



Cecilians like *Ichthyophis nigropalmatus* are legless amphibians.
Photo credits: Prof. Ulmar Grafe (Faculty of Science, Universiti Brunei Darussalam)

Foreword by Dr. Tommy Tong



Augmented Reality as a teaching tool

Do you know what is “Augmented Reality” technology?

If not, don't worry. Because you have already been exposed to it! This technology was portrayed in science fiction movies such as Top Gun (1986), Robocop (1987), Total Recall (1990) and Minority Report (2002). If these movies don't ring a bell, how about in Iron Man (2008) where Tony Stark interacts with Jarvis through his helmet while flying across the skies of Malibu?

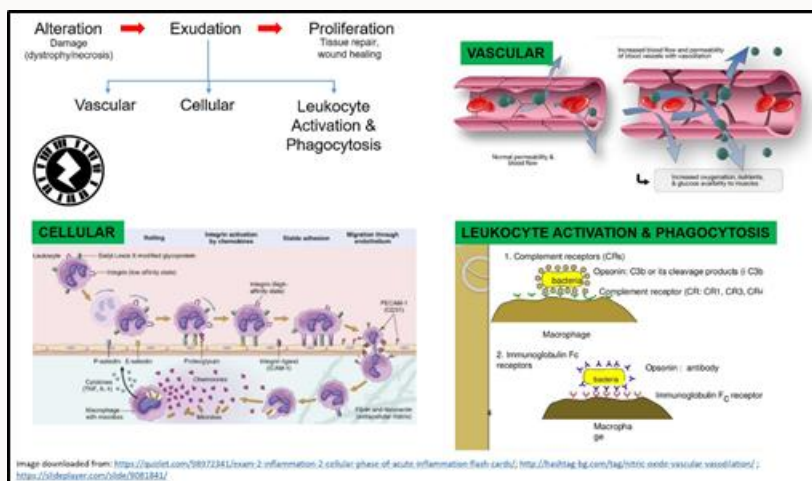
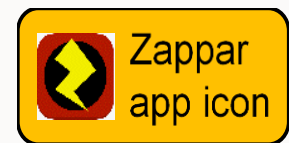
Augmented reality (AR) is a technology that superimposes a computer-generated image/interface on user's view of the real world (The History of Augmented Reality). This technology makes the user feel as though they were in an interactive environment. Pokémon Go is an example of AR-based mobile game that allows players to “catch” digital Pokémon in the real world.

The real question, however, is “How can AR be used as a teaching tool?” The potential of combining smartphones and AR for education is immense. In fact, Google Expeditions app is an education app that allows teachers and students to explore the world through different virtual reality and AR tours. You can download “Expeditions” app, developed by Google LLC from Play Store or App Store.

Here at Sunway University, several lecturers have incorporated AR technology as part of teaching and learning for students (eg: BIO2254 Pathology, BIO2044 Medical Microbiology).

You can experience the AR technology by following these simple steps:

1. Go to Google Play Store or Apple App Store
2. Search “Zappar” by Zappar Ltd
3. Install “Zappar” onto your mobile device
4. Run “Zappar” app
5. Use the camera function of your mobile phone to scan the image below.
6. Enjoy the video embedded within the image on your mobile phone.



Let us know if you think this technology can be used to improve your learning experience by filling an online form: Department of Biological Sciences elearn > Student Feedback Form.

Research

Recent Publications

1. Roberts R, Yee PTI, **Mujawar S**, **Lahiri C**, Poh CL, Gatherer D. A decade of sustained selection pressure on two surface sites of the VP1 protein of Enterovirus A71 suggests that immune evasion may be an indirect driver for virulence. *Sci Rep.* 2019 Apr 1;9(1):5427. doi: 10.1038/s41598-019-41662-8.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6443798/>

Significance of findings: Enterovirus A71 (EV-A71) is an emerging pathogen in the Enterovirus A species group. EV-A71 causes hand, foot and mouth disease (HFMD), with virulent variants exhibiting polio-like acute flaccid paralysis and other central nervous system manifestations. We analysed all enterovirus A71 complete genomes with collection dates from 2008 to mid-2018. All sub-genotypes exhibit a strong molecular clock with omega (dN/dS) suggesting strong purifying selection. In sub-genotypes B5 and C4, positive selection can be detected at two surface sites on the VP1 protein, also detected in positive selection studies performed prior to 2008. Toggling of a limited repertoire of amino acids at these positively selected residues over the last decade suggests that EV-A71 may be undergoing a sustained frequency-dependent selection process for immune evasion, raising issues for vaccine development. These same sites have also been previously implicated in virus-host binding and strain-associated severity of HFMD, suggesting that immune evasion may be an indirect driver for virulence

2. **Ayaz Anwar**, Samina Perveen, Shakil Ahmed, **Ruqaiyyah Siddiqui**, Muhammad Raza Shah and **Naveed Ahmed Khan**. Silver Nanoparticle Conjugation with Thiopyridine Exhibited Potent Antibacterial Activity Against *Escherichia coli* and Further Enhanced by Copper Capping. *Jundishapur J Microbiol.* In Press(In Press):e74455. DOI: 10.5812/jjm.74455

<http://jjmicrobiol.com/en/articles/74455.html>

Significance of findings: Background: Nanomaterials-based antibacterial agents are anticipated as future generation antibiotics. Silver nanoparticles are promising candidates to enhance the antibacterial effects of antibiotic drugs and lead compounds. Pyridine compounds and thiol moieties are important classes of pharmacophores that are part of many drugs used against numerous diseases; therefore, we conjugated synthetic thiopyridine (ThPy) with silver nanoparticles. Objectives: The study was designed to evaluate the antibacterial potential of ThPy and the effects of silver nanoparticles conjugation with it and to explore the synergistic effects of other metal ions. Methods: Using formyl pyridine reaction with dibromopropane, N-alkylated product was obtained. Bromo group was substituted by thioacetate nucleophile resulting in the formation of thiopyridine (ThPy). Thiopyridine was used to stabilize silver nanoparticles synthesized by one-phase reduction. Silver nanoparticle-conjugated thiopyridine (ThPy-AgNPs) showed typical surface plasmon resonance band, while atomic force microscopy (AFM) showed size and morphology of spherical polydispersed nanoconjugates of 60 nm. Results: Antibacterial properties of synthesized cationic compound thiopyridine was enhanced by conjugation with silver nanoparticles. Moreover, we presented a new strategy in which thiopyridine-AgNP nanoconjugates' affinity towards copper ions is utilized to further enhance antibacterial activity of nanoconjugates. ThPy-AgNPs exhibited more inhibitory effects against *Escherichia coli* (MIC of 100 µg/mL compared to 200 µg/mL with ThPy). Nanoconjugates showed selective affinity for Cu(I) ions to cross the *E. coli* membrane.

3. Akbar N, Siddiqui R, Sagathevan KA, Khan NA. Gut bacteria of animals/pests living in polluted environments are a potential source of antibacterials. *Appl Microbiol Biotechnol*. 2019 Apr 2. doi: 10.1007/s00253-019-09783-2. [Epub ahead of print] Review.
<https://link.springer.com/article/10.1007%2Fs00253-019-09783-2>

Significance of findings: The morbidity and mortality associated with bacterial infections have remained significant despite chemotherapeutic advances. With the emergence of drug-resistant bacterial strains, the situation has become a serious threat to the public health. Thus, there is an urgent need to identify novel antibacterials. The majority of antibiotics available in the market are produced by bacteria isolated from soil. However, the low-hanging fruit has been picked; hence, there is a need to mine bacteria from unusual sources. With this in mind, it is important to note that animals and pests such as cockroaches, snake, crocodiles, and water monitor lizard come across pathogenic bacteria regularly, yet flourish in contaminated environments. These species must have developed methods to defend themselves to counter pathogens. Although the immune system is known to possess antiinfective properties, gut bacteria of animals/pests may also offer a potential source of novel antibacterial agents, and it is the subject of this study. This paper discusses our current knowledge of bacteria isolated from land and marine animals with antibacterial properties and to propose untapped sources for the isolation of bacteria to mine potentially novel antibiotic molecules.

4. JL Coleman, JS Ascher, D Bickford, D Buchori, A Cabanban, RA Chisholm KY Chong, P Christie GR Clements, TEE de la Cruz, W Dressler, DP Edwards CM Francis, DA Friess X Giam, L Gibson D Huang, AC Hughes...LR Carrasco. Top 100 research questions for biodiversity conservation in Southeast Asia. *Biological Conservation*, Volume 234, June 2019, Pages 211-220.
<https://doi.org/10.1016/j.biocon.2019.03.028>
<https://www.sciencedirect.com/science/article/abs/pii/S0006320718315751>

Significance of findings: Southeast (SE) Asia holds high regional biodiversity and endemism levels but is also one of the world's most threatened regions. Local, regional and global threats could have severe consequences for the future survival of many species and the provision of ecosystem services. In the face of myriad pressing environmental problems, we carried out a research prioritisation exercise involving 64 experts whose research relates to conservation biology and sustainability in SE Asia. Experts proposed the most pressing research questions which, if answered, would advance the goals of biodiversity conservation and sustainable development in SE Asia. We received a total of 333 questions through three rounds of elicitation, ranked them (by votes) following a workshop and grouped them into themes. The top 100 questions depict SE Asia as a region where strong pressures on biodiversity interact in complex and poorly understood ways. They point to a lack of information about multiple facets of the environment, while exposing the many threats to biodiversity and human wellbeing. The themes that emerged indicate the need to evaluate specific drivers of biodiversity loss (wildlife harvesting, agricultural expansion, climate change, infrastructure development, pollution) and even to identify which species and habitats are most at risk. They also suggest the need to study the effectiveness of practice-based solutions (protected areas, ecological restoration), the human dimension (social interventions, organisational systems and processes and, the impacts of biodiversity loss and conservation interventions on people).

Research

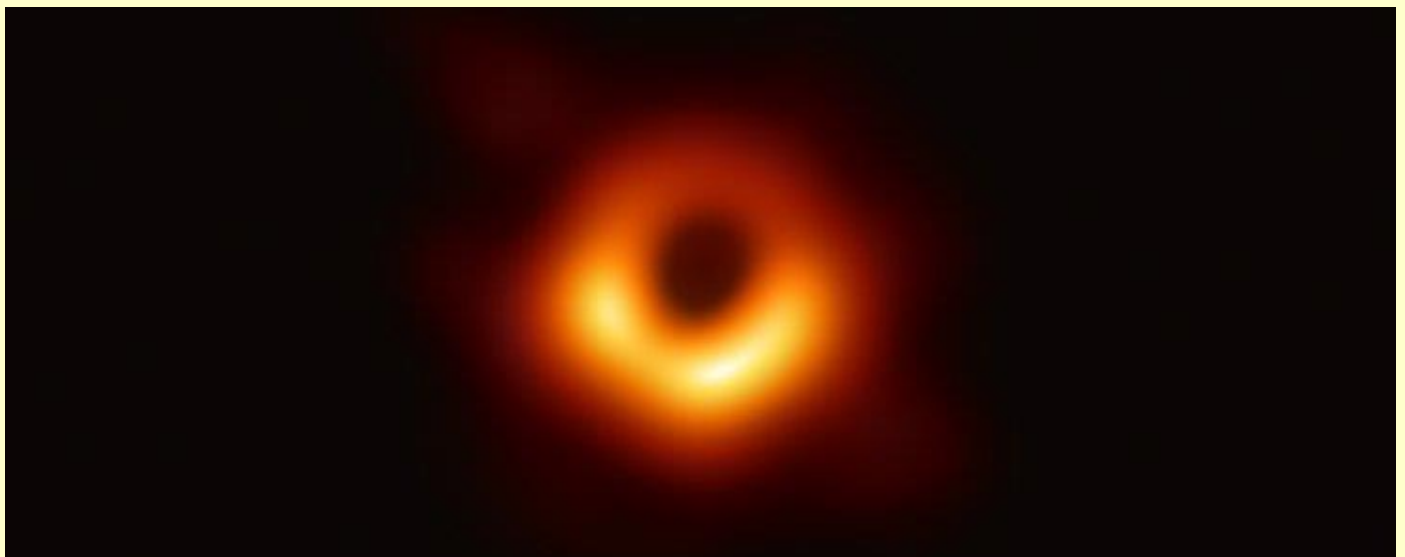
Funding opportunities

1. 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>

2. L'Oréal-UNESCO For Women in Science Fellowships
Quick facts: Maximum award of RM 30,000. Age limit 40 years.
Deadline: 31st May 2019
More details: <https://www.forwomeninscience.com/en/fellowships>
3. MTSF Malaysia Toray Science Foundation Science & Technology Research Grant
Quick facts: Maximum award of RM 60,000 for 1-year project.
Dateline: 31st May 2019
More details: <http://www.mtsf.org/mtsf/strg/infor.html>



April 2019 - Astronomers capture the first image of the [black hole](#). The image reveals the black hole at the center of Messier 87, a massive galaxy in the nearby Virgo galaxy cluster. This black hole resides 55 million light-years from Earth and has a mass 6.5 billion times that of the Sun.

Department Events

DBS Internship Briefing and Pre-Internship Training for 2020

Date: 20th April 2019

INT3056 internship briefing was held on 20th April 2019 (Saturday) in Hall 1, Graduate Centre. The aim of the briefing is to inform students on the process and procedures required to secure internship placement.

Pre-internship training (PIT) was conducted on the same day, by Ms Geraldine David from Country Talent Acquisition Lead, Johnson & Johnson. PIT's main purpose is to guide and equip students with the required skills (resume writing, interview skills) prior to applying internship placement.

Students are given access to Internship Handbook and relevant documents via INT3056 Internship elearn. For further enquiries, please contact DBS Internship Coordinator, Dr Tommy at tommyt@sunway.edu.my.



Department Events

2. Dean Communication Session #2/2019

Date: 18 April 2019 (Thursday)

In his second communication session to the School of Science and Technology, our Dean conveyed the current status and projections for student intake for the school. He also shared results from the PEMANDU meetings, and finally clarified issues regarding research conference participation policy.



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.

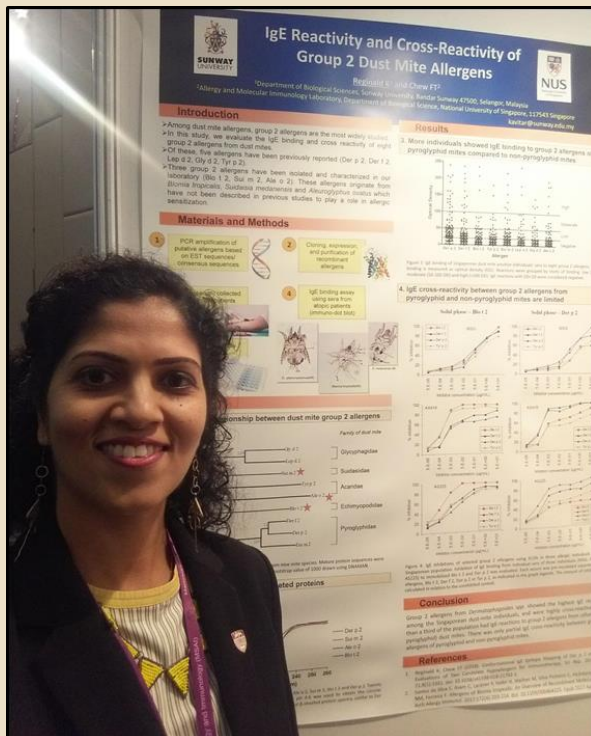
2nd April - Ms. Kavitha Rajendran, PhD student, DBS - “Enzymatic chokepoints and synergistic drug targets in the sterol biosynthesis pathway of *Naegleria fowleri*”

9th April - Arcana A/P Thirumorthy, PhD student, DBS - “Blocking PGE2-induced tumour repopulation abrogates bladder cancer chemo-resistance”

DBS members in action

Dr. Kavita Reginald wins First Prize for poster presentation at the Malaysian Allergy Congress 2019

Dr. Kavita recently took part as a delegate in the 19th Malaysian Congress and Exhibition on Allergy and Immunology incorporating the GA²LEN (Global Allergy and Asthma European Network)-MSAI Allergy School & World Allergy Week 2019. The three-day event was organized by the Malaysian Society of Allergy and Immunology and held at the Le Meridien Hotel in Kuala Lumpur from the 5th-7th April 2019. The congress was attended by approximately 600 researchers and medical practitioners from Malaysia and other Asia Pacific countries, as well as Europe. Dr Kavita won the first prize for her poster presentation with the title “IgE Reactivity and Cross-Reactivity of Group 2 Dust Mite Allergens”.



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

Upcoming Events

1. The 1st Euro-Asia Conference on CO₂ Capture and Utilisation 2019 (EACCO₂CU 2019).

Students and staff members are cordially invited to participate in the 1st Euro-Asia Conference on CO₂ Capture and Utilisation 2019 (EACCO₂CU 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.

EACCO₂CU 2019 was inspired by the successful workshop on CO₂ 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, EACCO₂CU 2019 will be organised by Sunway University aiming to bring researchers, academicians, industry players and policymakers from Europe and Asia working on CO₂ related research to share recent trends and developments in the field of CO₂ 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 2nd 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/

Inspire, create, repeat