

# EARTH TO SPACE



INSTITUTE OF  
CLIMATE CHANGE BULLETIN  
VOLUME 5 | ISSN (2462-1528) | JAN - DEC 2019



6<sup>th</sup> International Conference  
on Space Science and  
Communication  
(ICONSPACE2019)

ISSN 2462-1528



9 772462 152009

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2019 6th International Conference on  
Space Science and Communication  
(ICONSPACE2019)

### **Published by**

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# CONTENT

<b>2019 6TH INTERNATIONAL CONFERENCE ON SPACE SCIENCE AND COMMUNICATION (ICONSPACE2019)</b>	<b>PAGE</b> <b>05</b>
<b>PUBLICATIONS</b>	<b>08</b>
Journals	08
Books	10
<b>PROGRAMMES AND ACTIVITIES</b>	<b>12</b>
Visit by Tan Sri Abdul Wahid Omar, Chairman of UKM Board of Directors	12
Bengkel Sanggar Kerja IPI	12
Workshop on Book Writing (Sustainable School Project: Recycle for Life)	12
MoU Signing Ceremony between UKM and University of Chemistry and Technology (UCT) Prague	13
2019 Smart Control Helicopter Workshop and Competition	13
Training of Trainers Sustainable School Project: Recycle for Life Workshop	13
Public Lecture by Mr. Jaya Singam Rajoo	14
ESSA 9th Annual General Meeting	14
Panel Forum Central Forest Spine: Ke Arah Jaringan Ekosistem Mampan dan Progresif	14
Bengkel Hala Tuju Penyelidikan IPI	15
Workplace Fire Drill Training	15
IPI Seminar Series 1/2019: Research in Upper Atmosphere Physics and Astrophysics in Iceland	15
IPI Excellent Service Award Ceremony	15
IPI Seminar Series 2/2019: Lightning prediction in Antarctic Peninsula and Detection of Shoreline Changes by UAV application	16
Public Talk: "Climate Change Science: What Do We Know About Malaysia?"	16
MoU Signing Ceremony between Universiti Kebangsaan Malaysia and Kumamoto University	16
Kem Sehari Skuad Palma Emas 2019	17
IPI Seminar Series 3/2019: Quantifying Biomass and Biomass Change at Multiple Scales from TLS and ALS	17
IPI Student Research Colloquium 2019	17
Fieldwork for Project DIP-2018-030: Impact of Forest Degradation and Forest Change Caused by Selective Logging Using High Resolution Satellite Image and UAV Multispectral	17
STEM 5R Road Tour (Sustainable School Project: Recycle for Life)	18
Workshop on Remote Sensing & Application	18
IPI Seminar Series 4/2019: Climate Change Education in the South East Asia Region	19
Kuala Lumpur Urban Thinkers Campus 2019	19
IPI Seminar Series 5/2019: Geomagnetism and Space Weather Research in Egypt	19
<b>AWARDS AND RECOGNITIONS</b>	<b>20</b>



## FOREWORD BY CHIEF EDITOR

Dr. Teh Wai Leong

Dear IPI folks,

This is the 5<sup>th</sup> IPI Bulletin. It reports all the IPI programmes and activities that have been carried out in the year 2019, and the outstanding achievements accomplished by IPI. Congratulations to the IPI folks, this year the institute has successfully organized the 6<sup>th</sup> International Conference on Space Science and Communication (IconSpace2019), which has attracted many international researchers in the space science field to participate, and a conference proceeding is produced. On the IPI publications, 26 research papers were published in the high impact journals in Q1 and Q2, and 6 books were published. This year the institute has conducted many activities and workshops in the Sustainable School Projects especially for secondary school students and several public lectures for IPI students and public. In addition, the institute has successfully signed two MoU with Kumamoto University of Japan and University of Chemistry and Technology of Prague for research collaboration.

Hopefully, this bulletin will guide the readers to recognize the IPI in all aspects. If you have comments/suggestions on the content of the IPI Bulletin, please contact us at [pghikp@ukm.edu.my](mailto:pghikp@ukm.edu.my).

Sincerely,

Dr. Teh Wai Leong

Research Fellow

Space Science Centre, Institute of Climate Change,  
UKM



## 2019 6<sup>th</sup> INTERNATIONAL CONFERENCE ON SPACE SCIENCE AND COMMUNICATION (ICONSPACE2019)

Nurul Hajjiah Hair, Badariah Bais & Mardina Abdullah

The Institute of Climate Change (IPI) of Universiti Kebangsaan Malaysia through its Space Science Centre organized the 6<sup>th</sup> International Conference on Space Science and Communication at the Pulau Springs Resort in Johor Bahru, Malaysia, during 28–30 July 2019.

The theme of the conference is “Advancing Space Science for Societal Sustainability”, aiming at providing a multi-task platform for researchers, scientists, and industry people to communicate and disseminate information on the latest developments in the space science and communication to achieve societal sustainability goals.



Prof. Dr. Mengu Cho  
Day 1 Keynote Speaker



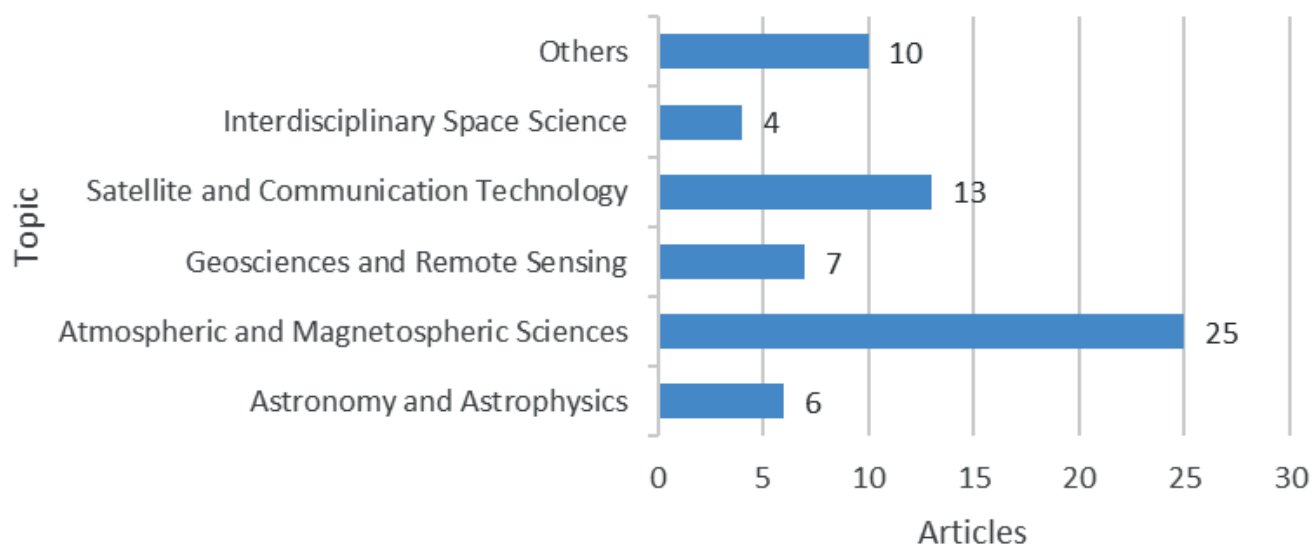
Prof. Dr. Mazlan Hashim  
Day 1 keynote speaker

A total of 65 research papers were presented in the conference among the six research topics, as illustrated in the next page, in which the atmospheric and magnetospheric science has the highest number of articles submitted. All the articles complied with the publication rules of the Institute of Electrical and Electronics Engineers (IEEE) will be published in the journal of IEEE Xplore.

The conference had gathered many local and foreign researchers, including Japan, United Kingdom, United States of America, Nigeria, Australia, Taiwan, and China. This time the IconSpace2019 received a technical co-sponsorship from the Institute of Electrical and Electronics Engineers Young Professional Malaysia. In addition, kind support was received from National Space Agency of Malaysia, Centre of Advanced Electronic and Communication Engineering, Faculty of Engineering and Built Environment of UKM, Earth and Space Science Students Association of IPI, and Tenaga Nasional Berhad.

Dr. Andrew Thomas Hudak (left) and  
Mrs. Clara Yono Yatini (right) were the  
keynote speaker for the second day of  
IconSpace2019

## Articles of IconSpace2019



Number of articles submitted and presented in the IconSpace2019



Nine papers were selected as the best conference paper. The awards were given to the presenters during the reception dinner in the last day of the conference. During the dinner, participants also enjoyed the cultural performance by the local dancers and recognized the local culture.

The 6<sup>th</sup> IconSpace conference had successfully achieved its targets to advance the developments of space science research in Malaysia. The next IconSpace conference will be held in the year 2021 and further information is available at the website <http://www.ukm.my/iconspace/>.

# PUBLICATIONS

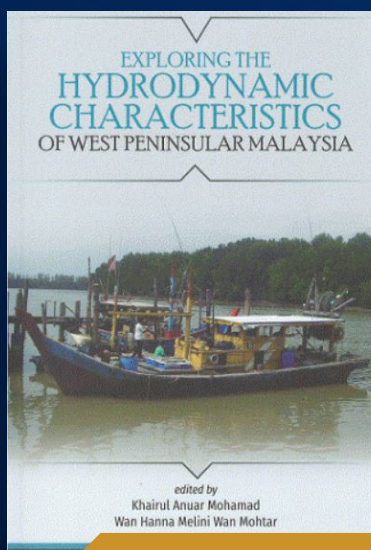
## HIGH IMPACT JOURNALS

NO	PAPER TITLE JOURNAL/PROCEEDING NAME	AUTHORS*
1	BTEX compositions and its potential health impacts in Malaysia <i>Chemosphere</i> (Q1)	Fatimah Ahamad Mohd Shahrul M. Nadzir
2	Distribution, sources and potential health risks of polycyclic aromatic hydrocarbons (PAHs) in PM2.5 collected during different monsoon seasons and haze episode in Kuala Lumpur <i>Chemosphere</i> (Q1)	Md Firoz Khan
3	Chemical characterisation of water-soluble ions in atmospheric particulate matter on the east coast of Peninsular Malaysia <i>Atmospheric Chemistry and Physics</i> (Q1)	Mohd Shahrul M. Nadzir
4	Discovering opportunities to meet the challenges of an effective waste electrical and electronic equipment recycling system in Malaysia <i>Journal of Cleaner Production</i> (Q1)	Marlia Mohd Hanafiah
5	Factorial design and optimization of landfill leachate treatment using tannin-based natural coagulant <i>Polymers</i> (Q1)	Marlia M. Hanafiah
6	ForestGapR: An r Package for forest gap analysis from canopy height models <i>Methods in Ecology and Evolution</i> (Q1)	Wan Shafrina Wan Mohd Jaafar
7	Membraneless polyester microdroplets as primordial compartments at the origins of life <i>Proceedings of the National Academy of Sciences of the United States of America</i> (Q1)	Kuhan Chandru
8	Response of ionospheric profile parameters to equatorial electrojet over peruvian station <i>Earth and Space Science</i> (Q1)	S. A. Bello** M. Abdullah N. S. A. Hamid
9	Risk of concentration of major air pollutants on the prevalence of cardiovascular and respiratory diseases in urbanized areas of Kuala Lumpur, Malaysia <i>Ecotoxicology and Environmental Safety</i> (Q1)	Md Firoz Khan Ahmad Hazuwan Hamid
10	Spatial and temporal risk quotient based river assessment for water resources management <i>Environmental Pollution</i> (Q1)	Khairul Nizam Abdul Maulud
11	Spatio-temporal assessment of nocturnal surface ozone in Malaysia <i>Atmospheric Environment</i> (Q1)	Fatimah Ahamad
12	Thermodynamic properties of mirror structures in the magnetosheath: MMS observations and double-polytropic MHD simulations <i>The Astrophysical Journal</i> (Q1)	Wai-Leong Teh**

13	Ambient BTEX levels over urban, suburban and rural areas in Malaysia <i>Air Quality, Atmosphere and Health (Q2)</i>	Mohd Shahrul M. Nadzir Md Firoz Khan
14	Composite circular split ring resonator (CSRR)-based left-handed metamaterial for C- and Ku-band application <i>Results in Physics (Q2)</i>	Tayaallen Ramachandran** M. R. I. Faruque Eistiak Ahamed
15	Comprehensive coastal vulnerability assessment and adaptation for Cherating-Pekan coast, Pahang, Malaysia <i>Ocean &amp; Coastal Management (Q2)</i>	Khairul Nizam Abdul Maulud
16	Discriminating between large-scale oil palm plantations and smallholdings on tropical peatlands using vegetation indices and supervised classification of LANDSAT-8 <i>International Journal of Remote Sensing (Q2)</i>	Aslinda Oon**
17	Dynamics of sediment transport and erosion-deposition patterns in the locality of a detached low-crested breakwater on a cohesive coast <i>Water (Q2)</i>	Khairul Nizam Abdul Maulud
18	Electrically compact SRR-loaded metamaterial inspired quad band antenna for Bluetooth/WiFi/WLAN/WiMAX system <i>Electronics (Q2)</i>	Md. Mehedi Hasan** M. R. I. Faruque
19	Flexible nickel aluminate (NiAl <sub>2</sub> O <sub>4</sub> ) based dual-band double negative metamaterial for microwave applications <i>Results in Physics (Q2)</i>	M. R. I. Faruque** Eistiak Ahamed Md. Atiqur Rahman
20	Leaching of Organic Toxic Compounds from PVC Water Pipes in Medina Al-Munawarah, Kingdom of Saudi Arabia <i>Processes (Q2)</i>	Marlia Mohd Hanafiah
21	Nickel particle-based compact flexible antenna for modern communication systems <i>Electronics (Q2)</i>	Md. Atiqur Rahman** M. R. I. Faruque Eistiak Ahamed
22	Polarization-dependent tunneled metamaterial structure with enhanced fields properties for X-band application <i>Results in Physics (Q2)</i>	Eistiak Ahamed** M. R. I. Faruque
23	Polarization-insensitive infrared-visible perfect metamaterial absorber and permittivity sensor <i>Results in Physics (Q2)</i>	Mohammad Jakir Hossain** M. R. I. Faruque Md. Jubaer Alam
24	Specific absorption rate reduction of multi split square ring metamaterial for L and S band application <i>Results in Physics (Q2)</i>	Tayaallen Ramachandran** M. R. I. Faruque Eistiak Ahmed Sabirin Abdullah
25	Split ring resonator loaded horizontally inverse double L-shaped metamaterial for C-, X- and Ku-Band Microwave applications <i>Results in Physics (Q2)</i>	Ahmed Mahfuz Tamim** M. R. I. Faruque Md. Jubaer Alam
26	Two-dimensional reconstruction of magnetic mirror structures with pressure anisotropy: Theory and application <i>Journal of Geophysical Research: Space Physics (Q2)</i>	Wai-Leong Teh**

# PUBLICATIONS

## BOOKS



Exploring the hydrodynamic characteristics of West Peninsular Malaysia

Authors: Wan Hanna Melini Binti Wan Mohtar  
 Editors: Khairul Anuar Mohamad & Wan Hanna Melini Wan Mohtar

Publisher: Penerbit UKM  
 ISBN: 9789674128340

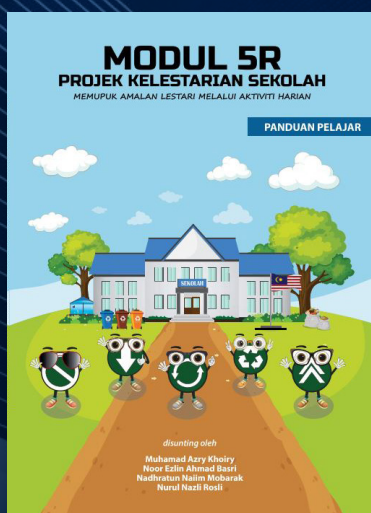


Modul 5R Projek Kelestarian Sekolah: Memupuk Amalan Melalui Aktiviti Harian Sekolah (Panduan Guru)

Authors: Muhamad Azry Bin Khoiry; Nadhratun Naiim Binti Mobarak; Noor Ezlin Bt. Ahmad Basri

Editors: Muhamad Azry Khoiry, Nadhratun Naiim Mobarak & Noor Ezlin Ahmad Basri

Publisher: Institut Perubahan Iklim  
 ISBN: 9789672224358

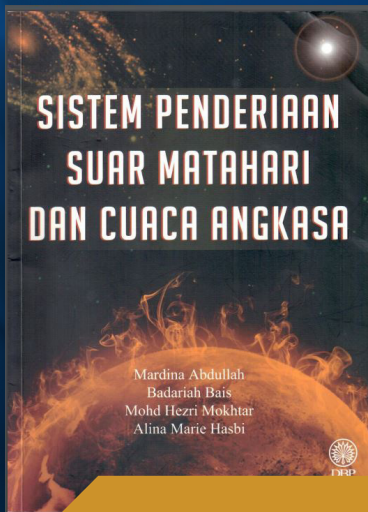


Modul 5R Projek Kelestarian Sekolah: Memupuk Amalan Melalui Aktiviti Harian Sekolah (Panduan Pelajar)

Authors: Muhamad Azry Bin Khoiry; Nadhratun Naiim Binti Mobarak; Noor Ezlin Bt. Ahmad Basri

Editors: Muhamad Azry Khoiry, Nadhratun Naiim Mobarak & Noor Ezlin Ahmad Basri

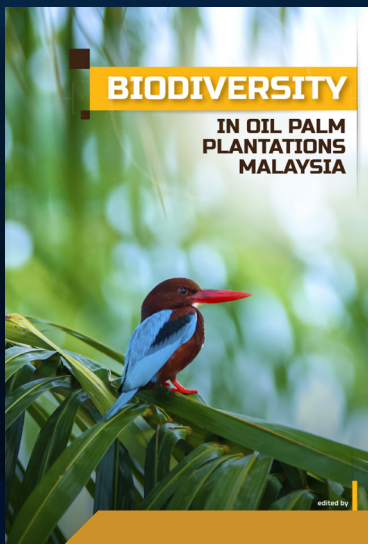
Publisher: Institut Perubahan Iklim  
 ISBN: 9789672224358



### Sistem Penderiaan Suar Matahari dan Cuaca Angkasa

Authors: Mardina Abdullah, Badariah Bais, Mohd Hezri Mokhtar & Alina Marie Hasbi

Publisher: Dewan Bahasa dan Pustaka  
ISBN: 9789834913663



### Biodiversity in Oil Palm Plantations Malaysia

Editors: Maimon Abdullah, Norhayati Ahmad & Sharifah Mastura Syed Abdullah

Publisher: Penerbit UKM  
ISBN: 9789674126780



### Seronoknya Matematik Bermain dengan Objek Alam Semulajadi

Authors: Azmin Sham Rambely, Mohd. Salmi Md. Noorani, Abd. Ghafur Ahmad, Noriza Majid, Eddie Shahril Ismail & Abdul Razak Salleh

Publisher: Institut Perubahan Iklim  
ISBN: 9789672224310

# PROGRAMMES & ACTIVITIES

Visit by Tan Sri Abdul Wahid Omar, Chairman of UKM Board of Directors

Date: 11 January 2019

Venue: Institute of Climate Change (IPI)

Organizer: Institute of Climate Change (IPI)



Bengkel Sanggar Kerja IPI

Date: 11-13 January 2019

Venue: Klana Beach Resort, Port Dickson

Organizer: Institute of Climate Change (IPI)



Workshop on Book Writing (Sustainable School Project: Recycle for Life)

Date: 7 February 2019

Venue: Meeting Room, Institute of Climate Change (IPI)

Organizer: (1) UKM-YSD Chair in Climate Change, (2) Faculty of Engineering & Built Environment



The "Sustainable School Project: Recycle for Life" was a Science Technology Engineering Mathematic (STEM) educational programme through Reduce, Reuse & Recycle activities. The aims of the project were to expose secondary school students to environmental friendly and sustainable production and consumption concepts and to practice through classroom and school activities.

## MoU Signing Ceremony between UKM and University of Chemistry and Technology (UCT) Prague

Date: 25 March 2019

Venue: Bilik Majlis, Chancellery Building, UKM

Organizer: Institute of Climate Change



## 2019 Smart Control Helicopter Workshop and Competition

Date: 3-4 April 2019

Venue: Politeknik Banting Selangor

Organizer: (1) Institute of Climate Change (IPI), (2) Faculty of Engineering & Built Environment, (3) Politeknik Banting Selangor, and (4) Jabatan Pelajaran Negeri Selangor



The workshop aimed to provide a platform for participants to learn problem-solving skills in a wide variety of math, science, and engineering situations. It also aimed to develop teamwork skills by building hardware and software simultaneously as well as to inspire students to explore more on their own and take the skills learned in the workshop to higher levels. The Centre of Advanced Electronic and Communication Engineering, Politeknik Banting Selangor, and Jabatan Pendidikan Negeri Selangor also took part in this event as collaborators.

## Training of Trainers Sustainable School Project: Recycle for Life Workshop

Date: 11 April 2019

Venue: Keriang Hill Resort, Kedah

Organizer: (1) Yayasan Sultanah Bahiyah, (2) E-Idaman Sdn. Bhd., (3) Faculty of Engineering and Built Environment, (4) UKM-YSD Chair in Climate Change.



The purpose of this workshop was to train the teachers on 5R practices (Refuse, Reduce, Reuse, Recycle and Recover) to be applied in schools through activities in the Sustainable School Projects. The participants consisting of 77 teachers from 38 secondary schools in Kedah were trained using a module developed by a group of researchers from UKM led by Dr. Muhammad Azry Khoiry and 13 other researchers from Faculty of Engineering and Built Environment and Faculty of Science and Technology. E-Idaman Sdn. Bhd. also shared their knowledge on waste management including the Recycle for Life (RFL) programme during the workshop. RFL is a programme to allow students and local communities to carry out recycling activities and they will get some benefit through a smart card reward system that can be used in the selected stores. This programme was sponsored by Yayasan Hasanah under the grant ZF-2019-004.

# PROGRAMMES & ACTIVITIES



## Public Lecture by Mr. Jaya Singam Rajoo

Date: 16 April 2019

Venue: Bilik Majlis, Chancellery Building, UKM

Organizer: UKM-YSD Chair in Climate Change



This public lecture on “Dasar Perubahan Iklim Negara: Cabaran & Peluang” was delivered by Mr. Jaya Singam Rajoo, from the Environmental Management and Climate Change Division, under the Ministry of Natural Resources and Environment (MESTECC). About 60 participants joined the lecture, including representatives from the Department of Environment Malaysia, Centre of Engineering and Built Environment Education Research, Dr. Nik & Associates Sdn. Bhd., and Forest Research Institute Malaysia.

## ESSA 9<sup>th</sup> Annual General Meeting

Date: 17 April 2019

Venue: Meeting Room, Research Complex UKM

Organiser: Earth and Space Science Students Association, IPI



The annual meeting gathered all IPI students and also students who are conducting research affiliated to IPI. The meeting focused mainly on the issues related to students. The former Chair of ESSA presented the activities and finance report for the year 2018/2019. Amirul Mustaqim Azman was elected as the new Chair for ESSA committee for term 2019/2020.

## Panel Forum Central Forest Spine: Ke Arah Jaringan Ekosistem Mampan dan Progresif

Date: 18 April 2019

Venue: Pejabat Tun Abdullah Ahmad Badawi

Organizer: (1) Pertubuhan Legasi Tun Abdullah Ahmad Badawi, (2) Lanskap Malaysia & Tropical Rainforest Conservation & Research Centre



The Chairholder of UKM-YSD was invited as a panel for a forum discussion entitled “Central Forest Spine: Ke Arah Jaringan Ekosistem Mampan dan Progresif”. The other panel members are Dato’ Lim Kee

Leng, the Senior Director of Forest Management Division under the Forestry Department Headquarters Peninsular Malaysia, and Dr. Dzaeman Dzulkifli, the Executive Director of TRCRC. The panel was moderated by Puan Ivy Wong Abdullah, the Senior Vice President and Head of Environment Pillar, Yayasan Hasanah.

## Bengkel Hala Tuju Penyelidikan IPI

Date: 26-28 April 2019

Venue: Hatten Place, Melaka

Organizer: Institute of Climate Change (IPI)



## Workplace Fire Drill Training

Date: 29 April 2019

Venue: Research Complex UKM

Organizer: Jawatankuasa Keselamatan & Kesihatan Pekerjaan Bangunan Kompleks Penyelidikan

## IPI Seminar Series 1/2019: Research in Upper Atmosphere Physics and Astrophysics in Iceland

Date: 30 April 2019

Venue: Meeting Room, Faculty of Engineering and Build Environment, UKM  
Organizer: Institute of Climate Change (IPI)  
Speaker: Prof. Dr. Gunlaugur Bjornnsson (Science Institute, University of Iceland)




## IPI Excellent Award Ceremony

Date: 17 June 2019

Venue: Palm Garden Hotel, Putrajaya

Organizer: Institute of Climate Change (IPI)

## PROGRAMMES & ACTIVITIES



### IPI Seminar Series 2/2019: Lightning prediction in Antarctic Peninsula and Detection of Shoreline Changes by UAV application

Date: 24 June 2019

Venue: Meeting Room, Level 5, Research Complex UKM

Organizer: Institute of Climate Change (IPI)

Speaker: Mr. Rishabh Saxena and Mr. Abdul Aziz Rahman (IPI student)


### PUBLIC TALK: "CLIMATE CHANGE SCIENCE: WHAT DO WE KNOW ABOUT MALAYSIA?"

Date: 25 June 2019

Venue: Tenby International Schools Setia Ecopark Shah Alam

Organizer: UKM-YSD Chair in Climate Change & Tenby International Schools

The Chairholder of UKM-YSD was invited to give a lecture on climate change for around 200 primary and secondary students during morning assembly on 25 June 2019, at Tenby Schools Setia Eco Park Shah Alam.




### MoU Signing Ceremony between Universiti Kebangsaan Malaysia and Kumamoto University

Date: 10 July 2019

Venue: Puri Pujangga, UKM

Organizer: Earth Observation Centre, IPI



Through the Institute of Climate Change (IPI), Universiti Kebangsaan Malaysia and Kumamoto University had signed an MoU for research collaboration. During the event, Prof. Dr. Ryuju Kakimoto gave a public talk entitled "Disaster Mitigation and Land-use Control".

## Kem Sehari Skuad Palma Emas 2019

Date: 27 July 2019

Venue: Hutan Pendidikan Alam, FST UKM

Organizer: (1) UKM-YSD Chair in Climate Change, (2) Faculty of Science & Technology, and (3) PINTAR Foundation

The programme was officiated by Prof. Dato' Dr. Imran Ho Abdullah, Deputy Vice Chancellor HEJIM. Kem Sehari Skuad Palma Emas is a yearly programme conducted by the UKM-YSD Chair in Climate Change since 2015. This year 81 primary students (9-12 years old) from SK Dengkil and SK Jenderam Hilir attended the program. The opening ceremony session were attended by Puan Karimah Tan Abdullah, the Chief Executive Officer of PINTAR Foundation, En. Muhammad Hafizzudin Mohd Arif from Yayasan Sime Darby and Prof. Dato' Dr. Rokiah Hj Omar, the Director of University Community Transformation Centre UKM. Teaching and learning were based on the module and activity book entitled "Kepelbagaian Biologi Ekosistem Sawit".



## IPI Seminar Series 3/2019: Quantifying Biomass and Biomass Change at Multiple Scales from TLS and ALS

Date: 1 August 2019

Venue: Bilik Majlis, Chancellery Building, UKM

Organizer: Institute of Climate Change (IPI)

Speaker: Dr Andrew Thomas Hudak (Rocky Mountain Research Station, US Forest Service, USA)



## IPI Student Research Colloquium 2019

Date: 8 August 2019

Venue: Faculty of Science and Technology

Organizer: Institute of Climate Change (IPI)

This programme was a platform for IPI students and students affiliated to IPI to present their research progress and studies. A total of 15 students participated in the colloquium. The presentations were evaluated by Assoc. Prof. Dr. Helmi Zulhaidi Mohd Shafri from Universiti Putra Malaysia.



## PROGRAMMES & ACTIVITIES



### Fieldwork for Project DIP-2018-030: Impact of Forest Degradation and Forest Change Caused By Selective Logging Using High Resolution Satellite Image and UAV Multispectral

Date: 19-23 August 2019

Venue: Ulu Jelai Forest Reserve, Kuala Lipis, Pahang

Organizer: Earth Observation Centre, IPI

This activity was a collaboration between Universiti Kebangsaan Malaysia, Forest Research Institute Malaysia, and Universiti Teknologi Mara. The objective of this activity was to collect data from the selective logging area and to provide knowledge and experience to the students on the techniques for data collection that was carried out at the site.

### STEM 5R Road Tour (Sustainable School Project: Recycle for Life)

Date: 25 – 29 August 2019

Venue: Kedah

Organiser: (1) Yayasan Sultanah Bahiyah, (2) E-Idaman Sdn. Bhd., (3) Faculty of Engineering and Built Environment, and (4) UKM-YSD Chair in Climate Change



The tour was included 50 schools in Kedah and was conducted by 11 facilitators among postgraduate students from the Faculty of Science & Technology of UKM. During the tour, the facilitators were divided into 5 teams and activities were conducted in two sessions for 10 schools per day. The module was based on "Modul 5R Projek Kelestarian Sekolah: Memupuk Amalan Lestari Melalui Aktiviti Harian" book which contains 7 chapters on environmental issues, especially those that require solutions through science, technology, engineering and mathematic (STEM) education. This programme was sponsored by the grant ZF-2019-004 from Yayasan Hasanah.



### Workshop on Remote Sensing & Application

Date: 11-12 September 2019

Venue: Makmal ICT 1, Earth Observation Centre, IPI

Organizer: Earth Observation Centre, IPI

The workshop aimed to guide and train the staff of Dr. Nik & Associates Sdn. Bhd. on remote sensing technology, using ERDAS imagine software for pre-processing, image processing, analysis and mapping. In the end of the training, participants were expected to be able to handle satellite images and to process and analyse remote sensing data.

## IPI Seminar Series 4/2019: Climate Change Education in the South East Asia Region

Date: 3 December 2019

Venue: Senate Room, Chancellery Building, UKM

Organizer: UKM-YSD Chair in Climate Change & Institute of Climate Change (IPI)

Speaker: Dr. Mee Young Choi (Head of Education, UNESCO Jakarta)



## Kuala Lumpur Urban Thinkers Campus 2019

Date: 7 – 9 December 2019

Venue: Dewan Bandaraya Kuala Lumpur (DBKL), Kuala Lumpur

Organizer: Institute of Climate Change (IPI) & Kuala Lumpur City Hall (DBKL)



The KL Urban Thinkers Campus is an initiative of UN-Habitat conceived as an open space for critical exchanges between urban researchers, professionals, civil society actors, and decision-makers who believe that urbanization is an opportunity to lead to a positive urban transformation. It is also intended as a platform to build consensus between partners engaged in addressing urbanization challenges and proposing solutions to urban futures. The KL Urban Thinkers Campus 2019 with the title “Combating the Urban Climate Change in South East Asia: Towards Implementation of New Urban Agenda” has attracted a total of 150 participations from different institutions.

## IPI Seminar Series 5/2019: Geomagnetism and Space Weather Research in Egypt

Date: 16 December 2019

Venue: Meeting Room, Research Complex, UKM

Organizer: Institute of Climate Change (IPI)

Speaker: Prof. Dr. Essam Ghamry (National Research Institute of Astronomy and Geophysics, Egypt)



# AWARDS & RECOGNITIONS

## GOLD MEDAL

STEM Mentor-Mentee Award  
UKM Smart Control Helicopter Workshop

Event: Malaysia Technology Expo (MTE) 2019

Date: 21-23 February 2019

Venue: Putra World Trade Centre (PWTC)



## SILVER MEDAL

STEM Mentor-Mentee Award  
Sistem Cerapan Mudah Alih UKM-SIDPi  
untuk Pelajar Sekolah

Event: Malaysia Technology Expo (MTE) 2019

Date: 21-23 February 2019

Venue: Putra World Trade Centre (PWTC)



## BRONZE AWARD

A New Double Negative Metamaterial Design for  
Electromagnetic Absorption Reduction in Human  
Head

Mohammad Rashed Iqbal Faruque, Estiak Ahmed,  
Mohammad Tariqul Islam

Event: Innovation Technology Expo 2019 (INTEX19)

Date: 24-25 July 2019

Venue: Universiti Malaysia Sarawak (UNIMAS)



# AWARDS & RECOGNITIONS

## SILVER AWARD

### Metamaterial Absorber for Energy Harvesting

Mohammad Rashed Iqbal Faruque, Ahmed Mahfuz Tamim, Mandeep Singh Jit Singh, Mohammad Tariqul Islam, Md. Mehedi Hasan, Mardina Abdullah

Event: Innovation Technology Expo 2019 (INTEX19)

Date: 24-25 July 2019

Venue: Universiti Malaysia Sarawak (UNIMAS)



## SILVER AWARD

### Circularly Polarized Four Elements Array Antenna at 1.27 GHz for Low Cost Remote Sensing

Nurulazlina Ramli, Taher Khalifa Sanossi, Norsuzlin Mohd Sahar, Ali Hassam

Event: Invention, Innovation & Design Exposition 2019 (IIDEX2019)

Date: 10-15 September 2019

Venue: Universiti Teknologi Mara (UiTM), Shah Alam



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