IEEE Malaysia Distinguished Lecturer Program (MyDLP)

1.0 Information on MyDLP program

IEEE Malaysia Distinguished Lecturer Program (MyDLP) is a new program initiated in 2018 as a platform to recognize IEEE members (both professionals from the industry and academicians) for their technical expertise. IEEE Malaysia provides this platform for sharing of knowledge on advanced and new topics by members for members.

Each MyDLP speaker is appointed for a period of two years and is required minimum three lectures on the proposed topics within two years. IEEE Malaysia Section and the partner IEEE Malaysia Technical Chapter will provide financial support to conduct the MyDLP talks at the host universities. List of MyDLP lecturers will be advertised in a special portal in IEEE Malaysia website and in the quarterly newsletters.

2.0 Inviting MyDLP speakers to your event

Active IEEE Student Branches in collaboration with IEEE Malaysia technical chapter(s) are given priority in inviting the speakers. MyDLP Speakers Invitation can be submitted using the form available at {provide link to application form}.

IEEE Malaysia Section will support the travel and accommodation expenses for the DLP speaker up to a maximum of RM1000 per MyDLP talk. The partnering IEEE Malaysia Technical Chapter will support the additional expenses at the host universities, including local arrangements, expenses for volunteers, promotional activities, F&B expenses, etc.

It is expected that at the beginning of every MyDLP talk, 15-20 minutes will be allocated to introduce and promote IEEE Malaysia. An IEEE membership booth should also be setup and manned by the student branch volunteers.

3.0 MyDLP Speakers for 2019-2020

Based on the number of proposal submitted at the end of 2018, Malaysia Section has decided to appoint the following distinguished panel as the first group of MyDLP Speakers under this program.

 Mohammed Rawidean Mohd Kassim Senior member MIMOS Bhd dean@mimos.my	Mohamed Rawidean Mohd Kassim has worked for more than 30 years in MIMOS (Malaysian Institute of Microelectronic Systems), the Ministry of Science, Technology and Innovation Malaysia. MIMOS is the government applied and industrial R&D arm in IT and microelectronics. He joined MIMOS as a Research Fellow and now is the R&D Manager in the Technology Deployment department. His research interest area are Wireless Sensor Network (WSN), Internet of Things (IoT), Real-Time Systems and Multimedia. He has participated in more than 30 national and international R&D projects as a team member, or leader on technical and management positions. Mohamed Rawidean is an IEEE Senior Member. He was the IEEE Computer Society Malaysia Chapter Chair from 2002 to 2013. He has eight patents registered under his name, mostly in wireless sensors, networks and sensor applications. He received his B.Sc. (Hons) degree in the Computer Sciences (1987) from National University of Malaysia, and his M.Sc. in Interacting Systems Design (1993) from Loughborough University of Technology, United Kingdom. He obtained his Six Sigma Black Belt in 2009 from Motorola University. Lecture #1: Applications of WSN in Agricultural Environment Monitoring Systems Lecture #2: A 7-Level Smart Home Systems for XY Generations
 Prof Dr Saad Mekhilef Senior Member Universiti Malaya saad@um.edu.my / mekhilef@yahoo.com	Saad Mekhilef is an IET Fellow and IEEE senior member. He is the associate editor of IEEE Transaction on Power Electronics and Journal of Power Electronics. He is a Professor at the Department of Electrical Engineering, University of Malaya since June 1999. He has been the Head of Department of Electrical Engineering, the Deputy Dean of Postgraduate studies and the Acting Dean for the faculty of Engineering. He is currently the Director of Power Electronics and Renewable Energy Research Laboratory-PEARL- He is the author and coauthor of more than 300 publications in international journals and proceedings (184 ISI journal papers) and 5 books with more than 13000 citations and 57 H-index, 114 Ph.D. and master students have graduated under his supervision. He has 6 patents. Prof. Saad listed by Thomson Reuters (Clarivate Analytics) as one of the Highly Cited (Hi Ci) engineering researcher in the world, and included in the Thomson Reuters' The World's Most Influential Scientific Minds: 2018. Lecture #1: Power Electronic Systems for the Grid Integration of Renewable Energy Sources Lecture #2: Maximum Power Point Tracking (MPPT) Controllers for Photovoltaic (PV) System – current status and future prospects

 Prof Ir Dr Mohd Rizal Arshad Senior member Universiti Sains Malaysia eerizal@usm.my / dr.rizal@gmail.com	Mohd Rizal Arshad graduated from the University of Liverpool, in 1994 with a B.Eng. in the field of Medical Electronics and Instrumentation. He then pursued his MSc. in Electronic Control Engineering at the University of Salford, graduating in Dec. 1995. Following from this, in early 1996, he continued his study with a PhD degree in Electronic Engineering, with specialization in robotic vision system. After completing his PhD training, i.e. January 1999, he started working at the Universiti Sains Malaysia (USM), Malaysia as a full-time academic. He has supervised many postgraduate students at the MSc. and PhD. levels. He has also published actively in local and international publications. He is currently a Full Professor and the Dean of the School of Electrical and Electronic Engineering, USM. He is also an Adjunct Professor at Universiti Malaysia Terengganu (UMT) for a period of two years (2016/2018). He is currently the President of the Malaysian Society for Automatic Control Engineers (MACE) and Chair of the Oceanic Engineering Society (OES) Malaysia Chapter. In early 2017, he was awarded with the Professional Engineer (P.Eng) status by the Board of Engineer, Malaysia (BEM). Prof Rizal is well known as the pioneer of underwater system technology research efforts in Malaysia. Prof Rizal is very interested in investigating the fusion of the natural world with the modern engineering pool of knowledge. Lecture #1: Swarm Robotics - Concepts and Its Potentials Lecture #2: ASV and AUV Robotics Platform Technology: Advancement and Potentials
 Prof Dr Lim Eng Hock Senior Member Universiti Tunku Abdul Rahman limeh@utar.edu.my	Eng Hock Lim (S'05-M'08-SM'14) was born in Malaysia. He received his B. Sc. (electrical engineering) from National Taiwan Ocean University in 1997, M. Eng. (electrical and electronic engineering) from Nanyang Technological University in 2000, and Ph.D. (electronic engineering) from City University of Hong Kong in 2007. Currently, he is a Professor at Universiti Tunku Abdul Rahman, Malaysia. He served as an Associate Editor of the IEEE Transactions on Antennas and Propagation from 2013 to 2016. He is the founding chair of the IEEE Council on RFID, Malaysia Chapter. His current research interests include RFID antennas, reflectarrays, transmitarrays, and multifunctional antennas. Lecture #1: Design of Miniature Metal-Mountable UHF Tag Antennas Lecture #2: Design of Novel Patch-Based Reflectarrays

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MyDLP Speaker: **Mohammed Rawidean Mohd Kassim**, Senior member, MIMOS Bhd
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Lecture #1: Applications of WSN in Agricultural Environment Monitoring Systems

Wireless Sensor Networks (WSN), Cloud computing, Big Data and their convergence with the Internet of Things (IoT) offer vast opportunities to build decision support systems to solve many real-world problems. One of the most interesting fields having an increasing need for decision support systems is agricultural environment applications.
Agricultural environment monitoring has become an important field of control, providing real-time system and control communication with the physical world. An intelligent and smart WSN system can collect and process large amounts of data from the beginning of the monitoring and manage air quality, soil conditions, to weather situations. The proposed system collects and monitors information related to the growth environment of crops outside and inside greenhouses, using WSN sensors and CCTV cameras. The temperature and humidity sensors are developed in-house, and both sensors are very reliable. Furthermore, the system allows automatic control of the greenhouse environment remotely and thus improves the productivity of crops.

Lecture #2: A 7-Level Smart Home Systems for XY Generations

In the past few years, the digital revolution has dramatically increased the function and reduced the cost of consumer devices. This has led to an explosion of new smart devices in the home and office, from digital LED TVs and game systems to environmental controls, smart appliances, and safety and monitoring devices, along with lifestyle, wellness and medical devices. Today, you can easily control your home's mechanical systems and appliances over your cellular phone or Internet, and the lighting in your home can be set to save your money when you leave the room. The Internet of Things provides even more incredible access to information and services.

A 7-Level Model of Smart Home Systems is proposed in this paper. The benefits and advantages of a smart home for various categories of users will be discussed, particularly for XY Generation in this model. A detailed description of each level with examples is given, based on the author's 20 years of knowledge and experience in the design, development and installation of smart-home systems. This model can be further customized and developed for the implementation of an intelligent township or smart city.

MyDLP Speaker: **Prof Dr Saad Mekhilef**, Senior Member, Universiti Malaya
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Lecture #1: Power Electronic Systems for the Grid Integration of Renewable Energy Sources

The increasing number of renewable energy sources and distributed generators requires new strategies for the operation and management of the electricity grid in order to maintain or even to improve the power-supply reliability and quality. In addition, liberalization of the grids leads to new management structures, in which trading of energy and power is becoming increasingly important. The power-electronic technology plays an important role in the distributed generation and the integration of renewable energy sources into the electrical grid, and it is widely used and rapidly expanding as these applications become more integrated with the grid-based systems. During the last few years, power electronics has undergone a fast evolution, which is mainly due to two factors. The first one is the development of fast semiconductor switches that are capable of switching quickly and handling high powers. The second factor is the introduction of real-time computer controllers that can implement advanced and complex control algorithms. These factors together have led to the development of cost-effective and grid-friendly converters. In this lecture, new trends in power electronic technology for the integration of renewable energy sources and energy storage systems will be presented.

Lecture #2: Maximum Power Point Tracking (MPPT) Controllers for Photovoltaic (PV) System – current status and future prospects-

Solar energy is gaining popularity in the field of electricity generation. The advantages of solar power, such as no air pollution, no fuel costs, noiseless, and low maintenance, have boosted the demand for this type of energy. However, the high expense in acquiring the photovoltaic (PV) module has slowed down the adoption of PV system in electricity generation. Furthermore, the power of PV modules is unstable and strongly dependent on solar irradiation, and load. Hence, the maximum power point tracking (MPPT) controller is introduced to ensure the PV system always provide high efficiency despite the variation in solar irradiation and load resistance. Many MPPT algorithms have been introduced to improve the efficiency of the PV system, including fractional open circuit voltage, fractional short circuit current, fuzzy logic, neural network, hill climbing or perturbation and observation (P&O), and incremental conductance. In this lecture, all the MPPT methods will be reviewed, compared and suggestions will be made based on experimental verification done in our laboratory.

MyDLP Speaker: **Prof Ir Dr Mohd Rizal Arshad**, Senior member, Universiti Sains Malaysia
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Lecture #1: Swarm Robotics - Concepts and Its Potentials

The main aim of every research endeavor is ultimately to develop and produce output which will add benefit to human life; either by helping, simplifying, optimizing or even replacing human tasks. Robotic is one of the examples which have been widely used to assist human in solving different types of tasks. However, a traditional robotic system either manually control or autonomously control has many technical limitations such as high structural complexity, low level of fault tolerance and constrained by the limited task performing capabilities. As a result, many complex tasks are out-of-reach and in most cases failed to be executed especially in large and unstructured workspaces. To overcome these limitations, a new approach in robotic research called swarm robotics has been actively researched over the last few decades. A basic principle of the swarm robotics tasks development is to mimic robustness, scalability, and flexibility of some types of insects and animals. The research into swarm robotics has grown significantly since its infancy. In swarm robotics, some tasks can be considered as fundamental tasks while other tasks are the one that correlated to the fundamental tasks. In this presentation, the tasks are categorized into two major types: low-level tasks and high-level tasks. The low-level tasks include aggregation, dispersion, self-assembly and self-reconfigurable, pattern formation and flocking, robot-environment interaction, task allocation and learning. The high-level tasks include collective source searching, collective mapping, collective foraging, collective transport, collective manipulation and collective tracking. High-level tasks are discussed in terms of related skills and methods. A number of swarm robotics hardware and software platforms will also be highlighted to give an overview of the platforms which can be useful for swarm robotics behaviors and tasks researched. At the end of this presentation, a number of challenges and the ways forward for swarm robotics research from the perspective of swarm robotics task are briefly suggested.

Lecture #2: ASV and AUV Robotics Platform Technology: Advancement and Potentials

The Unmanned Marine Robotics platforms are gaining wider usage as the technologies gained maturity in the last few decades. Autonomous Surface Vessel (ASV) and Autonomous Underwater Vehicle (AUV) are two types of unmanned marine platforms which can be utilized for a number of industrial and scientific applications. The basic sub modules of ASV and AUV platforms such as the power, sensing, communication, vehicle design, manipulator and control sub-modules are becoming more intricate and interconnected. The utilization of swarm of ASV and AUV robotics platforms performing redundant and more robust data acquisition application is gaining momentum. By using unmanned robotics platforms which can cover wider and deeper water column, the danger risk factor towards human operators is reduced significantly. Both ASV and AUV system can be deployed for longer duration and to perform more complex tasks including sample handling and object tracking. Continuous data gathering from the marine environment will enable better analysis to determine precautionary or preventive actions needed to be taken by human operators. ASV and AUV unit can be controlled directly (teleoperation: satellite-based or free-wave/RF) or pre-programmed to follow certain paths. Ocean monitoring applications will benefit significantly from wider utilization of ASV (Motorized or wave-propelled) and AUV (UW gliders) for marine applications. In this talk, the current state-of-the-art for ASV and AUV technologies will be discussed including their potential utilizations in various sectors.

MyDLP Speaker: **Prof Dr Lim Eng Hock**, Senior Member, Universiti Tunku Abdul Rahman
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Title #1: Design of Miniature Metal-Mountable UHF Tag Antennas

In recent years, applications of UHF RFID tagging systems (860 MHz-960 MHz) have been growing rapidly in many sectors such as retail, logistics, transportation, and tracking management. Passive UHF tag, which is a transponder composed of a microchip and a microwave antenna, is able to provide long read range at low cost. However, mounting a UHF tag antenna on metal is challenging as its radiation performance can deteriorate significantly. When a tag antenna is placed in the vicinity of a conductive surface, the radiated fields of the image current and the antenna itself cancel out each other, resulting in poor radiation efficiency. In this lecture, the design tradeoffs of the metal-mountable UHF tag antenna will be discussed. Folding techniques will be introduced for designing various flexible tag antennas using the soft PET (polyethylene terephthalate) substrate. It will be shown that designing a UHF tag antenna usually requires strenuous effort to make tradeoffs between radiation efficiency, impedance bandwidth, and circuit size.

Title #2: Design of Novel Patch-Based Reflectarrays

Reflectarray is composed by an array of uniformly spaced radiating elements which are spatially illuminated with a feed source. An offset feed is usually preferred as it reduces the blockage of the broadside radiation beam. Reflectarray was found to be able to offer high antenna gain for long-distance communications, and it has combined the features of parabolic reflector and phased array. Unlike a parabolic reflector, reflectarray is light in weight, and it is easy to manufacture its planar radiating surface. Since then, reflectarray has become popular in wireless and radar applications. The patch resonator has been explored for designing different types of reflectarrays. In the first part, the E-shaped patch resonator is proposed for designing a novel linearly polarized broadband reflectarray. The element is made up of a shorted E-shaped patch with a polystyrene foam placed beneath it, and no dielectric substrate is needed by the reflectarray. It is found that the proposed reflectarray is able to achieve an antenna gain of ~23.7dBi and a -1dB gain bandwidth of 8.1%. In the second part, a reflectarray with circular polarization is designed using elliptical patches. The proposed element consists of two elliptical patches covering up the top surfaces of two substrates, respectively. The proposed element is found to be able to generate a broad reflection phase range of 550° by varying the major axis of the elliptical patches.