

A male sun bear taking a siesta at the Bornean Sun Bear Conservation Centre Sabah. Photo credits: Dr. Jacty Chew

# Foreword by Prof. Kheireddine

## A Word from Associate Dean (Research)



For Sunway University, Research Excellence with Impact is one of its priorities to be a globally recognised University. The School of Science and Technology is expected to play a key role to achieve that and will continue to be the engine that propels the University research to excellence. In 2018, the school academic staff published 228 articles and it is expected that by 2025, SST publications will exceed 600 with an average of 3 publications per academic staff per year. This is an ambitious target but I am confident that it is achievable in view of the quality of researchers and the excellent research environment being built in SST. In order to achieve this ambitious target, all of us shall work as a team in a healthy competitive manner and we shall leverage on the heavy investment that the University is putting to build research facilities and infrastructures in our School. The establishment of research centres attracted quality researchers two of them being recognized by Clarivate analytics as top cited researchers in their field and the new postgraduate programs in the pipeline will attract quality higher degree students who will energise the research activities in the School. With these strategic actions, the school will be in a better position to build sustainable and win-win collaborations with renowned Institutions and with industry players. Research in SST will thrive through the following principles:

- Research excellence shall be always our gauge of success
- Fundamental research shall be an important focus of our research since it is the foundation for discovery, understanding and knowledge creation.
- Fundamental and applied research shall be conducted simultaneously and interdependently
- Impacting communities and society shall be the ultimate goal of our research
- We shall conduct our research to the highest ethical standards
- We shall integrate our research with the education of our students to foster the spirit of enquiry among them.

Together we shall advance research in SST.

# Research

## Recent Publications

1. Mukheem A, Shahabuddin S, Akbar N, Miskon A, Sarih NM, Sudesh K, Khan NA, Saidur R and Sridewi N. Boron Nitride Doped Polyhydroxyalkanoate/Chitosan Nanocomposite for Antibacterial and Biological Applications. *Nanomaterials* 2019, 9(4), 645.

<https://doi.org/10.3390/nano9040645>

**Significance of findings:** The present research focused on the fabrication of biocompatible polyhydroxyalkanoate, chitosan, and hexagonal boron nitride incorporated (PHA/Ch-hBN) nanocomposites through a simple solvent casting technique. The fabricated nanocomposites were comprehensively characterized by Fourier transform infrared spectroscopy (FT-IR), field emission scanning electron microscope (FESEM), and elemental mapping and thermogravimetric analysis (TGA). The antibacterial activity of nanocomposites were investigated through time-kill method against multi drug resistant (MDR) microbes such as methicillin-resistant *Staphylococcus aureus* (MRSA) and *Escherichia coli* (*E. coli*) K1 strains. In addition, nanocomposites have examined for their host cytotoxicity abilities using a Lactate dehydrogenase (LDH) assay against spontaneously immortalized human keratinocytes (HaCaT) cell lines. The results demonstrated highly significant antibacterial activity against MDR organisms and also significant cell viability as compared to the positive control. The fabricated PHA/Ch-hBN nanocomposite demonstrated effective antimicrobial and biocompatibility properties that would feasibly suit antibacterial and biomedical applications.

2. Rajendran K, Anwar A, Khan NA and Siddiqui R. trans-Cinnamic Acid Conjugated Gold Nanoparticles as Potent Therapeutics against Brain-Eating Amoeba *Naegleria fowleri*. *ACS Chem. Neurosci.* 2019. Publication Date: April 10, 2019.

<https://doi.org/10.1021/acscchemneuro.9b00111>

**Significance of findings:** Primary amoebic meningoencephalitis (PAM), a deadly brain infection, is caused by brain-eating amoeba *Naegleria fowleri*. The current first line of treatment against PAM is a mixture of amphotericin B, rifampin, and miltefosine. Since, no single effective drug has been developed so far, the mortality rate is above 95%. Moreover, severe adverse side effects are associated with these drugs. Nanotechnology has provided several advances in biomedical applications especially in drug delivery and diagnosis. Herein, for the first time we report antiamoebic properties of cinnamic acid (CA) and gold nanoparticles conjugated with CA (CA-AuNPs) against *N. fowleri*. CA-AuNPs were successfully synthesized by sodium borohydride reduction of tetrachloroauric acid. Size and morphology were determined by atomic force microscopy (AFM) while the surface plasmon resonance band was analyzed by ultraviolet-visible (UV-vis) spectrophotometry for the characterization of the nanoparticles. Amoebicidal and cytopathogenicity (host cell cytotoxicity) assays revealed that both CA and CA-AuNPs displayed significant anti-*N. fowleri* properties ( $P < 0.05$ ), whereas nanoparticles conjugation further enhanced the anti-*N. fowleri* effects of CA. This study established a potential drug lead, while CA-AuNPs appear to be promising candidate for drug discovery against PAM.



3. Pardo LE, Campbell MJ, Cove MV, Edwards W, Clements GR & Laurance WF. Land management strategies can increase oil palm plantation use by some terrestrial mammals in Colombia. *Scientific Reports* 9, Article number: 7812 (2019).

<https://www.nature.com/articles/s41598-019-44288-y>

**Significance of findings:** While the conservation role of remaining natural habitats in anthropogenic landscapes is clear, the degree to which agricultural matrices impose limitations to animal use is not well understood, but vital to assess species' resilience to land use change. Using an occupancy framework, we evaluated how oil palm plantations affect the occurrence and habitat use of terrestrial mammals in the Colombian Llanos. Further, we evaluated the effect of undergrowth vegetation and proximity to forest on habitat use within plantations. Most species exhibited restricted distributions across the study area, especially in oil palm plantations. Habitat type strongly influenced habitat use of four of the 12 more widely distributed species with oil palm negatively affecting species such as capybara and naked-tailed armadillo. The remaining species showed no apparent effect of habitat type, but oil palm and forest use probabilities varied among species. Overall, generalist mesocarnivores, white-tailed deer, and giant anteater were more likely to use oil palm while the remaining species, including ocelot and lesser anteater, showed preferences for forest. Distance to nearest forest had mixed effects on species habitat use, while understory vegetation facilitated the presence of species using oil palm. Our findings suggest that allowing undergrowth vegetation inside plantations and maintaining nearby riparian corridors would increase the likelihood of terrestrial mammals' occurrence within oil palm landscapes.

4. Pawar S, Ashraf MI, Mujawar S and Lahiri C. Influential Quorum Sensing Proteins of Multidrug Resistant *Proteus mirabilis* causing Urinary Tract Infections. In: 2nd Proceedings of the Ninth International Conference on Complex Systems, July 22-27, 2018, Cambridge, MA, USA.

[Published online 10th May, 2019]

[https://static1.squarespace.com/static/5b68a4e4a2772c2a206180a1/t/5cd470fdc830253030167665/1557426435054/book\\_final\\_1.pdf](https://static1.squarespace.com/static/5b68a4e4a2772c2a206180a1/t/5cd470fdc830253030167665/1557426435054/book_final_1.pdf)

**Significance of findings:** Catheter-associated urinary tract infections (CAUTI) has become an alarming hospital based disease with the increase of multidrug resistance (MDR) strains of *Proteus mirabilis*. High prevalence of long-term hospital based CAUTI for patients along with moderate percentage of morbidity due to ignorance, failure and MDR, necessitates an immediate intervention strategy to combat the deadly disease. Several reports and reviews focus on revealing the important genes and proteins essential to tackle CAUTI caused by *P. mirabilis*. Despite longitudinal studies and methodical strategies to circumvent the issues, effective means of unearthing the most influential proteins to target for therapeutic uses have been meagre. Here we have reported a strategic approach for identifying the most influential proteins from the complete set of proteins of the whole genome of *P. mirabilis*, besides comparing the interactomes comprising the autoinducer-2 (AI-2) biosynthetic pathway along with other proteins involved in biofilm formation and responsible for virulence. Essentially, we have adopted a computational network model based approach to construct a set of small protein interaction networks (SPIN) along with the whole genome (GPIN) to identify, albeit theoretically, the most significant proteins. These might actually be responsible for the phenomenon of quorum sensing (QS) and biofilm formation and thus, could be therapeutically targeted to fight out the MDR threats to antibiotics of *P. mirabilis*. Our approach signifies the eigenvector centrality coupled with k-core analyses to be a better measure in addressing the pressing issues.

# Research

## Funding opportunities

### 1. EFSD European Foundation for the Study of Diabetes: European Programme in Type 1 Diabetes Research.

This year, the EFSD/JDRF/Lilly European Programme in Type 1 Diabetes Research will accept applications within any area of basic or clinical research related to type 1 diabetes including treatment and monitoring strategies.

The research will be supported through the award of grants, each of up to Euro 100,000.

Applications for this programme must be submitted in the EFSD online Application System which is available via the [MyEASD](#) platform.

Applications must be submitted in the EFSD online application system before 18:00 CET on the deadline date 1 July 2019.

Enquiries should be directed to [Foundation@easd.org](mailto:Foundation@easd.org)

### 2. The ASEAN-U.S. Science Prize For Women

The prize theme for 2019 - 'Circular Economy'. Circular Economy is defined an economic system aimed at minimising, reusing and recycling waste and making the most of resources. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital.

Quick facts: Award of \$20,000 for best application. Second best gets \$5,000.

Deadline: 7<sup>th</sup> June 2019

More details: <https://scienceprize4women.asean.org/>

### 3. APEC funding: The deadlines for the Concept Note submission to APEC Program Directors are on 12 March 2019 (for Session 1/2019) and **15 July 2019 (for Session 2/2019)**. MESTECC will assist projects related to science, technology and innovation to secure co-sponsoring economies for the project before the above-mentioned submission deadlines. Hence, we urge all submissions of Concept Note to reach the secretariat (undersigned) latest by 19 February 2019 (for Session 1/2019) and 24 June 2019 (for Session 2/2019 - preferred).

For further details:

<https://www.apec.org/Projects/Funding-Sources>,  
<https://www.apec.org/Projects/Applying-for-Funds>

# Department Events

## 1. “An Eye for an Eye: Using nature’s creation to combat deadly diseases” workshop for Sunway College Foundation students.

Date: 10th May 2019

Venue: Bio Lab 2, Level 4, Sunway University

DBS organized a workshop for 17 students from the Foundation in Science & Technology (FIST) and Foundation in Arts (FIA), Sunway College, as part of the Sunway Foundation Programme Future Landings. The workshop title is “An Eye for an Eye: Using nature’s creation to combat deadly diseases”, which showcases our efforts in tapping into mother nature’s resources, searching for novel solutions to solve public health issues.

We appreciate the efforts of postgraduate and Year 3 undergraduate students to showcase their research activities and share their interesting findings and research experiences with the students. The workstations include (1) Crocodile as potential source for anti-cancer molecules; (2) Cockroaches: hidden source for novel antibiotics; and (3) Novel drugs delivery system to kill brain-eating amoebae.



(1) Dr Tommy started the session by introducing the workstations to the students; (2) Shareni (PhD candidate) and Morhana (MSc candidate) sharing their exciting findings for anti-cancer molecules in crocodiles; (3) Thevashree (Year 3) showing cockroaches while Salwa (PhD candidate) elaborated on the dissection process and experimental works on cockroaches to discover novel antibiotics; (4) Timothy and Kavitha (PhD candidate) discussed methods used to control and to eradicate brain-eating amoebae.



# Department Events

## 2. Interactive Workshop on Genes and Diseases by University of Portsmouth Academic Date: 25<sup>th</sup> April 2019

The Department of Biological Sciences hosted an interactive workshop on genes and run by Dr. James Brown from the University of Portsmouth. Dr. Brown is currently the Science Faculty International Coordinator and the Head of Pharmacology at University of Portsmouth. The workshop was designed to tackle important questions regarding how our DNA influences the dynamic health and disease continuum and how our greater understanding of biomedical sciences through the lens of genetics and pharmacology is shaping how we manage a myriad of diseases such as diabetes, heart attack and stroke. The participating staff and students gained new knowledge and enjoyed the interactive nature of the workshop. We look forward to fostering further research as well as teaching and learning collaboration with Dr. James Brown and University of Portsmouth.



## 3. Pro tem Member Recruitment for the Society of Biological Science (SBioS) Date: 7<sup>th</sup> May 2019

The current pro tem executive committee members of SBios set up a booth at the college extended foyer to recruit society members. In three hours, they were successful in recruiting a total of 30 members, including 14 college students and 16 university students.



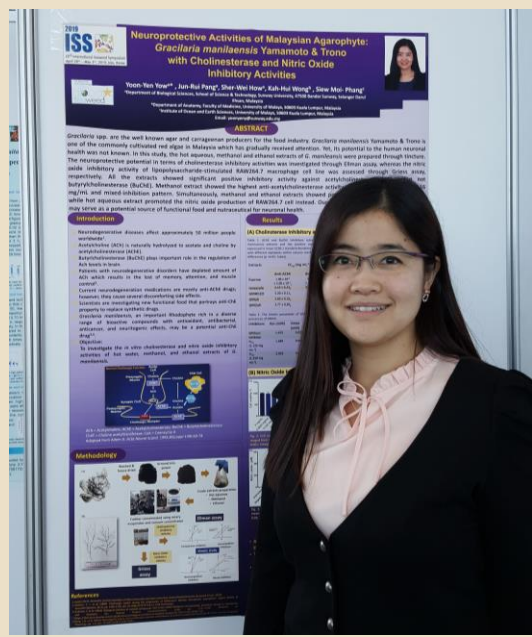
# DBS members in action

## Dr. Yow Yoon Yen wins the Outstanding Woman in Science Award



Dr. Yow has been awarded the 'OUTSTANDING WOMAN IN SCIENCE' (Major Area of Study - Biotechnology) 2019 by the Venus International Foundation. This award is established in 2016 and conferred to a dedicated woman professional working in the field of science and technology who possesses exceptional record of significant contributions to the institute (the 'Best - Brightest - Inspirational - Talented Woman' who demonstrated courage, creativity, excellence, originality and endurance in Science and Technology).

## Dr. Yow Yoon Yen was awarded with the GlobalSeaweedSTAR Travel Fund



Dr. Yow Yoon Yen was awarded the GlobalSeaweedSTAR Travel Fund of £2000 supported by the UK Research and Innovation - Global Challenge Research Fund, to attend the 23rd International Seaweed Symposium, held from 28 April to 3 May 2019, in Jeju, Korea. There were 796 registrants from 41 countries. The fund is aimed at applicants from both the UK and DAC list countries to support attendance of national and international seaweed-related scientific conferences or travel related to capacity building activities. She gave a poster presentation with the title "Neuroprotective Activities of Malaysian Agarophyte: *Gracilaria manilaensis* Yamamoto & Trono with Cholinesterase and Nitric Oxide Inhibitory Activities" during the symposium.

Please share your updates (publications, events, funding) via [this link](#) by the 25<sup>th</sup> of each month, to be published in the up-coming bulletin.



# Upcoming Events

## 1. The 1st Euro-Asia Conference on CO<sub>2</sub> Capture and Utilisation 2019 (EACCO2CU 2019).

Students and staff members are cordially invited to participate in the 1st Euro-Asia Conference on CO<sub>2</sub> Capture and Utilisation 2019 (EACCO<sub>2</sub>CU 2019) to be held in Sunway University, Selangor, Malaysia on 6-7th August 2019. In addition to the conference, a 1-day post-conference workshop will be organised on the 8th August 2019.

EACCO<sub>2</sub>CU 2019 was inspired by the successful workshop on CO<sub>2</sub> Capture and Utilisation that was organised by University of Malaya, Universiti Malaysia Perlis and Queen's University Belfast on 6-8 February 2017 in Kuala Lumpur within the framework of an International Project, involving the three Universities, and funded by the British Council under Newton Institutional Links program. This year, EACCO<sub>2</sub>CU 2019 will be organised by Sunway University aiming to bring researchers, academicians, industry players and policymakers from Europe and Asia working on CO<sub>2</sub> related research to share recent trends and developments in the field of CO<sub>2</sub> mitigation and utilisation and to discuss the challenges and opportunities toward achieving SDG13 on climate change. The conference will cover a wide range of hot topics ranging from fundamental aspects to applications and industrial case studies.

Conference URL: <https://my.sunwayu.edu.my/eacco2cu/>

## 2. The 2<sup>nd</sup> Biennial Medical and Health Sciences Conference 2019

You are cordially invited to attend the conference on “2nd Biennial Medical and Health Sciences Conference 2019” organized by FMHS of Universiti Tunku Abdul Rahman (UTAR). This conference will be particularly benefit to academicians and students (undergraduates and postgraduates). The Seminar schedules are as follows:

Date: 4th - 6th July 2019

Time: 8.00 am - 5.30 pm

Venue: MPH, UTAR Sungai Long Campus

Link to the conference: [http://www.utar.edu.my/fmhs\\_conference/](http://www.utar.edu.my/fmhs_conference/)

# Other News

## *DBS Journal Club*

DBS Journal Clubs are held on Thursday afternoons to promote research interest in research, and showcase current discoveries both by students and faculty members.

15<sup>th</sup> May - Ng Wai Pak, MSc student, DBS - “Mammal Species Composition and Habitat Associations In a Commercial Forest and Mixed-Plantation Landscape”

# Upcoming Events

## 3. International Conference on Industry 4.0: A Global Revolution in Business, Technology and Productivity

SEGi University in collaboration with multiple Government Agencies, GLCs and private sectors is organizing an “International Conference on Industry 4.0: A Global Revolution in Business, Technology and Productivity” ([www.myindustries.org](http://www.myindustries.org)) from 5th- 7th September 2019 at SEGi University, Kota Damansara, Selangor.

This mega Conference is to be officially opened by YB Tun Dr. Mahathir bin Mohammad who would also deliver the Keynote address. The Conference offers academic tracks in multi disciplines. Attached please find copy of the areas suggested for academic presentations. The conference consequently offers academics an opportunity to publish in Scopus journals. The list of journals which have agreed to publish our papers is also attached for your perusal.

More information: [www.myindustries.org](http://www.myindustries.org)

## 4. 27th FAOBMB & 44th MSBMB Conference: Call for Participation

The 27th FAOBMB Conference will have the general theme of “Biomolecules: Networks & Systems” with a Special Symposium on “Mosquito-borne illnesses”. We have put together an excellent scientific programme with eminent speakers, forums for Career Development, Education and Women in Science and pre- and post-conference workshops providing networking opportunities for all delegates.

Abstract submission deadline: 31 May 2019

Conference date: 19<sup>th</sup> - 22<sup>nd</sup> August 2019

Venue: Berjaya Times Square Hotel

More information: [www.faobmkl2019.com](http://www.faobmkl2019.com)

