UCSI University

RESEARCH@UCSI

CENTRE OF EXCELLENCE IN RESEARCH, VALUE INNOVATION AND ENTREPRENEURSHIP

OFFICE OF POSTGRADUATE STUDIES

DECEMBER 2022
VOL.4 NO.6

e-ISSN: 2710-7256

RECENT RESEARCH DISCOVERIES
Assistant Professor Dr Quek Shio Gai

Assistant Professor Dr Quek Shio Gai is an assistant professor from the Department of Actuarial Science and Applied Statistics, UCSI University. His areas of specialisation are fuzzy logic, artificial intelligence, machine learning and mathematics. Below are the recent studies reported by his research group in the world top journals.

Assistant Professor Dr Quek Shio Gai

A novel hybrid machine learning framework for the prediction of diabetes with context-customized regularization and prediction procedures.

The proposed prediction algorithm was proven to be able to overcome the limitations of the existing techniques and provides an effective framework for the detection and prediction of diabetes. The proposed technique is a unique normalisation method that adapts itself with the degree of skewness of each variable's distribution. This enables our normalisation method to work simultaneously on many heterogeneous variables, ranging from the most symmetrical (e.g., a normal distribution) to the most skewed (a negative exponential distribution), yet the normalised values remain centered at the appropriate positions. The proposed techniques identify potential missing values on their own, even if the entries were merely presented as "0" in the raw data. The entries with missing values are treated uniquely compared to the entries whose values are known, and the AI can even decide on the best way of enabling entries with missing values to be used in the computations.

Full text of the study is available at A, Rajagopal, S. Jha, R. Alagarsamy, S. G. Quek & G. Selvachandran (2022). A novel hybrid machine learning framework for the prediction of diabetes with context-customised regularization and prediction procedures. Mathematics and Computers in Simulation, 198, 388-406.

Link to full text: https://www.sciencedirect.com/science/article/abs/pii/S037847542200091X

Content

A New Hybrid Model of Fuzzy Time Series and Genetic Algorithm Based Machine Learning Algorithm: A Case Study of Forecasting Prices of Nine Types of Major Cryptocurrencies

The proposed system is found to be the first FTS (Fuzzy Time Series)-based algorithm which faithfully serves the purpose of forecasting as it has been intuitively understood. Throughout the entire forecasting process of the proposed system, any element is obtained solely based on the previous data. In contrast, most of the existing literature is found to have used present and event future data into forecasting which violates the true nature of forecasting. The proposed system is also found to be the first FTS-based algorithm that takes the entire set of previously known data into account for forecasting. In contrast, all the existing literature is found to take only the few nearest values. The proposed system is also found to be the first FTS-based algorithm who incorporated a new algorithm of machine learning which encompasses a much greater range of parameters, including all the membership functions which had usually (if not always) been fixed at a set of very trivial values since 1993. The proposed system is also found to be the first FTS-based algorithm that utilises modern platforms of computing. The entire program was created in C++ with CUDA extension, allowing us to see every single structure of the algorithm. In contrast, almost all the authors who incorporate FTS relied on a proprietary software such as MATLAB. Such a seemingly user-friendly interface gives no information on how the output was computed, which puts both the novelty and the credibility of their works into dispute.

Full text of the study is available at S. G. Quek, G. Selvachandran, J. H. Tan, H. Y. Adam Thiang, N. T. Tuan & L. H. Son (2022). A new hybrid model of fuzzy time series and genetic algorithm based machine learning algorithm: A case study of forecasting prices of nine types of major cryptocurrencies. Big Data Research, 28, 100315.
Link to full text:
https://www.sciencedirect.com/science/article/abs/pii/S2214579622000090

New concepts of pentapartitioned neutrosophic graphs and applications for determining safest paths and towns in response to COVID-19

The proposed model enables us to deal with 5 mutually distinct kinds of membership: truth, contradiction, ignorance, unknown, and falsity. Throughout our observation of the literature, there are yet to be any literature that considers the theory of PPNG as well as the practical applications of PPNG in real-life events. Therefore, all of the reputable works in literature that were observed have only 4 (mostly 3) distinct kinds of membership at most. Besides the advantage of having more types of membership functions, our work deploys a novel and dedicated, customised fuzzification procedure that was custom-made for the scenario. Moreover, our fuzzification procedure grants the user an unprecedentedly great range of possibilities in adopting the model to suit their individual needs.
In contrast, all recent works encountered in the literature were observed to directly start with the fuzzified input. This defeats the purpose of the demonstration of the application as it is a well-known fact that no data in real-life comes in the form of a fuzzy set or any of its derivatives, including the PPNGs proposed in this study. As a result, most (if not all) of the models introduced in the previous studies are general ones that were not specifically configured to deal with a specific scenario.

Full text of the study is available at S. G. Quek, G. Selvachandran, D. Ajay, P. Chellamani, D. Taniar, H. Fujita, P. Duong, L. H. Son & N. L. Giang (2022) New concepts of pentapartitioned neutrosophic graphs and applications for determining safest paths and towns in response to COVID-19. Computational and Applied Mathematics volume, 41, 151.
Link to full text:
https://link.springer.com/article/10.1007/s40314-022-01823-4

TURNING RESEARCH IDEAS INTO INNOVATION

Ts Sr Dr Nadzirah Hj Zainordin and Ts Sr Khoo Sui Lai

The Spike of Turning Research into Innovation

As researchers, the need on building an innovative structure includes fundamental knowledge on how to go about it and the necessary tools to support the direction. The spike comes when the research becomes more competitive yet still wants to contribute to the betterment of human beings. The rapid progression of technology changes which is affected globally is the spike of turning research into innovation. Research and Innovation (R&I) plays a key role in driving smart, sustainable growth and job creation. By generating new knowledge, research becomes central to the development of new and innovative products, processes and services that enable higher productivity, industrial competitiveness and ultimately prosperity. In countries with high output per capita, R&I, skills and technology development are most important for multifactor productivity. Closing the productivity gap is also important to iimprove. Research and Innovation systems, coupled with improved regulatory and institutional frameworks, and efficient functioning of markets, are essential for countries to be more efficient in their combined use of labour and capital.

The Research and Innovation system is a complex ecosystem that requires various elements to function optimally. These include a solid public scientific base that produces high-quality results. Strong corporate involvement in innovation activities. Fluent and rich knowledge flow among Research and Innovation actors. Good framework conditions to enable business innovation. The main bottleneck of Research and Innovation is to clearly identify the challenges in research practices which might be from economic factor, policy of the institution or even countries and the availability of the experts on the specific research area. The factsheet aims to spike the research into innovation by identifying persistent challenges in terms of investment, knowledge flows, institutions policy and readiness of the researchers to shifting from research to innovation.

The highlights on shifting and creating spike into innovation can be achievable by increasing the quality of the Research and Innovation system, building stronger knowledge flows by stretching the sciences-business linkages, and putting in place an investment-friendly environment for innovation. These improvements in scientific quality have been made possible primarily by large investments in research and development from either external funds or internal structural funds. Indeed, while a focus needs to be placed on fostering links between science and business in order to increase public and private investment in research & development and enable adequate knowledge dissemination, some research institutes are already It shows particularly strong public-private cooperation. There is highly efficient and effective public research & development investment, high and improved excellence in science and technology, and the development of key enabling technology hotspots. In fact, innovation performance can improve steadily. The Green Deal approach is a great example aimed at creating an investment-friendly environment and removing innovation barriers to sustainable economic growth, especially in the early stages when innovative initiatives face the greatest challenges. This approach is designed to complement existing tools such as legislation and regulation, market and financial incentives, and measures to foster innovation and bring government closer to business, interest groups and interest groups.

Ts Sr Dr Nadzirah Hj Zainordin

Graduated with Degree in Quantity Surveying from International University College of Technology Twintech, then pursuing his master's degree in Quantity Surveying with Heriot Watt University. Her Ph.D from Universiti Teknologi Malaysia. In addition, she actively participated in research, writing in professional bodies magazines, won's many national and international innovation and invention awards. Recently she is awarded as International Scholar Young Researcher and Outstanding Teaching Award and Outstanding Young Professional of the Year Award, World Leaders & Achievers Conclave at international level. She also been selected and interviewed as The Most Successful People in Malaysia by British Publishing House 2021.

Ts Sr Khoo Sui Lai

Graduated with Diploma in Quantity Surveying from Institut Teknologi Pertama, then pursuing his Bachelor's Degree and Postgraduate Diploma of Building in Construction Economics with University of Technology Sydney (UTS). He has vast experienced as QS Practitioners working with consultant and contractor in various sectors (oil & gas, construction, infrastructure, etc.) locally and internationally especially with Middle East countries. His involvement with professional bodies at national and international level bring him into a strong connection in built environment.

Creating Sustainable Success by Knowing the Types of Innovation

Yet many research institutions and researchers struggle to get effective results from their innovation efforts. Teams expend resources and leaders watch other institutions unleash innovation in industries and new markets to expand their competitive advantage. When innovation efforts are seen as failures, it can be difficult to build organisational momentum to reinvest in future efforts. Building an innovative culture requires more than technology. It's about creating a workplace that encourages ongoing engagement and action. Placing and caring for these pieces will help your innovation continue to thrive. Innovation is a continuous process. See how Fresh Consulting helps clients deliver innovation as a service by bringing together the right people, processes, and tools.

Here we look at the different ways innovation is shaped, how these definitions lead to different outcomes, and why certain methods are more effective than others.

Novelty of a technology describes whether the innovation is based on new or proven technology. Ideas with low market impact are easier to implement and their effectiveness increases over time. Ideas with high market impact are usually difficult, expensive, and risky to develop, but have high potential value. Figure 1.0 shows the types of innovation to be appreciated. Disruptive innovation is often the best-known type of innovation. Where the usage of new technologies effectively and deliver impactful results. Disruptive innovation is highly visible and makes headlines, but it also brings with it many nuances and challenges. The most common organisations that exhibit the characteristics of disruptive innovation are startup that target overlooked market segments and offer more affordable, convenient, or simpler products than incumbent players.

Incremental innovation is the gradual and continuous improvement of an existing research product or service or even knowledge. Despite being the least noticeable of all categories, it offers the most obvious value for established returns. By continuously improving their products, services and business processes, even knowledge, institution can overcome stagnation and steadily increase Research and Innovation share. Sustaining innovation is the best way to protect the institution to remain reliable and visible as knowledge contributor.

Figure 1 Types of Innovation

Sources: https://www.freshconsulting.com/insights/blog/the-4-types-of-innovation/

Incremental innovation focuses on small improvements to existing products and knowledge to enhance existing output. Sustainable innovation focuses on greater change to gain or maintain a Research and Innovation leading position. Radical, innovations typically use technological breakthroughs to transform industries and transform industries and create new markets. This kind of innovation completely changes the way institutions interact with the industry via Research and Innovation. The success of underlying technological change to drive this kind of innovation is often related to institutional behaviour and the ability of researchers to create the right conditions for successful commercialisation of new ideas.

The Wrap-up

Each of the points discussed has value, and a system of all four combined creates robust and effective innovation while uncovering blind spots in potential Research and Innovation practices.

Without incremental innovation, product, services and developing new knowledge can fall behind. Research experience and institutional tolerance are compromised. Without continuous innovation, institutions will have to work harder to achieve industry leadership status and capture majority industry share. And without radical or disruptive innovation, institutions will miss out on significant values and risk being disrupted by new methods and technologies. By implementing all four, researchers and institutions will optimise their current offerings and differentiate themselves from the others to ensure short-term success while protecting long-term sustainability. Properly applied innovation can be a strategy for current and future successes.

MECHANISM OF ACTION STUDY IN DRUG DISCOVERY RESEARCH: IS IT IMPORTANT?

Dr Lee Yu Zhao

The process of discovering and researching novel chemical compounds as potential therapeutic agents are known as drug discovery and development. For a compound to be an approved drug, it will go through several phases of stringent tests and trials. Before the drug-lead are allowed to be tested in humans, they will have to be tested in-vitro (cells/tissues) and in-vivo (animal) in the preclinical studies [1].

At present, US FDA does not require the understanding of mechanism of action (MoA) for a new drug to be approved. In fact, there are about 10-20% of approved drugs have yet to identify its molecular target or MoA [2]. The most striking example of such cases, which also happens to be the most widely used drug in the world, the aspirin or acetylsalicylic acid had been utilised as treatment for pain and fever for more than a hundred years before the discovery of its MoA in 1971 [3]. Notwithstanding, research committees, journal reviewers and editors had been progressively necessitating MoA studies in manuscript submission or grant application [4].

In my PhD work, my research group at UPM actively studied a bioactive phloroglucinol compound 2,4,6-trihydroxy-3-geranyl acetophenone, abbreviated "tHGA". tHGA was first discovered in the methanolic extract of Melicope pteleifolia (Champ. ex Benth.) T.G.Hartley young leaves. Locally, it is commonly known as "tenggek burung" and consumed as a vegetable salad or "ulam". The plant has been used extensively in as traditional medicine in China and Southeast Asia to treat a range of conditions, including fever, rheumatism, stomach aches, wounds, abscesses, haemorrhoids and skin diseases [5,6]. The compound tHGA had demonstrated various pharmacological activities including anti-inflammatory, anti-asthmatic, anti-allergic, anti-cancer, endothelial and epithelial barrier protective effects [7].

Due to previous findings that demonstrated effectiveness of tHGA administered intraperitoneally in attenuating acute and chronic allergic airway inflammation, I further evaluated the efficacy of orally administered tHGA upon airway remodelling in a murine model of chronic asthma. Airway remodelling is a pathological feature of chronic asthma that involved the irreversible structural changes of the respiratory tract which involved excessive extracellular matrix deposition and increased airway smooth muscle (ASM) mass leading to subepithelial fibrosis and thickening of the airway wall. Corticosteroids, the gold standard in asthma treatment are ineffective at impeding airway structural changes as remodeling processes still progress even when inflammation is effectively under control. Currently, research is actively done to discover novel treatments that can particularly attenuate airway remodelling [8,9]. Albeit prolonged ovalbumin challenge, tHGA was able to inhibit the overproduction of interleukin (IL)-4, IL-13, transforming growth factor (TGF)-β, immunoglobulin (Ig)G, and IgE. By suppressing these inflammatory mediators, infiltration of inflammatory cells especially eosinophils and lymphocytes into the airway were reduced, which abrogated chronic airway inflammatory responses and hyperresponsiveness. Additionally, tHGA dramatically decreased the expression of alpha-smooth muscle actin (α-SMA), a defining hallmark of both ASM and myofibroblasts [10].

Epithelial-mesenchymal transition (EMT) is recognised as the main cellular event that contributes to airway remodelling. Eosinophils can induce EMT in airway epithelial cells via increased TGF-β production through direct interaction. To further understand the MoA of tHGA in abrogating airway remodelling, we performed study using a coculture model of eosinophil induced EMT. Following tHGA administration, the induction of EMT was suppressed in which the expression of E-cadherin and the morphology of the epithelium were restored. Vimentin, collagen I, and fibronectin protein and mRNA expression in eosinophil-induced epithelial cells were all profoundly reduced by tHGA. In search of molecular target of tHGA, pathway analysis showed that tHGA suppressed eosinophil-induced activator protein (AP)-1-mediated TGF-β production by targeting c-Jun N-terminal kinase (JNK) and phosphoinositide 3-kinase (PI3K) signaling pathways (Figure 1). It is possible that tHGA may target further upstream molecules of JNK and PI3K [11]. However, to date, the mechanism and upstream receptors/ ligands that mediate cell-to-cell interaction implicated in eosinophil-epithelia EMT remain undefined. A better understanding of the mechanism orchestrating eosinophil epithelial cell interaction may shed light on the exact molecular target of tHGA.

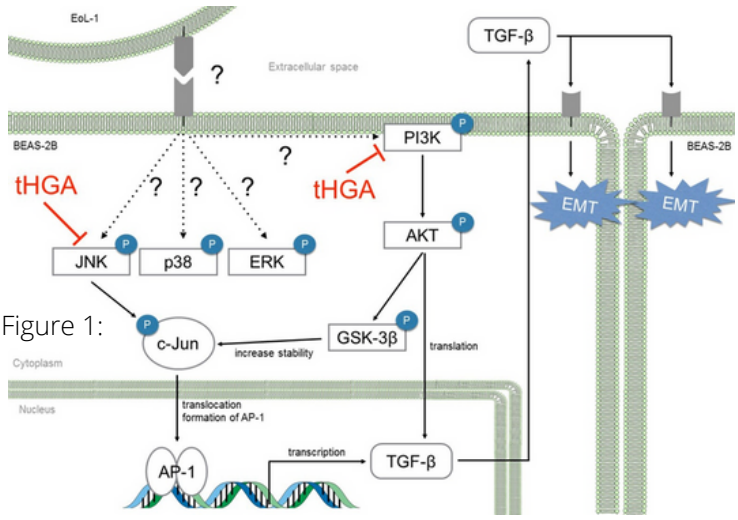

Figure 1:

Figure 1: THGA blocked AP-1 Mediated TGF-B production by targeting JNK and P13K pathways [11]

Understanding a drug lead's MoA is found to be efficient and cost-effective in the long run and offer better chances for success as a drug [12]. For the development of the next generation of drugs with established standards of care, MoA or target identification is recommended to be done early in the drug development process to add value and to determine the advantages of the new treatment regime. In addition, knowledge of a drug lead's MoA may allow side effects prediction and monitoring especially during clinical trials to prevent unintentional harm to patients 4. Moreover, the drug discovery process can also be a tool to provide an understanding of the pathophysiology of a disease and to identify the knowledge gap.

Taking my previous work as an example, receptors and ligands implicated in the EMT had to be identified prior to the determination of the exact molecular target of tHGA. A fundamental study of pathophysiology should be done in tandem with drug MoA studies to help stratify clinical trials to identify patients that most likely benefit from. Another powerful example of the value of target identification strategy is Trastuzumab, a biologic targeting HER2 tyrosine kinase receptor for HER2-overexpressing breast cancer patients. Undoubtedly, such a significant advancement would not have been achieved without prior information of HER2 expression in specific subtypes of breast cancer cells. Nonetheless, the biggest hurdle for MoA investigation is that the process can be very complex and resource-intensive that may take years or even decades [13].

MoA studies are undoubtedly valuable. For indications that possess standards of care, MoA studies should typically happen early in the drug discovery process. Due to the significant demands on resources and efforts, MoA studies can be delayed until demonstrating promising efficacy in vivo for drug leads developed for unmet needs. However, they should be done before entering the risky phases of clinical trials since this knowledge can save money, time and most crucially, patients live while improving the likelihood of the treatment getting approval.

References

1. Hughes, J., Rees, S., Kalindjian, S. & Philpott, K. Principles of early drug discovery. British Journal of Pharmacology 162, 1239–1249 (2011).
2. Moffat, J. G., Vincent, F., Lee, J. A., Eder, J. & Prunotto, M. Opportunities and challenges in phenotypic drug discovery: an industry perspective. Nat Rev Drug Discov 16, 531–543 (2017).
3. Vane, J. R. & Botting, R. M. The mechanism of action of aspirin. Thromb Res 110, 255–258 (2003).
4. Davis, R. L. Mechanism of Action and Target Identification: A Matter of Timing in Drug Discovery. iScience 23, 101487 (2020).
5. Li, S.-G., Tian, H.-Y., Ye, W.-C. & Jiang, R.-W. Benzopyrans and furoquinoline alkaloids from Melicope pteleifolia. Biochemical Systematics and Ecology 39, 64–67 (2011).
6. Perry, L. M. & Metzger, J. Medicinal plants of East and Southeast Asia: attributed properties and uses. Medicinal plants of East and Southeast Asia: attributed properties and uses. (1980).
7. Chan, Y. H. et al. Pharmacological Properties of 2,4,6-Trihydroxy-3-Geranyl Acetophenone and the Underlying Signaling Pathways: Progress and Prospects. Front Pharmacol 12, 736339 (2021).
8. Banno, A., Reddy, A. T., Lakshmi, S. P. & Reddy, R. C. Bidirectional interaction of airway epithelial remodeling and inflammation in asthma. Clinical Science 134, 1063–1079 (2020).
9. Boulet, L.-P. Airway remodeling in asthma: update on mechanisms and therapeutic approaches. Current Opinion in Pulmonary Medicine 24, 56–62 (2018).
10. Lee, Y. Z. et al. An orally active geranyl acetophenone attenuates airway remodeling in a murine model of chronic asthma. European Journal of Pharmacology 797, 53–64 (2017).
11. Lee, Y. Z. et al. Blockade of Eosinophil-Induced Bronchial Epithelial-Mesenchymal Transition with a Geranyl Acetophenone in a Coculture Model. Frontiers in Pharmacology 8, (2017).
12. Mechanism matters. Nat Med 16, 347–347 (2010).
13. Chemical biology for target identification and validation. MedChemComm 5, 244–246 (2014).

WHAT IS FLOW? AN INTERVENTION TO IMPROVE ORGANISATIONAL EFFECTIVENESS IN THE HOTEL INDUSTRY

Assistant Professor Dr Mark Kasa

History of Flow

Young Mihaly Csikszentmihalyi was in his 20s when he was intrigued by a phenomenon observed through artists and most obviously through painters. These artists were seen to be so absorbed by their work until the point that they even forgot to eat, drink and even sleep. Csikszentmihalyi's curiosity led to the development of the theory of Flow, and together with his fellow researchers they became the pioneers of the field of flow experience in Italy. The research on flow became a widespread subject between the 1980s and 1990s. Since then, researchers have been keen on studying the theory of flow, which can be described as the state when an individual delve into a mental state of total focus when they are working together with the focus on the positive experience felt (Csikszentmihalyi et al., 2005).

What is Flow?

Csikszentmihalyi (1997) stated that flow is an experience of holistic feeling when an individual is totally involved in an act including work-related activities. Researchers from the past recognised that indeed there was the existence of flow experience when an individual is engaged in performing activities such as playing music, working, and sports (Kowal & Fortier, 1999; Catley & Duda, 1997; Csikszentmihalyi & LeFevre, 1989).

Bakker and Demerouti (2008) revealed that, flow experience deriving from work is a momentary peak experience portrayed through three components namely absorption, work enjoyment and intrinsic work motivation. The state of absorption is a state of absolute attention and immersion in one's work, work enjoyment is a state of positive judgement towards the quality of work life in which the sense of positive judgment manifest when an individual's flow experience is being evaluated as affective and cognitive (Diener, 2000), and intrinsic work motivation is an intrinsic crave or attachment towards performing a particular work-related task.

Assistant Professor Dr Mark Kasa

What are the Outcomes?

Experiencing flow allows an individual to improve work performance which further leads towards satisfying achievement and eventually leading towards individuals to feel intense enjoyment (Csikszentmihalyi 1997). The impact of flow is strong, especially in the discipline of arts and scientific creativity (Perry, 1999), education (Csikszentmihalyi, 1997), learning (Csikszentmihalyi et al., 1993) and sports (Jackson et al., 2001), studies have found the existence of a positive relationship between flow and improved performance. There is a strong relationship between the experience of flow and the further development of an individual's skills and personal growth (Csikszentmihalyi et al., 2005). When being fully immersed in the state of flow, an individual would master the work at hand.

Once a certain level of difficulty for the work is reached, the individual would put in more effort to reach the highest point of difficulty until the goal is successfully met. After that, an individual would then emerge from the state of low and would experience heightened sense of personal growth, feeling much more competent and efficacious. This indicates that an individual experiencing flow is likely to be highly motivated to perform well with their work. Bakker's (2005) finding on the experience of flow being beneficial in the workplace setting.

Thus, these studies reveal the positive impact of flow experience in various contexts.

Even though study on flow in the context of hotels is limited, however being a subject of study of more than 30 years the studies on other contexts remain ample.

Flow ~ Relevancy of Flow Experience in Hotel Context.

Flow falls under the field of positive psychology considered a motivating process experience (Bakker & Demerouti, 2008) and a powerful psychological instrument to develop human resources toward promising results in hotel operation and management. Thus, hotel management should encourage the experience of flow among the hotel employees as it leads to positive, energising, as well as able to align with work-related activities.

To facilitate workplace positive intervention through flow experience in which the hotel industry can maximise the fit between employees and their jobs and thus flow experience suitably fit with efficiency and effectiveness within the hotel context. The more frequently an employee experiences flow at work, the more productive, and innovative a person will be and even lead to an increase in positive and productive results. A most recent study in Sarawak's hotels revealed that flow experience would lead to organisational effectiveness compared to those hotels that are not instilling flow experience such as setting clear goals to be achieved, providing a conducive space to avoid distraction for employees, determine challenge-skill balance, give empowerment while giving a sense of control to the employees.

Conclusion

In the context of the hotel industry, flow experience offers information about work-related task that could intertwine with other job interventions such as job enrichment, job enlargement, and many more. This is to increase the knowledge to identify the problems or risks towards work-related well-being among the employees in the hotel. The focus of this written piece of work is to add knowledge on protecting factors at the organisational level to discover the factors that make people in the organisation flourish in their respective working environments.

References

Bakker, A. B. (2005). Flow among music teachers and their students: The crossover of peak experiences. Journal of Vocational Behavior, 66, 26–44.

Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. Career Development International, 13(3), 209–223. https://doi.org/10.1108/13620430810870476

Catley, D., & Duda, J. L. (1997). Psychological antecedents of the frequency and intensity of flow in golfers. International Journal of Sport Psychology, 28(4), 309–322.

Csikszentmihalyi, M. (1997). Finding Flow. The Psychology of engagement with everyday life. New York: Basic Books.

Csikszentmihalyi, M. (2003). Good Business, leadership, flow, and the making of meaning. New York: Penguin Books.

Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. Journal of Personality and Social Psychology, 56(5), 815–822.

Csikszentmihalyi, M., Abuhamdeh, S., and Nakamura, J. (2005). Flow. In A. J. Elliot and C. S. Dweck (Eds.), Handbook of competence and motivation (pp. 598–608). New York: Guilford.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). Talented Teenagers: The Roots of success and failure. New York: Cambridge University Press.

Diener, E. (2000). Subjective well-being, the science of happiness and a proposal for a national index. American Psychologist, 55, 34–43.

Jackson, S. A., & Marsh, H. (1996). Development and validation of a scale to measure optimal experience: The flow state scale. Journal of Sport & Exercise Psychology, 18(1), 17–35.

Jackson, S. A., Thomas, P. R., Marsh, H. W., & Smethurst, C. J. (2001). Relationships between flow, self-concept, psychological skills, and performance. Journal of Applied Sport Psychology, 13(2), 129–153.

Kowal, J., & Fortier, M. S. (1999). Motivational determinants of flow: Contributions from self-determination theory. The Journal of Social Psychology, 139(3), 355–368. https://doi.org/10.1080/00224549909598391

Perry, S. K. (1999). Writing in flow: Keys to enhanced creativity. Writer's Digest Books.

FUNDAMENTAL RESEARCH GRANT SCHEME (FRGS) 2021: GINGEROLS AND SHOGAOLS: INVESTIGATIONS ON THE ROLE OF SELECTIVE PHOSPHODIESTERASE 4B INHIBITION IN THE RESPIRATORY ANTI-INFLAMMATORY ACTIVITY WITHOUT CENTRAL SIDE EFFECTS

Associate Professor Dr Anand Gaurav

Inflammatory disorders of respiratory tract are major global health burden. Phosphodiesterase-4 inhibitors have been developed as drugs for these conditions because of their combined anti-inflammatory and airway smooth muscle (ASM) relaxant effect. However, non-selective PDE4 inhibitors have side effects like nausea, vomiting and depression. Research has proved that selective PDE4B inhibitors retain the beneficial effects of non-selective PDE4 inhibitors while lacking the side effects, thus likely to be an effective therapy for these disorders. The active sites of PDE4B and PDE4D are identical but one amino acid in the C-terminal region (CR3) is different. PDE4B selectivity of known selective inhibitors is due to this single polymorphism in CR3 i.e., the exchange of a leucine for a glutamine leads to a 70– 80-fold shift in PDE4B selectivity. Ginger is traditionally used for anti-inflammatory and ASM relaxant effects and its phenolic compounds (gingerols and shogaols) are reported to possess an affinity for PDE4D.

The hypothesis for this study is based on the known pharmacology of ginger phenolic compounds i.e., no emesis and CNS depression, thus these compounds must possess selectivity for PDE4B over PDE4D. A study published by our group in 2016 supported this hypothesis. However, more elaborate/extensive in silico and in vitro studies are required to fully establish these findings.

In this project funded by the FRGS scheme of the Ministry of Higher Education, our team of researchers from Malaysia (UCSI University and Universiti Malaya) and India (KIET School of Pharmacy) will perform extensive molecular dynamics simulations to establish the PDE4B selectivity of 6-gingerol and 10-shogaol. The results of in silico studies will be confirmed using in vitro PDE4B and PDE4D inhibition assays. The study will shed light on the role of PDE4B selectivity in their pharmacology. Structural features which are responsible for PDE4B selectivity will be identified and used to design new selective inhibitors of PDE4B. The designed compounds will be synthesised and evaluated for PDE4B and PDE4D inhibition (in vitro) and respiratory anti-inflammatory activity using a suitable model. The project will generate human resources in form of PhD students in addition to publications and patents.

FUNDAMENTAL RESEARCH GRANT SCHEME (FRGS) 2021: MOLECULAR CHARACTERISATION OF CRISPR-CAS ELEMENTS IN METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) AND ITS POTENTIAL ROLE FOR EARLY DIAGNOSIS OF BREAST INFECTIONS CAUSED BY MRSA

Esprit de corps. This project is an effort and blessings from every member of this project. It was the right recipe that consists of a surgeon, a microbiologist and researchers who are good in their own field. The idea for this project starts from Dr See, an Oncoplastic Breast Surgeon who has the will to shorten the treatment duration for patients who suffered from MRSA-associated breast infections. Patients required prolonged hospital stays due to delays in accurate diagnosis and changes in antibiotics after empirical treatment. Current practices of screening for MRSA among breast infection patients to prescribe the appropriate antibiotics, resulted in treatment delays, hamper the patient's productivity and quality of infant care, and takes up precious hospital resources. Moreover, there is still no clinical screening method to differentiate MRSA of community, hospital, or agriculture origin, where each type requires different effective antibiotics treatments.

Assistant Professor
Dr Tan Yong Hui

Typing CRISPR-Cas elements has been studied for the development of precision diagnostics in bacteria such as Salmonella typhi. Thus, the focus of this project is to explore the CRISPR-Cas genetic elements as a basis for molecular characterisation of MRSA in breast infections and understand the role of these elements in susceptible and domination of MRSA as the primary pathogen in this infection. Investigation into bacterial identification, MRSA confirmation and antibiotic resistance profiling will be carried out via culture and target-specific molecular assays. Molecular characterisation of CRISPR-Cas will be done via DNA sequencing and bioinformatics analysis. Predisposing factors for breast infections to different MRSA types will be analysed through the patient medical history. This project will contribute towards the development of potential CRISPR-based MRSA typing tools and the formulation of evidence-based treatment guidelines for MRSA breast infections.

CURRENT RESEARCH GRANT CALL, EXHIBITION AND SYMPOSIUM

No.	Funding Scheme	Endorsement by CERVIE	Submission Closing Date
1	Malaysia Grand Challenge, MOSTI • Applied Innovation Fund (AIF) • Technology Development 1 Fund (TeD 1) • Bridging Fund (BGF) • MOSTI combatting COVID-19 Fund *URL link: https://edana.mosti.gov.my/*	Open, no closing date as for now	Open, no closing date as for now
2	PETRONAS-Academia Collaboration Dialogue		29 Dec 2022
3	THE ASEAN-INDIA COLLABORATIVE R&D (AICRD) SCHEME 2022 URL link: *https://aistic.gov.in/ASEAN/HomePage*		31 Dec 2022
4	Trialect Visiting Fellowship URL link: *https://trialect.com/*		any time before June 2024
No.	**Symposium(s)**	**Abstract Submission Closing Date**	
1	Asian Federation of Biotechnology Malaysia Chapter International Symposium 2022 (AFOBMCIS 2022) Date: 18 – 21 September 2022 URL link: *https://www.istr.org/general/custom.asp?page=AsiaPacific*	NA	
No.	**Awards**	**Closing Date**	
1	Mahathir Science Award URL link: *https://msa-foundation.org/how-to-nominate/* URL link: *https://msa-foundation.org/*	1 Mar 2023	

Please refer to your respective Head of Research for more information.

CONTACT

Centre of Excellence for Research, Value Innovation and Entrepreneurship (CERVIE)
10th Floor, Block G, UCSI University, No. 1, Jalan Menara Gading, UCSI Heights (Taman Connaught)
56000 Cheras, Kuala Lumpur, Malaysia

Tel: +603-9101 8880 (ext: 2256)
Website:
https://www.ucsiuniversity.edu.my/research