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# OFFICE OF POSTGRADUATE STUDIES



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# FOREWORD BY THE VICE-CHANCELLOR AND CHIEF EXECUTIVE OFFICER



Professor Datuk Ir Ts Dr Siti Hamisah Binti Tapsir P.J.N, D.P.M.S, P.Eng, Ph.D (Eng), Hon. FAFEO, P.Tech (Eng) Vice-Chancellor of UCSI University and UCSI Group Chief Executive Officer Emerging trends in the field of Science, Technology and Innovation (STI) play a vital role in global socio-economic development. With the 10-10 Malaysian Science, Technology, Innovation and Economy Framework (10-10 MySTIE) released in 2020, our country has embarked on a journey of enhancing its economic competitiveness and the quality of life for all citizens. This Framework aims to improve Malaysia's innovative and creative capability by integrating ten key socio-economic sectors with ten global science and technology drivers using a holistic ecosystem approach.

In line with MySTIE Framework, UCSI community is committed in achieving excellence in research, innovation and enterprise. Last year, few outstanding researchers from UCSI University – Senior Professor Ts Dr Ooi Keng Boon, Senior Professor Dr Phang Siew Moi, Professor Dato' Dr Ng Seik Weng, Associate Professor Dr Eric Chan Wei Chiang and Associate Professor Dr Garry Tan Wei Han – were ranked among top 2% researchers in the world as featured in the Stanford University List. I hope that this excellent achievement will inspire more academics as well as postgraduate students at UCSI University to spearhead research initiatives in various fields.

As a part of the national STIE ecosystem development, UCSI researchers need to ensure that these initiatives are contributing to the socio-economic transformation of the country. We should build collaborative networks with the government bodies, fellow academicians and researchers, industry players and global community as well as continue enhancing research competencies and welcoming more postgraduate research students in the future.

I would like to take this opportunity to encourage all researchers at UCSI University to work together to transform Malaysia into a harmonious, progressive, prosperous and sustainable nation.

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# PREDICTION ON PHYSICS OF FLUIDS VIA COMPUTATIONAL MECHANICS AND APPLIED NUMERICAL MODELLING



Tey Wah Yen

### **Mr Tey Wah Yen**

Computational mechanics and applied numerical modelling involve the formulation, development, improvement, and application of numerical mathematics for the prediction of the physics of fluids and other related physical phenomena. Mr Tey Wah Yen from the Department of Mechanical Engineering is working on the development of numerical schemes in solving various fluids-related problems and other engineering problems.

A modified α-based time marching scheme was proposed in 2020 as an improved method to solve an unsteady ordinary differential equation. The method was devised as a means to ensure both stability and computational speed can be fulfilled. The algorithm was applied in various solvers such as Euler's method and Runge-Kutta family methods. These algorithms were then further applied in solving the Rayleigh-Plesset equation, which governs the historical changes of bubble radius in ultrasonic cavitation. Moreover, the solver was applied further to investigate the effect of the superposition of ultrasonic waves on the mechano-acoustical effect of microbubbles. The work has been presented at the International Conference on Sustainable and Green Technology 2019 Energy [https://doi.org/10.1088/1755-1315/463/1/012117].



The interference of acoustical waves is expected to improve the mechanoacoustical effect of ultrasonic pretreatment.



This history of bubble radius during the contraction and expansion of the bubble due to ultrasonic cavitation.



**Multivariable Power Least Squares Method (MPLSM)** is a new interpolation scheme proposed in 2020 to correlate the multivariate factors via power functions. The method is inspired by the meshfree techniques, which mainly deploy polynomial moving least-squares techniques for regenerating a smooth surface from a set of scattered data. The technique has been applied in various fields, particularly in engineering optimisation. The mathematical formulation of the method has been archived in Ain Shams Engineering Journal (Q1) [https://doi.org/10.1016/j.asej.2019.08.002]. Several works that used the new method for engineering optimisation comprise regression modelling in ozone depletion and magnetic separation of micron-sized particles.

**A modified Klinaku-Berisha equation** was proposed in 2021 to describe the apparent frequency due to a moving wave (Doppler's effect). The equation was proposed after examining the Klinaku-Berisha equation (proposed in 2019) via a very detailed numerical analysis (high-resolution grid refinement) using the Delfim-Soares time marching scheme. The proposed equation has successfully corrected the original Klinaku-Berisha equation which appears to have an erroneous prediction on the apparent frequencies at arbitrary angles. The work has been published in Applied Acoustics (Q1) in 2021 [https://doi.org/10.1016/j.apacoust.2021.108080].

New proposed equation: 
$$f_{corrected}' = \left[1 + \sigma_1 \exp\left(-\sigma_2 \left(\frac{\left|\mathbf{\theta} - \overline{\mathbf{\theta}}\right|}{\left\|\mathbf{\theta}\right\|}\right)^2\right)\right] \left(\frac{c}{\sqrt{c^2 - v_s^2 \sin^2 \theta} + v_s \cos \theta} f\right)$$



Wave ripples are distorted by a moving wave. The frequency at the forefront and wake of the source of the wave is increased and decreased respectively, due to the Doppler's effect.



A moving wave would produce the secondary wave or perturbed wave at the wake of the moving wave source, besides than the smooth primary wave. The perturbed wave is formed as a result of both highly unsteady wave excitation and moving source. Moreover, the theoretical ideal wavefront is not able to predict the wave ripples correctly.



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32ND INTERNATIONAL INVENTION, INNOVATION & TECHNOLOGY EXHIBITION (ITEX 2021) GOLD MEDALISTS & INTERNATIONAL SPONSOR AWARD: INDONESIAN INVENTION AND INNOVATION PROMOTION ASSOCIATION (INNOPA)

### Invention: Urinary Sodium Test Strip Researchers: Associate Professor Dr Cheah Shiau Chuen and Assistant Professor Dr Tan Chung Keat (Faculty of Medicine & Health Sciences, UCSI University)

### Award synopsis:

Excessive salt consumption is a leading cause of hypertension, which can lead to higher risk of cardiovascular diseases. Through dietary sodium reduction guidelines and initiatives, the targeted mean sodium intake would be <2 g/day. World Health Organization (WHO) have highly recommended that by 2025, the global sodium intake would decrease by 30%. To achieve the desired goal, an effective self-monitoring system on sodium intake is the crucial factor to determine the successful of any intervention. Current methods of evaluating sodium level irregularity include typically utilizing blood serum or urine samples. Measuring urinary sodium content would be favourable prior to giving medical consultation and recommendation as this method is non-invasive and majority of the daily sodium intake is reflected in the average amount of excreted sodium per day. However, the samples obtained must be sent to laboratory facilities to conduct the sample analysis, which can take 0.5 to 1 day. As such, patients are unable to perform their own assessment independently. In addition, these services are commonly marketed in service packages, which can be expensive and supernumerary to the patients. Besides that, these methods can potentially generate a considerable amount of both plastic and electronic waste prior to storing and analyzing the collected samples.

Test strips were made by attaching paper discs onto carrier strip. Reagent was optimized with  $\beta$ -galactosidase ( $\beta$ -gal) enzyme and chlorophenol red- $\beta$ -D-galactopyranoside (CPRG) substrate. As sodium concentration increases, sodium activated  $\beta$ -gal will convert CPRG into its chromogenic by-product, shifting its base colour of chartreuse yellow to scarlet in colour. Colour formation can be distinguished when tested at 0 M (chartreuse yellow), 0.05 M (sunflower), 0.1-0.15 M (mango tango), and 0.2-0.25 M (persimmon) sodium. Test strip was validated in terms of sensitivity, stability, selectivity, and accuracy and precision tests. Moreover, test strips can also semi-quantified the sodium concentration for overnight, random spot, and 24-hours urine samples and results obtained was comparable to flame photometry quantification with <15% variation. Thus, the developed strips can be a better alternative to replace conventional method, as spot urine sampling is much convenient to collect. To that end, the application of test strip would allow users to perform urinary sodium monitoring rapidly, conveniently, and repeatably wherever and whenever possible. The implementation of test strips can be easily mass produced with at a lower cost in comparison to the current methods without the requirement of neither plastics nor electronic equipment. This in turn effectively reduce both the overall expenditure and rate of waste generation. Thus, a paper-based test strip was developed for the enzymatic semi-quantification of urinary sodium ion by providing visual and colour indicator based on the sodium concentration among its hypertensive and normotensive users. While the developed strip can be used for its intended function, it could serve as a model to further optimize, enhance, and create alternative enzyme and substrate system-based biosensor for individual use to detect other specific ions commonly found in urine sample.



Associate Professor Dr. Cheah Shiau Chuen



Assistant Professor Dr. Tan Chung Keat



**Certificate of Award** 



## 32ND INTERNATIONAL INVENTION, INNOVATION & TECHNOLOGY EXHIBITION (ITEX 2021) SILVER MEDALISTS

Invention: OR2 (Oil Remover Raft) Researchers: Assistant Professor Dr Michelle Soo Oi Yoon, Joel Ashervin Zachariah, Kang Zhi Yong, Larsen Alessandro, Associate Professor Dr Eric Chan Wei Chiang, Tan Yong Hui (Faculty of Applied Sciences).

### Award synopsis:

Marine oil spills are happening rampantly in the open waters and mitigation can be challenging especially because of how easily oil particles can travel due to wave action. Oil particles remain in water indefinitely and are very slowly broken down by naturally-occurring oil-degrading bacteria. However, this breakdown is very slow and cannot accommodate a large spill. The Oil Remover Raft (OR2) was designed for its ease of use and application to locals living in coastal regions affected by oil spills. The purpose of the Oil Remover Raft (OR2) is to clean up minor oil spills that occur in jetties and ports where large skimmers or booms may not be suitable "due to the secondary pollution". It can be easily applied by anyone living in coastal regions to clean up an oil spill without the use of sophisticated methods. OR2 consists of the following components:

### Body

The body of a single Oil Remover Raft (OR2) is composed of two used plastic bottles, a mesh bag and bacteria-beads. The plastic bottles (1.5 liters) are 32 centimeters in length with a diameter of 9.55 centimeters. The mesh bag which holds the bacteria beads has a length and width of 30 centimeters

### **Plastic bottles**

The used plastic bottles serve as flotation device for the bacteria-beads contained in a mesh bag. It is also meant to keep the bacteria-beads just above the surface of the water to allow efficient oil absorption.

### **Bacteria-beads**

The average size of a single cellulose bead measures 3.165 + 0.111mm. The interior of the beads is composed of void spaces called micropores (>50nm). The surface area of a single bead is 10.803 mg2/g. The oil degrading bacteria is immobilized on the surface as well as the inner structure of the beads. The beads have an absorption capacity of 2.4850 + 0.1326 g/g in crude oil.

### Mesh bag

The mesh bag with a pore size of 0.5mm is used to contain the bacteria beads. It also serves as a wave dampener to reduce oil from being washed off from the beads.

OR2 provides simultaneous absorption and degradation of crude oil, thus preventing physical and chemical changes of the oil spill. By using OR2, the crude oil will be absorbed before it settles to the seabed while at the same time is being degraded by oil-degrading bacteria. Issues such as acute toxicity and mass mortality of marine organisms could be minimized and avoided when immediate actions are taken. The porous structure found on the beads will also allow proper nutrient diffusion and oxygen supply which further sustains the growth "and multiplication" of the oil degrading bacteria, thus promising the degradation efficiency of oil. Not only that, the use of used plastic bottles as the flotation device paves the path towards zero waste action. The idea behind the use of bacteria-beads to remediate an oil spill was basically the use of bio-balls or ceramic rings found in any aquarium for proper filtration. Nitrifying bacteria inhabit these filters to convert ammonia into nitrates. However in the case of the OR2, medium to short chains "short to long chains" of hydrocarbons "n-alkanes" are degraded into shorter chains and eventually carbon dioxide and water. We foresee the OR2 stepping out as a tool that can be further explored and modified to remediate large scale oil spills or even other forms of pollution.



Assistant Professor Dr Michelle Soo Oi Yoon



Associate Professor Dr Eric Chan Wei Chiang



Miss Tan Yong Hui



Joel Ashervin Zachariah, Kang Zhi Yong and Larsen Alessandro

OIL REMOVER RAFT (OR2)



Drawing of Oil Remover Raft (OR2)

# ARE WE FRAGILE, ROBUST OR ANTI-FRAGILE?

# Assistant Professor Dr Alwyn Lau

Is Malaysia a teapot which cracks easily or can be smashed to bits if enough force is exerted? Is our organization a rock which can resist shock in the face of adverse events? Or are we like a news leak which spreads faster with every attempt to snuff it out?

Are we fragile, robust or anti-fragile?

It's been almost ten years since Nassim Nicholas Taleb's book, Anti-Fragile: Things That Gain From Disorder (Random House: New York, 2012), was published. Not exactly an oceanful of articles on the topic from Malaysian news sites and many people remain unfamiliar with even the definitions.

So this is a primer on this sexy triad. If nothing else, I hope it helps us to think about the nature of the groups or things which are important to us and their inherent qualities when it comes to risk, disorder and chaos.

Let's start with the weakest of the three:

# 1. FRAGILE - craves order, suffers badly from shocks

Conventional businesses. Most Malaysian corporations, really. Financial systems. Academia. Fundamentalist religion. Tradition and culture. Overprotective parents. KL traffic. Monarchies. British colonists in Malaya.

Notice how all the above demand stability to survive. Notice how easily they can be unraveled, shaken up, even torn down. One shock and they get concerned. Two shocks the panic button sounds. Three shocks it's all over. Corporations work like crazy to get the numbers yet can go from black to red between CNY and the World Cup. Pak Lah's Islam Hadhari couldn't survive the onslaught of those who preferred another version of how faith should affect the country. Good 'ol Tunku himself saw the end of his career even before May 1969 happened. And see what the Japs did in 1942? Percival's troops caved in to the Sushi boys so fast you thought maybe the British were firing blanks.

Fragility is all over the place. Our post-SPM-ers and graduates are just one uncertain project or task away from exposing how much they lack in capability. Our academic departments are often just two (or even one) staff resignation away from chaos. Our stock portfolios are at the mercy of the stock market. Those who keep buying property after property will, as usual, keep telling themselves that 'property can never depreciate', proving that they have learnt less than nothing from the 2008 subprime crisis.

Taleb has, over and over again, warned against the tendency towards fragility (seemingly) inherent in human nature. There's a quote from the movie, Limitless (starring Bradley Cooper and Robert de Niro) which makes this point with less subtlety:

"There are no safeguards against aggressive overexpansion because there are no safeguards in human nature. We're wired to overreach. Look at history, all the countries that have ever ruled the world - Portugal, with its big, massive navy... All they've got now are salt cods and cheap condoms. And Brits? Now they're just sitting in their dank little island, fussing over their suits. No one's stopping and thinking, 'Hey, we're doing pretty well. We got France, we got Poland, we got a big Swiss bank account. You know what? Let's NOT invade Russia in the winter, let's go home, let's pop a beer and let's live off the interest.""



There we have it. We ain't never satisfied. Like Hitler, who may've won WW2 if he didn't go on a wintersuicide mission to capture Stalingrad, we love crazy risks. Our greed makes us fragile.

# 2. ROBUST - prefers order (and sometimes thrive on it), able to resist shocks

The Vatican. The Christian Federation of Malaysia. Early Mahathir. Finance departments. Facebook. Love. Legal systems. Healthy bodies. High-performing sports teams. Strong governments. Popular writers. Computers. Forests and eco-systems. Malls. A good car. Disciplined students.

This category is a good notch above Fragility. If we get even here in our personal/professional lives, 'tis a damn good blessing dah. At this level, nothing can destroy us. We're relatively safe, we're productive and we've eliminated all major risks.

My uncle stores six months' worth of food in his storeroom – that's robust. I have some students whom I know will never fail their subjects no matter how hard they party – that's robust (compared to some top students who are just one bad paper from a nervous breakdown). Singapore's National Service ensures that should the island be invaded, the invaders will need to take on practically the entire adult male population – that's robust. A sizeable Fixed Deposit account – that's robust. Good family connections who will vouch and fight for you – that's robust. Strong political grassroots support – again, robust.

A bit of kia-see isn't entirely a bad thing. Ensure you 'cannot die'. Then go out and do brave things.

# 3. ANTI-FRAGILE - thrives on shocks, becomes stronger when attacked, suffers with too much order!

Desire. Authentic learning. HK umbrella protests. Ponzi schemes. Top Glove in the midst of the pandemic. The hydra. Sherlock Holmes. ISIS. Mao's Cultural Revolution. Whatsapp. (High-functioning) Marketing and Media departments. Unconventional businesses. Controversial movies. Late Mahathir. United States military. Bersih. Trotsky. Capitalism. Planet Earth. Curiosity.

One of my former bosses used to tell me that he loves it when competitors try to take him down – because this only spurs him to annihilate them. Management guru Tom Peters had a similar characteristic; he's known as the guy who is, "never happy unless he's pissed off."

Speaking about organisations, if the public bad-mouths your company on social media, do all your fans rally to defend you, lifting you up even further in the process, securing an even wider customer base? Or, gasp(!), is your fragile revenue vulnerable to just one or two dubious Facebook posts?

Finally, in our personal lives, what 'happens' when times are down? When our loved ones do unexpectedly chaotic or stupid things, do we love them even more? When our bank accounts dry up suddenly, do we produce creative ways of showing generosity, or do we drive up to Genting and throw our money away in dice and drink? When people all around us get depressed due to economic or political factors, do we perform better, work harder, and feel even more motivated?

So, again, are you a teapot that breaks easily, a stone that can withstand hammering or a hydra that can't wait for people to attack?



Assistant Professor Dr. Alwyn Lau is a lecturer in the Mass Comm Department in FOSSLA where he teaches Media Studies, Marketing, etc. His career includes stints in the training and management consulting sector. He is also a columnist for The Malay Mail. Anti-fragility was the topic of his TEDx talk in 2019 in University Malaya.

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### SAUROPUS ANDROGYNUS (CANGKUK MANIS): THE BORNEAN FAVORITE GREEN Assistant Professor Dr Leong Quee Ling Assistant Professor Christopher Wan Sageng Assistant Professor Joseph Martin Pudun

*Sauropus androgynous* is a perennial shrub reported to be growing in the wild naturally; especially in geographical areas that are hot and humid such as the Southeast Asia region (Zhang et al., 2020). It grows on the upright stems that are thick and tough which can go beyond one-meter high. Its dark green leaves growing near to the branch tip are the most tender ones. When it is cooked, *Sauropus androgynous* has a sweet and green flavor, resembling spinach. Due to its mildly sweet flavor, it is a favored vegetable to be added into dishes.

In Malaysia, this green leafy vegetable is well-liked by all races, especially the Bornean in Sarawak. Due to its popularity, various version of common names is attached to this vegetable. For example, sweet leaf, star gooseberry leaf, shuzi cai, cekur manis, pucuk manis and sayur manis. Sarawak in particular, *Sauropus androgynous* is known as cangkuk manis among the Bumiputeras while mani cai among the Bornean Chinese. The plant can be found easily in many fresh markets.

Being one of the popular vegetable dish selection among Sarawakians, *Sauropus androgynous* is also called the "multivitamin" plant due to its superior nutritional values (Zhang et al., 2020). Research found that *Sauropus androgynous* has very high vitamins and minerals content, such as vitamin A, B, C, E, K, provitamin A, carotenoids, fiber, chlorophyll and minerals such as copper, potassium, calcium, phosphorus, magnesium and iron (Padmavathi & Rao, 1990; Fletcher 1998; Ching & Mohamed, 2001; Paul & Anto, 2011; Zhang et al., 2020).

Attributing to its high vitamins and minerals content, *Sauropus androgynous* is also regarded as a traditional medicinal plant in Southeast Asia (Zhang et al., 2020). The plant is found to have the properties that are able to relieve fever and antifungal infection (Ogle et al., 2003). While several other research reported that *Sauropus androgynous* is able to relieve cough, manage hypertension as well as diabetes (Arifin, 2005; Khoo et al., 2015; Chan et al., 2018).

*Sauropus androgynous* can be found easily within Sarawak geographical landscape; either growing in the wild or cultivated in home gardens. The plant is considered a staple food in many Sarawakians dietary habits where it is cooked in various methods. The cooking methods are usually influenced by ethnicity culinary practices. For instance, the Sarawak Chinese will usually stir-fry *Sauropus androgynous* with bee hoon (vermicelli) and scramble eggs. Whereas it is common for the Sarawak Bumiputeras to consume it as ulam-ulaman (traditional salad) (Bachok et al., 2014) or adding the leaves into soupy based dishes such as 'labu masak lemak cangkuk manis' (creamy pumpkin with *Sauropus androgynous*).

*Sauropus androgynous* is a versatile plant with natural unique flavor. Besides cooking it the traditional way, the plant can be incorporated into many other recipes that are creatively and innovatively inspired to create dishes with distinctive flavors. Here are three simple recipes that are inspired from the traditional and innovative preparation method that contains all the goodness of the plant.



Assistant Professor Dr Leong Quee Ling



Assistant Professor Christopher Wan Sageng



Assistant Professor Joseph Martin Pudun



### Fried Mani Cai Bee Hoon



### Sweet Leaf Frittata



### Mani Cai Red Rice Congee



#### <u>Ingredients</u>

- 300gm Mani Cai (coarsely chopped)
- 400gm Bee hoon (soaked and drained)
- 3 Eggs 15gm Sl<u>iced fish cake</u>
- 10gm Pounded dried prawn
- 15gm Sliced chicken
- · 1 nos Sliced chili
- · 10gm Minced onion
- · 10 gm Minced garlic
- 10 gm Minced shallot
  1 tablespoon Fish sauce
- ½ teaspoon Black pepper

#### Preparation methods

- Begin by frying onions, garlic, and chili in 4 tablespoons of cooking oil in a large skillet with medium heat.
- 2. Add chicken and fish cake. Sauté until cooked.
- 3. Add 3 eggs. Continue frying.
- 4. Add 1 tablespoon of fish sauce, 1/2 teaspoon of black pepper.
- 5. Add mani cai into the skillet and continue frying for 3 minutes.
- 6.Lastly, add bee hoon (vermicelli), pounded dried prawn and stir fry for another 2 minutes and ready to serve.

Cooking time: approximately 10 - 20 minutes Serves: 2 persons

#### <u>Ingredients</u>

- 300gm sweet leaf 50gm minced beef 6 Eggs 15gm Chopped onion 10gm Chopped garlic 10gm Chopped shallot
- · 10gm Butter · Salt and pepper (to taste)
- 20gm Cheddar cheese

#### Preparation methods

- 1. Preheat oven to 350 °C. Butter a 9 to 10-inch-deep pie dish and set aside.
- Place the minced beef in a non-stick skillet and cook over medium-high heat, tossing frequently, until browned and crisped about 6 to 10 minutes.
- 3. Transfer the minced beef to a plate lined with several layers of paper towels to drain the oil.
- 4. Heat the skillet with the access minced beef oil with medium-high heat. Add in sweet leaf, chopped onion, shallot, and garlic. Sauté briefly for about 15 seconds until the ingredients are wilted. Transfer to plate.
- 5. In a large mixing bowl whisk together the eggs, season with salt and pepper to taste.
- 6.Add in the cooked minced beef and sweet leaf in the mixing bowl and mix well to evenly distribute the ingredients.
- 7. Pour the evenly mixed ingredients into the prepared pie dish.
- 8. Bake in preheated oven until just set for about 25-30 minutes.
- 9. Cut into wedges and serve warm.

Cooking time: approximately 25 - 30 minutes Serves: 2 persons

#### <u>Ingredients</u>

- 200gm Red rice
- 200gm Sheared mani cai 200ml Chicken stock
- 10gm Sliced ginger
- 15gm Thinly sliced chicken
- 400ml Water
- · Salt (to taste) · Black pepper and white pepper (to
- taste)
- 15gm Minced salted vegetable
  15gm Crispy anchovies

#### Preparation methods

- 1. Wash the rice and toast dry.
- 2. Boil the rice with water and chicken stock for approximately 10 minutes and simmer.
- Add the sliced chicken meat and sliced ginger into the congee. Continue simmering until the chicken is thoroughly cooked.
- 4.Add mani cai, salted vegetable into the congee and simmer for 2 minutes.
- 5. Season with salt, white pepper, black pepper,
- served in a bowl and top with crispy anchovies.

Cooking time: approximately 15 - 40 minutes Serves:2 persons

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# FUNDAMENTAL RESEARCH GRANT SCHEME (FRGS) 2021: INVESTIGATING THE SYNERGISTIC POTENTIAL BETWEEN A G12V/A MUTATED KRAS VACCINE IN COMBINATION WITH ANTI-PD-L1 CHECKPOINT INHIBITOR AGAINST COLORECTAL CANCER



Dr Lionel In Lian Aun

As an immuno-oncologist, Dr Lionel has been a strong advocate of the idea that our own immune system holds the key in taming cancer. Just as how vaccines are solving the current COVID-19 pandemic, he believes that cancer vaccination technologies carry the potential to one day eradicate cancer from the face of our planet. Dr Lionel has been working on this proof-of-concept since 2014, when he started using KRAS-mutated colorectal cancers (CRCs) as a model.

Mutations acquired in the human KRAS gene is the single most predominant mutation with approximately 45% prevalence amongst colorectal cancer (CRC) patients worldwide, and are considered early drivers of carcinogenesis. Individuals within this genotypic cohort are clinically recognized as being ineligible for anti-EGFR therapies and tyrosine kinase inhibitors which are often prescribed to CRC patients. As a consequence, they are left with conventional non-specific first line chemotherapeutic regimens with a poor 5-year prognosis as their sole treatment option.

Unfortunately, while cancer vaccines offer a promising solution to this problem, many tumour-specific antigen (TSA)-based cancer vaccines under development often fail in reducing tumour load and disease progression clinically. This is attributed to immune escape mechanisms, such as the immune checkpoint blockade which allow tumours to evade active immune surveillance. In order to address this problem, this FRGS study will evaluate a prototype mutated KRAS bivalent vaccine pre-clinically in a humanized mice model in combination with the recently discovered anti-PD-L1 immune checkpoint inhibitor to further enhance its effectiveness. The research team believes this synergistic combination will be able to overcome the immune escape mechanisms that tumours so cleverly adopted over generations to ensure its survival.

# FUNDAMENTAL RESEARCH GRANT SCHEME (FRGS) 2021: STUDY ON THERAPEUTIC POTENTIALS OF VITAMIN E-RICH PLANT EXTRACT IN MENOPAUSE-ASSOCIATED DEPRESSION AND ANXIETY

A significant portion of women at menopausal age are inflicted with mood and neuropsychological distress, in which depression and anxiety are often highlighted. These phenomena profoundly devastated the career, productivity and well-being of the affected women. To some extent, it was even reported that suicidal thoughts were formed in postmenopausal women experienced with chronic stress and depression. The clear underlying cause of menopause-associated mood disorder is still unknown but is largely attributed to the dysregulation of stress pathway due to the depletion of ovarian hormones, i.e. estrogen and progesterone.

In view of the negative impact of menopause-associated psychological disorders, the limited efficacy of hormone replacement therapy, and longer treatment duration of conventional antidepressants/anxiolytics accompanied with high side effect profiles,



Associate Professor Ts Dr Lee Ming Tatt

natural products can be explored to as dietary supplements to provide relief to these problems. Thus, the present study aims to employ a menopause-mimicking model in mice with neuropsychological impairment to evaluate the potential alleviating effect of vitamin E-rich plant extract, and its possible mechanism of action. The outcome of this study may warrant further clinical study on the remedial effect of plant extract rich in vitamin E, which is a common feature among important agricultural commodities of Malaysia.

The present study is led by Associate Professor Ts Dr Lee Ming Tatt and the team members including Associate Professor Dr Mogana Sundari Rajagopal, Yap Chuan Seng from Faculty of Pharmaceutical Sciences, and Associate Professor Dr Tham Chau Ling (Universiti Putra Malaysia).



### RESEARCH GRANT CALLS, EXHIBITIONS AND SYMPOSIUMS

No.	Funding Scheme	Endorsement	Submission
		by CERVIE	Closing Date
1	Malaysia Grand Challenge, MOSTI		
	Applied Innovation Fund (AIF)	Onon no	Open no
	Technology Development 1 Fund (TeD 1)	closing data as	closing data as
	Bridging Fund (BGF)	for now	for now
	MOSTI combatting COVID-19 Fund	TOT HOW	TOT HOW
	URL link: https://edana.mosti.gov.my/		
2	Research Excellence and Innovation Grants (REIG)	1 Jan 2022	28 Feb 2022
3	Fundamental Research Grant Scheme (FRGS)	22 Jan 2022	16 Mar2022
4	Prototype Research Grant Scheme (PRGS)	25 Jan 2022	9 Feb 2022
5	Malaysia Toray Science Foundation (MTSF)	1 Jan 2022	31 May 2022
No.	Exhibition(s)	Submission Closing Date	
1	Malaysia Technology Expo (MTE) 2022	14 Feb 2021	
	URL link: https://mte.org.my/	(Video submission)	
2	International Invention, Innovation & Technology Exhibition (ITEX 2022)	29 April 2021	
<u> </u>	URL link: https://itex.com.my/		
No.	Symposium(s)	Abstract Submission Closing	
		Date	
1	5th International Conference on Tropical Medicine and Infectious Diseases (ICTMID) via Virtual	20 Jun 2022	
	Date: 23 – 25 Aug 2022		
	URL link: http://www.ictmid.com/		

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

### Advisor

Emeritus Professor Dr Phang Siew Moi

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