

# EETECH NEWS

FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA TERENGGANU BRANCH DUNGUN CAMPUS



## Featured this edition:

**1** Puisi: Salahkah Teknologi dan Internet?

**2** Introduction to IPv6

**3** Living for Work. Is It Worth It?

**5** Esport FKE: Mobile Legends dan Counter Strike Global Offensive (CSGO)

**7** The Untold Story in the Management of Diabetes Mellitus

**8** Mental Health Awareness

**9** Physics Law in washing machine design

**10** Kembara Ilmu bersama Ustaz Abdul Somad

**11** Systematic Guideline for Safety Assessment based on Process Information

**12** Pulsed lasers: Q-switched and Mode-locked techniques

**14** Colour Development of Green Coffee Bean during Batch Roasting in Fluidized Bed Roaster

**16** Super Robot

**16** Istiadat Konvokesyen UiTM Cawangan Terengganu ke-91

**16** Overview of Protein Structure Prediction



## Puisi: Salahkah Teknologi dan Internet?

oleh Siti Sara Rais

Dahulu, era 90-an

Aku masih di bangku sekolah

Seringkali disajikan dengan kata-kata berbunyi...

“Maklumat di hujung jari”

Langit terbuka ,bersediakah kita?”

Entah apakah itu?

Zaman itu, yang kaya saja mampu memiliki telefon bimbit dan komputer...

Dahulu, awal tahun 2000

Internet ‘dial up’ 1515 yang mahal tapi perlahan diperkenalkan TM

Nokia 3310 mula menggegar tanahairku

Zaman itu, ramai orang mampu memilikinya

Hari ini, teknologi itu semakin berkembang canggih

Telefon bimbit menjadi telefon pintar

Komputer menjadi ‘notebook’ malah ‘ultrabook’

Hari ini, semua orang memiliki teknologi ini

Namun, sayang seribu kali sayang

Nilai kemanusiaan semakin hilang

Budi bahasa kian pudar

Fitnah dan tohmahan berleluasa

Benarkah salah teknologi dan internet?

Adakah kita, manusia kini dikuasai oleh teknologi dan internet?

Bukankah manusia yang mencipta teknologi ini?

Mengapa kita pula yang hilang kemanusiaan?

Undang-undang adab dan budi pekerti  
membentuk kemerdekaan bekerja.  
Undang-undang akal membentuk  
kemerdekaan berfikir.

Dengan jalan menambah kecerdasan akal,  
bertambah murnilah kemerdekaan berfikir.

- HAMKA -

# Introduction to IPv6

written by Siti Sara Rais

Size of IPv4 is 32-bits only, while IPv6 is 128-bits and it is represented in hexadecimal numbers in the form of X.X.X.X.X.X.X.X which X consists of 16-bit value. Example expression of IPv6 is 2000:0000:1234:ABCD:0000:0000:FACE:00006. This can be written as 2000:0:1234:ABCD:0:0:FACE:0006 or simplified to 2000::1234:ABCD::FACE:6. If we find the address is 2000::A, it is also can be written as 2000:0:0:0:0:0:000A.

Let's take a look at this example of CIDR X:X:X:X:X:X:X:X/64. It means that the network is 64-bit, and we can calculate like Figure 1, and hence we get N.N.N.N.H.H.H.H. IPv6 does not have broadcast and network address translation (NAT). However, similar to IPv4, IPv6 has unicast and multicast. IPv6 is faster because of no broadcast. It can access anywhere, and everyone gets public IP. The differences between IPv4 and IPv6 are summarized in Table 1. We will discuss further the range of global unicast, link-local and multicast in the next volume.

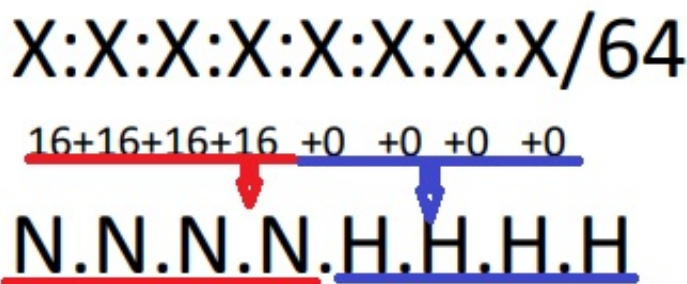


Figure 1 CIDR in IPv6

IPv4	IPv6
32-bit (decimal)	128-bit (hexadecimal)
Public IP	Global unicast 2000::/3
Private IP	Link local FE80::/10
Loopback 127.0.0.0 => 127.255.255.255	:::1
Multicast 224-239	Multicast FF00::/8

Table 1 IPv4 vs IPv6

IPv6 can be anycast i.e. one to nearest. Same IPv6 can be assigned to many hosts. Refer to the Figure 2, if we are in Malaysia and we do not have the server in Malaysia, we can anycast to the nearest, and it is Singapore server.

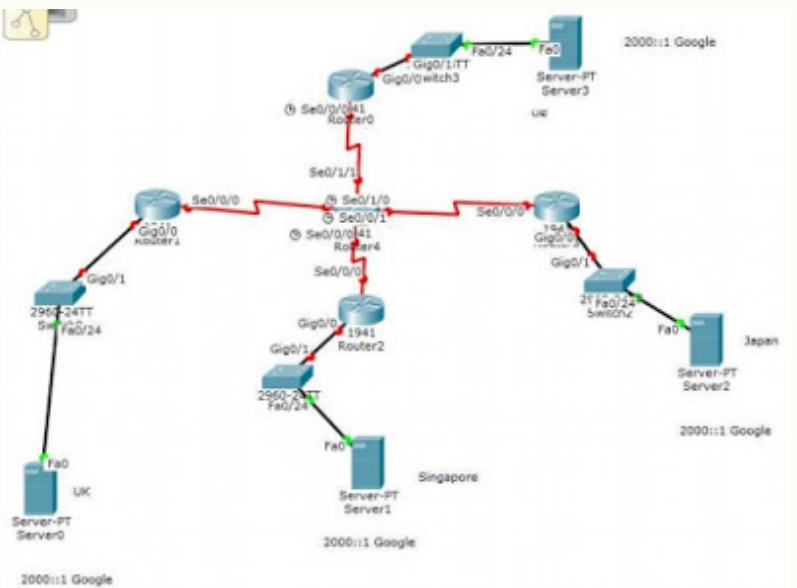


Figure 2 IPv6 anycast

Reference: CCNAX Training Materials

A photograph of a wooden desk with a notebook, ruler, and pen. The notebook is orange with a circular logo. The ruler is black with white markings. The pen is white with a black tip. The desk is light-colored wood. An orange chair is visible in the background.

# LIVING FOR WORK. IS IT WORTH IT?

WRITTEN BY  
NUR IDAWATI MD  
ENZAI

Long gone the days where a normal job revolves around 9-5 working time. Constant availability for communication, no thanks to Internet, has made the situation becomes worse. In the good old days, if you are on leave, you really could rest and don't have to think about work. As technology has enabled us to become contactable 24-7, our bosses and colleagues could endlessly shove job after job under our very nose day and night. This could seriously affect the work life balance negatively.

Most European countries have been seriously implementing healthy work-life balance after realizing its importance. Australia and New Zealand have also jumped into the bandwagon by giving a particular attention on the work-life balance. Shorter working weeks and hours have been adopted as it is believed to help the staffs wellbeing and happiness [1]. Fun fact, even though working hours have been shortened, these countries still thrive economically. Having experienced living in Australia for a few years, I personally witnessed most Australians working really hard during the day, resting with family and friends at night, spending time with family and friends during weekends. Even the shopping malls are closed early during the weekends. A friend's husband was told off by his boss for working on a weekend. "Don't you have a family?" his boss asked. A university official even jokingly told the graduate students, "I don't want to see you Asian scholars at the university on weekends."

Asian countries are especially guilty when it comes to working long hours. Japan has always been known for long working hours and little to none vacation. True, it is a developed country, and yet the suicide rates are among the highest. Cases of death due to overwork has become quite common as well. Therefore, the government of Japan has been seriously looking into this problem, even though back in the 70s and 80s there was apparent denial that death could be caused by overwork. However, the relationship between overwork and death has been accepted by Japanese corporate lawyers and government officials [2]. I believe that the reason Asian countries tend to have more working hours, could be due to culture of saving face and hierarchy. Leaving early while the others are still at work may make an Asian feeling guilty even though he/she has finished work. Asians are generally taught to keep their opinions to themselves to avoid conflict, compared to a Westerner who typically doesn't care what the others think. I remember, a friend from China once told me that on Chinese New Year, some of them don't even go back to their hometown. Chinese New Year which is supposed to be their number one celebration is not even in their priorities. It makes me afraid to imagine their working style.

**Being citizens of a Muslim majority country, Malaysian Muslims should know better that this worldly life is not the only life to be encountered. Indeed, Islam teaches us to work diligently in order to earn halal income and support the family. But not to the extent of neglecting family, friends and social responsibilities.**

*Surah Al-An'am verse 96 clearly indicates: "He causes the dawn to break; and He has made the night for rest, and the sun and the moon for reckoning; this is an arrangement of the Mighty, the Knowing."*

Benefits of good work life balance include: increase in productivity and motivation, reducing truancy, as well as gaining loyalty from staffs. The risks for physical and mental health can also be minimized [3]. Of course, long working hours are unavoidable especially for certain sectors such as healthcare, technical support and security. But for normal regular jobs, efficiency and common sense are the key. For instance, simple documentation works could definitely wait till morning. There's no need to discuss about work after working hours if it is not urgent. Working long hours should be the exception, not the rule. It's about time that number of working hours should not dictate productivity; rather flexibility and ample time for family, friends and other self-improvement activities must be encouraged. This may sound easier said than done, but it is not impossible. Start with yourself, be an advocate for work life balance by being an exemplary employee and respect others' private time. Insya Allah the positivity can be spread and the others will follow suit.

## References

- [1]. <https://thriveglobal.com/stories/work-life-balance-how-do-different-countries-approach-the-working-day/>
- [2]. <https://apjff.org/-Samuel-J--Timinsky/5283/article.pdf>
- [3]. <https://www.hrzone.com/community/blogs/valeriemaniarecruitment/offering-work-life-balance-to-improve-productivity>

# ESPORT FKE: MOBILE LEGENDS DAN COUNTER STRIKE GLOBAL OFFENSIVES (CSGO)

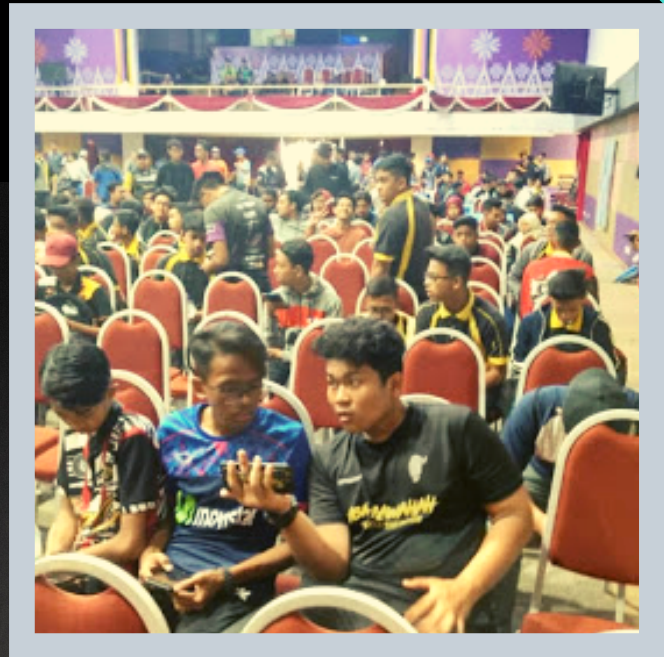
Oleh: Mohd Amir Hamzah Ab. Ghani, Dr. Ilham Rustam, Fadhli Dzul Hilmi Mohd Fauzi, Abdul Hafiz Kassim, Dr Mohamad Yusof Mat Zin.

Hari sukan UiTM Cawangan Terengganu (UiTMCT) yang dianjurkan bersama kelab pensyarah Fakulti Kejuruteraan Elektrik (FKE), Kelab EESA (Electrical Engineering Student Association) dan unit Hal Ehwal Pelajar (HEP) pada 10 October sehingga 19 October 2019 pertama kali mempertandingkan sukan elektronik atau lebih dikenali sebagai esport. Sukan yang dipertandingkan kali ini hanya dua sahaja iaitu Mobile Legend (ML) dan Counter Strike Global Offensive (CSGO). Sukan ML bermula pada 15 October 2019 pada hari Selasa manakala CSGO berlangsung selama 2 hari iaitu pada 18 October dan 19 October 2019.



Sukan ML yang berlangsung mendapat penyertaan seramai 120 orang iaitu sebanyak 24 kumpulan daripada pelajar UiTM Cawangan Terengganu Kampus Dungun, Kampus Kuala Terengganu, Kampus Bukit Besi dan juga pelajar Sekolah Menengah Kebangsaan Tengku Intan Zaharah. Pengurus acara diketuai oleh Mohd Amir Hamzah Ab. Ghani dan dibantu oleh pelajar FKE yang juga ahli EESA seramai 12 orang. Para peserta mula berkumpul di Dewan Aspirasi (DA) sejak dari pukul 7.30 pagi dan taklimat bermula pada 8.30 pagi kerana memberi laluan kepada perasmian Hari Sukan Negara dan pelepasan atlit lumba basikal Weather The Storm yang berlangsung pada hari yang sama.

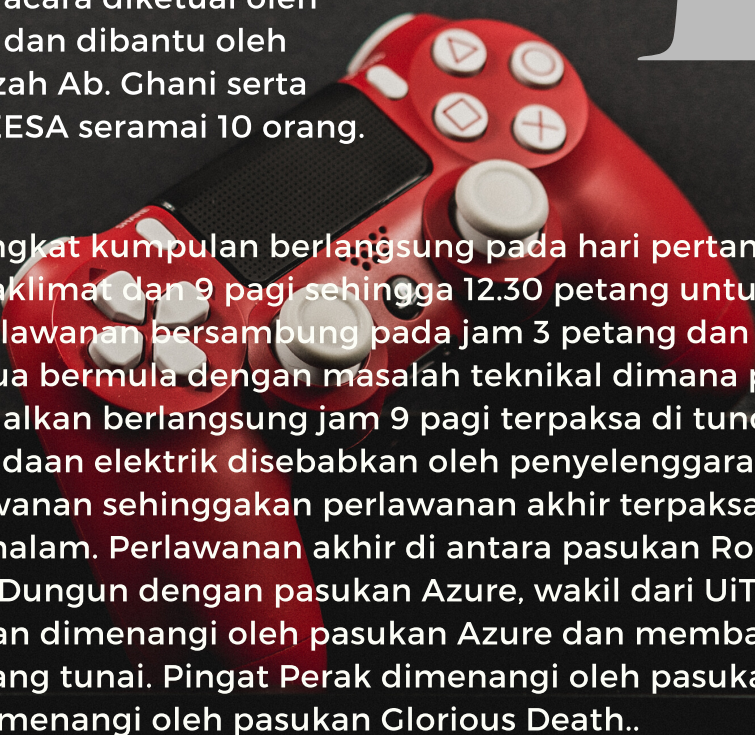
Perlawanan peringkat kumpulan pada sesi pagi bermula jam 9 pagi berlangsung serentak sebanyak 8 perlawanan dan dipertontonkan di skrin besar DA menerusi projektor. Manakala perlawanan separuh akhir dan akhir berlangsung pada sesi petang bermula jam 2 petang. Perlawanan akhir diantara pasukan Team Joki dan Team Public dimana kedua-dua pasukan adalah wakil daripada pelajar UiTMCT Kampus Dungun dimenangi oleh pasukan Team Public. Johan membawa pulang pingat Emas, sijil dan juga hadiah wang tunai. Pingat Perak dimenangi oleh pasukan Team Joki dan Pingat Gangsa dimenangi oleh pasukan Google.



Sukan CSGO pula berlangsung di Makmal blok 14b2 dan 14b3 pada hari Jumaat dan Sabtu. CSGO mendapat penyertaan sebanyak 12 kumpulan daripada pelajar UiTMCT Kampus Dungun, Kampus Bukit Besi dan Kampus Kuala Terengganu. Jumlah penyertaan seramai 60 peserta dimana 1 kumpulan hanya dibenarkan 5 peserta sahaja. Pengurus acara diketuai oleh Dr. Ilham Rustam dan dibantu oleh Mohd Amir Hamzah Ab. Ghani serta urusetia pelajar EESA seramai 10 orang.



Perlawanan peringkat kumpulan berlangsung pada hari pertama bermula jam 8.30 pagi untuk sesi taklimat dan 9 pagi sehingga 12.30 petang untuk memberi laluan solat Jumaat. Perlawanan bersambung pada jam 3 petang dan tamat jam 6 petang. Hari kedua bermula dengan masalah teknikal dimana perlawanan separuh akhir yang dijadualkan berlangsung jam 9 pagi terpaksa di tunda ke sesi petang pada jam 2. Ketiadaan elektrik disebabkan oleh penyelenggaraan mengganggu susun atur perlawanan sehinggakan perlawanan akhir terpaksa berlangsung sehingga jam 7 malam. Perlawanan akhir di antara pasukan Rodong, wakil dari UiTMCT Kampus Dungun dengan pasukan Azure, wakil dari UiTMCT Kampus Kuala Terengganu. Johan dimenangi oleh pasukan Azure dan membawa pulang pingat Emas, sijil dan wang tunai. Pingat Perak dimenangi oleh pasukan Rodong dan Pingat Gangsa dimenangi oleh pasukan Glorious Death..





# THE UNTOLD STORY IN THE MANAGEMENT OF DIABETES MELLITUS

WRITTEN BY: DR. NUR SYUKRIAH AB RAHMAN

Diabetes mellitus (DM) is one of the most important metabolic disease that hit the globe in the present millennium. It has been listed as one of the five leading cause of deaths and approximately six death per minute are associated to DM complications [1]. The report from National Health and Morbidity Surveys shown that there is an increasing trend in the recorded prevalence of DM for the past decades and surprisingly the overall prevalence of DM has been increased by more than doubled from 1996 to 2015 in Malaysia [2].

The earliest history recorded in the treatments of DM involved the use of plants. Metformin is one of the oral diabetic drug that is widely prescribed by the medical practitioner nowadays which is originated from the use of Galega officinalis (*G. officinalis*) Linn as herbal medicine in primitive Europe [3]. *G. officinalis* is a perennial herb with blue, white or purple flowers which is commonly found in most temperate regions and grows over three feet high.

The scientific research on the development of Synacinn™ as herbal medicine in the management of DM is still in progress and a group of researchers from UMT and UTM have put their blood and tears on this development. As for now, Synacinn™ is already available on the market for example Shopee, Lazada or can be directly purchased from NatureMedic Laboratories Sdn Bhd. It is hoped that we one fine day we found the cure for this disease.

#### References:

- [1] Li, H., Wu, X., Davey, A. K., & Wang, J. (2011). Antihyperglycemic Effects of Baicalin on Streptozotocin-Nicotinamide Induced Diabetic Rats. *Phytotherapy Research*, 25(2), 189-194.
- [2] Tee, E.-S., & Yap, R. W. K. (2017). Type 2 Diabetes Mellitus in Malaysia: Current Trends and Risk Factors. *European Journal of Clinical Nutrition*, 71(7), 844-849. <https://doi.org/10.1038/ejcn.2017.44>
- [3] Bailey, C. J., & Day, C. (1989). Traditional Plant Medicines as Treatments for Diabetes. *Diabetes Care*, 12(8), 553-564. <https://doi.org/10.2337/diacare.12.8.553>



# MENTAL HEALTH AWARENESS

Written by Fathiah Zakaria



Mental illness has become one of the prevailing health problem nowadays. Mental illness happens to people from all walks of lives, professionals, students, parents and children. Among prevention and intervention methods available are counselling, therapeutic assessment (psychiatrist), circle time and support group. DSM-5 is a Diagnostic and Statistical Manual of Mental Disorders, published by the American Psychiatric Association (APA). DSM-5 serves as the guidelines for psychiatric diagnosis and also treatment recommendations. Among types of mental disorder listed in DSM-5 are Anxiety Disorder, Autism Spectrum, Personality Disorder, Major Depressive Disorder, Social Communication Disorder and etc. [1]. In developed countries like United States, the treatment cost for mental disorder is covered by medical insurance.

There are numbers of Government entities, NGO and private practices that provide services related to mental health in Malaysia such as MENTARI Malaysia, Mental Illness Awareness & Support Association (MIASA), Relate Malaysia, Malaysian Mental Health Association and etc. In fact, most of the Government entities provides in-house counsellor and psychologist. If you feel you are having unstable emotional, changing in mental state condition, there is no harm of finding professional help. Counselling would be one of effective methods to deal with this condition. Counselling provides a safe space to talk about thoughts and feelings, subjected to counsellor's ethics and confidentiality. It allows someone to talk with a professional who can help to work on specific issues that they are facing with. Try to find registered counsellor with notation (KB,PA) - "Kaunselor Berdaftar dan Perakuan Amalan" after their name, because they are registered with Lembaga Kaunselor Malaysia [2]. In the condition where further treatment and medical assessment is needed, counsellor will refer the clients to the psychiatrist.

World Health Organization (WHO) defined mental health as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" [3]. Let's check on our mental state condition. Positive mental well-being results in blissful community and prosperous country. Remember that "loving ourselves works miracle in our lives".

[1] "DSM-5" Accessed on: 1 November, 2019. [Online].

Available: <https://www.psychiatry.org/psychiatrists/practice/dsm/educational-resources/dsm-5-fact-sheets>

[2] "Lembaga Kaunselor Malaysia" Accessed on: 1 November, 2019. [Online].

Available: <https://www.lkm.gov.my/>

[3] "Mental Illness Definition" Accessed on: 1 November, 2019. [Online].

Available: <https://relate.com.my/>

# PHYSICS LAW IN WASHING MACHINE DESIGN

Written by Siti Aishah Che Kar and Syila Izawana Ismail

Nowadays, washing machine is one of the must-have household equipments. But how does the smart machine spin and drain all the water from our clothes? Or what is actually happening during the spinning process? Here comes the scientific explanation. Centrifuge is the word or term that is used to describe the whole process. You can do a very simple experiment at home to understand the centrifuge phenomenon. Take wet clothes and turn the clothes while holding them. You can see the excess water sparking out from the wet clothes. Actually the clothes spin in circle because you force it but the water trapped in clothes retains to move in straight line. Thus the water will fly out from the wet clothes and automatically the clothes will be drier than before. [1].

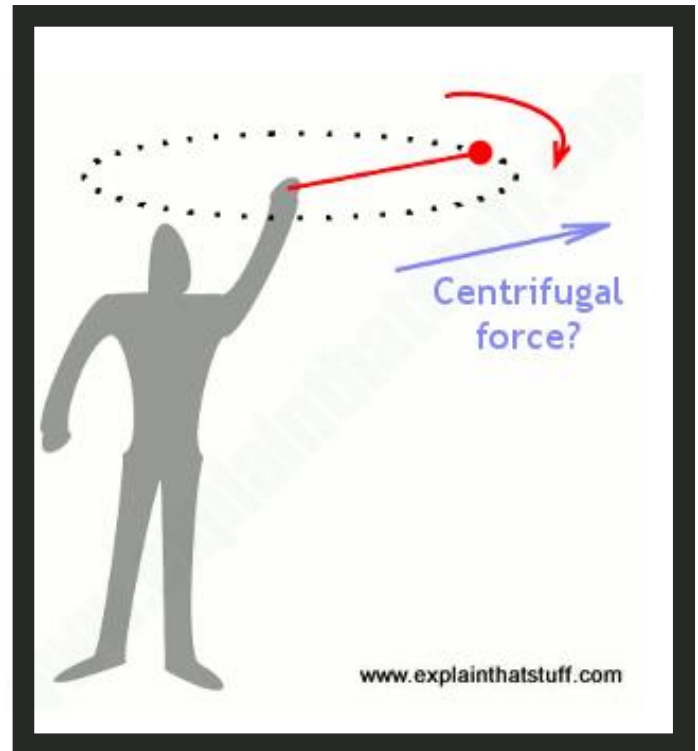
Thus this concept is applied in the washing machine process. After the rinsing process, the washing machine will be in drain mode automatically where a pump is used to drain all the excess water. Then, the spin mode will take over. In top loader washing machine, the agitator which is a large plastic at the bottom of the drum will spin while in the front loader washing machine, the drum itself will spin. The drum is actually like a big basin that holds our clothes. Usually each washing machine contains two drums which are the inner drum and the outer drum.

References:

[1] <http://www.explainthatstuff.com/centrifuges.html>

[2] <https://www.livescience.com/46558-laws-of-motion.html>

[3] [https://en.wikipedia.org/wiki/Astronaut\\_training](https://en.wikipedia.org/wiki/Astronaut_training)



The clothes are forced to move in circle because the inner drum is spinning but the excess water in clothes still goes straight, turning into water drop. The water drop is small enough to pass through the drum's tiny holes into the outer drum. This phenomenon is actually relevant to the Isaac's most famous laws of motion. The First Law of motion states, "A body at rest will remain at rest, and a body in motion will remain in motion unless it is acted upon by an external force." This simply means that things cannot start, stop, or change direction all by themselves. It takes some force acting on them from the outside to cause such a change [2]

The centrifuge concept is well used in many applications especially in science laboratory as centrifuges to separate things like component in blood or any substances in liquid form. The blood sample will be spin at high speed using centrifuge to separate the blood cell such as plasma and red blood cells. NASA also uses centrifuge concept for testing their astronauts and pilots in psychology test by using human centrifuges to test whether the astronauts are fit for the space ship [3].



## KEMBARA ILMU BERSAMA USTAZ ABDUL SOMAD

Oleh : Wan Ahmad Khusairi Wan Chek, Fadhli Dzul Hilmi Mohd Fauzi, Dr. Baktiar Musa (Fakulti Kejuruteraan Elektrik), En Tajulurus Mohammad ( Fakulti Pengurusan Hotel)



15 Febuari 2019 merupakan hari pertama kami berempat memulakan satu ekspedisi bermotosikal bagi mengikuti perjalanan penceramah terkenal dari seberang iaitu Ustaz Abdul Somad (UAS) yang menjelajah Malaysia menerusi siri ceramah beliau. Memandangkan ceramah beliau bermula di negeri Kelantan, maka destinasi pertama konvoi kami menuju ke negeri Cik Siti Wan Kembang. Konvoi biasanya sinonim dengan kembara berkumpul yang menggunakan motorsikal berkuasa tinggi, namun kami sedikit berbeza kerana menggunakan motorsikal dari kategori moped. Tepat jam 830 pagi, kami mula berkumpul di perkarangan stesen minyak Petronas (hadapan SM Sains Dungun) untuk acara pelepasan. Walaupun hanya berempat, namun semangat berkonvoi tetap membara dan berkobar-kobar. Bagi Wan dan Fadhli, ini merupakan pengalaman konvoi pertama yang disertai. Setelah selesai membaca doa bagi memulakan perjalanan, maka deruan enjin motorikal mula bergema dan perjalanan konvoi kami pun bermula.

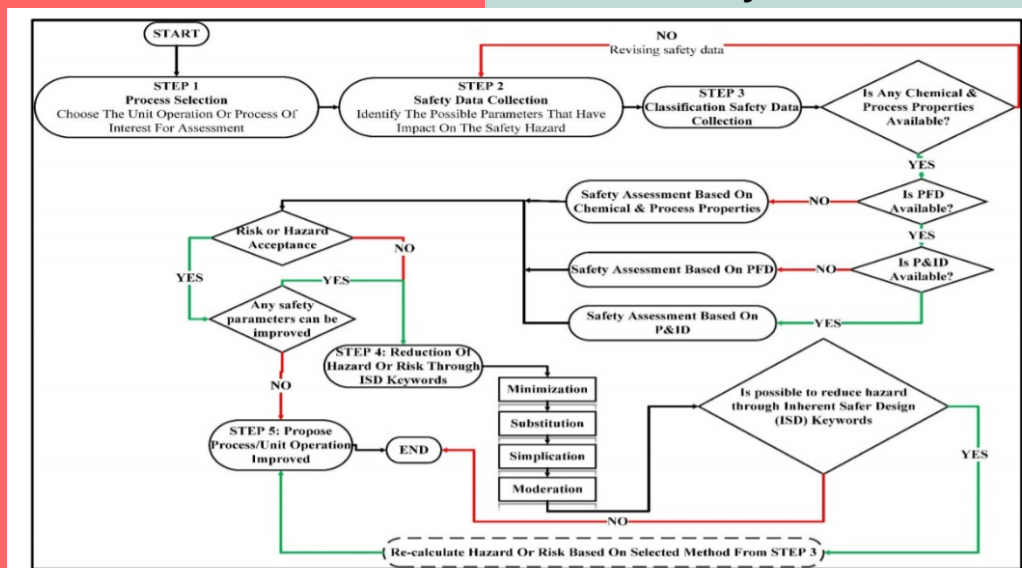
Perhentian pertama kami adalah di sekitar daerah Marang kerana kami semua 'skip' makan pagi bersama keluarga. Chief de Mission kami, En Tajul mencadangkan untuk berhenti menjamu selera di kedai nasi dagang 30 tahun. Saya akui itu merupakan pertama kali saya mengetahui akan kewujudan kedai nasi dagang tersebut. Menarik nama panggilan kedai it's. Sesudah selesai menjamu selera, konvoi diteruskan. Dalam jam 1.00 tengahari, kami sampai di Kuala Besut. Kami berhenti sekejap untuk makan tengah hari. Kami memilih untuk makan nasi ayam di sebuah kedai yang terletak berhampiran pasar pagi Kuala Besut. Harga nasi ayam di situ agak murah dan yang penting mengenyangkan kami. Alhamdulillah, syukur. Perjalanan direntasi dan kami sampai di rumah penginapan di Kota Bharu sekitar jam 3.30 petang. Penginapan yang di tempah oleh En Tajul agak selesa dan selamat kerana berpagar. Setelah berehat dan menyegarkan badan, kami terus bergerak menuju ke Stadium Sultan Mohamad ke - 4 untuk menyertai ceramah Ustaz Abdol Somad (UAS). Kami keluar awal kerana memang menjangkakan kesesakan berlaku memandangkan ribuan orang yang memenuhi stadium tersebut.

Kami sampai di sekitar perkarangan agak awal, namun kawasan stadium sudah pun sangat meriah dipenuhi dengan orang ramai yang berpusu-pusu. Juga terdapat pelbagai gerai jualan. Menantikan program bermula, kami mengambil kesempatan untuk menjamu selera terlebih dahulu. Sebaik sahaja masuk waktu Maghrib, kami semua menunaikan solat Maghrib secara berjemaah di padang stadium tersebut. Setelah selesai menunaikan solat kami bergegas mencari lokasi yang strategik untuk mendengar ceramah dari Ustaz Abdol Somad.

Usai ceramah, kami singgah untuk minum malam di sebuah kedai berhampiran Wakaf Che Yeh. Di situ, kami perbincangan tentang aturcara perjalanan untuk keesokan harinya. Mengikut jadual, destinasi UAS yang seterusnya adalah kuliah subuh di Pasir Puteh dan seterusnya di Perak. Setelah selesai minum malam kami pun pulang ke rumah penginapan kami untuk melepaskan mata.

# SYSTEMATIC GUIDELINE FOR SAFETY ASSESSMENT BASED ON PROCESS INFORMATION

Written by: Muhammad Firdaus Husin



In chemical engineering, one of the targets of the process design is the creation or modification of flow diagrams capable of manufacturing the desired chemical. It is also essential to consider safety aspects when designing any new process or in the case of retrofiting. As a result, several methods have been introduced for safety assessment during process design phase [1]. To date, there are lacks of guideline in selecting an appropriate method for him/her based data availability, target of assessment and budget constraints. To fill in this gap, a heuristic framework are designed for assisting users in conducting safety assessment during chemical process design

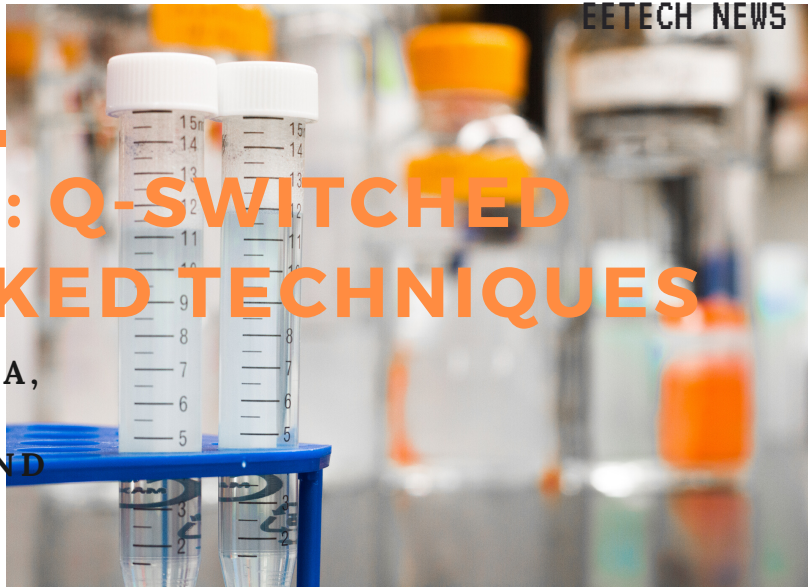
Figure 1 shows a summary of designing framework for process safety assessment in chemical process design methods and their strategies for minimization of hazards or risks which are based on inherent safer design (ISD) keywords [2]. For all methods, the calculated index or risk values and hazards will be compared with the respective benchmark. If the value of calculated index or risk is not acceptable, four ISD keywords (minimization, substitution, moderation and simplification) are taken-over to reduce or eliminate the hazard as much as possible. Finally, the re-assessment of hazards can be performed until the index values and all hazards are at acceptable range. The frameworks shall serve as a great help for engineers to select appropriate method for safety assessment based on the availability of process information during the chemical process design. Instead of assessing the safety level of process design phase, this framework can also be used to analyse the root of the safety problems and recommend the possible solutions.

## References

- [1] Khan, F. I. and Abbasi, S. A. (1998c). Techniques and methodologies for risk analysis in chemical process industries. *Journal of Loss Prevention in the Process Industries*, 11(4), 261-277.  
 [2] Kletz, T. A. (1991). *Plant Design for Safety : User-friendly Approach*.

# PULSED LASERS: Q-SWITCHED AND MODE-LOCKED TECHNIQUES

WRITTEN BY: DR BAKTIAR MUSA,  
SUZIANA OMAR,  
IR. DR. ZULZILAWATI JUSOH AND  
NORIZAN AHMED



This article tries to explain about our research on Q-switched and mode-locked lasers. We begin with the definition of laser first, LASER is actually an acronym for Light Amplification by Stimulated Emission of Radiation. Historically, the first laser was realized in 1960 at Hughes Research Laboratories by Theodore H. Maiman following the theoretical work by Charles Hard Townes and Arthur Leonard Schawlow [1]. In order to understand how pulsed lasers work, we need to revisit our fundamental knowledge in physics. But explaining all those fundamentals can be tiresome, so here we just focused on differentiating pulsed laser and continuous wave (CW). CW refers to a laser that is continuously pumped and continuously emits light. The emission can occur in a single resonator mode or on multiple modes. An example of CW laser is CO<sub>2</sub>, where initially the gas is ionized to the threshold level and then by using pulse width modulation (PWM), the laser output can be controlled. For comparison, CO<sub>2</sub> molecules readily lase at 10.6  $\mu\text{m}$ , while neodymium-based crystals (like YAG or vanadate) produce wavelengths in the range between 1047 and 1064 nm. Each laser wavelength is associated with a linewidth, which depends on several factors: the gain bandwidth of the lasing medium and the design of the optical resonator [2]. On the other hand, a pulsed laser operates in such a way that all of its energy is dumped out in a single pulse which normally lasts from picoseconds to few nanoseconds. After that the laser output goes to zero. Again, the pulse appears at the output. This switching is done by Q switch.

Two commonly used techniques employed in producing pulsed lasers are Q-switching and mode-locking. A Q-switched laser is a laser to which the technique of active or passive Q switching is applied, so that it emits energetic pulses [3]. Typical applications of such lasers are material processing (e.g. cutting, drilling, laser marking), pumping nonlinear frequency conversion devices, range finding, and remote sensing. Q-switching technique allows the production of light pulses with extremely high (gigawatt) peak power, much higher than would be produced by the same laser if it were operating in a CW mode. Using mode-locking technique, the laser output will be pulses of light of extremely short duration, on the order of picoseconds (10<sup>-12</sup> s) or femtoseconds (10<sup>-15</sup> s). Here, the laser resonator contains some kind of mode locking device – either an active element (an optical modulator) or a nonlinear passive element (a saturable absorber), which causes the formation of an ultrashort pulse circulating in the laser resonator [4]. In terms of repetition rates and pulsed durations, Q-switched lasers showed lower values compared to ones produced by using mode-locking technique.

Depending on the applications, sometimes the techniques are used together to produce pulsed lasers.

# PULSED LASERS: Q-SWITCHED AND MODE-LOCKED TECHNIQUES

WRITTEN BY: DR BAKTIAR MUSA,  
SUZIANA OMAR,  
IR. DR. ZULZILAWATI JUSOH AND  
NORIZAN AHMED

For generation of pulsed laser, a passive mode-lockers are preferred due to their simpler configuration and thus far, a variety type of saturable absorber (SA) have been proposed [3-6]. Our research focused on finding and exploring new materials that are suitable as saturable absorbers. Previously, carbon materials such as carbon nanotubes (CNTs) and graphene show promising performances as saturable absorber to achieve mode-locking in fiber lasers [5, 6]. It offers characteristics such as ultrafast recovery time and capable to achieve broadband operation. Recently, numerous novel 2D materials such as topological insulators [8,9], transition metal dichalcogenide (TMD), black phosphorus, MXene, bismuthene, metal-organic frame-works, and perovskite have demonstrated broad-band optical nonlinearities [7]. The properties of these saturable absorbers will be discussed in the next article.

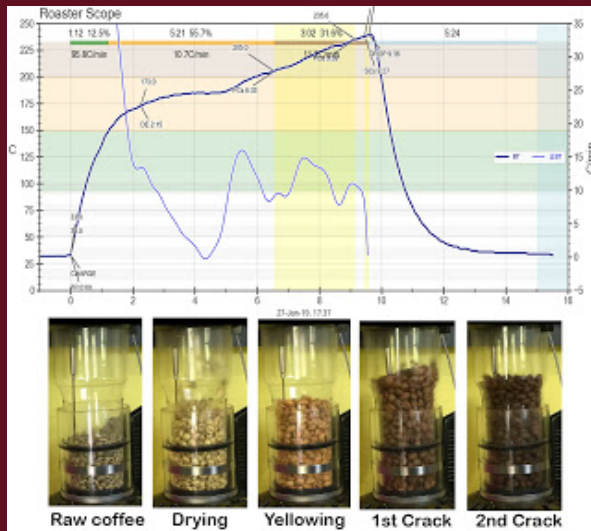
1. <https://en.wikipedia.org/wiki/Laser>
2. [https://www.photonics.com/Articles/Lasers\\_Understanding\\_the\\_Basics/a25161](https://www.photonics.com/Articles/Lasers_Understanding_the_Basics/a25161)
3. [https://www.rp-photonics.com/q\\_switched\\_lasers.html](https://www.rp-photonics.com/q_switched_lasers.html)
4. [https://www.rp-photonics.com/mode\\_locking.html](https://www.rp-photonics.com/mode_locking.html)
5. Luo Z, Liu C, Huang Y, Wu D, Wu J, Xu H, Cai Z, Lin Z, Sun L and Weng J. IEEE Journal of Selected Topics in Quantum Electronics 20 1-8 (2014)
6. Bao Q, Zhang H, Wang Y, Ni Z, Yan Y, Shen Z X, Loh K P and Tang D Y. Advanced Functional Materials 19 307 83 (2009) Li, L., Lv, R., Chen, Z. et al. Nanoscale Res Lett 14, 59 (2019)



# COLOUR DEVELOPMENT OF GREEN COFFEE BEAN DURING BATCH ROASTING IN FLUIDIZED BED ROASTER

WRITTEN BY: MOHAMAD TAIB MISKON & NURUL 'UYUN AHMAD

Roasting has been one of the most important step in a coffee production as it transforms the tasteless green coffee bean into a delicious cup of Joe. It is an act of introducing an amount of heat to a batch of green coffee bean to trigger complex chemical reaction [1] as well as colour and physical change [2]. There are various types of coffee roasting methods such as using the traditional hot pan, drum roaster and fluidized bed or hot air roaster. This article presented the colour development of green Ethiopian coffee bean during roasting in a Fresh Roast SR500 coffee roaster with Artisan Roaster Scope. Figure 1.0 depicted the colour changes of the bean over temperature progression during the roasting process. The process took about 15 minutes and it can be divided into six key stages;



## Stage 1: Drying (at minutes: 0 – 2.15)

The roasting process started with the bean temperature at 33°C and it endured the drying phase for about 2.15 minutes as the beans' colour changed from green to yellow. During this stage, the beans were absorbing heat from the hot air or also known as an endothermic process.

## Stage 2: Yellowing (at minutes: 2.15 – 6.33)

At this stage, more water was removed from the bean and the bean colour was changing from yellow to brown. The size of the bean was also expanding rapidly due to the build-up of gas pressure inside the bean [3].

*“While enjoying a cup of an aromatic, astonishing, hot and refreshing coffee drink.”*



no moving parts  
absolutely unique!  
has a flash-beat  
a visual beat synchronized with an audible  
adjusts louder or softer  
to any tempo  
DIALS the tempo easily  
the whole range from 40 to 200 beats per minute  
precision! in all positions  
doesn't need flat surface. Precision at any angle  
\$1600  
FULLY GUARANTEED  
YORK, N.Y.

**Stage 3: First Crack (at minutes: 6.33 minutes)**

The first crack was determined by the audible popping sound, indicating the beginning of the beans' exothermic reaction. Stage 4: Roast development (at minutes: 6.33-9.09) At this stage, the beans' flavour and sweetness started to develop [4] and the process continued for about 3 minutes.

**Stage 4: Roast development (at minutes: 6.33-9.09)**

At this stage, the beans' flavour and sweetness started to develop [4] and the process continued for about 3 minutes.

**Stage 5: Second Crack (at minutes: 9.27)**

The second crack occurred at minutes of 9.27 and the heater was turned off shortly after to allow the execution of the cooling phase. At this stage, the bean experienced the second crack whereby the oil's bean were encapsulated to the surface of the bean. The bean produced was less acidic, smoky yet aromatic, and the authentic flavour has developed.

At this stage, the beans' flavour and sweetness started to develop [4] and the process continued for about 3 minutes.

**Stage 6: Cooling (at minutes: 9.36-15.00)**

The bean must be cooled quickly to stop the roasting process.

**“What goes best  
with a cup of  
coffee?  
Another cup.”  
-Henry Rollins-**

[1] A. N. Gloess et al., "Evidence of Different Flavour Formation Dynamics By Roasting Coffee From Different Origins: On-Line Analysis With PTR-ToF-MS," *Int. J. Mass Spectrom.*, vol. 365–366, pp. 324–337, 2014.

[2] J. Daniel Bustos-Vanegas et al., "Developing Predictive Models For Determining Physical Properties of Coffee Beans During The Roasting Process Kinetic Charcoal Cooling: Computer Simulation and Technological Applications View Project Harvest Process View Project Developing Predictive Models For Determining Physical Properties Of Coffee Beans During The Roasting Process," *Ind. Crop. Prod.*, vol. 112, pp. 839–845, 2018.

[3] R. Eggers and A. Pietsch, "Technology I: Roasting," *Coffee Recent Dev.*, pp. 90–107, 2008.

[4] L. Poisson, I. Blank, A. Dunkel, and T. Hofmann, *The Chemistry of Roasting-Decoding Flavor Formation*. Elsevier Inc., 2017. and the authentic flavour has developed.





# SUPER ROBOT

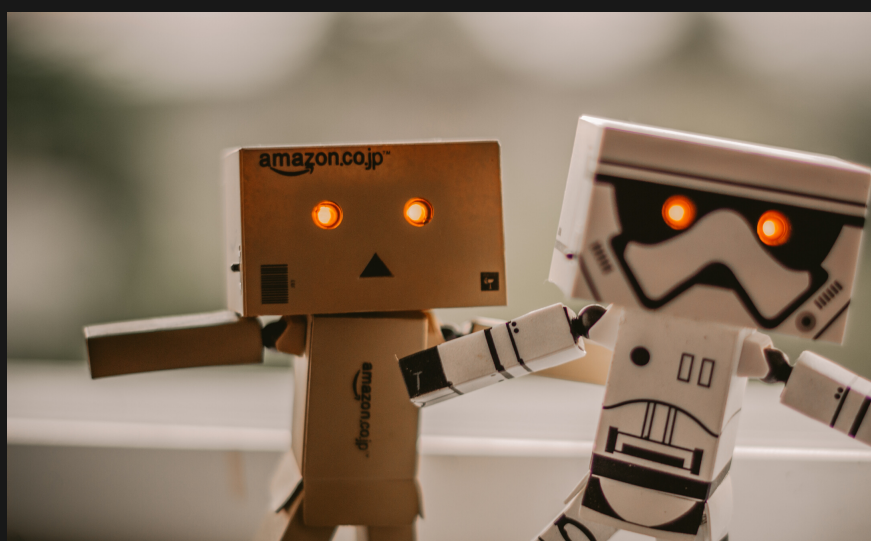
*Disediakan oleh Siti Aishah Che Kar*

Ketika awal zaman awal 90-an, ketika kami masih lagi anak-anak sekolah, banyak nostalgia kenangan antaranya mesin air kotak atau air tin. Gembira dapat masukkan duit syiling dan tekan pilihan air terus keluar setin air bunga kekwa dari mesin tersebut. Mesin gedegang kami gelar sempena bunyinya gang kuat bila air tin jatuh di tempatnya. Dan masih terbayang gembiranya kami kalau dibawa berjalan ke Supermarket Hanku Jaya atau The Store di bandar Kota Bharu, Kelantan kerana dapatlah merasa naik tangga bergerak atau eskalator.

Berdebar-debar pijak tangga takut tersepit kaki di celah-celah tangga bergerak. Jika ada saudara yang ingin diziarahi oleh ayah dan mak di Hospital Kubang Kerian (HSUM), Kelantan, kami berebut untuk ikut. Bagaimana kami anak-anak tidak sabar untuk berumur 12 tahun ke atas. Sebabnya apa kerana hanya kanak-kanak yang berumur 12 tahun ke atas dibenarkan masuk ke ruang wad yang ditempatkan di puluhan tingkat hospital tersebut. Sudah pasti kami teruja kerana di hospital itulah terdapat lif. Bukan senang nak jumpa dan merasa naik lif.

Kini memasuki tahun 2020 semuanya makin berubah pantas. Lif, tangga bergerak dan juga mesin air kotak bukan lagi pengalaman agung bagi anak-anak. Mungkin kita belum lagi dapat melihat kereta terbang di atas atap rumah atau pokok tapi perubahan besar memang telah berlaku malah amat pantas bergerak. Jika dulu kita mimpikan sebuah mesin atau robot yang mampu mengalih semua kerja, namun siapa sangka super robot impian itu datang dalam bentuk sebuah telefon. Ya hanya dengan sebijik telefon pintar, kini pelbagai dapat dilakukan.

Jam tangan, penggera, kalendar, diari, kalkulator, album gambar, kamera, lampu suluh, peta, kompas, dan namakan apa saja apa sahaja produk boleh kini dengan hanya menggunakan telefon pintar. Malah juga perbagai urusan harian telah diambil-alih oleh penggunaan telefon pintar seperti, urusan perbankan. Kita juga tidak perlu lagi sebuah gedung membeli belah, restoran, bank dan kedai buku. Ruangan meja kopi apatah lagi dengan rangkaian media sosial yang berselirat. Jika dulu mesin hanya mengambil tugas-tugas mudah kini tugas professional seperti doktor, guru, pensyarah, akauntan juga boleh ambil alih oleh penggunaan teknologi. Jika dulu pusat pengajian tinggi diibaratkan syurga ilmu pengetahuan dan kemahiran, kini ia perlu difikirkan kembali kerana kini gedung ilmu yang terbesar hanya berada diujung jari sahaja dengan kos yang lebih murah dan mudah untuk dicapai.



Impian kita untuk memiliki sebuah alat yang dapat menyelesaikan semua tugas hampir tertunai. Kita hanya perlu memiliki telefon pintar, semua masalah dapat diselesaikan. Namun kebergantungan terhadap hanya sebuah alat akhirnya pasti secara tidak langsung akan menjerat manusia juga. Secara perlahan-lahan semua jualan produk oleh syarikat kecil diambil alih oleh syarikat multi-gergasi seperti Google, Facebook, Amazon. Kebergantungan kita kepada syarikat gergasi ini bagi menyelesaikan semua masalah kita pasti amat bahaya. Jika dulu hanya pekerjaan sokongan seperti pengkeranian, yang perlu bersaing dengan penggunaan mesin, kini pekerjaan bidang professional seperti guru, pensyarah, doktor dan juga jurutera juga akan juga turut terkena tempas perlu bersaing dengan penggunaan teknologi.



Mungkin seperti yang gambarkan dalam filem animasi WALL-E keluaran Walt Disney dan Pixar dimana semua manusia pada zaman tersebut hanya bergantung kepada satu robot iaitu AUTO untuk menguruskan semua aktiviti harian mereka. Mereka hanya berbaring di atas kerusi malas dan tidak bergerak langsung hingga hilang keupayaan diri termasuk untuk berjalan. Malah watak manusia dalam filem tersebut hanya sebagai pelakon "extra" manakala watak utama semua didominasi oleh robot dan sebuah megasyarikat bernama B n L. Klise sungguh. Pasti dalam masa yang akan datang perubahan akan terus mendatangi kita kerana kita jugalah yang menciptakannya dan menyerunya.

Berubah atau tidak  
kita hanya ada  
satu pilihan...





# ISTIADAT KONVOKESYEN UITM CAWANGAN TERENGGANU KE-91

DISEDIAKAN OLEH SITI AISHAH CHE KAR

Pada 30 hingga 31 Oktober 2019 yang lalu telah berlangsung istiadat Konvokesyen yang ke-91 bagi UiTM Cawangan Terengganu bertempat di Dewan Aspirasi, UiTM Cawangan Terengganu Kampus Dungun. Terdapat empat sesi sidang yang berlangsung pada kedua-dua hari tersebut di mana sesi sidang petang pada 30 Oktober 2019 melibatkan lepasan pelajar diploma dari Fakulti Kejuruteraan Elektrik (FKE) kampus Dungun, Terengganu.

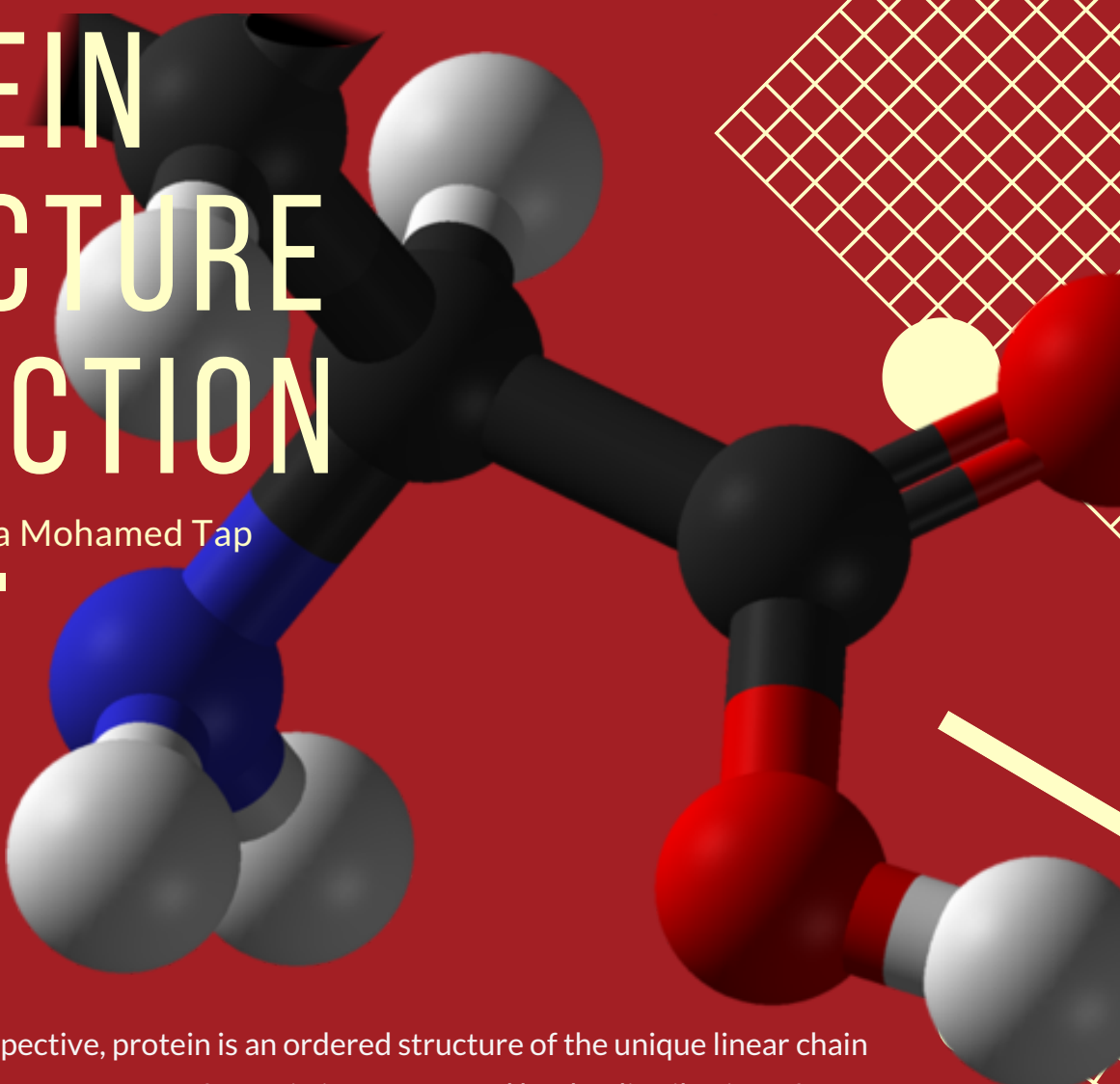
Seramai **249 orang graduan** dari FKE yang telah diraikan dalam majlis tersebut yang terdiri daripada 25 orang graduan daripada Diploma Kejuruteraan Elektrik (Kawalan & Instrumentasi), 130 orang graduan dari Diploma Kejuruteraan Elektrik (Elektronik) dan seramai 94 orang graduan dari Diploma Kejuruteraan Elektrik (Kuasa). Majoriti graduan yang diraikan pada sesi kali ini adalah pelajar kemasukan sesi 1 2016/2017. Manakala seramai 19 orang pensyarah FKE hadir dalam sesi tersebut bagi meraikan kejayaan semua graduan terbabit.

Konvokesyen kali ini juga mencatatkan sejarah manis kepada FKE kerana seorang pelajar dari FKE, **Siti Nurul Amirah Afrina binti Sheikh Mohd Rosdi** telah dianugerahkan dua anugerah pencapaian akademik iaitu **Anugerah Graduan Terbaik Fakulti Kejuruteraan Elektrik** dan **Anugerah Graduan Terbaik Program bagi program Diploma Kejuruteraan Elektrik (Kuasa)** manakala seorang lepasan diploma dari FKE, UiTM Terengganu **Ahmad Syakirin bin Ismail@Rosdi** telah dianugerahkan **Anugerah Kedoktoran Tuanku Canselor** dalam konvokesyen yang berlangsung di UiTM Shah Alam.

Beliau merupakan pelajar lepasan diploma dari FKE, UiTM Terengganu seterusnya menyampung pengajian hingga ke peringkat Doktor Falsafah di FKE, UiTM Shah Alam. Tahniah pada semua pelajar, para pensyarah, staf sokongan dan ibu bapa serta keluarga pelajar di atas kejayaan ini. Semoga kejayaan ini dapat memberi inspirasi dan FKE terus akan menempa kejayaan yang lebih manis dengan kerjasama dan dukungan semua pihak.

**SEKALUNG TAHNIAH....**

# OVERVIEW OF PROTEIN STRUCTURE PREDICTION



Written by: Fatahiya Mohamed Tap

---

Based on structural perspective, protein is an ordered structure of the unique linear chain of amino acids. The tertiary structure of protein is represented by the distribution of secondary structures. The secondary structure is defined by the presence of hydrogen bond patterns between hydrogen atoms of the amino acid and the oxygen atom of the carboxyl groups in the polypeptide chain. The functional properties of the protein can be determined from the known tertiary structure of the protein. Thus, the generation of this tertiary structure is vital in understanding the functional and structural properties of a protein.

Structural bioinformatics is an important area in the field of computational biology. It focuses on the prediction and analyses of structures which are mainly protein and DNA [1]. Conventionally, the tertiary structure information of protein is obtained through experimental methods such as protein crystallography (X-ray diffraction), and nuclear magnetic resonance (NMR). The structures obtained from these methods can be further used to investigate the protein folds, evolution, and structure-function relationship.

However, the determination of protein structure through experimental approach is expensive and time-consuming [1]. The difficulty in finding the structure of a protein has generated a large gap between the number of sequences of amino acids and the number of tertiary structures of proteins. Only a small number of amino acid sequences have their tertiary structures solved using the experimental method. Thus, this gap motivated the researchers to predict the tertiary structure of proteins using computational approaches [2]. Computational approaches are fast and non-expensive compared to the experimental approaches. Thus, several computational methods have been developed in order to predict the tertiary structure of proteins. These methods are:

- Homology modelling/Comparative modellingii
- Fold recognitioniii
- Ab initio

The threading and comparative modelling methods are the fastest and effective approaches in predicting the structure of protein because these two methods are based on known template structures with the availability of fold library [3], [4]. These methods can predict the tertiary structures of proteins with high accuracy. The models can be applied in the field of drug design, virtual screening and site-directed mutagenesis [5].

## References

- [1] M. Dorn, M. B. e Silva, L. S. Buriol, and L. C. Lamb, "Three-dimensional protein structure prediction: Methods and computational strategies," *Comput. Biol. Chem.*, vol. 53, no. Part B, pp. 251–276, 2014
- [2] H. Deng, Y. Jia, and Y. Zhang, "Protein structure prediction," *Int. J. Mod. physics. B*, vol. 32, no. 18, p. 1840009, Jul. 2018.
- [3] V. K. Vyas, R. D. Ukawala, M. Ghate, and C. Chintha, "Homology Modeling a Fast Tool for Drug Discovery: Current Perspectives," *Indian J. Pharm. Sci.*, vol. 74, no. 1, pp. 1–17, Jun. 2012.
- [4] S. D. Lam, S. Das, I. Sillitoe, and C. Orengo, "An overview of comparative modelling and resources dedicated to large-scale modelling of genome sequences," *Acta Crystallogr. Sect. D, Struct. Biol.*, vol. 73, no. Pt 8, pp. 628–640, Aug. 2017.
- [5] T. Schmidt, A. Bergner, and T. Schwede, "Modelling three-dimensional protein structures for applications in drug design," *Drug Discov. Today*, vol. 19, no. 7, pp. 890–897, Jul. 2014.

# EDITORIAL BOARD

## **PATRONS :**

**Assoc. Prof. Ts. Dr. Mazidah Puteh**  
**Assoc. Prof. Dr. Hajah Khlipah Ibrahim**

## **ADVISOR:**

**Dr. Baktiar Musa**

## **LAYOUT & GRAPHIC DESIGN :**

**Dayana Kamaruzaman**  
**Fatimah Nur Mohd Redzwan**

## **CHIEF EDITOR:**

**Nur Idawati Md Enzai**

## **EDITORS:**

**Mazratul Firdaus Mohd Zin**  
**Dr. Nurbaiti Wahid**  
**Syila Izawana Ismail**

**FACULTY OF ELECTRICAL ENGINEERING**  
**UNIVERSITI TEKNOLOGI MARA (UiTM)**  
**CAWANGAN TERENGGANU KAMPUS**  
**DUNGUN**  
**23000 DUNGUN, TERENGGANU**  
**MALAYSIA**

# EETECH NEWS

<https://eetechnews.blogspot.com/>

<https://terengganu.uitm.edu.my/v3/index.php/research-publications/ebook-dan-buletin-dalaman#ee-tech-news>