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Keynote Lecture

Alexander von Humboldt Legacy today

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Alexander von Humboldt (1769-1859) belongs to a generation of scholars living in the era of enlightenment, discoveries and industrial revolutions surrounded by social turbulences and disruptions. Colonialism, slavery, the American and the French Revolution, wars of liberation and wars of restoration mixed up in this age. He travelled a lot and was well recognized as a hero of science in his time and even after his death, but he has no single theory or equation bearing his name. However, after 250 years some said he has been forgotten! Why is that? What really is his contribution to the world of science? What does Alexander von Humboldt mean for scholars of today?



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PL-01

Exploration and navigation in mixed realities

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Exploration and navigation are key elements of science. Since the times of Alexander von Humboldt, however, new technologies radically changed the way how we find our ways in real spaces. In addition, human-made virtual spaces of vast amounts of data represent new challenges for exploration and navigation. The design of interactive tools for exploration and navigation in real and virtual spaces needs careful design. In order to support people in finding the right place or information at the right time, human-computer-interaction plays an important role. The talk will give examples from real wayfinding, virtual 3D modelling, medicine and software engineering and will show where problems occur and how humans can be empowered with digital media in order to master spatial tasks.



Rainer Malaka is Professor for Digital Media at the University of Bremen since 2006. The focus of Dr. Malaka’s work is Digital Media, Mobile and Ubiquitous Interaction, and Entertainment Computing. At the University of Bremen, he directs a Graduate College “Empowering Digital Media” funded by the Klaus Tschira Foundation. He is also director of the TZI, the Center for Computing Technologies at the University of Bremen. Before joining the University of Bremen, he led the research group Personal Memory at the European Media Lab (EML) in Heidelberg. Rainer Malaka is the German representative and chairman of IFIP’s technical committee TC14 for Entertainment Computing. Rainer Malaka is member of the editorial boards and has been Chair and PC chair of various Workshops and conference (line IFIP-ICEC, Smart Graphics, German HCI conference). Dr. Malaka received several awards for his scientific work: e.g., the Klaus Tschira award for Understandable Science, and the Research and Innovation Award of the Rhein-Neckar Foundation and various best paper awards.

PL-02

Unmasking the secret of biopigments, understanding the beauty and wisdom of nature and culture

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Batik, ikat weaving, jamu (traditional medicine) and other local wisdom of Indonesia use natural pigments extracted from biological organisms for coloring and bioactive materials. We present how the secret of biopigments is unmasked and studied prior to understand the beauty and wisdom of nature and culture of Indonesian.

As a mega biodiversity country, Indonesia has the total number of 17,504 islands and 95,181 km coastal line. Flora of Indonesia is part of the Melanesia floral types where 25% of the species of flowering plants in the world are in Indonesia, making Indonesia the seventh country with a total number of species reaching to 20,000 species. About 40% of the species are endemic (native) plants of Indonesia. On the other hand, Indonesia is a country with the highest level of threat and extinction of the world’s plant species. Currently there are around 240 species of plants has been declared as rare species, around 36 species of trees in Indonesia are declared endangered, and about 58 species of plants are protected.

Research related to the Indonesian colorful plants and Indonesian local culture wisdom in the use of pigments from the colorful plants as functional foods and their use for medicines are very interesting to be developed, both in terms of basic research, related to the structure elucidation and function of pigments, and applied research in agriculture, health and tourism. The presentation will show the results of research on biodiversity of colorful plants in Indonesia and its hereditary utilization as the basic ingredients of herbal medicine (jamu), phytochemical raw materials, functional food sources, and future research potential.

Keywords: Biodiversity, Pigments, Chlorophylls, Carotenoids



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PL-03

Stem cell research in Southeast Asia: Thailand as an example

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Since the establishment of human embryonic stem cell in 1998, there have been progresses in the field of stem cell research. It is the hope that pluripotent stem cells can be used to treat patients with degenerative disorders and traumatic organ injury. However, at present only hematopoietic stem cell transplantation is the standard treatment for hematological disorders.

Siriraj Center of Excellence for Stem Cell Research has been founded in 2006. Several research works dealing with stem cell were reported including disease models of hereditary and acquired diseases. The ultimate goals of the Center are large scale production of platelet from stem cell for clinical use and the establishment of clinical grade pluripotent stem cell bank.



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PL-04

White noise analysis: understanding big data from complex systems with memory

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Measurements and observations of complex systems from nanoscale DNA, to internet traffic, all the way to large galactic systems churn out huge amounts of unanalyzed data. The observables measured from these complex systems often exhibit seemingly random fluctuations as a result of many influencing intractable factors. Do the fluctuating values exhibited by these observables tell a story? In this talk, we discuss how white noise analysis [1,2] can be used to uncover patterns, memory behavior, and mathematical relations in datasets that could have several million data points, or more. We give several examples starting with the DNA sequence of bacteria species [3], followed by studies on the gelation of fibrin [4] which is important in wound healing and tissue engineering. We end by showing how measured variables from the Great Barrier Reef degradation, sea surface temperatures, and rising atmospheric CO₂ levels exhibit the same stochastic process with memory [5].

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PL-05

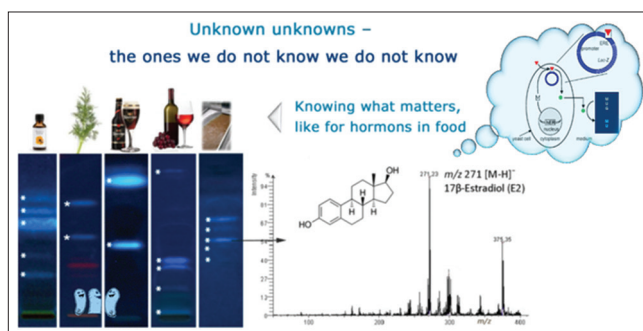
How to analyze unknown unknowns? How to discover compounds that matter for food safety along the global food chain?

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Consumers are concerned about food or food supplements they consume. Although food fraud is a big issue, botanicals play an increasing role in commercial food products. Until now, chemical marker compounds have been used to evaluate the product quality, but they cannot represent the full complexity of the sample. Sophisticated chromatographic/mass spectrometric non-target techniques do not figure out unknown activities that may involve risk. However, small product changes do matter, when active components at trace level affect consumer health, especially when consumed regularly. All the thousands of unknown compounds in a single sample under control? How can active unknown unknowns be detected? What analytical effort makes sense? It is obvious that routine quality control must take into account bioprofiling or effect-controlled fingerprints to ensure product quality and food safety. [1-4] A bioanalytical imaging technique is presented that can cope with this complex task. The data obtained are a highly appreciated source of information for risk assessment.



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PL-06

An innovative solution to design seawall structures in Vietnamese coastal protection

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Climate change has been changing in a harmful way to human life for recent years. Frequently occurring flood leads to the sea level risen dramatically threatening to many provinces located near coastlines in Vietnam. There are many fatal effects of increasing sea level. For example, the vanishing of various lands on the world map or a lot of infrastructures close to shorelines have been destroying because of the erosion. Therefore, researching and developing advanced methods for the resistance of flood and erosion is an urgent task. Especially, the monitoring health structure field can help to control the safety of a complex structure to estimate any severe collapses. In this study, a hollow concrete block (HCB) used to prevent coastal erosion has been designed. Furthermore, machine learning has been applied to such structures to predict an existed damage inside the model with a variety of fiber concrete material properties considered. Due to the lack of experiment data, the numerical simulations were employed to generate many datasets from the HCB model (see Figure 1).

Keywords: seawall structure, fibre reinforced concrete, damage modelling, vibration-based damage detection, machine learning, convolution neural network

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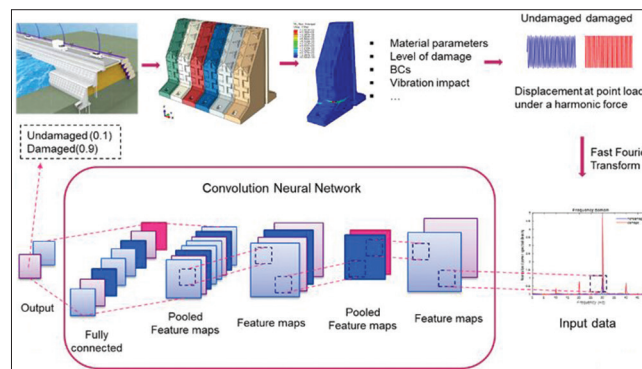


Figure 1: Framework of Convolution Neural Networks for predicting damage of a hollow seawall block



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PL-07

Research and cross-cultural enrichment

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Science and technology have long recognized the international character of research. The same cannot be said for the humanities, for in some academic quarters such as German Studies in Thailand, a dogmatic belief persists that only Germans know things German. Such antiquated dogma was demolished long time ago by German scholars themselves, and significant contributions from the “Auslandsgermanistik” (German Studies by non-Germans) are given due recognition. In the other direction, Thai Studies abroad have been flourishing for several decades. The author, a Comparatist and Germanist, seeks leave to recount his participation in these cross-cultural scholarly encounters.

Recent developments in Thai academia tend to view research as a grand system of generation of knowledge, sustained by a quasi-impersonal “internal” momentum that can be quantitatively gauged. This tendency runs the risk of overlooking the human elements that buttress in the research community, locally as well as internationally. The author reminisces about the many *personal* contacts at the international level that have enriched his career as a scholar and researcher. A few telling examples are given, some with wider implications that transcend scholarly boundaries.

The commendation from his doctoral supervisor for his impartiality in arbitrating between German and French Romanticism in his first monograph, published in Germany, has been an inexhaustible inspiration that induces the author to live up to the early promise in investigating cross-cultural phenomena in his subsequent research during the past 5 decades. His current project on the re-emergence of Comparative Literature in Germany after the Second World War is revelatory in the sense that the impetus coming from the Allies to hasten the re-opening of German universities did also accelerate the rebirth of the vanquished nation, propelled by the quest for knowledge and wisdom as well as a new spirit of democracy. Comparative studies can help explain why Germany has now become a pillar of European unity.

The author’s preoccupation with cross-cultural studies and his international contacts have given him the reassurance that technologically advanced countries also value and support the humanities, and in some progressive Asian countries, a subject like Religious Studies is in the ascendancy, a forceful argument against the facile, utilitarian education and research policy of his own country. In the final analysis, research is not just a means to achieve a certain goal, but a way of life that can be enriched by international experience.



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OP-01

Tailoring of surface properties to direct biological responses

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Artificial (human-made) materials are generally made to support the quality of human’s life. Some examples of artificial materials in contact with biological fluids are heart stents, tooth and hip implants, contact lenses, urinary catheter, and so on. Despite their main roles to support human’s life, artificial materials very often cause problems such as bacterial infection and inflammation in human’s body. Our research activities focus on the tailoring of surface properties of materials that are in contact with biological fluids. We have utilized a number of polymers such as poly(oxazoline)s, poly(ethylene glycol), and poly(N,N-dimethyl acrylamide) to coat and modify surfaces of various substrates. The surface chemistry, architecture, and performance of the coated substrates were investigated. Research results showed that biological responses of materials can be directed and controlled by tailoring the surface properties of the materials, using suitable polymers. For example, bacterial adhesion can be reduced, while tissue cell adhesion can be enhanced on such tailored surfaces (illustrated in Figure 1).

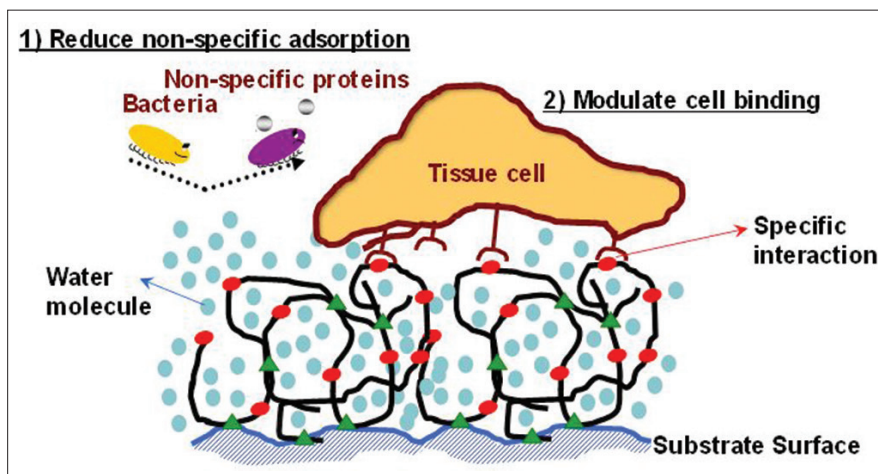


Figure 1: A tailored surface that reduces bacterial adhesion, however, enhances tissue cell adhesion



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OP-02

Cancer stem cells: New molecular targets for drug discovery

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As a controller of cancer aggressiveness and metastasis, the certain subpopulation of cancer cells exhibiting phenotypes of normal stem cells, termed Cancer Stem Cell (CSC), is among the famous targets in cancer research as well as drug discovery research nowadays. Therefore, identification of the potential factors facilitating transformation of the normal cancer cell to CSC and the regulatory mechanisms of CSC enhancement and maintaining will provide new insight in cancer cell biology, which can be utilized for the development of new therapeutic strategies against aggressive cancer. Here, we have provided several recent evidences indicating role of Nitric oxide (NO) and other endogenous and exogenous substances in regulating cancer stemness in lung cancer. We have shown that NO exposure increases cancer stemness of lung cancer cells and these effects of NO are reversible after cessation of the NO. Furthermore, we unveiled the the regulatory of caveolin-1 (Cav-1) on cancer cell aggressiveness. Cav-1, which is upregulated by NO, is responsible for the aggressive behaviour of the cells, including anoikis resistance, anchorage-independent cell growth, and increased cell migration and invasion. We provide the direct evidence how Cav-1 control Oct-4 degradation. As Oct-4 is a key stem cell transcription factor, this regulatory mechanism could be the underlying mechanism of NO-mediated CSC. In terms of anti-cancer drug discovery, we have provided information regarding potentials of several compounds together with their mechanism of actions in suppression of lung cancer aggressive behaviours, including metastasis, CSC, and EMT, that could be beneficial for the further development for lung cancer therapeutics. Taken together, we have provided insights regarding roles and mechanisms of endogenous and exogenous substances in regulating cancer stemness and aggressive behaviours in lung cancer cells. Even though clinical and in vivo data are of necessity, this knowledge based on cellular and molecular investigations offered a potential opportunity to develop a new strategy in treating lung cancer by targeting CSC potentiating factors and signals.



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OP-03

Do Necroptotic cells really want to survive? – Membrane repair in Necroptosis

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Necroptosis is a recently identified form of caspase-independent regulated cell death that has gained considerable attention over the past couple of years largely due to its role in various pathophysiological conditions. This mechanism of cell death is inherently immunogenic due to the release of damage-associated molecular patterns upon plasma membrane rupture, a morphological change that characterizes this pathway. Between the initiation of necroptosis to its final outcome, i.e. cell death under the persistent presence of necroptotic stimuli, the cell activates various counterbalancing repair mechanisms that serve to delay cell death and allow proper cell to cell communication to occur. Here, we show that upon necroptotic induction, CHMP4B, a component of ESCRT-III complex previously implicated in membrane repair, is activated and forms punctae concomitant with an increase in cytosolic Ca^{2+} concentration. The source of the increase in cytosolic Ca^{2+} concentration cannot yet be ascertained, although our data suggest that Ca^{2+} related to endoplasmic reticulum channels is independent of CHMP4B activation. Previous reports also indicated that CHMP4B mediates shedding of damaged membrane regions during necroptosis, but our data indicate that most of the CHMP4B puncta are intracellular in nature, suggesting the involvement of other pathways in necroptotic membrane repair. Indeed, we show that inhibiting PI3K and acid sphingomyelinase resulted in some cellular protection, similar to interfering with the regulated secretion mechanism. Shedding light on how these repair mechanisms work during necroptosis will be important towards understanding the potential means by which we can control this type of cell death, and possibly exploit it for some therapeutic benefit.



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OP-04

Combination of nanobodies and methicillin could help treatment of methicillin-resistant *Staphylococcus aureus* (MRSA)

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Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most serious multi-antibiotics resistant bacterial pathogens, which causes skin and soft tissue infections, bone, joint and implant infections, ventilator-associated pneumonia, and sepsis. There are many drugs for treatment of MRSA infections, for instance vancomycin, daptomycin, ceftaroline, flucloxacillin, and linezolid. Nevertheless, even under controlled use, MRSA strains show reducing susceptibility to these antibiotics. Therefore, it urgently needs new effective therapeutic approaches for treatment of these infections. The research is based on the fact that a transpeptidase of the penicillin binding protein 2a (PBP2a) encoded by the *mecA* gene plays a key role in cell-wall synthesis for effectiveness of β -lactam antibiotics.

We selected and produced humanized-camel VHs/V_HHs or nanobodies, which are specific to the PBP2a transpeptidase (PBP2a_{TP}) of MRSA from the previously constructed VH/V_HH phage display library. The binding specificity of nanobodies was tested by ELISA and Western blot analysis. The *in vitro* PBP2a_{TP} inhibition by the combination of the nanobodies with β -lactam antibiotic (methicillin) demonstrated the bactericidal synergy at sub-MIC. Furthermore, the interaction between the selected nanobodies and PBP2a-TP was predicted by homology modelling and intermolecular docking. The proposed mechanism for the synergistic activity in MRSA involves the inhibition of the transpeptidase activity of PBP2a; the nanobody binds to the residues involved in the active site pocket and to the allosteric critical residues on the TP domain of PBP2a, triggering the active site pocket and allosteric response of allosteric domain. These lead to the opening of the transpeptidase active pocket to which methicillin could bind to an active-site resulting in blocking of the cell wall biosynthesis, with bactericidal consequences. The efficacy of synergistic activity of nanobodies and methicillin will be further validated *in vivo* in mouse MRSA infection model.

Keywords: MRSA, PBP2a, Transpeptidase, Nanobodies, VH/V_HH



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OP-05

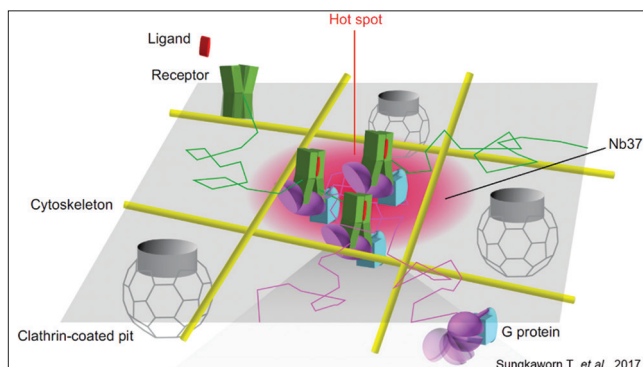
G protein-coupled receptors: From dynamic interactions to novel targets of diabetic nephropathy

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G protein-coupled receptors (GPCRs) are largest family of membrane receptors for hormones and neurotransmitters. According to their physiological significance, more than 30% of FDA-approved drugs target to GPCRs. However, the molecular basis of how GPCRs interact and transmit signal to G proteins is not fully uncovered. Recently, we used single-molecule microscopy to directly visualize interactions between individual receptors and G proteins at the surface of living cells. We reported, for the first time, hot spots on the plasma membrane in which receptors and G proteins are confined and preferentially interact. These findings allow us to investigate potential molecules in GPCR singling for applications as therapeutic targets. Here we do propose the identification approach of GPCRs as novel drug targets for diabetic nephropathy, a kidney complication from diabetes. Diabetic nephropathy leads to end-stage renal disease which is a leading cause of morbidity and mortality of patient among other diabetes complications. Nowadays, tightly controlled blood sugar and blood pressure are the only approach to prolong an onset of diabetic nephropathy. The direct target for pathogenesis of the disease has not yet been identified. Interestingly, there are accumulating evidences of GPCRs expression and signaling in kidney especially podocytes, the kidney cells that perform a major function to prevent albumin leakage into the urine. Since podocyte injury is a hallmark of diabetic nephropathy, any conduct to protect or treatment of podocyte injury would be considered as potential therapeutics for diabetic nephropathy. Furthermore, the identified GPCRs could be used as a basis for the novel screening strategy and drug discovery for therapeutics of diabetic nephropathy.



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OP-06

Assessment of embryotoxic, teratogenic, and cellular stress gene induction in zebrafish after exposure to e-cigarette fluids

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Although e-cigarettes have been marketed as the safer alternative to tobacco cigar smoking, most researchers are still skeptical since the implications of their usage have not yet been thoroughly investigated. In line with this, the study aims to determine the chemical components in three (3) different flavors of e-cigarette fluid (i.e. strawberry, vanilla, and tobacco) and whether exposure to varying dilutions of these treatments induce morphological abnormalities and hsp70 gene expression in zebrafish embryos. The chemical components of the e-cigarette fluid were determined via gas chromatography-mass spectrometry, and the treated embryos were subjected to ZFET, and then hsp70 gene expression analysis by RT-qPCR. All treatments were significantly embryotoxic for the parameters of lethality, heart rate, hatching, and malformation occurrences. Similarly, all treatments induced the upregulation of hsp70 gene expression. The embryos exposed to the vanilla and tobacco-flavored e-cigarette fluid exhibited similar trends in their results, which coincided with their similarity in chemical composition. Meanwhile, the embryos exposed to the strawberry-flavored e-cigarette fluid exhibited the most pronounced effects, distinct from those of the other two (2) flavors, which may be attributed to its possession of the highest relative nicotine content among all three (3) flavors. The results of this study implicate the possible adverse effects of e-cigarette smoking as it induces embryotoxic, teratogenic effects, and stress response on zebrafish embryos, a vertebrate model homologous to humans.



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OP-07

Drug discovery from fungi at Prince of Songkla University

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After the discovery of penicillin, fungi are then long known as rich sources of natural molecules for drugs. Interestingly, isolated metabolites can be excellent new starting points for the development of novel pharmaceuticals. Our research group at Prince of Songkla University has focused on the investigation of bioactive secondary metabolites from fungi since 2005. Fungi were isolated from a wide variety of substrates including plants, marine organisms and soil. Chemical investigation of 80 fungal strains has resulted in the isolation of more than 800 secondary metabolites of which ~34% are new natural products with diverse structures, for example, anthraquinones, γ -butenolides, cytochalasins, lovastatins, piperidines, β -resorcylic macrolides, depsidones and meroterpenoids. Some secondary metabolites displayed interesting antibacterial, anticancer, HMG-CoA reductase inhibitory, cystic fibrosis transmembrane conductance regulator (CFTR) inhibitory and transmembrane protein 16A (TMEM16A) inhibitory activities. The mechanism of action of potential natural compounds has been investigated. In addition, structural modification of these compounds has been studied in order to obtain analogues with better activity and lower toxicity. An overview of our findings will be presented.



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OP-08

Novel secondary metabolites from Dothideomycetes: Prospects for drug discovery

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The rise of emerging diseases caused by bacterial- and fungal-related infections, especially the alarming spread of drug-resistant bacterial species has necessitated the discovery of new generation antibiotic compounds from natural resources. Among which, the fungal kingdom is a prolific producer of a variety of natural products that have served as structural drug prototypes for developing new anti-infective hit compounds. As part of our continuing efforts to explore the chemodiversity of fungal species as well as their anti-infective and cytotoxic properties, we hereby present the result of our studies on several fungal species allied to the class Dothideomycetes. Thus, after preliminary screening which included LC-DAD-MS chemical profiling and standard microbial inhibitory assays, allowed us to select several fungal species for further investigation. Extraction of fungal cultures of *Sparticola junci*, *Rousella* sp., *Pseudolophioblastoma mangiferae*, and *Pseudopalawania siamensis* followed by chromatographic purification and spectroscopic identification afforded a number of new/novel polyketide and terpene secondary metabolites. In general, the compounds exhibited potent antimicrobial activities against filamentous fungi and Gram-positive bacteria, inhibited *Staphylococcus aureus* biofilm formation, toxicity against *Caenorhabditis elegans* and cytotoxic activities against cancer cells. Our results show the promise of Dothideomycete fungi in drug discovery.



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OP-09

Some results on functional equations

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Two fundamental questions in mathematics are the following. Given a system of Diophantine equations, characterize the integral or rational solutions. In a similar spirit, given a system of polynomial equations, characterize the “functional” solutions, that is what kind and how many meromorphic functions can be substituted in for the variables. Of course, stated in this level of generality, the answers to both questions are far from understood. One can start with the simplest case of one of these problems by considering just one equation, rather than a system, such that the equation defines a one-dimensional object, namely, a possibly reducible algebraic curve. Here Picard’s theorem from the end of the nineteenth century tells us that the equation can contain non-constant meromorphic functions as solutions if and only if the algebraic curve contains an irreducible component of genus at most one. In a parallel sense, Falting’s Theorem from the 1980’s tells us that the equation can have infinitely many solutions belonging to a fixed number field only if the curve contains an irreducible component of genus at most one. Although Falting’s and Picard’s work give us a good theoretical understanding of how the geometry of the equation influences the solution space, it can still remain a formidable challenge to determine whether an explicit concretely given equation might contain an irreducible component of genus at most one. In the further special case when the variables of the polynomial can be separated so that the equation can be written in the form $P(x)=Q(y)$, where P and Q are one-variable polynomials on a some field, we now have a very good understanding and useful characterizations for when the curve associated to such an equation may have irreducible components of genus zero or one. The first results presented here describe our contribution to this study of when the algebraic curves represented by equations of the form above contain small genus components. In the second part, we move from the analysis of a single equation to the analysis of a particular system of polynomial equations known as the Buchi n -th power problem. Finally, we consider zeros of some differential polynomials.



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OP-10

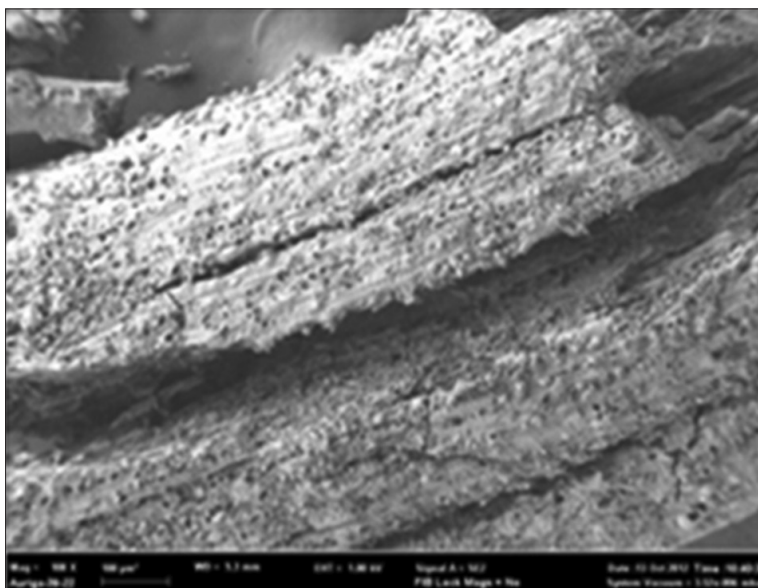
Microwave-assisted fast-pyrolysis used to produce porous carbon materials

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In this study, magnetic bio-char was produced using discarded material i.e. Palm oil empty fruit bunch (EFB) by pyrolysis with impregnated FeCl_3 . The microwave-assisted fast-pyrolysis of the impregnated EFB was carried out with the help of single stage microwave heating technique. The details of process parameter were studied such as: microwave powers, radiation time and impregnation ration ferric chloride hexahydrate to biomass. The performance of the produced magnetic bio-char was applied to remove methylene blue (MB) from aqueous solution. The preparation conditions were statistically optimized to produce high surface area, high yield of magnetic bio-char and high adsorption of MB.



Jaya Narayan Sahu, B. Tech. (Chemical Engg.), Berhampur University, India, and Ph. D. (Chemical Engg.), Indian Institute of technology, Kharagpur, India. My research focuses on developing a fundamental understanding of the design and optimization of processes and products for environmental applications, waste minimization and energy recovery. Dr. Jaya have a total of fifteen years of teaching, research, consultancy & projects experience. I am also serving as editor for more than 5 international high impact scientific journals and also editorial board member of the several international academic journals. For my outstanding research career at young age, I was been awarded the ProSPER.Net-Scopus Young Scientist Award (YSA) in 2014 for sustainable waste management in Asia level and also rewarded the Alexander von Humboldt Foundation grants research fellowship (as experienced researchers). In 2019 Web of Science Group identifies as Highly Cited Researcher.

OP-11

Transferred electron devices for T-rays generation

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GaN is known as one of the promising materials for transferred electron devices also known as Gunn diodes to generate THz signals or T-rays at applicable power ranges. The performances of GaN-based Gunn diodes have been studied extensively for more than two decades, in particular, theoretical predictions using various methods including Monte Carlo model, Negative Differential Mobility model and Hydrodynamic model. As a shorter device is expected to operate at a higher frequency, many studies were carried out for devices in the micron to submicron range; the reported Gunn diode with shortest transit length is 400 nm. The fundamental operating frequency of these GaN Gunn diodes varied from 87 GHz up to 1.55 THz. In comparison, the reported experimental measurement shows a 5 μm transit length device applicable for 2.7 W output signal at 38 GHz. Many studies on wurtzite GaN drift velocity characteristics have been performed, particularly theoretical predictions using analytical band and full band Monte Carlo models. These simulated results show great discrepancy from each other and from the experimental measurements. For example, the Monte Carlo model using full band structure derived from non-local empirical pseudopotential calculations shows a peak drift velocity of 3.13×10^7 cm/s at electric field of 200 kV/cm with an applied field along the Γ -A direction, while the experimental work by Yilmazoglu *et al.* shows a peak drift velocity of 1.9×10^7 cm/s at 220 kV/cm. Overall the theoretical works show peak drift velocity ranging from 2.5×10^9 cm/s to 3.1×10^7 cm/s and the critical field ranging from 132 kV/cm to 224 kV//cm. Generally, the experimental results show that the peak drift velocity and the drop of drift velocity in negative differential resistance (NDR) region are much lower than that predicted from theoretical simulations. Thus, it is important to review these results and the impact on the performance of GaN Gunn diodes as THz sources. It is well demonstrated that the Monte Carlo method is suitable for modelling of transferred electron devices due to its advantages of taking into account the transport dynamics of particles and various scattering mechanisms. In this work, two analytical-band Monte Carlo models are used to evaluate the performance of GaN Gunn diodes. The first model MC-A is using electron transport parameters capable of reproducing the Γ -A applied field direction electron drift velocity characteristics of GaN predicted from the first-principles full band Monte Carlo model and the second model MC-B with additional defect scattering for fitting to the experimentally measured data. Both Monte Carlo models are used for device simulations to evaluate and compare Gunn diode performances particularly in the terahertz range. The MC-A model predicts a GaN Gunn diode with a transit length of 400 nm capable of operating at a frequency up to 625 GHz with an estimated output power of 3.0 W. However, the lower electron drift velocity and less pronounced negative differential resistance of the MC-B model predicts THz signal generation of 2.5 W at highest sustainable operating frequency of 326 GHz in a Gunn diode with a transit length of 600 nm.



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OP-12

Chemistry in big data era as the key science for comprehensive understanding about nature and its changes

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Previously, Baconian induction is the best methodology for developing science. Most data and treatments were collected as hypotheses were proven. In today's accelerated expansion of scientific data, most software developed for data development and management purposes. The power of digital communications even shifts the progress in science much faster than before.

In principle modern analytical chemistry reveals much information at chemistry level of nature. The science aids the development of science up to now. Modern analytical chemistry in digital era also shapes the science and technology in the future more rigorously than today. Wider applications would be made feasible by bigger capacity of big data analysis as software development also in line with rapid progress in science. Analysis can now be done without separation chemistry.

Instrumentation and big data are two major attention of scientist today. Materials making and applications, risk managements, environmental awareness, natural product exploration, food combining and analysis as well as method development and validation in any area of science, are some of many modern topics in science. The shift of scientific expression towards social media is supported by big data in science available. Some “bridges” for reporting scientific development are needed to avoid misunderstanding in the society. Innovation in education and learning plays its role to deliver science to broader audience.

Keywords: analytical chemistry, big data, innovation in science education



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OP-13

Organochlorine pesticide contamination in surface and groundwater in central Luzon, Philippines

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Poorly-regulated pesticide use to increase food production may lead to pollution of water resources. Organochlorine pesticides were analysed in surface and groundwater collected along the Pampanga River, Philippines. Our results revealed that surface water and groundwater were tested with residues of organochlorine pesticides such as dieldrin, endrin aldehyde, α -BHC, β -BHC, δ -BHC, γ -chlordane, and endosulfan II, which are all banned according to the Stockholm Convention. Our results further revealed that the concentrations of organochlorine pesticides including endrin aldehyde, total BHCs (i.e., α -BHC, β -BHC, δ -BHC), and heptachlor in groundwater exceeded regulatory limits. The presence of banned organochlorine pesticide residues in surface water and groundwater may suggest that they are deliberately and continuously used illegally. Together, our results suggest that these banned organochlorine remains a major environmental concern despite the bans and restrictions under the Stockholm Convention. Routine chemical monitoring coupled with biological monitoring using a battery of biomarker tests of organochlorine pesticide and residues along the Pampanga River are necessary to provide inputs for the control and reduction of environmental pollution and for minimizing human health risks.



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OP-14

The research of soil nematodes abundance and functional group at global scale

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Groundbreaking research into the soil beneath our feet, published in the journal *Nature*, transforms our understanding of life on land by revealing that the world’s largest animal populations are found in high-latitude sub-arctic soils. Our research was carried out by more than 69 scientists from 35 laboratories all over the world. The study focused on the top 15cm of soil – the most biologically active zone – and calculated that around the world it is home to 4.4×10 to the power of 20 nematodes, or 57 billion for each human on the planet. We took 6,759 soil samples representing every continent, and every environment from arctic tundra to tropical rainforest, and used microscopes to analyse the density of each type of nematode to generate a representative global dataset. It also calculates that the world’s population of soil nematodes is far greater than previously estimated, with 57 billion for every single human. The nematodes have a total biomass of around 300 million tonnes – approximately 80% of the combined weight of Earth’s human population of 7.7 billion people. The study provides conclusive evidence that the majority of the world’s animals live in high latitudes: 38.7% of soil nematodes exist in boreal forests and tundra across North America, Scandinavia and Russia; 24.5% in temperate regions; and only 20.5% in the tropics and sub-tropics. We used machine learning to determine how the abundance of each type of nematodes related to the climate, soil and vegetation at each sample site, identifying 73 different variables. They used this information to build models which predict nematode populations for each square kilometer and create the first global high-resolution maps of soil nematode density and functional group composition. “Predicting climate change requires that we understand global carbon and nutrient cycles. We currently have a great understanding of the physics and chemistry of our planet, but we know far less about the biological organisms that drive these cycles. Improving our understanding of these organisms at a global level is critical if we are going to understand and address climate change. “Healthy soil communities are essential for the stability of ecosystems and the storage of carbon on land. Our research will help scientists to make better predictions about carbon cycling by developing models that reflect the impact of soil organisms. It will also enable land managers to make the right decisions in the fight against biodiversity loss and climate change by identifying soils which need to be restored to health.”

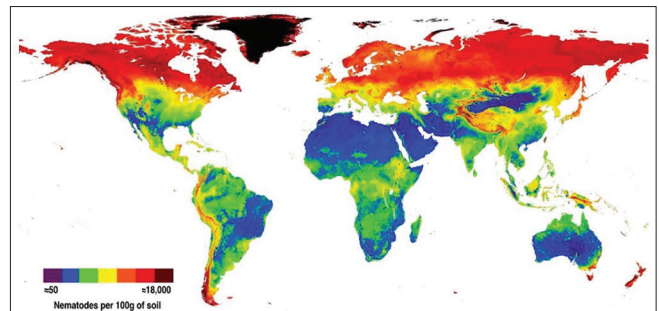


Figure 1: Abundance of nematodes per 100g of Soil



Nguyen Thi Anh Duong, Bachelor degree in Biology at the Faculty of Biology, University of Natural Sciences, Ho Chi Minh, Vietnam. (B.Sc., 2006), Master degree in Biology at the Faculty of Sciences, Department of Biology, University of Ghent, Belgium and Faculty of Experimental Sciences, Department of Animal Biology, Plant Biology and Ecology, University of Jaén, Spain (M.Sc., 2011) (Erasmus Mundus Scholarship), Institute for Zoology, Department of Terrestrial Ecology, University of Cologne, Germany (Ph.D., 2017) (DAAD scholarship). Currently, I am working at researcher at the Department of Nematology, Institute of Ecology and Biological Resources (IEBR), Viet Nam Academy of Science and Technology (VAST). Research interests: Ecology of free-living terrestrial nematodes and using them as bio-indicator and relationship to many other factors of environment such as physical elements, chemical elements, human, impact, and so forth, and taxonomy of free-living nematodes in soils such as Mononchida, Dorylaimida and Rhabditida.

OP-15

Artificial intelligence and geospatial computation for urban applications

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Our world is expanding and getting complex day after day. Cities are built with new design concepts and sophisticated infrastructures. Transport networks, urban vegetation, and other urban features are densely connected and effectively organized. New technologies have been developed to mitigate natural hazards such as floods, cyclones, earthquakes, and landslides. Novel methods have been tested for site suitability analysis and natural resources management. Almost all these have been enabled by remote sensing and advanced geospatial computations. The speaker in this talk will first explain the basic and advanced geospatial concepts that have been widely used to solve urban problems. Then, he will discuss several applications ranging from 3D city modelling to urban feature extraction, urban growth simulation, to natural hazards, and to site suitability assessment. Finally, the speaker will conclude the talk by presenting the current challenges in geospatial computation for urban applications and areas to improve in future research works.

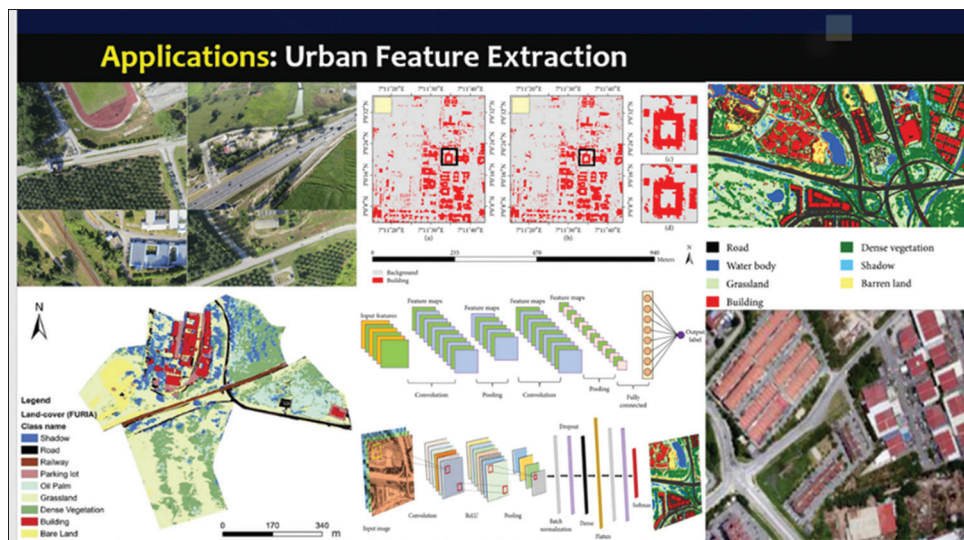


Figure: An example showing the application of AI and geospatial computations for urban feature extraction



Biswajeet Pradhan, is a distinguished professor internationally established scientist in the field of Geospatial Information Systems (GIS), remote sensing and image processing, complex modelling/geo-computing, machine learning and soft-computing applications, natural hazards and environmental modelling. He is the Director of the Centre for Advanced Modelling and Geospatial Information Systems (CAMGIS) at the Faculty of Engineering and IT. He is also the distinguished professor at the University of Technology, Sydney. He is listed as the World's most Highly Cited researcher by Clarivate Analytics Report in 2019, 2018, 2017 and 2016 as one of the world's most influential mind. In 2018 and 2019, he has been awarded as World Class Professor by the Ministry of Research, Technology and Higher Education, Indonesia. He is a recipient of Alexander von Humboldt Fellowship from Germany. Professor Pradhan has received 55 awards since 2006 in recognition of his excellence in teaching, service and research.

OP-16

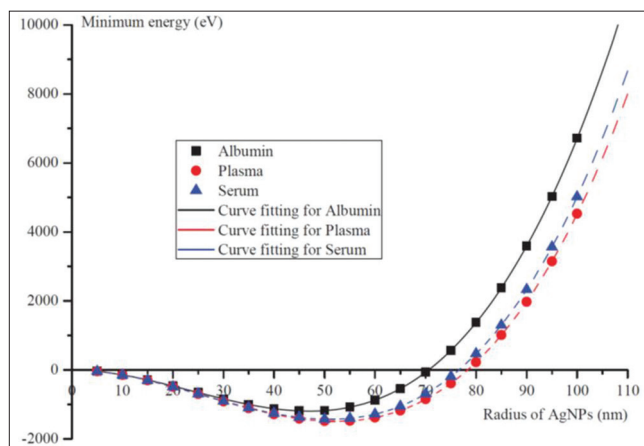
Mathematics modelling in nanotechnology

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Protein corona can be illustrated as a layer coating on a nanoparticle. Here we model the interaction of a spherical nanoparticle and surrounding proteins using the 6-12 Lennard-Jones potential and the Columbic potential to represent the van der Waals and the electrostatic interactions, respectively. The main outcome is an analytical expression to describe the energy behaviour of the system as a function of size and type of the nanoparticle and those of the proteins. We find that zeta potentials play an important role to the stability of the protein corona. In particular, more favourable Coulombic interaction will be established between opposite charges of nanoparticle and protein. Furthermore, an optimum value of the corona thickness is predicted to be 5 nm independent of silver nanoparticle size, value of zeta potential and protein type. This mathematical model can be applied to interpolate other core nanoparticles with various combinations of proteins in media. Curve fittings for minimum energy versus radius of AgNPs for three protein environments of zeta potential -50 mV and thickness 5 nm. Interceptions of x -axis represent critical radii of AgNPs.



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OP-17

Higher education reform of Myanmar

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In this paper, higher education reform process, started in 2016 in Myanmar, is studied in terms of structure, internationalization, collaboration, student mobility, etc. There are many remarkable achievements in HEIs such as steady progress in reforming teaching methodologies, student assessment systems, internal quality assurance systems and planning processes, in addition establishment of Student Unions and University Teachers Association. Moreover, increase in international collaboration and greater autonomy of Universities; have also been achieved in Higher Education sector. However, the HE sector is still facing four major challenges: to transform the traditional centralized system into a corporate model focusing on performance, accountability and autonomy; to improve curriculum, learning environment, research and teaching process; to introduce the programs to overcome the limitation of access to HEIs, particularly for students from under-privileged backgrounds, and to enhance research capacity leading to foster critical thinking and innovation. Myanmar HEIs need extensive budget, autonomy, international cooperation and support even to reach ASEAN level. To overcome these issues and challenges, Myanmar National Education Strategic Plan (NESP) 2016-2021 was developed and identified with the Higher Education Transformational Shift. According to NESP, it is anticipated that students will be able to have equitable access to a world-class higher education system, better opportunities for employment and significant contributions to a knowledge-based economy. Ministry of Education is committed to work together with all stakeholders to achieve the goals of NESP.

Keywords: Higher education reform, National education strategic plan (NESP), Myanmar HEIs, Higher education transformational shift



Professor Dr. Kyaw Naing, is a Deputy Permanent Secretary of Ministry of Education since April 2018. His duty and responsibility is international collaboration, academic and administrative functions of the ministry. He has 40 years expertise of academic and senior leadership and management roles within the Myanmar higher education system. He gained B.Sc. in 1981, B.Sc. (Hons.) in 1983 and M.Sc. in 1987 from University of Yangon, and Ph.D. in 1995 from Hokkaido University, Japan. His study continued in University of Heidelberg as an Alexander von Humboldt research fellow in 1998, 2003 and 2012 in Professor Dr Peter Comba group of Institute of Inorganic Chemistry. He worked as Chemistry Professor, Pro-rector, and Deputy-director General of Department of Higher Education.

OP-18

New challenges for ASEAN and Korean lawyers in the 21st century

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Due to rapid globalization and regional integration, especially in the region of ASEAN countries and Korea, the development of international trade law and the international organizations dealing with private and commercial law are facing a range of challenges. The driving force behind the phenomenon of globalization is not governmental policy but private initiative, such as expanding markets; global competition; increasing mobility of individuals, companies, goods, services, and capital; and developing of means of communication and instant sharing of information through the media and the Internet. The result is a variety of new international legal issues not only between states, but also between private and commercial parties, usually involving the legal systems of more than just one jurisdiction. For the ten ASEAN countries comprising four common law based systems, three on civil laws, and another three are hybrids of both common and civil law – the ideal of ‘one legal framework’ to find single common ground remains a considerable challenge.

Whenever legal diversity is overwhelming an approach has been often taken to accept intervention of legal system of so-called “large country” having dominating economic power, such as extraterritorial application of laws of the United States, and to obtain short-term economic benefit by following such legal system. However, such approach contains risks to facilitate disorders due to differences in legal cultures, and as a result could cause disruption in the society. For this reason, another approach is to suggest. It is important to understand diversity of legal systems in the region, and to research and reflect into practice the way to allow the diversity to co-exist in a coordinated manner and to achieve convergence thereof based on the existence of such diversity, not by “forcing” any one of the legal systems as having superiority, or not by taking isolationism approach ignoring the multi-culture and other legal systems consisting of domestic law of each country.

For lawyers in the region of ASEAN countries and Korea it is important that they understand the diversity of legal systems in the context of cultural and societal differences.

To reach this goal we have to change the concept of lawyers’ education in the 21st Century: Our lawyers should not only learn domestic laws but should also study foreign and international laws and different societies with understanding of the supporting cultural backgrounds. The international legal education in the scheme of new Korean professional law schools with their interdisciplinary education purpose after the reform in 2009 can be a model for a new way of international legal education in the 21st Century.



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OP-19

English as a Lingua Franca in ASEAN

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Over the last decade, there has been rising interest in English as a lingua Franca (ELF) in ASEAN, following work on the subject in Europe. Research on English as a lingua Franca can be considered a contribution to the study of identity regionalism. Regional awareness and regional identity are important areas to examine, and this would include shared norms by which regional identity is often shaped. Much discussion in the field of international studies on regionalism and regionalisation has been on economic or security integration and not in the area of socio-culture. There has been pessimism over the creation of a supra-national ASEAN-wide common identity as it is said that there is no common element that binds the Southeast Asia region. Moreover, although English is the common working language of ASEAN, it is often considered a language of pragmatism and not an emotive common language that can express any regional cultural content. This has been echoed by many researchers who highlight that diversity in the region, with a multiplicity of religions, cultures, political and legal cultures, makes it difficult for people in ASEAN to feel united or integrated. There is also a case for arguing that ASEAN has had greater value for political and economic elites with greater access to varieties of English from beyond the region than to Southeast Asians of lower socioeconomic status more likely to use highly indigenised varieties. This presentation is intended as a contribution to the socio-cultural pillar of ASEAN by focusing on ASEAN’s official language, English. Features that are used by ASEAN speakers of English will be identified and common features found among them will be highlighted. Evidence to the effect that, with increasing intra-regional cooperation and mobility, English among ASEAN nationals is developing its own characteristic features and thus is itself contributing to a supranational regional identity; some comparisons with ELF in Europe will be made.



Azirah Hashim, PhD (Malaya), MA Linguistics, MA TEFL (East Anglia), BA Humanities (Hertfordshire); Professor, Faculty of Languages and Linguistics, University of Malaya; Vice-President, International Association of Applied Linguistics (2017-2020); Executive-Director, Asia-Europe Institute, University of Malaya (2015-2020); Director, Centre for ASEAN Regionalism, University of Malaya (2015-2019); Dean, Humanities Research Cluster, University of Malaya (2010-2015); Dean, Faculty of Languages and Linguistics, University of Malaya (2003-2009); Visiting Professor, University of Bern (Sept 2019-February 2020); Alexander von Humboldt Foundation Fellow, Free University of Berlin (2009/2010); Project leader, Erasmus+ Capacity Building in Higher Education (2017-2020), Director, Jean Monnet Centre of Excellence (2017-2020).

OP-20

How legal science shall cooperate with other disciplines

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In 2011, a psychological study made headlines. It confirmed what everybody thought they knew: hungry judges issue harsher sentences. According to the study, Israeli judges were more likely to deny a prisoner’s request for parole, when their lunch break came closer. The study was published prominently and became even more famous, when Nobel prize-winner Daniel Kahneman cited it in his worldwide bestseller “Thinking, Fast and Slow”.

Lawyers were alerted. After all, their reputation was on the line. The outcome of a trial should not depend on whether the judge is hungry. So, the search for remedies began. The proposed solutions are far-reaching: If human judges performed so poorly, maybe we should rely on artificial intelligence instead? But what the heated debate overlooked was that in psychology the study had been met with much scepticism, as it suffered from methodological flaws.

In my talk, I will present the original study and the most important critiques thereof. The case will thus illustrate basic methodological problems of observational studies. Against this background, we will discuss the benefits, but also the pitfalls of the reception of other disciplines’ insights by legal science. While legal science can hugely benefit from these insights, it must be careful to also acknowledge the conditions under which they are generated. This does not mean that every lawyer should become a social scientist, but since much disciplinary knowledge is implicit, lawyers should at least invest in serious interdisciplinary dialogue.



Konstantin Chatziathanasiou, born in 1985 in Mainz, Germany; studies of law in Heidelberg, London (King’s College), and Bonn (scholarship by the German Academic Scholarship Foundation); clerkship in Bonn, Cologne, and Berlin; 2014–17 researcher at the Max Planck Institute for Research on Collective Goods in Bonn (graduate scholarship by the German Academic Scholarship Foundation); 2016 Grotius Research Scholar at the University of Michigan Law School; 2018 PhD in Law at the University of Bonn (referees: Prof. Dr. Christoph Engel; Prof. Dr. Christian Hillgruber); since 2018 postdoctoral researcher at the chair of Prof. Dr. Niels Petersen at the University of Münster; since 2019 fellow of the Young ZiF at the University of Bielefeld.

OP-21

Enhancing research and publish skills for young academics in Vietnamese universities

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Young academic in Vietnamese universities are under pressure to publish their research in recognised international academic journals. Many are also eager to send their manuscripts to different publishers, nonetheless, not many of them have been successful. Language barrier, writing skills, and especially a different way of doing research seem to be great challenges for these young academics to overcome to join the global scientific community. This presentation, based on my own experience as a reviewer for different academic journals, aims to discuss these challenges and approach some possible solutions to help young academics in Vietnam to enhance their research skills and their ability to publish research outcomes in international academic forums.



Dr Thi Tuyet Tran, is a mobile lecturer and researcher. She has worked in three countries: Australia, Vietnam and Germany and has developed an interest in interdisciplinary research. Her interests range from labour economics, human resource management, to various areas in management and education research such as graduate employability, work integrated learning, university-industry collaboration, language education and cultural study. She is currently based herself at RMIT university and working toward a research project investigating workplace integration of professional skilled migrants in Australian labour market.

OP-22

Academic Muslim scholars and mediated public sphere

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Academic scholars are a group of people which stick to the academic norms, which include honesty, disinterestedness and organized scepticism. These scholars are ideally granted a freedom in exercising their scholarly enterprises. The scholars accordingly constitute pillars of open society. Due to this position, the academic scholars may play a significant role in nurturing the public sphere.

Private and public identities of the people are not considered a challenge to public sphere as long as they are not manifested in the form of identity politics. The increase of identity politics, most particularly in the context of digital age, poses challenges for the progress of public discourse. With the intrusion of media (most specifically social media and web 2.0), the notion of public sphere is no longer based on real contact with people but brokered by the media.

This paper is aimed at investigating three main research problems: (a) What is the role of the academic Muslim scholars in nurturing public sphere; (b) How do the academic Muslim scholars response to the emergence of identity politics in mediated public space; and (c) What are the prospects for mediated public sphere in the Muslim world.



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OP-23

The impact of AI and automation on sustainable development and leadership in South East Asian countries

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From a historical perspective, Artificial Intelligence (AI) is nothing new because years ago, AI was already present in the imaginative stories of humans. Over the past centuries, machines have supported and gradually replaced human. In the coming years, automation and AI will continue to support people, creating new jobs on the one hand, and on the other hand leaving human without jobs. However, this will create new opportunities for young people, so it is necessary to prepare for the future.

The motivation for this paper is, first, AI has become one of the prominent factors in innovation and rapid development in Southeast Asia. The remarkable progress of and enormous investment in AI and automation in the past few years in Southeast Asia has made people curious about the power, challenges and opportunities for AI in the region. The second motivation is the increasing number of academic researches conducted to study the subject and attempt to answer several related questions: What problems can AI solve in Southeast Asian social life for those nations’ sustainable development? To what extent can AI and automation play some roles in leadership and which aspects are applicable? At best, AI can look into how similar issues are resolved in different countries, but it far from guarantees being able to not just resolve the current problems that the leadership provides, but to maintain strong leadership.

The purpose of this paper is twofold: to survey the literature on AI and automation in Southeast Asia, with an emphasis on their impact on sustainable development and leadership, and to put forward a research agenda for academics and policymakers to incorporate the current knowledge with future arrangements.

Keywords: Artificial Intelligence (AI), Automation, Sustainable development, Leadership, Southeast Asia



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SP-01

Special panel sessions for young researchers

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To encourage and to promote younger generations for research career, a Program on Multi-Mentoring System has been launched by The Thailand Science Research and Innovation (TSRI) (Formerly, The Thailand Research Fund (TRF)), together with the Office of Higher Education Commission (OHEC), Ministry of Higher Education, Science, Research and Innovation (MHESI) of Thailand.

The program is arranged in this 1st Southeast Asian Humboldt Kolleg 2019 in form of “Special Panel Sessions for Young Researchers”. The program consists of 3 sessions: 1) Soft Skills for Future Young Researchers, 2) The New Voices in Global Research Cooperation, and 3) Code of Ethics for Young Researchers.



Kate Grudpan, Chiang Mai University (BS, 1974), Liverpool John Moores (PhD, 1981), Alexander von Humboldt research fellow with Professor C. Keller, at formerly Karlsruhe Nuclear Research Center (1991-2), later on with Prof. H. Geckeis, Presently, Chiang Mai University, Faculty of Science, Head of Center of Excellence for Innovation in Analytical Science and Technology (I-ANALY-S-T), Head Coach of Multi-Mentoring System (MMS 5), and The TRF Distinguished Research Professor Awardee.

SP-02

Soft skills for future young researchers

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Scientific recognition depends on disciplinary excellence in a specific research topic. To gain relevant results out of a research process, the work plan has to be manageable, the research question must be clear, and a set of appropriate research methods has been deployed. That is mostly seen as hard skills. However, that is only half of the story for having a career as a researcher! Other skills are needed: The ability to communicate the research idea and the results on an international floor is also essential for success. Some people are blessed with these so-called soft skills, but most of us are not excellent in this field even if we are excellent researchers. Teaching these non-disciplinary abilities is usually not a central part of education at universities, and lecturers teaching the content for the hard skills often neither have these soft skills, nor are they able to teach or transfer it. Additionally, communication about research has to be conducted mostly in English in writing and speaking. For many researchers, English is a foreign language. A relevant proportion of them does not feel comfortable expressing themselves in English, neither in writing nor in talking. How to overcome these restrictions without putting too much emphasis on it?

Training and coaching are excellent ways to improve these skills! Training means to do it, again and again. The precondition for any improvement is to know the individual strengths and weaknesses and to use it actively. People may need appropriate tools and some awareness of themselves. Coaching can help to identify both as well as selecting the right measures and courses. All these measures have to be integrated into a regular exchange with the peer group of the interdisciplinary community. That will result in efficient soft skill training and personal development.



Ingrid Rügge, University of Bremen (Diplom/M.Sc. 1995, Dr.-Ing./PhD 2006) in Computer Science. Presently, Managing Director of the International Graduate School for Dynamics in Logistics (IGS), a structured doctoral training program of the University of Bremen, for the Faculties of Physics/Electrical Engineering, Mathematics/Computer Science, Production Engineering, Law, Economy/Business Studies. Ingrid developed a set of measures to support the personal development of doctoral candidates, researchers, and postdocs towards excellence in science and business. To date, she supported already 46 full doctoral candidates from 24 nations successfully. Three hundred students on all levels of education joined her training and coaching program, most of them more than once. Now she is transferring the concept to other universities.

SP-03

Soft skills for future young researchers

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Although the knowledge, trainings and experiences make anyone a brilliant academic, adaptability, moderation, creative thinking, communication and leadership known as soft skills make one a high-caliber researcher in scientific professions. In an increasingly competitive academia, researchers nowadays must be able to lead research teams, communicate their ideas/knowledge clearly and effectively, collaborate with others, manage conflicts and many more. Unlike hard skills that we can learn through reading, education and training programs, soft skills are social skills and personal attributes which we have to learn through interacting with other people and those who have both set of skills would make exceptional professional success. As university lecturers, we often bury ourselves with teaching, doing research, supervising postgraduate students and working crazy hours. Sometimes, we feel down or get frustrated from piles of work, academic system and non-working experiments. It is time like this that soft skills give us positive energy, inspiration and keep our motivation up. In this special session, I will be sharing my experiences on soft skills classes during my PhD study which helped me made it through especially when I was losing my passion in research. Some of the soft skills, for example, self-awareness, stress management, work organization skills, presentation and writing skills and project management are also absolutely helpful and make a huge difference in my academic career.



Burapat Inceesungvorn, Chiang Mai University (B.Sc., 2004 and M.Sc. 2005), Queen’s University of Belfast, UK (Ph.D., 2009). Currently, she is a lecturer in the Department of Chemistry, Faculty of Science, Chiang Mai University. She received National Young Scientist Award from the Foundation for the Promotion of Science and Technology under the Patronage of His Majesty the King in 2017 and an outstanding contribution award from the institute for the promotion of teaching science and technology, Thailand (in recognition of significant contributions and outstanding service to IPST) in 2018. Her current research interests focus on the development of photocatalytic materials especially semiconductor metal oxides for green organic synthesis, water depollution and photoelectrochemical H₂ production.

SP-04

Special panel session II: The new voices in global research cooperation

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The aim of this session is to highlight important research, policy and advocacy initiatives of young leaders. In this theme, we will select 5 young researchers (4 speakers, 1 moderator) from the all disciplines to discuss global problems and policy issues that require interdisciplinary expertise, motivation to young people to enter careers in research, and work to improve the foundations of both social and natural sciences worldwide.



Dr. Suttichai is a professor at Department of Chemical Engineering, Faculty of Engineering, Chulalongkorn University. He received his B.Eng. degree from Chulalongkorn University, and M.Sc. and Ph.D. degrees from Imperial College London. His research interest is on process intensification with particular focus on multifunctional reactors. He has published more than 300 peer-reviewed journal-proceedings articles. He is now working on several projects, for examples, hydrogen production technologies, biodiesel production, biorefinery and CO₂ capture and utilization.

SP-05

The new voices in global research cooperation

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*Professor, University of the Philippines Los Baños and Past President and Focal Person,
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As Past President and Focal Person of Philippine Academy of Young Scientists/Outstanding Young Scientists, Inc., what shall be articulated during the panel discussion will be the key initiatives of the organization exemplifying what a science/research-based organization, in the context of a developing country’s science/research environment, can spearhead to help strengthen scientific research, broaden its base of science/research workers and develop a science/research culture among the youth.

Among others, these focus on the (1) conduct of regional training-workshops on writing and presenting research proposals for researchers; (2) holding seminar-workshops on enhancing the teaching capabilities of special science school teachers; (3) serving as resource speakers in career guidance and leadership training for the youth; (4) functioning as a pool of experts in addressing current scientific and technical issues and concerns; and, (5) provision of opportunities for the members’ intellectual growth and professional development through information-sharing/networking and annual meeting on diverse scientific concerns.

As Professor and Director in the University of the Philippines of Los Baños, what shall be discussed will include: (1) collaborative research work with students undertaken in international research institutions, including Germany-hosted universities; (2) establishment of institutional links with Asian universities to develop academic and educational cooperation; and, (3) pursuit of research initiatives on interactive learning to provide more science-based guidance on relevant policy formulation and to help enhance our university’s contribution in the international knowledge base on the discipline.



Maribel L. Dionisio-Sese, Univ. of the Philippines Los Baños (B.Sc., 1981 *cl*; M.Sc., 1986), Univ. of Tokyo, Japan (D.Sc., 1990), Alexander von Humboldt research fellow with Prof. Dr. Albert Batschauer laboratory, Phillips Universität Marburg (2002-2003; 2013), President, Philippine Academy of Young Scientists (2014-2016). Presently, Professor at Univ. of the Philippines Los Baños’ Institute of Biological Sciences and Director, Interactive Learning Center. Research fields: Plant/microalgal physio-biochemical responses to abiotic stress; regulation of photosynthetic enzyme induction; blue light regulation of plant development and characterization of its photoreceptor; herbal plants and algal utilization in agriculture and medicine.

SP-06

The new voices in global research cooperation

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Multidisciplinary research team and international collaboration are essential elements for solving a complex problem and making an innovation that impacts globally. Thailand has been caught in the middle-income trap for a long time depending too much on the cheap labour and capital. The only solution for Thailand to achieve the higher-income stage is to shift from the resource-driven growth to the high productivity and innovation-driven growth. University has been considered as the brain of the country, because it is the place to develop human capital through education and generate new knowledge through research. In order to contribute to the economic growth of the country, the university must extend its capability to be able to make value out of research through commercializable innovation. Therefore, it is important for the young faculties in the university to learn and gain more entrepreneurial mindset and skills. Good news is many universities including Chulalongkorn University have locally launched centers for innovation, technology transfer and entrepreneurship, provided grants to support the innovative research and been trying to create an innovation ecosystem. Internationally, a grant from European Commission called Research and Innovation Staff Exchange (RISE), which is a part of Marie Skłodowska-Curie Action, supports the innovative research project that works collaboratively between European countries and partners outside Europe. In our case, we received the RISE grant in March 2019 under the project of OXIGENATED: Hemoglobin based Protein Nanocarriers for Tumour Oxygenation and a More Effective Photodynamic Therapy. This OXIGENATED project requires collaboration of eight partners from various institutes/universities and company (from Spain, Germany, Estonia, Brazil, Argentina and Thailand). Each partner has different expertise to contribute to the project. Beside cancer research, we have been working on urinary stone disease for almost 15 years and gained enough knowledge to develop our own innovative product, called HydroZitLa. HydroZitLa is a beverage-based regimen intentionally designed and developed for reducing the risk of urinary stone formation. To successfully develop the final product, both hard science (urologists, biochemist, food technologist) and soft science (artwork designer, sales and marketing) peoples are required to work collaboratively. In conclusion, to be able to make an impact to the society, faculties in the universities, especially the young ones, need to have innovative thinking and entrepreneurial mindset in order to be capable of turning the basic research on bench into the innovative product on shelf. And such innovation development does need an international collaborative teamwork of the diverse disciplines.



Chanchai Boonla, Khon Kaen Univ. (B.Sc., 1998), Khon Kaen Univ. (Ph.D., 2004, under RGJ-PhD program), Alexander von Humboldt post-doctoral fellowship with Professor K. Kriegelstein, Univ. of Freiburg (2008-2009), Humboldt Renewed Research Stay in Germany with Prof. W. Schulz, Heinrich Heine Univ. Düsseldorf (2016). Presently, Assistant Professor, Chulalongkorn Univ., Fac. of Medicine. Research fields: Oxidative stress and epigenetic change in urolithiasis and cancers. Research and development of innovative products for diagnosis and treatment of urinary stone disease and cancers.

SP-07

The new voices in global research cooperation: opportunity and experience

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The whole world is vast but it’s not hard to access. Presently, there are many platforms of communication to get close to each other across the world. Therefore, you should experience from a working perspective at least once because nowadays it can be pretty easy to work abroad. There are several advantages to doing a Ph.D. and an international postdoc/researcher overseas such as more opportunities and funding, better career perspectives, widening of the international network, open to a new culture of learning, working and living. I was motivated to gain scientific experiences outside Thailand by visiting foreign countries e.g., Japan, Hongkong, Switzerland, and Germany as a visiting scientist. Preferentially, Germany is one of the most attractive research locations because of its good infrastructure and excellent academic supervision. Moreover, I have collaborated with academic research institutes in Germany since 2012. For these reasons, I decided to apply for the postdoctoral research fellow of Alexander von Humboldt foundation because it provides good opportunities to the young and experienced excellent scientists to come to Germany to work on their chosen research projects together with a host and collaborative partner. Then, I was awarded as a Georg-Forster-Research-Fellow from this foundation since July 2017. I have learned many techniques and methodologies for doing the experiments in the new research project and received several career perspective experiences. Besides research, I am also involved in the training and supervision of scientists, master and Ph.D. students, and visiting researchers. I also appreciated the culture welcome of Germans and colleagues who are from different countries. Finally, I would like to convince you to try working and living abroad at least once in your life.



Surasak Jittavisutthikul, Kasetsart Univ. (B.Sc., 2005); (M.Sc., 2007), Mahidol Univ. (Ph.D., 2015). Georg Forster Research Fellowship for postdoctoral researchers of Alexander von Humboldt Foundation with Prof. Dr. Friedrich Götz and Prof. Dr. Rolf G. Werner at Department of Microbial Genetics, Interfaculty Institute of Microbiology and Infection Medicine, University of Tübingen (Nov. 2017- October 2019).

SP-08

The new voices in global research cooperation

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Currently, our research about the free-living nematodes published on Nature indicated the multidisciplinary research team and international collaboration. Our research was carried out by more than 69 scientists from 35 laboratories all over the world. In order to achieve this goal, I have been abroad for my study since I did my master in four different universities in Europe (such as Ghent in Belgium, Evora in Portugal, Bielefeld in Germany and Jaen in Spain) and following up with my PhD in Germany. That brings me a lot of opportunities to establish the collaboration with many nematology Laboratory from different continental. After I finished my PhD in Germany, I was back to Vietnam and at present, we have research on natural resources and biodiversity conservations granted in Vietnam for “Biodiversity loss of the fauna during deforestation from south-east Asia”. This grant strongly supported the international collaboration between four countries: Vietnam, Laos, Cambodia and Germany under (Memorandum of Understanding (MoU) program. The aim of this project is encouraged the networking between these countries to: 1/ establish new protected area systems among these nations; 2/ promote, stimulate the positive effects resulted from biodiversity conservation and 3/ educate the local people communities for environmental protection activities. By working together, we hope that we can make networking in an international collaborative teamwork.



Nguyen Thi Anh Duong, Bachelor degree in Biology at the Faculty of Biology, University of Natural Sciences, Ho Chi Minh, Vietnam. (B.Sc., 2006), Master degree in Biology at the Faculty of Sciences, Department of Biology, University of Ghent, Belgium and Faculty of Experimental Sciences, Department of Animal Biology, Plant Biology and Ecology, University of Jaén, Spain (M.Sc., 2011) (Erasmus Mundus Scholarship), Institute for Zoology, Department of Terrestrial Ecology, University of Cologne, Germany (Ph.D., 2017) (DAAD scholarship). Currently, I am working at researcher at the Department of Nematology, Institute of Ecology and Biological Resources (IEBR), Viet Nam Academy of Science and Technology (VAST).

SP-09

Special panel session III: Code of ethics for young researchers

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The aim of this session is to establish a foundation for open conversations that will unite different opinions, perspectives and recommendations to safeguard a positive and sound research environment. As the pace of scientific and technological progress and change brought about by the Fourth Industrial Revolution is drastically altering the research landscape. As society has access to more sources of information and diverging opinions, it in turn has given rise to questions and mistrust relevant to a host of scientific issues. In addition, an unethical scientific process unavoidably impacts the perceived credibility of important contributions to knowledge, making it harder to communicate with the general public. This new context gives rise to redefining the social and moral contracts or code of ethics binding researchers to society and infusing it with the most irreproachable behaviors.

In this session, there will be 5 young researchers (4 speakers, 1 moderator: Prof. Wibool Piyawattanametha) from the multi-disciplinary experts to explore and discuss this much-needed Code of Ethics Framework for ethical research with aims to help pave way for future discussions in the next AvH meeting and to create an ethics working group ASEAN region.



Dr. Piyawattanametha, received Ph.D. degree in Electrical Engineering from the University of California, Los Angeles, USA in 2004. He was with the Bio-X Program, Stanford University, Stanford, CA, USA as a research associate in 2005-2010. Currently, he is with the King Mongkut’s Institute of Technology Ladkrabang, Ladkrabang, Thailand as the Director of Advanced Imaging Research Center. In 2014, he was selected to receive the prestigious Fraunhofer-Bessel Research Award from the Alexander von Humboldt Foundation, Berlin, Germany. He has also been appointed as an Adjunct Professor, Institute for Quantitative Health Science and Engineering (IQ), Michigan State University, Michigan, USA since 2018.

SP-10

Code of ethics for young researchers

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The Code of Ethics is extremely an important core value during the conceptualization of research project, access of research funds, conduct of funded projects until the publication of outputs of any scientific researches regardless of field of discipline. It is a framework and guide to be followed to promote the best ethical behaviour in order to generate scientific knowledge and cutting-edge innovative technologies to the interest of all sectors in the society and for a sound and sustainable environment.

Many researchers may not be aware at some point in time that they have committed an unethical behaviour in the pre- and post-implementation of the project. The young researchers are always reminded to adhere the principles and policies of research ethics: competence, honesty and integrity, respect in all forms, confidentiality, safety as well as social and environmental responsibility. All these aspects contribute to the fulfillment and successes of researchers.



Erlinda A. Vasquez, Visayas State University formerly Visayas State College of Agriculture, Baybay, Leyte, Philippines (B. Sc in Agriculture, Major in Crop Protection, 1980 and M. Sc. In Entomology, 1985); Universitaet Hohenheim, Stuttgart, Germany (2000), Alexander von Humboldt (Georg Forster) Fellow at the Universitaet Hohenheim with Prof. Dr. Uwe Beifuss, Insitute of Chemistry and Prof. Dr. Claus P Zebitz, Institute of Phytomedicine (2005-2007). A recipient of the Presidential Lingkod Bayan Award, the highest award conferred to a Civil Servant in 2017 in thePhilippines. Presently, Director of the Philippine Rootcrop Research and Training Center or PhilRootcrops (2016-present) and as Professor at the Department of Pest Management, Visayas State University since 2000 and also Head of the Pest Management and Natural Product Laboratory of PhilRootcrops. Research Fields: Host plant resistance, Biological Control, Chemical Control and Semiochemicals for pest control.

SP-11

Code of ethics for young researchers

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Engaging research

The wide spread of globalisation and the booming information from the internet with diverse, different or even reverse outcomes, recommendations and suggestions from different accessible reports, projects and research documents place a question over the reliability of scientific research. In the meantime, the outcomes of many research projects in many South-East Asia countries stay only within the research institutions. There is a call for the scientists to create real impacts in the society, not only by conducting ethical research, maintaining a high standard of research practices, but also by engaging with other stakeholders, general public and policy makers included, to communicate and translate discoveries into practical solutions and/or public policies.

Researchers are suggested to actively look for different forums/channels to communicate their research, the reliability, validity and outcomes of their research. The language needs to be clear, accessible, persuasive and easy-to-understand to wide audience and policy makers. Researchers should also be open to listen, discuss and answer questions from other stakeholders. Only by doing so, contemporary scientific research could reach its missions: to generate knowledge and to stay relevant to the society and community which it serves and which sponsors researchers to conduct their projects.



Dr June Tran, is a mobile lecturer and researcher. She has worked in three countries: Australia, Vietnam and Germany and has developed an interest in interdisciplinary research. Her interests range from labour economics, human resource management, to various areas in management and education research such as graduate employability, work integrated learning, university-industry collaboration, language education and cultural study. She is currently based herself at RMIT university and working toward a research project investigating workplace integration of professional skilled migrants in Australian labour market.

SP-12

Code of ethics for young researchers

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Are you aware that a patent could be invalidated due to falsification of the inventorship? Have you ever put the names of your supervisors on your paper because of his/her senior position? If the answer to the aforementioned questions is a yes, this raises an urgent need for promoting the code of ethics and integrity for young scientists. In Asia, a culture of respecting seniors have big influence on behaviour of many careers including scientists. For example, putting the names of senior scientists or supervisors on a published paper or adding the laboratory head as co-inventor on a patent application without any intellectual contribution become a common practice in an academic environment. However, not knowing a falsification legal consequence of the invention could jeopardize your patent. The inventorship is the legal determination that shall not be compromised. A focus of the talk aims to highlight the intellectual property issues with an emphasis on authorship and inventorship. This is to help mitigating or preventing any dispute among scientific stakeholders, and preventing young scientists from any detriment resulting from falsification of the inventorship.



Orakanoke Phanraksa, Chula Univ. (LL.B., 1995), Univ. of Washington, USA (LL.M., 1999) and (Ph.D., 2005). Former Co-Chair of the Global Young Academy (2015/2016), Current Co-Chair of ASEAN Young Scientists Network. Since 2010, she has been working closely with the Office of the Higher Education Commission (OHEC) and has played a key role to form a policy framework to promote and strengthen technology licensing offices and IP professionals in the academic institutes in Thailand. She represents Thailand and closely works with the international IP community such as World IP Organization (WIPO), Licensing Executive Society International (LESI), and Association of University Technology Managers (AUTM). In 2019, she received the Global IP Champion Award from the US Chamber of Commerce’s Global Innovation Policy Center.

SP-13

The mind shift of young scientist group in order to develop a high quality code of ethics for young researchers at University in Indonesia

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As the current best practice towards higher education is objective based learning, it is essential that the mindset of young academic staff be reoriented towards research based teaching rather than merely teaching. By research, young faculty will be exposed to the latest developments in their field and can bring this knowledge to the classroom, ensuring that students graduate with a mind set towards future developments and conditions. As the director of the Centre for Energy Studies of Universitas Gadjah Mada, we have set a set a strong research climate in our research center. Many of our researchers are young faculty of our university. Thus, this climate has helped forge their research ethos. In addition, our interactions with industry, government and international academia has provided them the chance to develop as individuals and expand their horizons allowing them to be better educators in passing the torch to the next generation.



Deendarlianto, Gadjah Mada Univ., Indonesia (B.Sc., 1996), The Univ. of Tokushima, Japan (M. Eng., 2003), The Univ. of Tokushima, Japan (Ph.D., 2006), Alexander von Humboldt research fellow with Dr. Dirk Lucas, Helmholtz-Zentrum Dresden-Rossendorf, Institute of Fluid Dynamics (2009-2011), Director, Centre for Energy Studies, Gadjah Mada University, Indonesia (from 2013-present). Presently, Assistant Professor, Gadjah Mada Univ., Department of Mechanical and Industrial Engineering, Fac. of Engineering. Vice head of energy commission, National Research Council, Republic of Indonesia. Research fields: Interfacial behaviour of steam and water during the phase change and the transportation of gas-liquid two-phase flow.

SP-14

Establishment of the Humboldt-Club Southeast Asia for collaborative research without borders

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According to the Humboldt-Network database, there are approximately 250 Humboldtians from multiple countries in Southeast Asia (SEA), including Thailand (78), Vietnam (57), Indonesia (35), Malaysia (33), Philippines (28), Myanmar (16), and others (3). This total figure does not include the 100 Humboldtians from Singapore, 40% of whom are foreign researchers. So far, there have been five official Humboldt Clubs established in Southeast Asian countries: Indonesia, Malaysia, Philippines, Thailand and Vietnam. Historically, each of the Clubs organized a “Humboldt-Kolleg” meeting with a specific theme and invited Humboldtians in the neighbouring countries to participate. Due to organizational challenges, however, these individual Humboldt Kolleg meetings have not taken place as often as expected.

To solve this problem, Presidents of the five Humboldt Clubs agreed to form “The Humboldt Club of Southeast Asia”, a platform that would bring together Humboldtians from all over Southeast Asia. The five Humboldt Clubs would take turns hosting the Humboldt Kolleg, while co-organizing the event. This idea was very well received by the regional Humboldtians. Therefore, the 1st Southeast Asian Humboldt-Kolleg 2019 was set to take place in Bangkok, Thailand to announce the official establishment of the regional Humboldt Club. In spirit of the theme “Southeast Asian Research without Borders – Alexander von Humboldt’s Legacy Today”, Humboldtians from diverse research fields and backgrounds are encouraged to participate in the meeting.

As a result of the 2019 Humboldt Kolleg, we expect the following outcomes: 1) Humboldtians in the region will form closer collaborative partnerships in research, 2) potential young and talented researchers and Ph.D. students will learn about the Alexander von Humboldt fellowship program and the opportunity to apply for grants, and 3) the newly formed Humboldt-Club Southeast Asia will function as an effective platform for Humboldtians in Southeast Asia to coordinate and communicate.



Wanchai De-Eknamkul, Chula Univ. (B.Sc., 1974), Mahidol Univ. (M.Sc., 1978), Univ. of Guelph, Canada (Ph.D., 1987), Alexander von Humboldt research fellow with Professor M.H. Zenk’s laboratory, University of Munich (1989-1990), President, Humboldt-Club Thailand (from 2017-present). Presently, Professor, Chulalongkorn Univ., Fac. of Pharmaceutical Sciences. Head of Natural Product Biotechnology Group. Research fields: Biosynthesis of bioactive diterpenoids; hair research on searching natural compounds with anti-hair loss and hair pigmentation enhancement activities.

SP-15

The current status of Humboldt alumni in Indonesia

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Humboldt Club Indonesia is founded on the 1st of August 2001 under the guidance of the principles of non-profit taking, independent, non-partisan as well as pro inclusivity towards its members of various backgrounds (e.g. different ethnicity, race, nationality, group and religion). The main objectives of the Club are to: 1) enhance the close relations between Humboldt alumni of the many program of the Alexander von Humboldt Foundation, Germany; 2) encourage the Indonesian young scientists to join the postdoctoral program offered and managed by the Foundation; 3) endorse cooperation between the members of the Club and/or between the members of the Club and other potential partners in the field of scientific activities.

The Club has 40 members as of now, and these members are actively involved in different strategic positions such as the Indonesian government (e.g. Ministry of Education and Culture, the Indonesian institute of Sciences), universities, research institute, and private sector.

Together with the members of Humboldt Fellow from different universities in Indonesia, the Club have organized three main activities of Humboldt Kolleg in the year of 2011, 2014 and 2017 with high-level of participation for each activity, attended by approximately 100-150 participants which originated from 6-10 countries, namely Germany, Singapore, Malaysia, Thailand, Vietnam, Japan, The Philipine, USA.

From those activities, Humboldt Kolleg in Indonesia has also produced Malang Humboldt Resolution 2011. The Resolution consisted of 10 resolutions, among others are 1) to build the strong network of a multidisciplinary collaboration between Humboldt Fellows in the region of Southeast Asia (ASEAN countries), 2) to empower the young scientists to participate in the many program of Humboldt Foundation, and 3) to activate the strategic roles of Humboldt Fellows in each country within the region.

The major challenges for the Club are its members’ limited communication and coordination caused by the heavy workload of each member in their respective fields. Accordingly, the Club has yet to reach all of the strategic resolutions of Malang Humboldt Resolution 2011. We still need to find the correct solutions, therefore, which include a way forward with critical mass of Humboldt Fellows and research cluster that provides the medium to interact in the region.



Laksana Tri Handoko, got a BSc in Physics from Kumamoto Univ (1993), MSc in Theoretical Physics from Hiroshima Univ (1995) and a PhD in Theoretical Physics from Hiroshima Univ (1998). Humboldt Fellow at Deutsches Elektronen-Synchrotron (DESY) Hamburg in 1998-1999. Currently a Research Professor at Research Center for Physics, the Indonesian Institute of Sciences (LIPI), and also the Chairman of LIPI since 2018. Research fields: theoretical elementary particle physics, computational physics.

SP-16

The status of Humboldt alumni in the Philippines

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The Humboldt Fellows Association Philippines (Humboldt-Club Philippines) was formally organized during the Humboldt Colloquium for SE Asia held in Hanoi, Vietnam, on 12-14 November 2011. The Filipino Humboldtians who attended the organizational meeting included Prof. Dr. Romualdo Abulad (Philosophy, University of San Carlos, Cebu), Prof. Dr. Victor B. Asio (Soil Science and Geo-ecology, Visayas State University, Leyte), Prof. Dr. Christopher C. Bernido and Prof. Dr. Ma. Victoria Carpio-Bernido (Physics, Research Center for Theoretical Physics, Bohol), Prof. Dr. Maribel Dionisio-Sese (Plant Physiology, University of the Philippines Los Banos), Prof. Dr. Arnold V. Hallare (Environmental/Aquatic Toxicology, University of the Philippines Manila), Dr. Santiago A.B. Sibayan (Medicine, Makati Medical Center), Prof. Dr. Erlinda Vasquez (Pest Management, Visayas State University, Leyte), and Prof. Dr. Estela Llenado-Zamora (Chemistry, University of Santo Tomas). Prof. Zamora was elected as Interim President and Prof. Asio as Secretary-General. A year later, Prof. Asio was elected as the new President and Prof. Dr. Grecebio Jonathan Alejandro from the University of Santo Tomas in Manila as Secretary-General. From a total of 31 Filipino scientists and academics who have received the prestigious Humboldt Fellowship since the 1950s, only 15 are currently active in various institutions in the Philippines (one is currently a postdoc in Frankfurt, Germany in the person of Dr. Denise Margaret Matias). The Humboldtians are leaders in their respective scientific fields in the Philippines. The association has organized Humboldt seminars at the University of San Carlos in Cebu City, Ateneo de Manila University, and Visayas State University and plans to organize more seminars to encourage outstanding Filipino scientists to apply for Humboldt fellowships.



Victor B. Asio, Visayas State Univ (B.Sc., 1982), University of the Philippines Los Banos (M.Sc., 1988), Justus Liebig Univ. Giessen, Germany (Postgraduate, 1992), University of Hohenheim, Germany (Ph.D., 1996), Postdoctorate (National Taiwan University), Postdoctorate (University of Halle-Wittenberg), IRRI Research Fellow, DAAD Fellow, SEARCA Regional Professorial Chair winner, Alexander von Humboldt Research Fellow with Professor Reinhold Jahn’s laboratory, University of Halle-Wittenberg (2008-09), President, Humboldt-Club Philippines (from 2012-present). Presently, Professor of Soil Science and Geo-ecology and Dean of College of Agriculture and Food Science, Visayas State University. Research interests: soil formation, weathering, degradation, soil pollution, soil-landscape relationships, biogeochemical cycling of elements, and soil management.

SP-17

The Current status of Humboldt alumni in Vietnam

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Vietnam has about 60 humboldtians. Most of the Vietnamese Humboldtians are scientists working in natural sciences. More than one third of them are mathematicians. This has a long history. The first Vietnamese Humboldtian came to Germany in 1943 and received a PhD degree in mathematics from the University of Gottingen at the end of the World War II. Many of the Vietnamese Humboldtians have become leading scientists in the country and contributed a great deal to the development of Vietnam. Especially, they have helped a strong cooperation between Vietnam and Germany in many aspects. On the other hand, the Humboldt club of Vietnam has no official contacts with other Humboldt clubs in Southeast Asia beyond the meetings organized or supported by the Humboldt Foundation in the region.



Ngo Viet Trung, Martin-Luther Univ. Halle-Wittenberg (M.Sc., 1974, Ph.D, 1978), Alexander von Humboldt research fellow, Univ. of Essen and Univ. of Cologne (1989-1990), Professor, Institute of Mathematics, Vietnam Academy of Science and Technology. Research fields: Commutative Algebra, Algebraic Combinatorics, Algebraic Geometry.

PP-01

Biomedical compounds isolated from shrimp genome

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The research aimed to study the mechanism of shrimp immune response and to identify useful biological molecules such as anti-apoptosis, anti-viral and detoxification enzymes. Fortilin is a multifunctional protein which plays important roles in a number of cell physiological events. It promotes inflammatory responses by inducing the release of histamine from basophils or mast cells. It is also involved in microtubule stabilization, anti-apoptosis and embryogenesis. In addition, it is found in several immunological pathways, including the proPO-activating system. Currently, fortilin is one of the vital protein in feeding additive for animal health. In crustaceans, gamma-interferon-inducible lysosomal thiol reductase (GILT) was first reported in black tiger shrimp, *Penaeus monodon*. Because invertebrate organisms lack antigen presentation activities, it is believed that GILT functions as an effector immune molecule to directly fight infectious microorganisms. Our work proposes two mechanisms by which GILT activity against white spot syndrome virus (WSSV) infection may occur. WSSV enters cells through the endocytosis pathway, and GILT reduces the intrachain disulfide bonds of the WSSV target proteins within endosomal/endolysosomal compartments, resulting in the destruction of the structural protein complex of incoming WSSV and subsequent interference with the viral infection and/or replication. Alternatively, GILT may be involved in the restoration of melanization cascade in shrimp during WSSV and other viral infections.



Amornrat Phongdara, Mahidol Univ. (B.Sc., 1978), Mahidol Univ. (M.Sc., 1980), Osaka University, Japan (Ph.D., 1987), Alexander von Humboldt research fellow with Professor C.P. Hollenberg, Heinrich-Heine-Universität Düsseldorf (1989-1990). Presently, Professor, Prince of Songkla Univ., Fac. of Sciences. Head of Center for Genomics and Bioinformatics Research. Research fields: genetic analysis, gene expression, functional analysis of gene products and application.

PP-02

Core-shell magnetic particles for photocatalytic degradation of S-metolachlor in aqueous environment

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Core-shell magnetic particles consist of magnetic materials often iron, nickel and cobalt and functional compounds chosen for specific uses. It is employed in a variety of fields ranging from drug delivery to environmental remediation. In the present work, magnetically recoverable core-shell particles, magnetic cerium doped mesoporous titanium dioxide, were synthesized and used in photocatalytic degradation of S-metolachlor in aqueous system under simulated solar light. The photodegradation process followed (pseudo) first-order kinetics with a half-life of 55.18 ± 1.63 min. Using LC-QTOF and ion chromatography, fifteen degradation products were identified, and their transformation routes of the photocatalytic degradation were proposed. Complementary toxicity assessment of the treated S-metolachlor solution showed 1.7-fold reduction after 180 min of irradiation treatment, thereby confirming that the by-products formed would be less harmful from an environmental point of view. Additionally, following the treatment photocatalysts were easily separated from the system using an external magnet. The photocatalytic degradation of S-metolachlor appears to hold a promise as a cost-effective treatment alternative technology to reduce the presence of this herbicide in aquatic environment.



Pakawadee Sutthivaiyakit, Chulalongkorn Univ. (B.Sc., 1971), Chulalongkorn Univ. (M.Sc., 1973), Queen’s University of Belfast, UK (Ph.D., 1980), Alexander von Humboldt research fellow with Professor A.A.F. Kettrup, Paderborn Univ. (1982-1984), KU Coordinator of Center of Excellence for Innovation in Chemistry (2000- present), Professor Emeritus of analytical chemistry, Kasetsart Univ., Fac. of Science (2019). Research fields: Photocatalytic degradation of environmental pollutants and development of trace analyses of food contaminants and environmental pollutants.

PP-03

MgH₂-TiF₄-MWCNTs based hydrogen storage tank

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Improvement of hydrogen sorption kinetics of MgH₂-TiF₄-MWCNTs based tank by addition of central tube heat exchanger and enhancement of hydrogen diffusion is proposed. After doping with TiF₄ and MWCNTs, dehydrogenation temperature of MgH₂ decreases significantly ($\Delta T =$ up to 90 °C). Superior hydrogen permeability, favoring hydrogen sorption kinetics is detected at hydrogen supply side to the middle of the tank, while effective heat transfer during exothermic hydrogenation is assured by the temperature increment of heat exchanger fluid (compressed air at room temperature). Hydrogen desorption and absorption can be completed within 120-150 and 25 min, respectively, up to twice as fast as the tank without heat exchanger from the previous studies. Due to fast hydrogenation rate resulting in short reaction time at high equilibrium temperature (up to 390 °C), particle agglomeration and/or sintering of MgH₂ upon cycling are prevented. Enhanced de/rehydrogenation rates and suppression of MgH₂ particle growth during cycling yield to considerable reversibility upon 20 de/rehydrogenation cycles with storage capacity up to 5.60 wt. % H₂ (82 % theoretical value). By increasing operating temperature to 330-335 °C, hydrogen released with constant flow rate of 0.30 standard L/min is prolonged up to three times, favoring electrical power production of PEMFC stack. Electrical performances obtained from PEMFC stack (13 single cells) supplied with hydrogen gas from MgH₂-based tank are also investigated.



Rapee Utke, Khon Kaen University (B.Sc., 2002), The Petroleum and Petrochemical College, Chulalongkorn University (Ph.D., 2007), Alexander von Humboldt research fellow (Georg Forster Research Fellowship) with Dr. Martin Dornheim and Prof. Dr. Suzanna Nunse, Helmholtz Zentrum Geesthacht (2008-2010). Presently, Associate Professor, Suranaree University of Technology, Institute of Science, School of Chemistry. Head of Research Department, Institute of Science, Suranaree University of Technology (2018-present). Research fields: Solid state hydrogen storage materials and systems, Thermal storage materials, fuel cells.

PP-04

On quantum scattering from anisotropic potentials with dynamical symmetries

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We present analytic approaches to the formal quantum scattering problem for anisotropic potentials for which closed form Schroedinger wave functions could be obtained. We review our earlier theoretical results for quantum scattering from classes of noncentral potentials obtained via the Feynman path integral approach [1], and via the differential approach for Wigner generalized angular harmonics [2], and see how partial wave analysis with modified angular momentum operators for the anisotropic potentials could provide a theoretical framework [3] for quantum phenomena recently observed in newly achieved quantum experimental conditions such as interacting non-spherically symmetric molecules at ultracold temperatures in the order of and ring-shaped quantum dots [4]-[8].

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M. Victoria Carpio-Bernido, Univ. of the Philippines (Diliman) B. S. (Physics, 1982), State Univ. of New York at Albany (M.S., 1986; Ph.D. 1989), Holy Angel Univ., Doc. Humanities (*honoris causa*, 2012), Ateneo de Naga Univ. (Doc. Pedagogy, *honoris causa*, 2014); Alexander von Humboldt research fellow with Prof. Dr. Ludwig Streit, Bielefeld Univ. (1996-97); Regular Associate, International Centre for Theoretical Physics, Trieste, Italy (1992-99); Senior Researcher, Research Center for Theoretical Physics, Central Visayan Institute Foundation. Research fields: Theoretical physics; Quantum Scattering; Stochastic processes; Biophysics.

PP-05

Soft condensed matter laboratory at Kasetsart University

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Soft Condensed Matter Laboratory at Kasetsart University mainly focuses on studying optical properties of soft materials, e.g., liquid crystals, lipids and biological materials. We employed optical tools, for example, optical tweezers, polarized microscopy, laser spectroscopy to understand characteristics of particular materials. For liquid crystal project which is our main specialty, we participate in space project called “Observation and Analysis of Smetic Islands in Space” (OASIS II) hosted by NASA with an international collaborators from ROSCOSMOS (Russia), DLR (Germany), JAXA (Japan) and GISTDA (Thailand). The OASIS II aim is to understand behaviour of liquid crystals which is the complex fluids in space and to further develop liquid crystal-based technology for space. The interest of space program on liquid crystals follows from the fact that liquid crystal is widely used in our daily life technology and growing worldwide to billion-dollar industry. The unique characteristic of this complex fluid captured attention of those who focus on future technology for space. The project is to be launched on International Space Station (ISS) in 2023 following the success of OASIS I which was launched on ISS in 2016.

Our laboratory also focused on metamaterials which possess unique characteristic of adjustable index of refraction. We fabricated metalens in collaboration with Prof. Thomas Zentgraf from University of Paderborn, Germany. The metalens developed is to replace bulky thick lens with nanometer thin lens. Recently, we successfully demonstrated lab-on-a-chip optical tweezers based on metalens which can trap and manipulate a particle efficiently. We also partner with industry to develop metalenses for commercial purpose.

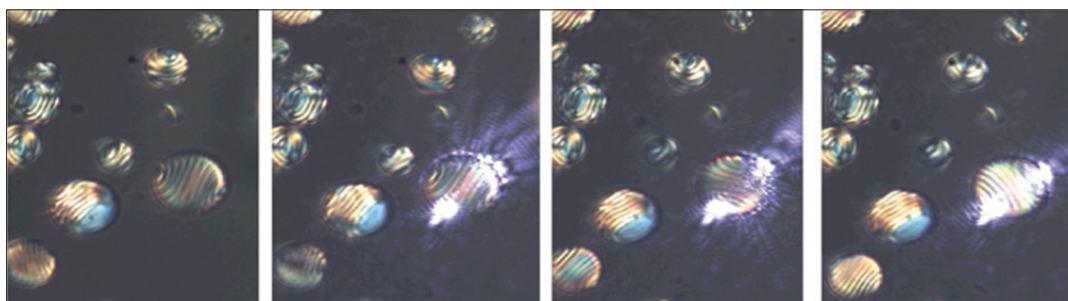


Figure 1: Liquid crystal droplet rotation under laser tweezers



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PP-06

Exploring biorefinery process for eco-efficient production of biofuels from lignocellulosic biomass

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As part of establishing collaborative research in biorefinery, an eco-efficient bioprocess for conversion of lignocellulosic feedstock to transportation fuel has been developed. Using high-throughput phenotyping established at Forschungszentrum Jülich, we have identified robust microbes that can tolerate against inhibitory compounds (weak acids, aldehydes) present in lignocellulosic hydrolysates. Key genes and mechanisms responsible for tolerance phenotypes were also identified using comparative multiomics. This established work provides foundation that will advance the development of industrially relevant microbes, achieving rapid and efficient conversion of second-generation feedstock into biofuels and biochemical in both Germany and ASEAN.



Pornkamol Unrean, Univ. of Minnesota, USA (Ph.D., 2010), Alexander von Humboldt research fellow with Stephan Noack’s laboratory, Forschungszentrum Jülich (2017-2018). Presently, Researcher, National Center for Genetic Engineering and Biotechnology. Research fields: Biorefinery and Lignocellulosic bioprocess.

PP-07

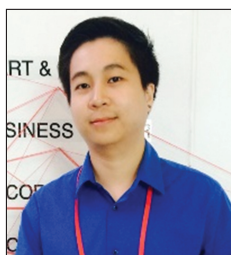
Extirpation and conservation palaeoecology of Southeast Asian gorals and serows through stable isotope tracking over the past 400,000 years

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In Southeast Asia, the subfamily Caprinae (Bovidae, Mammalia) is represented by two threatened genera, *Naemoredus* (goral) and *Capricornis* (serow), living today in mountainous areas and upland forests. Co-occurrences of both recognized genera with three species (Himalayan goral *Naemoredus goral* (locally extinct today), Chinese goral *Naemoredus griseus*, and Sumatran serow *Capricornis sumatraensis*) have been documented in Pleistocene fossil sites in Thailand. However, the past co-existence patterns in relation to diet and habitat preferences of these three species are poorly known. We used stable carbon and oxygen isotope analyses of tooth enamel to reconstruct the diets and habitats of these three Pleistocene sympatric taxa, to test the species co-occurrence patterns through time, and to guide the future habitat restoration for their surviving populations. We analyzed 94 caprine samples from five sites in Thailand during the past 400,000 years (Middle Pleistocene to Early Holocene) as well as some modern specimens. Carbon isotope results revealed different ecological patterns between serows and gorals. During the Pleistocene glacial-interglacial cycles, Sumatran serows had a wide range of diets and habitats varying from pure C₃ to C₄ vegetation, while both goral species from all Thai fossil sites fed on pure C₄ plants or a mixture of both types in an open habitat canopy such as a lowland grassland, different from where they are living today. This reflects that the Sumatran serow was a greater ecological generalist than these two goral species, in both diet and habitat. The habitat restriction of the extant representatives of these caprine species in closed-canopy upland forest is likely due to warmer Holocene climate changes and to human impacts on the Thai ecosystems. Therefore, we suggest considering open habitat landscapes for sustaining the remaining populations of these two threatened goral species.



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PP-08

Unique spiro-lactone nortriterpenoid oligoglycosides from the fresh bulbs of *scilla Scilloides druce*

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Four nortriterpenoids and two tetranortriterpenoids aglycones were isolated from the ethyl-acetate soluble fraction of methanolic extractive of the fresh bulbs of *Scilla scilloides*. The four nortriterpenoids were elucidated as 15-deoxo-eucosterol and its homologs while the two tetranortriterpenoids were characterized as trisnor-23-oxo-15-deoxo-eucostetol and its 22-beta-hydroxy homolog.

The extensive separation of the methanolic brown syrup using various separation media of column chromatography and combination of solvent system yielded 8 pure crystalline substances. Major components were three of them and were characterized as glycosides of 15-deoxo-eucosterol with 4, 5 and 7 sugar moieties, which compose of glucose, arabinose, rhamnose and galactose. The other glycosides indicated having aglycone moieties of 15-deoxo-eucosterol homologs including its acetyl derivative with 5 similar sugar moieties and another exhibited unique structure of spiro-gamma-lactone with 4 sugar chain.



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PP-09

Alpha-mangosteen to new emerging product

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Seven organic mangosteen pericarp samples from Phrom Khiri District, Nakorn Si Thammarat in Sounthern part of Thailand was extracted using 300 mg grinding sample and reflux at 70 °C for 2 h in methanol and vacuum dry, then resuspended in 1 ml methanol and analysed for alpha-mangosteen using the TLC method. All the samples had alpha-mangosteen at 0.596, 0.654, 0.7573, 0.8148, 0.5868, 0.6842 and 0.6623 mg/100 mg dry weight (Fig. 1). The activity of the chemical profile was tested on the TLC plate by DPPH solution. The grinding sample was then used as a material to produce the products at seven different communities at Phrom Khiri District.

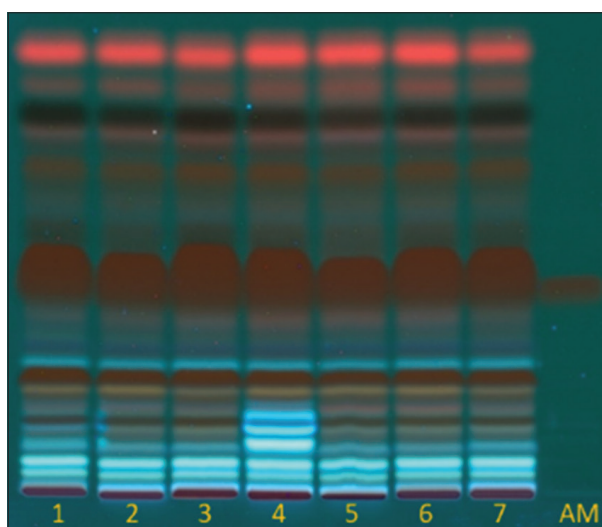


Figure 1: Chemical profile fingerprint of the seven organic mangosteen pericarp samples (lane 1-7) and alpha-mangosteen authentic standard (lane AM) under 366 nm



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PP-10

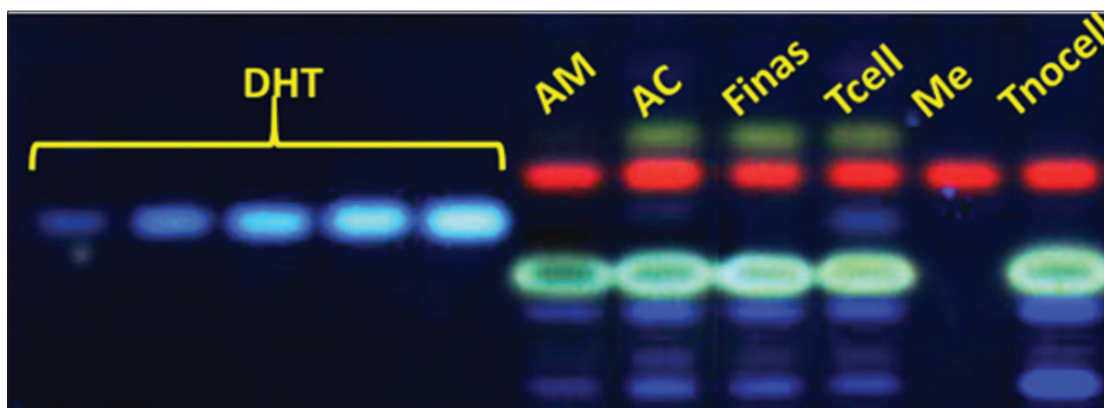
Effects of *Avicennia marina* extract on dermal papilla cells isolated from androgenic alopecia patients

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Androgenic alopecia (AGA) is a major type of hair loss found in both males and females, caused by the overproduction of 5 alpha-dihydrotestosterone (DHT) which is formed from testosterone (T) by the enzymes 5 alpha-reductase (5 α -R). In this study, the main focus was on inhibitory evaluation of *Avicennia marina* (AM extract) in primary dermal papilla cells (DPCs) from AGA patients who came to hair transplant clinic. The present study has revealed that AM extract and its active constituent, avicequinone C (AC) significantly inhibit the enzyme activity of 5 α -R on cell-based assay combined with a non-radioactive thin layer chromatography (TLC) using DPCs isolated from AGA patients. AM at 10 μ g/ml and AC at 10 mM, showed 92.46 ± 3.58 and 75.34 ± 9.61 % inhibition with internal control. The enzyme inhibition activity was reported has an effect on growth factors related to AGA such as HGF, KGF, and VEGF. Therefore, these studies revealed the possible molecular mechanisms of AM in regulating DPCs function as well as providing the scientific data supporting the use of AM extract to promote the hair growth in AGA patients.



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PP-11

Effect of plant extracts and isoflavonoids on melanin biosynthesis in B16F10 mouse melanoma cells

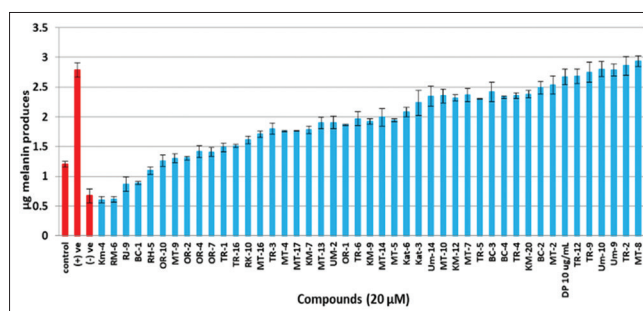
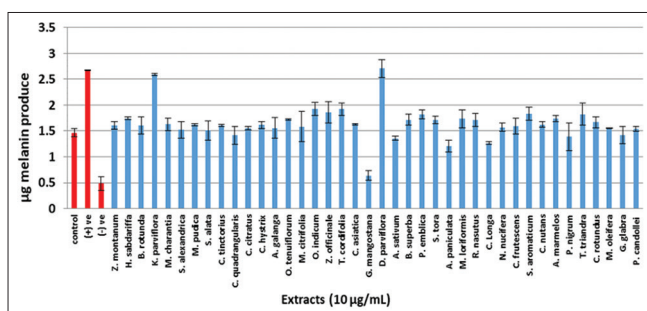
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Hypopigmentation is a disorder in which a low level of melanin is present in the eyes skin and hair. Nowadays there has been no optional remedies with high efficacy and human safety for treating hypopigmentation disorder. Development of novel darkening agent from natural products has become an important, recent trend. The purpose of this study is to find some natural compounds and isoflavonoid compounds that induce melanin generation in B16F10 mouse melanoma cells. To screen total natural plant extracts and natural isoflavonoid compounds, we used 40 plant extracts at 10 $\mu\text{g}/\text{ml}$ which were extracted with methanol. We found that there was only *Dalbergia parviflora* and *Kaempferia parviflora* which showed highest melanin generation. Moreover, we also investigated the melanin generation screening in B16F10 by testing with 44 isoflavonoid compounds at 20 μM . We found that all these compounds which are pure compounds showed a variety of melanin generation. Some compounds showed melanin inhibition and some compounds showed melanin stimulations. From our results, we were able to develop the technique of melanin-production from several compounds by measuring melanin production in 96 well plates.



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PP-12

HPTLC detection of Thai herbal formulations with lipase inhibitory activity

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Obesity is a metabolic disorder characterized by excessive deposition of lipids in the body. It has become a major worldwide health problem in every country in the world. Risk factors of obesity are a complex combination of metabolic factors, genetics, and lifestyle. Moreover, some medication treatments, diseases, and some endocrine disorders can also cause an increase in weight. Pancreatic lipase is a key enzyme that catalyses the final step in the digestive process of lipid. Hence, pancreatic lipase inhibitors can retard the liberation of free fatty acid and glycerol from the digestion of dietary fat and decrease lipid absorption. The objective of this study was to develop a TLC bioautographic analysis for the determination of pancreatic lipase inhibitory activity of medicinal plants in the gastrointestinal formulations in the National List of Essential medicines of Thailand. A bioautographic analysis based on thin-layer chromatographic technique was established using enzyme-substrate complex assay and detection of the lipase inhibition activity and 89 herbal plants in gastrointestinal formulations of the National List of Essential Medicines of Thailand were tested. Lipase inhibitory zones were visualized as white spots against the dark blue background of bromothymol blue. The method developed for the lipase inhibitory activity can be used for screening the active compounds as lipase inhibitors from the unknown samples. The advantages of this developed method are rapidity, simple, high stability, and specificity for screening and determination of the potential lipase inhibitors.



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PP-13

The use of HPTLC technique to identify aristolochic acid in bolus

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Thailand has a long history of using medicinal plants that have considerable pharmaceutical potential. Thai traditional medicine (TTM) drug is commonly sold in form of bolus that widely used for various treatment. TTM bolus is usually prepared from various Thai medicinal plants. There are many kinds of bolus drugs in the market and can be prescribed by TTM doctors or sold without a prescription. Thus, it is easily accessible to public. In many cases, evidences of unexplained nephropathy after prolonged consumption of bolus was found. It is frequently suspected that the bolus which patients used contain *Aristolochia* sp, which contains nephrotoxic aristolochic acid. Thus, aim of the study was to investigate the presence of aristolochic acid in the bolus samples using HPTLC technique. The 14 bolus samples taken from an inpatient with nephrotoxic acute kidney injury were analysed and compared with authentic *Aristolochia* sp, and reference aristolochic acid I and aristolochic acid II. HPTLC analysis showed that both compounds were not detected in all samples. Although in some samples a band observed at the same R_f value as both compounds but their spectrums did not match. This suggests that nephrotoxicity observed in the patient may be not due to these compounds. In addition, the result showed that the chemical profile of all samples was similar and therefore, they were possibly prepared from same plants. It is highly recommended to identify the components in the bolus for reducing the chances of nephrotoxicity in patients. The samples should also be further analysed by other techniques to either identify the compounds or the presence of *Aristolochia* sp, DNA to confirm the result. Although HPTLC technique has the detection limit such that small amount of compound can't be detected and may give a false positive result (show same R_f but different spectrum), HPTLC technique is fast, simple and inexpensive analytical technique that can be used for preliminary screening of samples which can be further confirmed by other analytical methods.

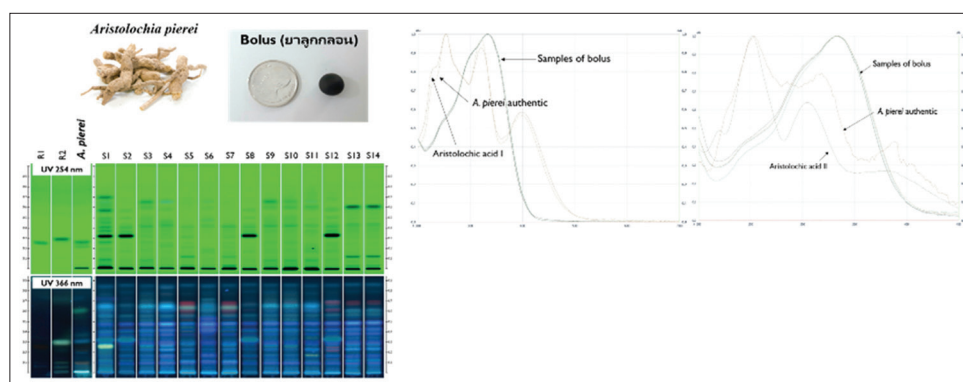


Figure 1: HPTLC profiles and spectrums of bolus samples 1-14 (lanes 4–17), aristolochic acid I (lane 1), aristolochic acid II (lane 2), and authentic of *Aristolochia* sp. (lane 3) observed (a) under UV at 254 nm, and under UV at 366 nm after spraying with 10% hydrochloric acid in 50% ethanol



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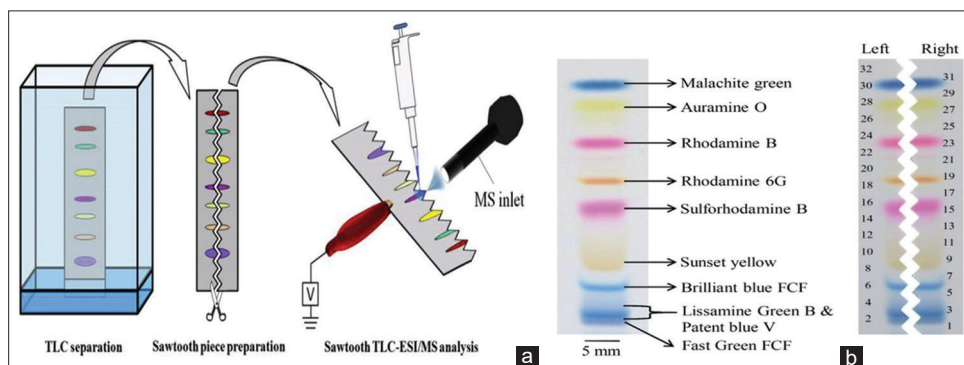
PP-14

Development of interface for scanning chemical compounds on the developed thin layer chromatography plate with electrospray ionization/mass spectrometry (TLC-ESI/MS)

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A simple and cheap design for interfacing thin layer chromatography (TLC) with electrospray ionization mass spectrometry (ESI/MS) was developed to scan and characterize compounds on TLC plate. The developed TLC plate was rapidly and easily modified into two sawtooth-edged pieces that were positioned on an XYZ stage so that one of the triangular tips was pointed toward the MS inlet. A drop of methanol and high DC voltage was applied at the tip to induce ESI. After the analytes in the first tip were analyzed, the TLC piece was moved so that the second triangular tip was pointed toward the MS inlet for analysis. The process was repeated until all the triangular tips on the piece were analyzed. In this manner, the analytes, no matter visible or invisible bands, were scanned and characterized. Since a 4.8 cm long TLC track were cut to 32 triangles on two sawtooth pieces for analysis, the spatial resolution of using the sawtooth TLC-ESI/MS for analysis is 1.5 mm/band. A mixture of dye standards and *Datura metel* flower extract was analyzed to demonstrate the capability of sawtooth TLC-ESI/MS on scanning and characterizing chemical compounds on the TLC plates. The limits of detection of the dye standards were between 0.25 and 2.5 ng/band. TLC bands containing alkaloids such as scopolamine and norscopolamine from the *Datura metel* flower extract were not visualized on the developed TLC track but were successfully detected at different triangular tips using sawtooth TLC-ESI/MS. Based on these results, the R_f values of scopolamine and norscopolamine were determined.



Suhail Muzaffar Bhat, received his PhD in 2019 from NSYSU (National Sun Yat Sen university Taiwan) master's degree at Barkatullah University in 2012. Currently Postdoc at Chulalongkorn University, Faculty of Pharmaceutical sciences, Bangkok Thailand. His research expertise is ambient ion mass spectrometry, flame atmospheric pressure chemical ionization FAPCI-MS and development of ion sources for TLC to MS for food and drug analysis.