BOOTH NO.</b>		II-01
<b>PEREKA CODE</b>		P0046/2018
<b>FPI</b>		FSSA
<b>CATEGORY</b>		INNOVATION
		<b>CLASSIFICATION</b>   ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		REAL TIME PARTICULATE MATTER CONCENTRATION MEASUREMENT USING LASER SCATTERING
<b>PROJECT LEADER</b>		DR. CHEE FUEI PIEN
<b>PROJECT MEMBER</b>		ANGELO SEAN FRANCIS TIWON ,ENCIK JACKSON CHANG HIAN WUI,PROFESSOR MADYA DR. JEDOL DAYOU,DR. CAROLYN MELISSA PAYUS,PROFESSOR MADYA JUSTIN SENTIAN

**Abstract :** This product is designed to overcome the limitations proposed by the conventional gravimetric method for particulate monitoring which requires long sampling interval apart from being high cost. The proposed product provide low cost alternative to real time reading of particulate matter concentration at varying size simultaneously by applying the mie scattering theory. Appart from being temporally efficient, the product also come in compact form making it suitable for deployment in hot spot area especially to asses PM exposure to those who is exposed in vicinity. The embeded data logging system makes the product feasible for continuos monitoring with minimal handling effort.

This product is showing great potential to be used in the field of air quality assement for both industry and law enforcement field. Its Low cost makes it efficient for mass production thus promoting dense monitoring network for particulate matter.

**Keywords :** Particulate Matter; air quality; Mie Scattering; Real Time, Low Cost



## I : ENGINEERING AND PHYSICAL SCIENCE

<b>BOOTH NO.</b>		II-02
<b>PEREKA CODE</b>		P0059/2018
<b>FPI</b>		FKJ
<b>CATEGORY</b>		INNOVATION
<b>CLASSIFICATION</b>		ENGINEERING AND PHYSICAL SCIENCE
<b>PROJECT TITLE</b>		UMS Eco-Solar Dryer
<b>PROJECT LEADER</b>		DR. JIDON @ ADRIAN BIN JANAUN
<b>PROJECT MEMBER</b>		Ananth A/L Manickam Wash, Lim Beng Chew, Valerian Victor Kong, Marcellus Kan

**Abstract :** The invention capitalizes the thermodynamic properties of air where it is lighter when it is warmer, and also the benefits of drying using convection technique. The invention is designed in such a way that maximizes the heating of the natural air and also to accelerate the convection aeration with dual changeable direction inside the drying chamber. It is generally known that a natural convective solar dryer in which a solar collector is mounted diagonally at a specific angle on the bottom or top entry of drying chamber to form the updraft and downdraft aeration modes, respectively. Updraft solar dryer allows heated air intake at the bottom of drying chamber rising up and through drying products before exiting out of the system due to the difference of the air density. Meanwhile, downdraft solar dryer is enabled by air intake at the top of drying chamber where the top air is sucked to the bottom of the drying chamber by a chimney attached outside of the drying chamber. These two modes provide the benefits of optimal drying due to the flexibility in changing the modes of aeration direction without the need of moving the substrate to be dried.

The dual aeration direction is advantageous in this invention. Typically, updraft solar dryer has a basic problem of inadequate ventilation when there is large amount of moisture evaporated in a short period of time. The heated air will then absorb the evaporated moisture from drying product thus losing its momentum to progressively rise up and exit through the top vent. This updraft system will hinder the heated air movement during the beginning phase of drying. On the other hand, downdraft solar dryer faces inadequate ventilation problem when the evaporated moisture have reduced extensively after certain period of drying.

UMS Eco-Solar Dryer is a sustainable product. The followings describe the sustainability (People, Planet, Profit).

(A) Beneficial to the society

- Hygienic drying process.
- Drying process is faster.
- Price is affordable.
- Easy to handle.
- Drying of agricultural & marine products.

(B) Benefits to the environment

- No electricity required.
- Using the power of the sun for heating.
- No pollution.
- Using recycled materials.
- Hybrid system uses low energy.

(C) Benefits to the economy

- Create a new industry (manufacturing Solar Dryer)
- Provide job.
- Create new businesses based on drying process.
- Spin off companies

UMS Eco-Solar dryer is suitable for the drying of agricultural and marine products. It is suitable to be used by a family for daily drying needs. Small and medium enterprises are also suitable to use this machine for their drying needs.

**Keywords :** Solar dryer, drying, agriculture, marine, Solar.