



2019 6th International Conference on Space Science and Communication (IconSpace2019)

"Advancing Space Science for Societal Sustainability"



28-30 July 2019
Pulai Springs Resort, Johor Bahru, Johor
Malaysia

PROGRAMME BOOK

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CONFERENCE BACKGROUND

Given that the development of space science and technology has been playing a critical role in the sustainable development of natural resources, telecommunications, and meteorology, and that the number of participants has been increased in the last five IconSpace conferences since 2009, the **Space Science Centre (ANGKASA) of Universiti Kebangsaan Malaysia (UKM)** is therefore to pursue the 6th IconSpace conference to promote the research and education in the field of space science, technology, and governance. The **2019 6th International Conference on Space Science and Communication (IconSpace2019)** will be organised with a theme on “**Advancing Space Science for Societal Sustainability**”. The objective of this conference theme is to provide a platform for researchers, scientists and industrially relevant to explore, co-operate, promote, motivate the participants in space science to achieve societal sustainability goals. We are very pleased to mention that the proceedings of IconSpace2019 with conference record #45581 will be included in the IEEE Xplore™ database. The conference and publication information is stated as below:

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FOREWORD BY DIRECTOR OF INSTITUTE OF CLIMATE CHANGE, UNIVERSITI KEBANGSAAN MALAYSIA

Assalamualaikum warahmatullahi wabarakatuh, Peace be Upon You.

As the Director of the Institute of Climate Change (IPI), I would like to welcome all participants to the 2019 6th International Conference on Space Science and Communication (IconSpace2019).



Dear Distinguished Guests, Participants and Presenters,

IconSpace2019 is the sixth in a series of conferences hosted by the Institute of Climate Change (IPI) UKM through one of our centres, Space Science Centre (ANGKASA) and technically co-sponsored by Institute of Electrical and Electronics Engineers (IEEE) Young Professionals Malaysia. We hope this assembly of researchers in the fields of space science and communication technology presenting their research findings will create opportunities for more research understanding and collaborations.

Institute of Climate Change (IPI) through Space Science Centre (ANGKASA) has been actively involved in several programs of studies and research activities to seek and augment the desired knowledge and expertise in the fields of space science and communication. Hence we hope IconSpace2019, with its theme "Advancing Space Science for Societal Sustainability", will generate more avenues for similar collaborations.

A warm congratulations to the organizing committee for hosting the IconSpace2019. My deepest appreciation also goes to our keynote speakers, technical co-sponsor and all supporters for their contribution to ensuring the success of this conference. Finally, to the presenters and participants, thank you for your participation and I wish the conference all success. Thank you.

Prof. Dr. Mohd Nizam Mohd Said
Director
Institute of Climate Change (IPI)
Universiti Kebangsaan Malaysia

FOREWORD BY GENERAL CHAIR OF ICONSPACE2019



Assalamualaikum warahmatullahi wabarakatuh, Peace be Upon You.

Alhamdulillah, all praise be to Allah, the Most High for his Grace in facilitating the organization of this conference and giving us the ability to make this conference a success.

Dear Conference Participants,

On behalf of the Space Science Centre (ANGKASA), Institute of Climate Change, Universiti Kebangsaan Malaysia (UKM), and conference committee members, we cordially welcome you to the 2019 6th International Conference on Space Science and Communication (IconSpace2019). We are very pleased with the participation from various local and international research institutions as well as institutions of higher learning.

IconSpace2019 with a theme “Advancing Space Science for Societal Sustainability” is a platform for bringing together researchers from all over the world to present and discuss their research findings in space science, space communication, remote sensing, climate change and other interdisciplinary fields. In line with UKM motto, “Inspiring Futures, Nurturing Possibilities” we hope this conference will create opportunities for more research collaborations and networking. Not to forget together we support frontier research for mankind with UKM spirit of “*Kualiti Teras Kebitaraan Universiti*”.

We wish to express our deepest gratitude and appreciation to the Universiti Kebangsaan Malaysia's management and staff for their support and the conference committee members for their relentless effort to ensure the smooth organization of this conference. Our deepest appreciation also goes to the Technical Co-Sponsor, IEEE Young Professionals (IEEE YP), Supporters, International Advisory Committee, Keynote Speakers, reviewers and sponsors from all over the world for their support towards this conference. Finally, we would like to thank the presenters and participants for the commitment and we wish you a fruitful conference and thank you for your participation.

Prof. Ir. Dr. Mardina Abdullah
General Chair of IconSpace2019
Space Science Centre (ANGKASA)
Institute of Climate Change (IPI)
Universiti Kebangsaan Malaysia

FOREWORD BY CHAIR OF TECHNICAL PROGRAM COMMITTEE



Welcome to the 2019 6th International Conference on Space Science and Communication (IconSpace2019), the 6th in series of the conference which is organised by the Space Science Centre (ANGKASA) under the Institute of Climate Change, UKM and technically co-sponsored by IEEE Young Professionals (YP), Malaysia. The conference with the theme "Advancing Space Science for Societal Sustainability" is to provide a platform for the researchers, scientists and industrially relevant researchers to explore, co-operate, promote and motivate the participants in space science to achieve societal sustainability goals.

The technical program of this conference includes four keynote speakers, three invited talks, and 65 full papers. The tracks of the sessions include Astronomy and Astrophysics, Atmospheric and Magnetospheric Sciences, Geosciences and Remote Sensing, Satellite and Communication Technology, Interdisciplinary Space Science, and Others. The papers for this conference were selected after a rigorous review process. We have received an overwhelming response with a total of 85 papers with a competitive acceptance rate. The papers were all evaluated by international and local reviewers and at least two reviewers were required to evaluate each paper. The proceedings of IconSpace2019 will be published in IEEE Explore.

We are indebted to the organising committee, the reviewers, our honored keynote speakers, and the volunteers, who deserves much credit for all the time and effort put in for the successful run of the conference, which culminated with to the publication. Without their relentless efforts, this conference would not be possible. We also wish to express our appreciation to all the authors whose papers and presentations make the event a very exciting forum to add values to learn, discussion and exchanges of ideas, and to meet old or new people from different countries and interact with them.

A handwritten signature in black ink, appearing to read 'Tariqul'.

Prof. Dr. Mohamad Tariqul Islam

Chair of Technical Program Committee (TPC)

2019 6th International Conference on Space Science and Communication

FOREWORD BY CHAIR OF IEEE YOUNG PROFESSIONALS MALAYSIA



The Fourth Industrial Revolution (4IR) era has witnessed the truly technological advancements that change our life. The emergence of new knowledge that become the outcomes of new discoveries in sciences and engineering has been realistic and no longer just a dream. As young minds in our community, we always wonder to achieve greatness in our life. We are eager to come up with breakthroughs that might change the ways we live. As scientists and young professionals, we also not to forget that whatever we do in our professions must also giving impacts to our society. With the arising issues that our world is now suffering, we must always think of achieving sustainable contributions that will be benefited to people around us. That is our responsibility. We built up our capacities and capabilities to make sure that our world we are living in is safe for the next generations. In this conference, we promote collaboration and cooperation among the scientists, researchers, and industrial players to join forces in keeping our world for a better future. This year's theme of "Advancing Space Science for Societal Sustainability" is believed to be very timely to our situation where we need to educate ourselves in applying our knowledge to the welfares for our society. We are always hoping that with such spirit and devotion may giving impacts to our sustainable future and generations.

A stylized, handwritten signature in black ink, consisting of a large, sweeping loop followed by a few smaller strokes.

Afnizanfaizal Abdullah
Chair
IEEE Young Professionals Malaysia

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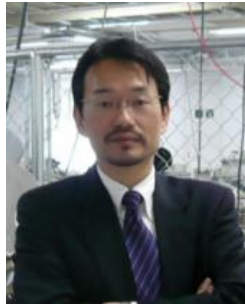
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Dr. Andrew Thomas Hudak (USDA Forest Service, USA)
Dr. Mark Moldwin (University of Michigan, USA)
Dr. Simon Wing (Johns Hopkins University, USA)
Dr. Kirpa Ram (Banaras Hindu University, India)

KEYNOTE 1



Prof. Dr. Mengu Cho

Laboratory of Spacecraft Environment Interaction Engineering,
Kyushu Institute of Technology

Mengu Cho received the B.S. and M.S. degrees from the Department of Aeronautics, University of Tokyo, Tokyo, Japan, in 1985 and 1987, respectively, and the PhD degree from the Department of Aero/Astro, Massachusetts Institute of Technology, USA, in 1992. From 1992 to 1995, he was a research associate with Kobe University, Kobe, Japan. From 1995 to 1996, he was a Teaching Associates with International Space University, France. Since 1996, he had been with Kyushu Institute of Technology (KIT), Japan, where he was an Assistant Professor in 1996 and Associate Professor in 1997. Since 2004, he has been a Professor and also the Director of the Laboratory of Spacecraft Environment Interaction Engineering (LaSEINE) of KIT. He has been with the Department of Applied Science for Integrated system engineering since 2010. His research interest includes spacecraft environmental interaction, especially spacecraft charging and nano-satellite reliability. He has authored or co-authored more than 120 papers in peer-reviewed journals.

CubeSat Interface Standardization for Fast Delivery and Mass Production**ABSTRACT**

It has been said that the advantage of CubeSat is low-cost and fast delivery. In fact, many CubeSat projects, however, are taking longer than two years since the project kick-off to the launch. There are various CubeSat component vendors available worldwide. The electrical interfaces from different vendors are often not compatible, even if they follow PC-104 specification. The incompatibility leads to additional time in the satellite development, assembly and integration. It may even require an interface board or harness to absorb the difference, adding extra complexity to the system. Clear definition of the electrical interfaces, such as the connector type and pin assignment help shortening the satellite delivery time. As CubeSat is now entering the era of mass production, simple interface suitable for mass production is also desired.

As CubeSat development and utilization proliferate and space start-ups based on CubeSat manufacturing and applications are born worldwide, international standards to promote the CubeSat sectors are desired. In general, when an industry grows to a certain size, soon some kinds of the standard become necessary to promote the growth further. In the past two years, three new ISO standards related to CubeSats are born, ISO-17770 (CubeSat), ISO-19683 (Testing), ISO/TS-20991 (Requirements). An IAA Study (SG4.18) was also done to define small satellites, leading to the new definition of “Lean Satellite”, which also applies to most of the CubeSat projects. The community who worked on the standard have identified a standard related to the interface is suitable as the next target of standardization. A new project to standardize the CubeSat electrical interface has been started with the funding support of the Japanese government. The project will be led by Kyushu Institute of Technology (Kyutech) based on its heritage of leading the standard activities. In the presentation, the overall project outline including the target and the timelines will be presented.

KEYNOTE 2



Professor Sr. Dr. Mazlan Hashim

Research Institute of Sustainable Environment, Universiti Teknologi Malaysia (UTM)

Prof. Sr. Dr. Mazlan Hashim is an expert in remote sensing technology applications within the natural resources management, environmental management, conservation and in mapping various national strategic applications. His research interest is in the rigorous development and innovation of diverse satellite remote sensing and geospatial applications for natural resources and environmental management, including in tropical ecology and biodiversity. He has led several national and international collaborative studies as Principal Investigator in remote sensing and geospatial technology applications, with a total accumulative of RM 33.9 million from national, international and contract research grants. He has published his research works in more than 250 indexed publications with h-index of 25, 1832 citations (Web-of-Science) and has 5 patents –granted, filed and disclosed.

He serves as an Editorial Board member for various international journals such as Scientific Reports; International Journal of Digital Earth; International Journal of Image and Data Fusion; International Journal of Geoinformatics; and Malaysian Journal of Remote Sensing & GIS. He received various awards at both national and international levels for his outstanding R&D&I in the field of geospatial sciences and its applications. Amongst others, he is one of the recipients of the Eduard Dolezal award 1996 by International Society of Photogrammetry and Remote Sensing (ISPRS), Eco-fellow Frontier award 2003 by Global Research Fund and Ministry of Environment, Japan and Top Research

Scientists Malaysia 2016 by Academy of Sciences Malaysia. Conferred as Fellow of Academy of Sciences Malaysia in May 2018.

Currently, Prof. Mazlan Hashim is the Senior Director of Research Institute of Sustainable Environment, Universiti Teknologi Malaysia (UTM). He held several positions as Visiting Professor/Scientist at Arabian Gulf University (2015); Tokyo Metropolitan University, Japan (2011-2019); Univ. of Cambridge, United Kingdom (2010); National Institute for Environmental Studies, Japan (2002- 2004), Peking University, China (1990); and Tohoku University, Japan (1989).

Prof. Mazlan Hashim is continuously inspiring young researchers to impactful research, putting scientific findings to actions, humanizing it to benefit related industry and society, apart from contributions to new knowledge. He has successfully supervised as the main supervisor for 16 completed PhD and 36 MSc (full research), respectively.

Prospects of Earth Observation Systems for Sustainable Development Goals (SDGs)

ABSTRACT

The United Nations provides 17 Sustainable Development Goals (SDGs), as a new global policy for guiding the method countries together transform and manage their economic, social, and environment. The pattern of people as well as the planet for the next 15 years (2030 agenda). Attaining these goals presents the entire nations and the world-wide policy community through a set of essential development challenges, which are almost generally geographic. Several of these issues impacting on sustainable development could be examined, modelled, and mapped in a geographic context using Earth Observations (EO) as a prospect to SDGs. Employing the EO technology offer the integrative framework essential for consensus, global collaboration, and evidence-based decision-making. Although, despite the significant advancement in EO systems, there are still gaps such as lacking awareness, comprehending and acceptance, specifically at the level of decision-making, the critical and integrative role of EOs and related technologies. This presentation highlights the role of EOs in contributing to SDGs, as it is not sufficiently been explained by the policy practice of sustainable development or by the EOs professional bodies. The global EOs community has an exclusive opportunity to integrate geospatial information to the global developmental agenda. Precisely in contributing data resources on monitoring and measuring the potentials out of the 17 SDGs, and 169 related targets, via the world-wide indicator framework, which supports the 2030 Agenda on Sustainable Development. In addition, this presentation reviews some case studies of EOs that if used by stakeholders, it will fast track the achievement of the SDGs.

KEYNOTE 3



Dr. Andrew Thomas Hudak

United States Department of Agriculture (USDA) Forest Service, USA

Andrew Hudak got his B.S. and PhD degrees in Ecology from the University of Minnesota, USA (1990) and the University of Colorado, USA (1999), respectively. In between, he taught secondary school science in the U.S. Peace Corps in Malawi (1990-1992) and travelled. In 1999, he began working for the U.S. Forest Service as a postdoctoral Research Ecologist with the Pacific Northwest Research Station. Since 2001, he has worked as a Research Forester with the Rocky Mountain Research Station. He currently studies biophysical relationships between field and remotely sensed data collected at landscape to regional scales, including upscaling project-level aboveground biomass carbon estimates across the northwestern U.S. from airborne LiDAR and annual Landsat time series, predicting fuel/carbon loads from 3D point cloud metrics at multiple scales, and relating fuel consumption to energy flux and fire effects. He recently completed a project tracking long-term vegetation recovery at 15 wildfires across the U.S. West and interior Alaska. Projects that bridge the scaling gap in both space and time, between field and remote sensing data, such that value is added to both, along with a utility for managers, are of greatest interest. He has published more than 200 refereed journal articles with 7,582 citations, h-index of 45 and an i10-index of 97. He received several awards such as award in Technology Transfer Publication in the USFS Rocky Mountain Research Station in 2012 and a Bridge Builder Award in 2010 for collaborative efforts with students and faculty of the University of Idaho, College of Natural Resources.

Mapping forest aboveground biomass annually (2000-2016) from Landsat time series

ABSTRACT

The advent of time series analyses algorithms applied to the historical Landsat image archive has made this the golden age of Landsat data utility. Moreover, the availability on Google Earth Engine of image time series algorithms and radiometrically and geometrically corrected Landsat image stacks, thoroughly cloud-screened at the pixel level, has made big data processing applications available to ordinary users. In this talk, we present results from a regional forest aboveground biomass (AGB) mapping study in the northwestern USA. Because Landsat data are relatively insensitive to canopy structure compared to airborne lidar, our approach was to train predictive Random Forest models from the ground up, using project-level lidar and field plots (N=3,672) contributed by US Forest Service and other land managers. Height and density metrics were calculated from the point cloud data binned within the plot footprints, and associated with the tree biomass calculations also summarized at the plot level, to predict forest AGB with high confidence and map AGB wherever lidar data were available. These landscape-level AGB maps served as training areas for predicting forest AGB synoptically across the northwestern USA; i.e., a stratified random sample of AGB pixels was drawn from these landscape-level forest AGB maps and used to predict AGB from the Landsat time series processed through the LandTrendr algorithm available on Google Earth Engine. LandTrendr predictors included annual tasseled cap indices (and annual delta indices) as well as disturbance metrics such as time since last disturbance. To help overcome the relative insensitivity to canopy structure that limits Landsat data, particularly in high biomass forests, the global forest canopy height product derived from ICESAT/GLAS spaceborne lidar and Shuttle Radar Topography Mission (SRTM) data was included as a predictor. Also included as additional predictors were climate metrics calculated from 30-year (1960-1990) climate normals, to better capture the huge, topographically-driven environmental gradients that exist across the northwestern USA. To verify our AGB maps for carbon monitoring, reporting and verification (MRV), we aggregated the mapped annual biomass predictions to the county level and compare them to annual county-level biomass summarized independently from systematic, field-based, annual inventories conducted by the US Forest Inventory and Analysis (FIA) Program nationally. National-scale forest cover maps generated independently from PALSAR data at 25-m resolution were used to define forested areas for the AGB aggregations. The unbiased AGB estimates based on FIA data were approximately 70% of our own AGB estimates that had been based on a biased sample. Therefore, we applied a simple linear bias correction to the 2000-2016 AGB maps, which have been submitted to the NASA Oak Ridge National Lab (ORNL) Distributed Active Archive Center (DAAC) for public consumption. Our plan for future research is to integrate AGB estimates sampled with ICESAT-2 and GEDI spaceborne lidar systems into our Carbon Monitoring System, which like Landsat data will be globally available.

KEYNOTE 4



Clara Yono Yatini

Space Science Center, LAPAN, Indonesia

Yatini received her BS from Bandung Institute of Technology and MS from Tohoku University Japan from the Department of Astronomy, specializing in Solar Physics. She joined the National Institute of Aeronautics and Space (LAPAN) Indonesia since 1990 and began to conduct research on the Solar Physics. She has served as the Head of the Sun and Space Division, and Geo and Space Magnetism Division afterwards. She currently serves as the Director of the Space Science Center. Research on space weather and its impact has been conducted more intensively, and since 2010 along with colleagues at the Space Science Center began to develop a space weather information system named SWIFtS (Space Weather Information and Forecast Services). Recently she regularly participated in the UN meeting as a member of the Indonesian delegation at UNCOPUOS (United Nations Committee on Peaceful Uses of Outer Space).

Space Weather Information and Forecast Services in South East Asia Region

ABSTRACT

Along with the increased awareness to the impact of space weather towards the space-based technology, the information services regarding space weather, including the forecast, is indispensable. The space weather covering the condition between the Sun and the Earth. The solar activity is a phenomenon that can be predicted to mitigate the impacts. The solar activities that have to be predicted among others are the flare(s) occurrence, coronal mass ejections, and also coronal holes. A few models of solar activities have been developed to give predictions. The condition of magnetosphere can be observed by doing ground-based observation using the magnetometer. These observations can show the index of geomagnetic disturbance which is utilized to give information regarding the interference to the earth magnetic field and the possible impact to the ionosphere. Ionosphere observation uses equipment such as ionosonde, GISTM, etc, are integrated to perceive the condition of the ionosphere and its impacts on HF radio communication and navigation. By combining the observations and the models used, therefore space weather service and forecast facility called SWIFtS has been built. SWIFtS gives information and daily outer space forecast, and has been standardized by ISO 9001-2015.

INVITED SPEAKER



Prof. Ir. Dr. Sharul Kamal Abdul Rahim
Wireless Communication Centre (WCC),
Faculty of Electrical Engineering, Universiti Teknologi Malaysia

5G Beamforming Network for Future Communication System

ABSTRACT

The presentation starts by providing an evaluation briefing of wireless mobile communication systems is provided with emphasising on the 5G potential requirements and challenges in terms of data rate and a number of connected devices. In order to meet the 5G requirements, a variety of new technologies are involved such as massive MIMO, beamforming and novel modulation and coding schemes. In addition, millimetre wave is the potential frequency band for 5G communications, however shorter waves are more prone to attenuation due to rain, and hence a large antenna array is needed to overcome this problem. The presentation focuses on beamforming technology and mainly antenna design in beamforming application and networks. Beamforming can be classified into two main categories namely adaptive and switched beamforming. Adaptive beamforming schemes can change the beamforming pattern dynamically to enhance the reception of the desired signal while mitigating the interference signal. While in switched beamforming approach, the beam pattern is changed according to the received signal. Switched beamforming involves Butler matrix to increase the system capacity and provides a higher signal to interference ratio, consequently enhancing the overall system performance. Butler matrix has the following advantages namely Simple and easy to fabricate, require few microwave components and generate narrow, highly directive and orthogonal beams.

INVITED SPEAKER



Assoc. Prof. Ir. Ts. Dr. Mohamed Thariq Haji Hameed Sultan
Department of Aerospace Engineering, Faculty of Engineering
Universiti Putra Malaysia

A Review on High Velocity Impact of Composite Laminates

ABSTRACT

Impact event is one of the commonly-causes damages in composites structures. Studies on low and high velocity impact of composites had been the researchers' attention since the last few decades due to their importance in analysing damages and failure in structures. Compared to low velocity impact, studies on high velocity impact of composites are less reported. This review will discuss on the high velocity impact studies on composite laminates in a different point of view, such as experimental, analytical and modelling works reported to date. High velocity impact properties of materials can be the preliminary studies to the hypervelocity impact, which applied on the objects in space, such as meteorite and other debris, due to no gravitational force. Therefore this review can show the gap in high velocity impact studies of composites to enhance the potential of composites and move forward in using composite laminates in aerospace applications, such as parts of spacecraft and satellite.

INVITED SPEAKER



Prof. Dr. Md. Shabiul Islam, MIEEE

Faculty of Engineering (FOE), Multimedia University (MMU)

**Design and Simulation of Piezoelectric Cantilever Beam Based on
Mechanical Vibration for Energy Harvesting Application**

ABSTRACT

This research work presents the design and simulation of a piezoelectric cantilever beam for energy harvesting using mechanical ambient vibration. Ambient vibration energy used by the developed piezoelectric cantilever beam can be converted into electrical energy using piezoelectric effect as a piezoelectric energy harvester. The piezoelectric cantilever beam consisted of a copper substrate, two piezoelectric layers, and a base. The two piezoelectric layers were placed at the top and bottom faces of the copper substrate. The 3D design of the beam was performed by using SolidWorks. The simulation of the piezoelectric harvester was performed by COMSOL Multiphysics where Finite Element Method (FEM) was used. During the analysis, mechanical and electrical properties of the energy harvester were analysed. In the mechanical properties analysis, maximum vertical displacement of $70.9\text{ }\mu\text{m}$ and maximum stress of $7.96 \times 10^5\text{ N/m}^2$ were obtained at the resonant frequency of 345.75 Hz . The maximum output power of $14.85\text{ }\mu\text{W}$ and voltage of 595.5 mV was obtained from the harvester at $12.6\text{ k}\Omega$ under the acceleration of 1 g ($g = 9.81\text{ m/s}^2$) at the resonant frequency of 345.75 Hz . This energy harvester can be used for numerous purpose in the field of sensors and wireless sensor networks.

CONFERENCE SCHEDULE

Date	Time	Event	Venue
27 July 2019 Saturday	8.30 pm – 10.00 pm	Registration	Library
28 July 2019 Sunday	7.30 am – 8.45 am	Registration	Library
	8.45 am – 9.00 am	Opening and Welcoming Remarks Professor Dr. Mohd. Nizam Mohd. Said Director of Institute of Climate Change (IPi)	Dewan Inderaputra
	9.00 am – 9.45 am	Keynote 1 : CubeSat Interface Standardization for Fast Delivery and Mass Production Professor Dr. Mengu Cho <i>Kyushu Institute of Technology (Kyutech), Japan</i> Chair: Dr. Norsuzlin Mohd Sahar	
	9.45 am – 10.30 am	Keynote 2 : Prospects of Earth Observation Systems for Sustainable Development Goals (SDGs) Professor Dr. Mazlan Hashim <i>Research Institute of Sustainable Environment, Universiti Teknologi Malaysia (UTM)</i> Chair: Dr. Norsuzlin Mohd Sahar	
	10.30 am – 11.00 am	Group Photo and Tea Break	
	11.00 am – 1.00 pm	Session 1 - AMS 1 Chair : Dr. Nurul Shazana Abdul Hamid	Dewan Inderaputra
		Session 1 - GRS Chair : Prof. Dr. Yoshihide Yamada	Maharaja
		Session 1 - SCT 1 Invited 1 : 5G Beamforming Network for Future Communication System <i>Prof. Ir. Dr. Sharul Kamal Abdul Rahim, UTM</i> Chair : Dr. Mohd Fais Mansor	Maharani
	1.00 pm – 2.15 pm	Lunch	Gleneagles

	2.15 pm – 4.00 pm	Session 2 - AMS 2 Chair : Dr. Teh Wai Leong	Dewan Inderaputra
		Session 2 - O 1 Invited 2 : A Review on High Velocity Impact of Composite Laminates <i>Assoc. Prof. Ir. Ts. Dr. Mohamed Thariq Haji Hameed Sultan, UPM</i> Chair : Assoc. Prof. Dr. Gan Kok Beng	Maharaja
		Session 2 - AA Chair : Dr. Nur Adlyka Ainul Anuar	Maharani
	4.00 pm – 4.30 pm	Tea Break	
	8.00 pm – 10.30 pm	Conference Dinner	Ramayana
Date	Time	Event	Venue
29 July 2019 Monday	9.00 am – 9.45 am	Keynote 3 : Mapping Forest Aboveground Biomass Annually (2000-2016) from Landsat Time Series Dr. Andrew Thomas Hudak <i>United States Department of Agriculture (USDA) Forest Service, USA</i> Chair : Dr. Wan Shafrina Wan Mohd Jaafar	Dewan Inderaputra
	9.45 am – 10.30 am	Keynote 4 : Space Weather Information and Forecast Services in South East Asia Region Mrs. Clara Yono Yatini <i>Space Science Center, LAPAN, Indonesia</i> Chair : Dr. Wan Shafrina Wan Mohd Jaafar	
	10.30 am – 10.45 am	Tea Break	
	10.45 am – 12.45 pm	Session 3 - AMS 3 & O 2 Chair : Prof. Dr. Omotosho Temidayo Victor	Maharaja
		Session 3 - SCT 2 Invited 3 : Design and Simulation of Piezoelectric Cantilever Beam Based on Mechanical Vibration for Energy Harvesting Application <i>Prof. Dr. Md. Shabiul Islam , MMU</i> Chair : Prof. Ir. Dr. Mandeep Singh Jit Singh	Maharani

	12.45 pm – 2.00 pm	Lunch	Gleneagles
	2.00 pm – 4.00 pm	Session 4 – AMS 4 Chair : Dr. Ernest Macalalad	Maharaja
		Session 4 – ISS & O 3 Chair : Assoc. Prof. Ir. Dr. Norhana Arsad	Maharani
	4.00 pm – 4.30 pm	Tea Break	
Date	Time	Event	Venue
30 July 2019 Tuesday	9.00 am – 12.00 pm	Technical Committee Meeting	
End of Conference			

Acronym	Track
AA	Astrophysics and Astronomy
AMS 1	Atmospheric and Magnetospheric Sciences 1
AMS 2	Atmospheric and Magnetospheric Sciences 2
AMS 3	Atmospheric and Magnetospheric Sciences 3
AMS 4	Atmospheric and Magnetospheric Sciences 4
GRS	Geosciences and Remote Sensing
ISS	Interdisciplinary Space Sciences
O 1	Others 1
O 2	Others 2
O 3	Others 3
SCT 1	Satellite and Communication Technology 1
SCT 2	Satellite and Communication Technology 2

TECHNICAL PROGRAMME

Sunday, 28 July 2019

**SESSION 1 : Atmospheric and Magnetospheric Sciences
(AMS 1)**

Venue : Dewan Inderaputra
Session Chair : Dr. Nurul Shazana Abdul Hamid
Time : 11.00 am – 1.00 pm

S1-AMS1.1	Hourly Variation of Gaseous Attenuation at A Tropical Location in 2013 <i>Temidayo Victor Omotosho, Iyanuoluwa Ogunrinola, Sayo A Akinwumi, Moses Emetere and Williams Ayara (Covenant University, Nigeria)</i>
S1-AMS1.2	Impact of Tropospheric Scintillation Models on Earth-Space Paths in Southwest, Nigeria <i>Temidayo Victor Omotosho, Sayo A Akinwumi, Iyanuoluwa Ogunrinola, Moses Emetere, Mojisola Usikalu (Covenant University, Nigeria), Oluwafumilayo Ometan, and Mustapha Adewusi (Lagos State University, Nigeria)</i>
S1-AMS1.3	Dependency of the Ionospheric Storm on the Local Time of Storm Onset in the Southeast Asia Sector <i>Teh Wai Leong (Universiti Kebangsaan Malaysia, Malaysia) and Wei-Sheng Chen (National Central University, Taiwan)</i>
S1-AMS1.4	Daytime Low and Middle Latitudes Plasma Density Enhancements Observed by Swarm Constellation During the 7-8 September 2017 Geomagnetic Storm <i>Ruoxiao Liu and Yuhua Zou (Guilin University of Electronic Technology, China)</i>
S1-AMS1.5	Seeding Effect on the Spread F Generation in the American Region <i>Abimbola Afolayan, Mandeep Singh and Mardina Abdullah (Universiti Kebangsaan Malaysia, Malaysia)</i>
S1-AMS1.6	Ionospheric Perturbation : A Review of Equatorial Plasma Bubble in the Ionosphere <i>Mohd Hezri Mokhtar, Muhammad Yusof Ismail, Nurliyana Abdul Rahim (Universiti Tun Hussein Onn Malaysia, Malaysia) and Suhaila M Buhari (Universiti Teknologi Malaysia, Malaysia)</i>
S1-AMS1.7	Characteristic of Low Midlatitude GPS Ionospheric Scintillations Over Australia and Niue <i>Lumei Wang and Yuhua Zou (Guilin University of Electronic Technology, China)</i>

Sunday, 28 July 2019

SESSION 1 : Geosciences and Remote Sensing (GRS)

Venue : Maharaja

Session Chair : Prof. Dr. Yoshihide Yamada

Time : 11.00 am – 1.00 pm

S1-GRS.1	<p>A Cross-Sensor Based Approach to Estimate Depth Values in Nearshore Coastal Waters, Case Study Nayband Bay, Persian Gulf <i>Keivan Kabiri (Iranian National Institute for Oceanography and Atmospheric Science (INIOAS), Iran</i></p>
S1-GRS.2	<p>Copernicus Sentinel Missions for Water Resources <i>Mario Angelo Gomasasca, Claudia Giardino, Mariano Bresciani, Giacomo De Carolis (CNR-IREA, Italy), Constantin Sandu (ITHACA, Italy), Fabio Giulio Tonolo (Politecnico di Torino, Italy) and Enrico Borgogno Mondino (University of Torino, Italy)</i></p>
S1-GRS.3	<p>Applications of Drones in Emerging Economies: A Case Study of Malaysia <i>Aziz Rahman, Wan Shafrina Wan Mohd Jaafar, Khairul Nizam Abdul Maulud (Universiti Kebangsaan Malaysia, Malaysia), Norzailawati Mohd Noor (International Islamic University Malaysia, Malaysia), Nik Norasma Che'Ya (Universiti Putra Malaysia, UPM), Midhun Mohan(NCSU, USA), Carlos Alberto Silva (University of Maryland, USA) and Adrian Cardil (University of Lleida, Spain)</i></p>
S1-GRS.4	<p>Enhancement of the Tomo-SAR Images Based on Compressive Sensing Method <i>Seyed Alireza Khoshnevis (University of South Florida, USA) and Seyed Ghorshi (The University of Texas at Tyler, USA)</i></p>
S1-GRS.5	<p>A Model to Detect Forest Change Relating to Mining Using Google Earth Engine Application in Belitung Island, Indonesia <i>Ratiranjan Jena and Biswajeet Pradhan (University of Technology Sydney, Australia)</i></p>
S1-GRS.6	<p>Earthquake Vulnerability Assessment Using Expert-based Approach in GIS <i>Ratiranjan Jena and Biswajeet Pradhan (University of Technology Sydney, Australia)</i></p>
S1-GRS.7	<p>Circularly-Polarized Four Element Array Antenna at 1.27 GHz for Low Cost Remote Sensing <i>Norsuzlin Bt Mohd Sahar, Mohammad Tariqul Islam (Universiti Kebangsaan Malaysia, Malaysia), Taher Khalifa and Nurulazlina Ramli (SEGi University Kota Damansara, Malaysia)</i></p>

Sunday, 28 July 2019

SESSION 1 : Satellite and Communication Technology (SCT 1)

Venue : Maharani

Session Chair : Dr. Mohd Fais Mansor

Time : 11.00 am – 1.00 pm

S1-SCT1.1	The Effect of Contaminated Channel in Vector Tracking Loop for Position Estimation <i>Syed Mohd Fairuz Syed Mohd Dardin, Akram Abdul Azid, Zuhairi Abdul Rashid, Anis Shahida Mokhtar and Latifah Sarah Sufian (Universiti Pertahanan Nasional Malaysia, Malaysia)</i>
S1-SCT1.2	On Capacity and Error Performance of DVB-S2X System over Rician Fading Channel <i>Sumaya Dhari Awad, Aduwati Sali, Raja Syamsul Azmir Raja Abdullah (Universiti Putra Malaysia, Malaysia), Ali M. Al-Saegh (Al-Ma'moon University College, Iran), and Mandeep Singh (Universiti Kebangsaan Malaysia, Malaysia)</i>
S1-SCT1.3	Evaluation of Ground Sensor Terminal (GST) Transceiver System for UITSAT-1 Store & Forward Mission <i>S. A. Enche Ab Rahim, M. F. Sapuri, S. M. A. Syaikh Abdullah, M. A. F. Megat Khairuddin, F. S. Suhaimi, I. Mohd Rafiee, S. N. K. Mustafa, S. N. Mohamad Rahim, M. N. Muhamad Zamil, M. H. Azami, and M. H. Jusoh (Universiti Teknologi MARA, Malaysia)</i>
S1-SCT1.4	A Metamaterial-Based Dual-Band Frequency Selective Surface Using Composite Material <i>Lay Hwa Tan, Amirjan Nawabjan, Liang Yun Ying and Sharul Kamal Abdul Rahim</i>
S1-SCT1.5	Koch Fractal Loop Circular Polarization (CP) Antenna Integrated with Solar Cells <i>Omar Al-Obaidi, Md. Akhtaruzzaman Akhtaruzzaman, Vidhya Selvanathan and Nowshad Amin</i>
S1-SCT1.6	A New Split Pitch Square Shape Metamaterial Absorber for X Band Application <i>Ahasanul Hoque, Mohammad Tariqul Islam, Mandeep Singh, Kamarulzaman Mat (Universiti Kebangsaan Malaysia, Malaysia), Mengu Cho (Kyushu Institute of Technology, Japan) and Rezaul Azim (University of Chittagong, Bangladesh)</i>
S1-SCT1.7	Invited 1 : 5G Beamforming Network for Future Communication System <i>Sharul Kamal Abdul Rahim (Universiti Teknologi Malaysia, Malaysia)</i>

Sunday, 28 July 2019

SESSION 2 : Atmospheric and Magnetospheric Sciences (AMS 2)

Venue : Dewan Inderaputra

Session Chair : Dr. Teh Wai Leong

Time : 2.15 pm – 4.00 pm

S2-AMS2.1	Rainfall Attenuation Measurement at Ota, a Tropical Location <i>Temidayo Victor Omotosho, Oluwafumilayo Ometan, Adenike Boyo, Moses Emetere (Covenant University, Nigeria), Mustapha Adewusi and Sayo A Akinwumi (Lagos State University, Nigeria)</i>
S2-AMS2.2	Modeling of Cloud Attenuation on Earth - Space Path in Ota Southwest Nigeria <i>Temidayo Victor Omotosho, Mustapha Adewusi, Akinyemi Lola, Moses Emetere Covenant University, Nigeria), Sayo A Akinwumi and Oluwafumilayo Ometan (Lagos State University, Nigeria)</i>
S2-AMS2.3	Meridional Direction Features of Low-Latitude Plasma Depletions in the 90°-150°E Sector Observed by the Swarm Satellites <i>Shihan Zhang and Yuhua Zou (Guilin University of Electronic Technology, China)</i>
S2-AMS2.4	Features of the Manifestation of the Winter Anomaly over the Mid-Latitude Ionospheric Station <i>Olga Maltseva (Southern Federal University Russia), Feza Arian (Hacettepe University, Turkey), Galina Gordiyenko and Artur Yakovets (National Center for Space Research and Technology, Kazakhstan)</i>
S2-AMS2.5	Preliminary Results on Favorable Conditions for Electron Heating and Acceleration During Magnetic Reconnection <i>Nurumira Abdul Wahab and Teh Wai Leong (Universiti Kebangsaan Malaysia, Malaysia)</i>
S2-AMS2.6	Observation of Low-Latitude Ionospheric Irregularities Using Rate of Change of Total Electron Content over the Philippine Sector <i>Kyle Ezekiel S. Juadines, Ernest Macalalad and Merlin M Mendoza (Mapúa University, Philippines)</i>

Sunday, 28 July 2019

SESSION 2 : Others (O 1)

Venue : Maharaja

Session Chair : Assoc. Prof. Dr. Gan Kok Beng

Time : 2.15 pm – 4.00 pm

S2-O1.1	Chemical Diagnostics of the Massive Star-Forming Cloud G33.92+0.11 <i>Young Chol Minh (Korea Astronomy and Space Science Institute, South Korea)</i>
S2-O1.2	A Compact Dual Band LC Resonator Loaded Metamaterial Inspired Antenna for 5G Wireless Communication <i>Md Mushfiqur Rahman, Shabiul Islam, Hin Yong Wong, Lee Lini (Multimedia University, Malaysia) and Mohammad Tariqul Islam (Universiti Kebangsaan Malaysia, Malaysia)</i>
S2-O1.3	A Flexible UWB Antenna for Wearable Technologies Application <i>Nur Fatimah Amir, Muzammil Jusoh, Muammar Mohamad Isa, Thennarasan Sabapathy, Samir Salem Al-Bawri (, Mohamed Nasrun Osman and Mohd Najib Yasin (Universiti Malaysia Perlis, Malaysia)</i>
S2-O1.4	Air Pollution Assessment : A Preliminary Study Towards Citing Industry <i>Moses Emetere, Samuel Sanni, Emeka Okoro, Temidayo Victor Omotosho, Gideon Adewale Adeyemi and Esther Akinlabi (Covenant University, Nigeria)</i>
S2-O1.5	Adaptation of Automatic Concentrated Pillar in Coastal Tropic Region <i>Moses Emetere and Temidayo Victor Omotosho (Covenant University, Nigeria)</i>
S2-O1.6	Invited 2 : A Review on High Velocity Impact of Composite Laminates <i>Mohamed Thariq Haji Hameed Sultan (Universiti Putra Malaysia, Malaysia)</i>

Sunday, 28 July 2019

SESSION 2 : Astrophysics and Astronomy (AA)

Venue : Maharani

Session Chair : Dr. Nur Adlyka Ainul Anuar

Time : 2.15 pm – 4.00 pm

S2-AA.1	An Introduction to the Semi-Automatic Lulin Wide-Field Telescope <i>Chow-Choong Ngeow, Jian-Fong Huang, Hung-Chin Lin, Chi-Sheng Lin, Hsiang-Yao Hsiao (National Central University, Taiwan) and Ting-Chang Yang (Academia Sinica, Taiwan)</i>
S2-AA.2	Black Hole Mass Estimation: Modelling the Biases <i>Suk Yee Yong and Rachel Webster (University of Melbourne, Australia)</i>
S2-AA.3	Comparing the New Moon Visibility Criteria for International Islamic Calendar Concept <i>Othman Zainon, Hamdun Ridwan Ali and Mohd Fauzi Abu@Hussin (Universiti Teknologi Malaysia, Malaysia)</i>
S2-AA.4	Debunking Flat Earth: From Geomatics Perspective <i>Faiz Arif, Abdul Aziz Ab Rahman, Khairul Nizam Abdul Maulud (Universiti Kebangsaan Malaysia, Malaysia) and Amir Kamaludin (Universiti Teknologi Malaysia, Malaysia)</i>
S2-AA.5	X-ray Sources Population in NGC 1559 <i>Nurnabilah Nazri and Nur Adlyka Ainul Annuar (Universiti Kebangsaan Malaysia, Malaysia)</i>
S2-AA.6	Urban Night Sky Conditions Determination Method Based on A Low Resolution All-Sky Images <i>Mohammad Afiq Dzuan Mohd Azhar, Nurul Shazana Abdul Hamid, Wan Mohd Aimran Wan Mohd Kamil and Nor Sakinah Mohamad (Universiti Teknologi Malaysia, Malaysia)</i>
S2-AA.7	Using Interactive Applet to Support Collaborative Learning of the Hertzsprung-Russell Diagram <i>Wan Mohd Aimran Wan Mohd Kamil, Nurul Shazana Abdul Hamid (Universiti Kebangsaan Malaysia, Malaysia) , Marlia Puteh, Nurhasmiza Sazalli, Lilie Zahara Ramly, Ayu Rita Mohamad, Othman Zainon, Nilam Nur Amir Sjarif, Mohd S Shamsir (Universiti Teknologi Malaysia Malaysia), Effie Lai-Chong Law , Nigel Bannister and Matthias Heintz (University of Leicester, UK)</i>

Monday, 29 July 2019

SESSION 3 : Atmospheric and Magnetospheric Sciences (AMS 3) & Others (O 2)

Venue : Maharaja

Session Chair : Prof. Dr. Omotosho Temidayo Victor

Time : 10.45 am – 12.45 pm

S3-AMS3-O2.1	Outdoor Air Pollution in Kumbo Cameroun <i>Moses Emetere, Temidayo Victor Omotosho and Temitayo Oladimeji (Covenant University, Nigeria)</i>
S3-AMS3-O2.2	Proposed Model for the Estimation of Rain Attenuation: At Ku-Band at Ota, a Tropical Location <i>Temidayo Victor Omotosho, Oluwafumilayo Ometan, Adenike Boyo (Covenant University, Nigeria), Mustapha Adewusi, Sayo A Akinwumi and Moses Emetere (Lagos State University, Nigeria)</i>
S3-AMS3-O2.3	Daytime Midlatitude Plasma Depletions Triggered by the Launch of a Falcon 9 Rocket on 7 September 2017 <i>Angang Tian, Yuhua Zou (Guilin University of Electronic Technology, China)</i>
S3-AMS3-O2.4	Analysis of the Ionospheric Total Electron Content During the Series of September 2017 Solar Flares over the Philippine - Taiwan Region <i>Merlin M Mendoza, Ernest Macalalad and Kyle Ezekiel S. Juadines (Mapúa University, Philippines)</i>
S3-AMS3-O2.5	A Method in Determining Ionospheric Total Electron Content Using GNSS Data for non-IGS Receiver Stations <i>Merlin M Mendoza, Ernest Macalalad, Kyle Ezekiel S. Juadines (Mapúa University, Philippines) and Tung - Yuan Hsiao (National Tsing Hua University, Taiwan)</i>
S3-AMS3-O2.6	The Observation of Ionospheric Large-Scale Wave Structure in Southeast Asia : Large-Scale Wave Structure <i>Yu Yi Liow, Suhaila M Buhari, Tajul Ariffin Musa (Universiti Teknologi Malaysia, Malaysia), Mardina Abdullah (Universiti Kebangsaan Malaysia, Malaysia) and Tulasi Ram (Indian Institute of Geomagnetism, India)</i>
S3-AMS3-O2.7	Preliminary Result of Seismic Response Prior to Mw 9.0 of Tohoku Earthquake in Japan <i>Amirul Mustaqim Azman, Mardina Abdullah, Siti Aminah Bahari, Muhammad Khairul Adib Muhammad Yusof (Universiti Kebangsaan Malaysia, Malaysia) and Noor Sheena Herayani Harith (Universiti Malaysia Sabah, Malaysia)</i>

Monday, 29 July 2019

SESSION 3 : Satellite and Communication Technology (SCT 2)

Venue : Maharani

Session Chair : Prof. Ir. Dr. Mandeep Singh Jit Singh

Time : 10.45 am – 12.45 pm

S3-SCT2.1	Optically Reconfigurable Gate Array with a Triple Modular Redundancy <i>Toru Yoshinaga and Minoru Watanabe (Shizuoka University, Japan)</i>
S3-SCT2.2	Development of Software Defined Radio - Based Satellite Telemetry and Telecommand System in Virtual Instrumentation Environment <i>Calvin Artemies Hilario, Mar Francis De Guzman, Alvin Retamar and Joel Joseph Jr. S. Marciano (University of the Philippines – Diliman, Philippines)</i>
S3-SCT2.3	Reflector Surface Shaping Method for a Cassegrain Antenna <i>Kamelia Quzwain, Yoshihide Yamada, Kamilia Kamardin (Universiti Teknologi Malaysia, Malaysia), Nurul Huda Abd Rahman (Universiti Teknologi MARA, Malaysia) and Nguyen Quoc Dinh (Le Quy Don Technical University, Vietnam)</i>
S3-SCT2.4	Housekeeping Data Analysis of UiTMSAT-1 Nano-satellite by Observation from UiTM Ground Station <i>M. H. Azami, S. B. M. Zaki, S. N. K. Mustafa, BIRDS-2 Project Members, S. A. Enche Ab Rahim, M. H. Jusoh (Universiti Teknologi MARA, Malaysia)</i>
S3-SCT2.5	Flexible CPW Fed Antenna with Organic Substrate for WLAN Applications <i>Liang Yun Ying, Sharul Kamal Abdul Rahim, Amirjan Nawabjan and Lay Hwa Tan</i>
S3-SCT2.6	Invited 3 : Design and Simulation of Piezoelectric Cantilever Beam Based on Mechanical Vibration for Energy Harvesting Application <i>Md. Shabiul Islam (Multimedia University, Malaysia)</i>

Monday, 29 July 2019

**SESSION 4 : Atmospheric and Magnetospheric Sciences
(AMS 4)**

Venue : Maharaja
Session Chair : Dr. Ernest Macalalad
Time : 2.00 pm – 4.00 pm

S4-AMS4.1	Threats of Recent Urban Air Pollution in Dakar-Senegal <i>Moses Emetere and Temidayo Victor Omotosho (Covenant University, Nigeria)</i>
S4-AMS4.2	Parametric Investigation of Air Pollution over Bafata <i>Moses Emetere, Temidayo Victor Omotosho and Aderemi A. Atayero (Covenant University, Nigeria)</i>
S4-AMS4.3	Angle of Arrival Study of Atmospheric High Frequency Radar Echoes <i>Toralf Renkowitz (University of Applied Sciences, Germany) and Ralph Latteck (Rostock University, Germany)</i>
S4-AMS4.4	Variation of GNSS-derived Precipitable Water Vapor over Manila in 2017 <i>Ernest Macalalad (Mapúa University, Philippines) and Rhonalyn V Macalalad (Philippine Atmospheric, Geophysical and Astronomical Services Administration, Philippines)</i>
S4-AMS4.5	Environmental Monitoring Using CanSat <i>Yousuf M Faroukh, Aisha AL-Ali, Anas Adwan, Ali Alhammadi, Ameer Faroukh, Muhammad Shaikh and Ilias Fernini (University of Sharjah, United Arab Emirates)</i>
S4-AMS4.6	Longitudinal Variability Study of Ionospheric Ranging Errors Around 20 N Geomagnetic Latitude <i>Abdollah Darya, Muhammad Shaikh and Ilias Fernini (Sharjah Center for Astronomy and Space Science, United Arab Emirates)</i>

Monday, 29 July 2019

**SESSION 4 : Interdisciplinary Space Sciences (ISS) & Others
(O 3)**

Venue : Maharani
Session Chair : Assoc. Prof. Ir. Dr. Norhana Arsad
Time : 2.00 pm – 4.00 pm

S4-ISS-O3.1	Smart Control Helicopter Competition as a STEM Outreach Program for Schools in Malaysia <i>Sabirin Abdullah, Kok Beng Gan, Mardina Abdullah, Lilia Halim, Roslinda Rosli, Nurul Hair, Roszaini Roslan, Noridawaty Mat Daud, Mohd Azlan Shah Jaafar (Universiti Kebangsaan Malaysia, Malaysia) and Norisza Dalila Ismail (Politeknik Banting, Malaysia).</i>
S4-ISS-O3.2	Exploring Space Science Through the UKM-SIDπ Outreach Program <i>Roslinda Rosli, Mardina Abdullah, Nur Choiro Siregar, Nurul Shazana Abdul Hamid, Sabirin Abdullah, Kok Beng Gan, Lilia Halim, Noridawaty Mat Daud, Siti Aminah Bahari, Rosadah Abd Majid and Badariah Bais (Universiti Kebangsaan Malaysia, Malaysia)</i>
S4-ISS-O3.3	Using Space Science as a Tool to Promote STEM Education to High School Students in Malaysia <i>Kuhan Chandru, Norsuzlin Mohd Sahar, Afifuddin Husairi Hussain, Zurina Mahadi and Wardah Mustafa Din (Universiti Kebangsaan Malaysia, Malaysia)</i>
S4-ISS-O3.4	The Use of Raspberry Pi and High Resolution Sound Card for Very Low Frequency Signal Detection <i>Kok Beng Gan, Mardina Abdullah, Syahril Amir Mohd and Sabirin Abdullah (Universiti Kebangsaan Malaysia, Malaysia)</i>
S4-ISS-O3.5	Integration of NiO Layer as Hole Transport Material in Perovskite Solar Cells <i>Abul Kalam Mahmud Hasan, Mohammad Jamal, Md Akhtaruzzaman, Nowshad Amin, Kamaruzzaman Sopian, Halina Misran, Nilofar Asim, Nurhafiza Kamaruddin, Omar Alobaidi, Yasuaki Ishikawa and Itaru Raifuku</i>
S4-ISS-O3.6	Investigating the Impact of Deposition Power on PVD Growth WS₂ for Solar Cell Application <i>Md Khan Sobayel Bin Rafiq, Nurhafiza Kamaruddin, A Ayob, Md. Akhtaruzzaman Akhtaruzzaman and Nowshad Amin</i>

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ACKNOWLEDGEMENTS

IEEE Young Professionals (YP), Malaysia

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Faculty of Engineering and Built Environment,
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