

# IT'S MEchanical

"empowering  
engineering  
technology"

THE OFFICIAL BULLETIN OF THE FACULTY OF MECHANICAL & AUTOMOTIVE ENGINEERING TECHNOLOGY

FTKMA Introduces Three New Academic Programmes  
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## PATRON WELCOME NOTE

Dear Readers,

It's with my great honour to welcome you to IT'S MEchanical, the first ever bulletin of FTKMA. The year 2020 presented us with multiple challenges, notably complications inflicted by the widespread of COVID-19. Inevitably, we in higher educational institutions were also impacted where abrupt deprivation of the face-to-face teaching and learning demanded for expedited creativity and aspirations from our dedicated academics and ecosystem to swiftly morph to that of virtual mode. Under the guise of steep adaptation gradient at the outset, the pressing need to switch from one delivery mode to the other has granted us with opportunities to innovatively explore new avenues in doing things not for a mere differently, but appositely, in more effective ways too.

Last year the KPT has approved three new Bachelor of Engineering Technology programmes which will be admitting their first intake in September 2021. These programmes aimed to produce applied engineers that fit the job demands in manufacturing, oil and gas and automotive industries in Malaysia.

In the meantime, we have to strive and put more effort to teach and educate the Bachelor Engineering Technology Automotive (B.Tech Auto) students, the programme we first offered in 2019. As the programme's curriculum emphasises more on practical skillsets rather than just on the theoretical elements, it hems us new challenges and opportunities to innovate the teaching and learning techniques and render it to be more interactive. Concurrently, we also running a Diploma of Mechanical Engineering and Bachelor of Automotive Engineering (a dual degree with HSKA in Germany). Dual-degree Bachelor of Automotive Engineering is a collaborative programme with Karlsruhe University of Applied Sciences (HSKA) in Germany. As per normal exercise for every semester, the professors from HSKA will come and teach students in person, but in 2020 owing to the ongoing health crisis all delivery modes were transformed virtually. The programme also undertook an EAC accreditation last year and gave us further experience in running it more effectively.

On the other front, research activities at FTKMA remains to be a paramount criterion defining our existence and is moving forward hand-in-hand with academic affairs. The faculty's output in the forms of research outcome, post-graduate supervision, scientific publication as well as securing research grants both internally, and externally, amid the precarious climate around COVID-19, nevertheless, stand to profess as unaffected and at par with those prior years. Same can be said true with project consultations as our academics continue to play their roles in providing technical expert services for many sectors around the country. There are also conspicuous highlights on the social services as many of the faculty's members were actively involved, either by explicitly assisting the front-liners, or implicitly behind the scene by proffering technical expertise in innovating and producing PPEs for local health authorities. IT'S MEchanical on its own may not be sufficient to cover all the activities, nevertheless it portrays of our efforts to contribute to the university and community around us in the year 2020. Also on behalf of the faculty, I would like to extend our heartfelt gratefulness to our colleagues at FTKMA who are now being transferred to other faculties. Let's us all work together steadfastly regardless of the roles and ranks to take UMP to where it deserves to be.

Finally, I would like to grasp this concluding remarks from the bottom of my heart, to thank all team players on the editorial committee for getting this bulletin published. It surely takes extra efforts and courage to work, mostly virtually, and convening multiple teams to toe under such an impeccable coordination, on a tight timescale, and under difficult situation around the Movement Control Order (MCO), understandably, is never easy.

Thank you!



## EDITOR-IN-CHIEF NOTE

It is with a great honour that I welcome you to our very first issue of IT'S MEchanical, a bi-annually, periodical bulletin published by the FTKMA. Our editorial team are formed by those enthusiastic, creative and committed members where for each publication, we hope to keep the society and our stakeholders informed with the latest updates encompassing activities took place within and around our immediate ecosystem. In this first publication, we take to the centre stage a theme of '*Empowering Engineering Technology*' as going forward, FTKMA is aiming to galvanise its curriculum structures to suit more of those TVET-driven programmes as manifested by the offering of three new engineering technology curriculums in September 2021. Despite of repercussions handed by the challenges from COVID-19, our faculty members remained fully committed to the cause and have adapted well with the repertoires necessitated by the new normalcy.

**ASSOC. PROF. IR. DR. MOHD HAFIZI ZOHARI,**  
Deputy Dean Research and Postgraduate Studies  
Faculty of Mechanical and Automotive  
Engineering Technology,  
Universiti Malaysia Pahang

Finally, I would like to take this opportunity to thank all the contributors involved in the publication of this bulletin and, unequivocally, all editors whom the hard work ensured that all articles, reports and writings were presented in the highest of standard.

## ACADEMIC NEWS

Bachelor of Mechanical Engineering Technology

### DESIGN AND ANALYSIS



Bachelor of Mechanical Engineering Technology  
**OIL AND GAS**

Bachelor of Mechanical Engineering Technology  
**AUTOMOTIVE**



## Thrusting Forward with TVET Agenda

FTKMA is presently running three TVET-oriented bachelor programmes. One being a dual-degree curriculum in collaboration with the Hochschule Karlsruhe University of Applied Sciences (HSKA) in Germany, the Bachelor of Engineering in Automotive (BHA). The other two are Bachelor of Engineering Technology in Automotive (BVA) and the Diploma of Mechanical Engineering (DMM).

The BHA is a German-based curriculum, practical-oriented and industry-driven programme. Over the nine semesters, students will be taught with the fundamental knowledge central to automotive engineering discipline and equipped with practical skillsets as well as with English and German conversancy. For courses with critical and high-value contents, the syllabus will be delivered by the *flying German professors*, on their regular visitation to UMP every year.

BVA programme is tailored to train future automotive engineering technologists and projected them to become the shop-floor managers or entrepreneurs as their career of choice. The three and half years' programme is designed for vocational students (DVM/DKM/DLKM Diploma holders) with aspirations to deepen knowledge and skills that would fit the need of higher-value jobs. The programme is marked by the two semesters *Work-Based Learning* (WBL). Finally, a diploma programme is intended to cater for SPM leavers with interest in technical discipline related to mechanical engineering with emphasis on the hands-on skillset. The six months industrial training in the final semester is designed not just to expose students to the relevant practical experience of the industries, but also to prepare them for a seamless transition into the job market which in return, is also a preferred headhunting option by the prospective employers.

**In line with UMP's aspirations to empower the technical education driven by the TVET-inclination, the existing three and the four upcoming programmes would portray FTKMA as an epicentre for the technical-based higher-education institutions.**



## Three New B.Eng. Tech. Programmes Offered in 2021

**B**eginning of academic year in September 2021, FTKMA will be offering three new programmes, which are Bachelor of Mechanical Engineering Technology specialising in Automotive, Design and Analysis, and Oil and Gas. The majority of year 2019 and entire 2020 were devoted to the thorough analysis of the prospective programme structure, such as curriculum benchmarking and full assessment of programmes' viability and sustainability.

The Board of Study (BOS) meeting was organised on February 5, 2020 with the aim to garner inputs from experts across industries on critical characteristics to facilitate the development of new programmes. Six experienced panels specialising in various sub-disciplines participated in the meeting, including academics from public universities, Majlis Rekabentuk Malaysia, MIROS, automotive components manufacturers as well as the oil and gas industries.

In the meantime, several benchmarking visits have been performed by the specifically appointed focus teams to oversee technical the aspects of the curriculum development, obeying to the requirements of varying industries, professionals institutions, and trade associations. The inputs amassed from their insights, predominantly the capabilities that match those of the criteria most sought after by the industries, their projections on future trends and skillsets needed by Malaysia's industrial sectors for years to come proved as invaluable for accurate development of the Programme Educational Objectives (PEOs) and Programme Outcomes (POs).

**With these newly-approved curriculums by the ministry, the first cohort offering the three courses will take place in September 2021.**



As the ministry has recently granted an approval for the courses to run, the faculty is now ready for the intake of the first cohort encompassing those three programmes beginning September 2021.



### EXTENDING THE MEMORANDUM OF UNDERSTANDING WITH HSKA



This is indeed a momentous event for UMP, particularly to the members of Faculty of Manufacturing and Mechatronics Engineering Technology (FTKPM), Faculty of Mechanical and Automotive Engineering Technology (FTKMA), and Faculty of Electrical and Electronics Engineering Technology (FTKEE) as well as the German Academic Collaboration Centre who have been working exceptionally hard to get this strategic collaboration to fruition since the joint effort was first inception in the last ten years for the mechatronics engineering, followed by the automotive engineering and very soon, the electrical engineering curriculums

The extension of the existing Memorandum of Understanding (MoU) marks as a continuation to the ten years of strategic collaboration between UMP and HSKA, therefore strengthening UMP's stature in offering the high-quality academic programmes among German higher education institutions. Therefore, we are truly delighted to continue having HSKA as our strategic partner, enabling UMP to benefit from HSKA's strong foundation and establishment in the field of engineering and technology.

Within that of UMP's Strategic Plan's framework, all faculties and departments are tasked to set their Key Performance Indicators (KPIs) corresponding to those internationalisation elements, where every department is expected to have international collaborative efforts and such a symbiotic partnership with HSKA further reinforces such aspirations.



# 10 years of Collaboration Between UMP and HSKA



## FTKMA Partnership with Industries

**Expansion of network and preparation of welcoming partners for students' industrial Work-Based Learning (WBL) period.**



### Collaboration with Kanaz Holdings for the life-Long Learning

A meeting between FTKMA and Kanaz Holding was held to commemorate a collaborative efforts between two parties in offering the life-long Learning programme. The proposed curriculum is intended to develop Malaysian youth as expert human resources in Japan workforce. The programme is structured under the coordination of summer camp, comprising collaborative and research projects centred around the theme of Industrial Revolution 4.0 (IR4.0).



### FTKMA visit to NAZA Academy

On January 13, 2020, FTKMA represented by its Deputy dean of Research and Postgraduates and Head of Automotive programme organised a visit to NAZA Academy in Kuala Lumpur.

The primary of the visit was to introduce to our industrial partners, on the faculty's new programme structure of automotive engineering technology whilst simultaneously to discuss on students' placements under that of Work-Based Learning (WBL) at NAZA Academy.

In response, NAZA gave a positive feedback on the two subjects discussed, further reiterated the faculty's aspirations to reinforce the future undergraduate programmes inclined into the TVET requirements. The visit also turned out as an important milestone that marked the onset for a strong partnership between academia and industries.



**Visit from Tan Chong Technical Institute**



**Meeting with external assessors for inputs on BHA programme**

### Meeting with FTKMA expert panels

Reported by Dr. Azri Hizami Rasid and Mr. Mohamad Faizal Mohamed Zahri



**B. ENG (HONS.) AUTOMOTIVE ENGINEERING (COLLABORATION PROGRAMME WITH HsKA)**

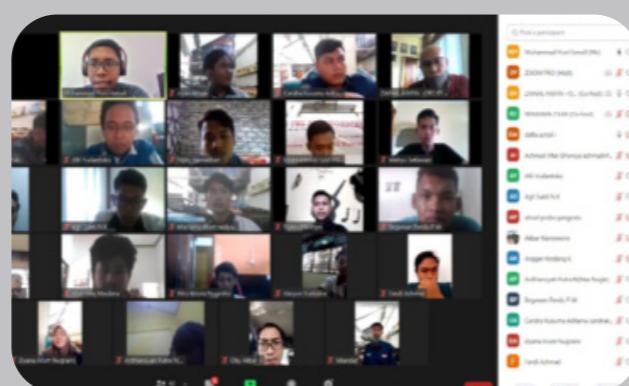
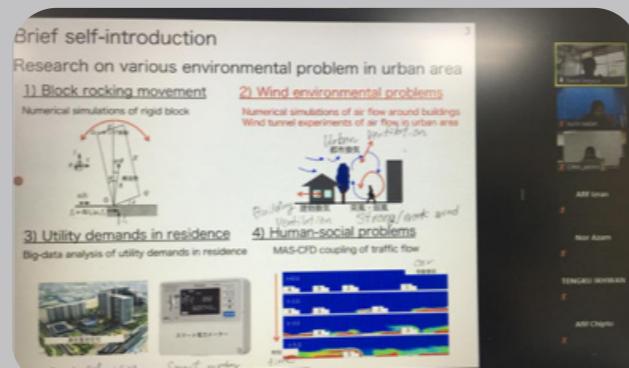
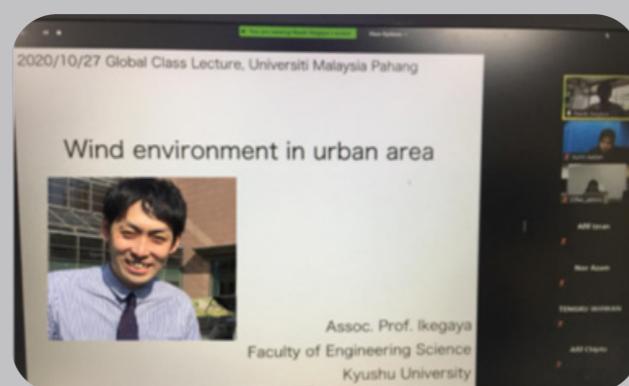
## Global Classroom

Of late, owing to the on-going MCO, the Virtual Learning Environment (VLE) emerged to be one of the means of teaching and learning of the faculty . Besides all the faculty courses running online, additional Global Classrooms were held with the objective of exposing students to additional knowledge on different niche area by benefitting UMP's collaboration with different overseas partners.

Two successful Global Classroom sessions were conducted in 2020. The first one being the knowledge exchange classes between FTKMA and Universitas Negeri Yogyakarta in Indonesia. Evolving around the theme of 'Automotive Technology, Current and Future Trends', ten separate sessions were delivered by academics from FTKMA: Dr. Yusri Ismail delivered lectures on conventional Internal Combustion Engine, Dr. Mohd Azri Hizami Rasid and Dr. Mohamad Heerwan Peeie shared materials on Electric Vehicle (EV) Technology. Each topic consists of five sessions. To reciprocate UMP's effort, the racing team of UNY Garuda, Indonesia, has shared experience on their strategy in winning various student race competitions, namely the Energy Efficient and EV races. A total 110 students attended all the sessions.

**Module 2:**  
Working  
Principles &  
Components  
  
Electric Vehicle Propulsion  
Systems  
  
Dr. Mohd Azri Hizami  
Faculty of Mechanical & Automotive  
Engineering Technology

The second Global Classroom session involved FTKMA's undergraduate students taking Fluid Mechanics course as well as the postgraduate students from Indonesia. The lecture was delivered by Assoc. Prof. Ikegaya from Kyushu University in Japan under the coordination of FTKMA's academic, Dr. Nurizzatul Atikha. The central content of the lecture revolved around the aspect of fundamental theory in fluid mechanics. Dr. Ikegaya also shared some applications of wind environment in urban area. A total of 64 students have participated with 11 questions asked to and discussed by Dr. Ikegaya.



## AROUND FTKMA

### COMMUNITY SERVICE:

#### Face Shield Donation

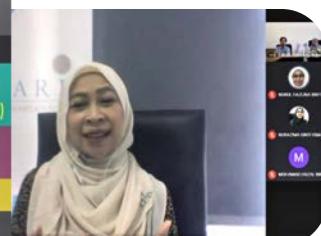
March 25, 2020 - The widespread of COVID-19 pandemic situation had caused a massive shortage in PPE supplies. Therefore, an effort has been made by FTKMA to assist the medical team by providing protective equipment for the use of health frontliners. Prof. Dr. Mahadzir Ishak@Muhammad, the Dean of FTKMA together with several other staff members initiated the move to produce the face shields. The produced shields have been handed over to the Pekan District Health Center and Pekan Hospital. Also present and involved in the initiative were Ir Dr. Mohd Rashidi Maarof and Dr Muhamad Zuhairi Sulaiman



### ONLINE LEARNING:

#### High Quality Lecture Video Preparation by Dr. Hazwan

September 29, 2020 - The workshop was conducted to help FTKMA's academic staff in producing high-quality video presentation that meet the requirement as stipulated by the Centre of Instructional Resources and e-Learning (CIReL). In response to the on-going pandemic crisis, the academic staff needed to equip themselves with creative and innovative delivery techniques to ensure that the highest standard of teaching and learning quality are preserved. It is a must for every academic staffs so that students can continue their study as usual under this new normal. Dr. Mohd Hazwan Yusof whose expertise is in producing good quality video contents has voluntarily shared the knowledge with the FTKMA members.



## FTKMA RECEIVED DELEGATION FROM VARIOUS PARTIES

NO.	VISITOR	PURPOSE OF VISIT	DATE
1	Pekan Pina Sdn. Bhd.	Exploring Business Opportunities	October 6, 2020
2	Faculty of Electrical and Electronic Engineering Technology, UMP	Academic Programme Benchmarking	September 29, 2020
3	Tan Chong Technical Institute	Academic Programme Collaboration	August 19, 2020
4	Malaysian Institute of Road Safety Research (MIROS)	Academic and Research Programme Collaboration	August 10, 2020
5	Akademi Maritim Sultan Ahmad Shah (AM-SAS)	Seeking Technical Services and Expert Person	July, 2020
6	Muehlbauer Technologies Sdn. Bhd.	Academic and Research Programme Collaboration	July 10, 2020
7	Pantai Bharu Professional Centre Sdn. Bhd.	Academic Programme Collaboration	February 27, 2020
8	Kanaz Holdings	Academic Programme Collaboration and Exploring Business Opportunities	February 19, 2020
9	Iwate University, Japan	Academic and Research Programme Collaboration	February 4, 2020
10	TOC Automotive College	Academic and Research Programme Collaboration	January 30, 2020
11	SEGI University, Universiti Malaya and Universiti Kebangsaan Malaysia (UKM)	Academic Programme Collaboration	January 23, 2020
12	Faculty of Ocean Engineering Technology And Informatics, Universiti Malaysia Terengganu	Academic Programme Collaboration	January 20, 2020
13	Murni International College	Academic Programme Collaboration	January 9, 2020



Delegation from Pantai Bharu Professional Centre Sdn. Bhd. (27 February 2020)



Discussion with representatives from Tan Chong Technical Institute to collaborate in offering new professional programme (19 August 2020)

## around FTKMA



Visit by Pekan Pina Sdn. Bhd. to look at the molding process in FTKMA



Initial meeting to setup UMP – MIROS collaborative research laboratory in FTKMA

Visitors came to FTKMA to seek for collaboration opportunities in both academic and research areas. As new faculty focusing in the engineering technology, we believe that our young and energetic talents are being recognized by those interested external parties.



President of Iwate University, Japan pay visit to FTKMA lab (4 February 2020)



Strategic partnership with German company, Muehlbauer Technologies Sdn. Bhd.



Programme Benchmarking visit by our neighbour, Faculty of Electrical and Electronic Engineering Technology (FTKEE) (29 September 2020)

Despite the fact the world faced a pandemic of COVID-19 for almost entire year of 2020, FTKMA still received and entertained visitors who wanted to explore potential collaboration in academic, research and business with us. We always make sure that all the SOPs are in place.

**MoU SIGNING CEREMONY:****UMP – MIROS collaboration on research in the road safety technology**

**A**ugust 11, 2020 - The strategic cooperation between UMP and the Malaysian Institute of Road Safety Research (MIROS) benefits both parties in technology sharing, human capital, research and expertise in road safety technology.



### Development of the UMP-MIROS Laboratory centered at FTKMA

The main objective of this collaboration is the joint venture in the development of the UMP-MIROS Laboratory located at FTKMA to be utilized by both parties. This cooperation is also beneficial especially in teaching and research on road safety. As a technical university in the east coast of Peninsular Malaysia, UMP is always ready to help in addressing road safety problems in line with the increase of roads in the region.

The ceremony saw the Deputy Vice Chancellor (Academic and International), Professor Ts. Dr. Mohd Rosli Hainin and Dean of the Faculty of Mechanical and Automotive Engineering Technology (FTKMA), Professor Dr. Mahadzir Ishak@Muhammad signed a Memorandum of Understanding (MoU) with the Director General of MIROS, Ir. Dr. Khairil Anuar Abu Kassim and Director of Vehicle Safety Research and Biomechanics Research Center, Zulhaidi Mohd Jawi@Said. The ceremony was also witnessed by MIROS Chairman, Datuk Suret Singh.

**around FTKMA**

**P**ekan, October 2020 – Eight FTKMA Academic staff have been transferred to College of Engineering and one academician has been transferred to the Faculty of Manufacturing and Mechatronic Engineering Technology (FTKPM). Also, another eight Vocational Training Officer have been transferred to Centre for Design and Innovation of Technology (PRInT).

**Transferred to College of Engineering:**

1. Dr. Erny Afiza Alias
2. Assoc. Prof. Ir. Ts. Dr. Wan Sharuzi Wan Harun
3. Assoc. Prof. Ts. Dr. Devarajan A/L Ramasamy
4. Ts. Dr. Ngui Wai Keng
5. Dr. Amiruddin Abdul Kadir
6. Ts. Dr. Norazlaniah Sazali
7. Dr. Farzad Jalilianabar
8. Ts. Dr. Mohd Razali Hanipah

**Transferred to Faculty of Manufacturing and Mechatronic Engineering Technology (FTKPM):**

1. Ts. Dr. Mas Ayu Hassan

**Transferred to Centre for Design and Innovation of Technology (PRInT):**

1. Ts. Mohd Tarmizy Che Kar
2. Ts. Junaedi Irwan Wan Abdul Halim
3. Ts. Muhammad Adib Shaharun
4. Ts. Mohd Fazli Ismail
5. Mr. Zulfiqa Anuar
6. Ts. Mohd Sazali Salleh
7. Ts. Mohd Adib Mohd Amin
8. Capt. Ts. Hazami Che Hussain

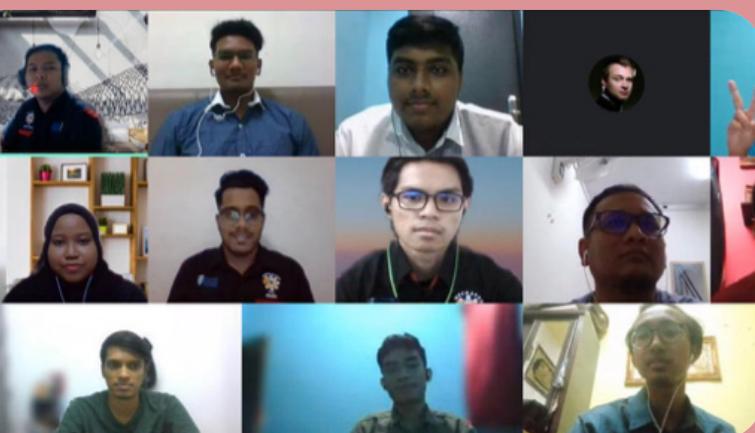
**All the best to the staff leaving FTKMA in 2020 and wish you good luck in future endeavour**

## STUDENT ACTIVITIES

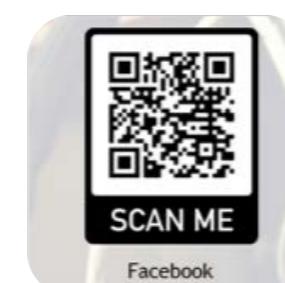
### Mechanical Engineering Professional Student Club (MECHAPRO)



The Mechanical Professional Engineering student club was formed in 2003 with the idea of establishing a connection between the student and the society. The vision and mission of this club are to integrate the learning outcome from class theory with engineering and science activity.



The platform allows the students to link up with the industries which also opens up opportunities towards future employment and understanding the necessities of the surrounding community.



<https://www.facebook.com/mechaproump1>

**"A leading club in academic and social activity for Mechanical engineering student in collaboration with society and engineering industry"**

Year 2020 has been another successful period for the MECHAPRO club. COVID-19 outbreak did not stop the club from providing online activities. For instance, IMEchE talk by Mr. Achu Vovind Kumar, former YMS Chairman, IMeche Malaysia on "What you should know before graduate?" (July 2020) and online Clinic for under-achiever student by senior students free-of-charge (June–Dec 2020). Also, Annual General Meeting (AGM) for the period of 2020/2021 had been carried out. Although it was not run as normal, there were more than 200 counts on the vote.

In the future, more activities have been scheduled. In the academic category, online quiz competition will be held. For those who love sports, an e-sports gaming contest will be arranged. Alumni, lecturers and industrial experts are not left behind as a workshop to share their ideas and experiences are already being planned. The local community will also be involved as two activities are planned, namely "Derma Sahabat" and "Bicara Sahabat" have been arranged. For existing student, extracurricular activity on photography workshop and video editing will be provided as well.

**"These activities will surely be much looked into in the coming year 2021 with adaptation to the current regulations"**



### student activities



### SPORT MULTICULTURAL PROGRAMME

To celebrate multicultural and intercultural participations from different background

**Multicultural Penalty Shootout Competition - Neunmeterschießen Wettbewerb 2020**



Reported by Mr Muhammad Ammar Nik Mu'tasim

# AERG Automotive Engineering Research Group

**S**ubmitted and published research outcome from AERG amounted to 50 publications in the year 2020. The number consists of WOS indexed journal, Scopus index journal, and Scopus indexed proceeding. The top author for the year 2020 belongs to Associate Professor Dr Kumaran Kadirgama with 25 publications.

To strengthen the linkages with external academic institution, AERG has initiated a joint meeting with TOC Automotive College, Malaysia.



AERG-TOC College Joint-Meeting

The cooperation is completed with the signing of a Letter of Intent (LOI) to support the new technical programme in the faculty, namely Bachelor of Technology in Automotive and Bachelor of Engineering Technology in Automotive. Members of AERG had also involved as academic panels for The 4th International Conference on Automotive Innovation and Green Energy Vehicle (AiGEV 2020) organised by Automotive Centre of Excellence, (AEC), UMP.



Major task for the group in the future includes restructuring the laboratories which were newly assigned, bidding for international grants related to the automotive engineering, recruiting associate members to the group for new field of knowledge exploration and enrolling more postgraduate students to strengthen the group.

**"In the year 2020, the group has managed to secure a total of RM863,000.00 funding for research and postgraduate study. It consists of three Fundamental Research Grant Scheme (FRGS), 11 UMP Internal Grant Scheme, two Industrial Grant, and three Prototype Research Grant Scheme (PRGS)."**

**A**utomotive Engineering Focus Group (AERG) members consist of two Professors, three Associate Professors, five senior lecturers and one lecturer (in year 2020). By the end of 2020, the group members reduced to one professor, one associate professor, two senior lecturers and one lecturer. The rest of the members (considered as associate members) have been relocated to College of Engineering. The group is assigned to manage three laboratories which are the Automotive Auxiliary Laboratory, Alternative Energy Laboratory, and Engine Performance Laboratory. These laboratories serve the teaching and research activities in the faculty, especially those associated with Automotive Engineering field.

In the year 2020, the group has managed to secure a total of RM863,000.00 funding for research and postgraduate study. It consists of three Fundamental Research Grant Scheme (FRGS), eleven UMP Internal Grant Scheme, two Industrial Grant, and three Prototype Research Grant Scheme (PRGS). Major research topics are nano-material fundamental, nano-material for engine cooling and lubrication application, gaseous fuel application in engine and its optimum control, vehicle health monitoring system, vehicle ride and comfort, autonomous vehicle system and automatic control for linear motor system.

A total of nine doctoral and eight masters students strengthen the group in the year 2020. Consist of full-time and part-time students, they are funded either by the research grant scheme or UMP graduate scheme. Full-time students are located in the group research laboratory.



Reported by Dr. Mohd Fadzil Abdul Rahim



# Advanced Fluids Focus Group AFFG

## Research Themes

*Research and Development in field of Combustion, Fluid Flow, Heat and Mass Transfer, Lubricant Technology, Fluidized Bed, Fuel, Nanofluids and Heat Exchanger.*

## Researchers



**A**dvanced Fluids Focus Group (AFFG) is dedicated to develop new innovations related to fluid and thermal in mechanical engineering and technology with high-level professionalism in global context. The focus group aims to anticipate the fundamental research with innovative engineering and technology with applied research to promote national growth.



## KANBAN @ MANUFACTURING



Kanban cards were attached to every finished product, and once it was sold, the cards would move back to the production line. Team members could only work on the new item as the card signaling a demand for it moved back to them, and only once the number of pending Kanban cards reached a defined threshold. Every material used during production also had its own Kanban card attached, so that the demand signal would ultimately flow down through the whole production chain, ending on external suppliers.

Industrial talk for Marii AICE programme by Dr. Daing



Collaboration Visit to Department of Machine Engineering, Universitas Indonesia by Dr. Nor Atiqah in Early March 2020



Computational Fluid Dynamics (CFD) Training for UMK and UMP students in Januari 2020 by Dr. Zuhairi and Dr. Ahmed Nurye



RCCI Engine Bench  
Reported by Dr. Muhammad Zuhairi Sulaiman

# ASiVR Advanced Structural Integrity and Vibration Research

It has been another successful year in terms of educational and learning under ASiVR focus group. As a leading research group in mechanics and vibration area, two short courses led by Professor Ir. Dr. Nik Abdullah Nik Mohamed and two promising young researcher Dr Mohd Firdaus Hasan and AP. Ir. Dr. Mohd Hafizi Zohari. The first short course entitled "Continuum Mechanics for Engineers" had been held weekly in February and March 2020. It had attract post graduate students and young lecturers to fill up their knowledge gap. Another short courses had been successfully held in August 2020 and covered interesting area of "Vibration based monitoring for predictive maintenance".

Year 2020 had been a challenging period forcing most people to adapt new normals. The challenge was to utilize the focus group resources in terms of handling yearly activities. As a senior ASiVR member, AP. Ir. Dr. Mohd Hafizi Zohari had been responsible by organizing Academic Research Sharing Knowledge visit to several potential industries like Flow Tech Services Sdn. Bhd., TMM Engineering Services Sdn. Bhd. and Universiti Kebangsaan Malaysia (UKM). The purpose of visit was to observe and learn fiber optic sensor technology for structural health and monitoring.



**"Leading research group in vibration, instrumentation and structural integrity area in the any prominent nowadays industry particularly in the oil and gas sector."**



The Advanced structural integrity and Vibration Research Focus Group is a leading research group in vibration, instruments and structural integrity particularly in the oil and gas sector. Our specialisation in vibration, monitoring, instrument technique, machine and structural dynamic, material fatigue and integrity is offering industry with the latest engineering skills and expertise to solve real life and complex engineering problems. The research group has a deep fundamental and knowledge that can contribute to vast engineering and science disciplines.



Reported by Mr. Muhammad Hatifi Mansor



## Energy Sustainable Focus Group ESFG

Sustainable development is defined as meeting the needs of the present, without compromising the ability of future generations to meet their own needs. Energy Sustainability Focus Group offers the solution for a better future. It is a group of seven researchers who are actively involved in various research fields including photovoltaic solar system, bee farming technology, wind engineering, vortex tube cooling system, refrigeration, air-conditioning and building energy consumption.

The members are actively collaborating with other institutes and industries such as Universiti Teknologi Petronas (UTP), Kyushu University Japan, Universiti Teknologi Malaysia (UTM), Hitachi, Venturi Asia and many more. We also have a collaboration with Persatuan Usahawan Kelulut Pahang (PUKP). Through this association, one of the team member, AP. Dr. Firdaus invented an award-winning product, the SLEEK PUMP.



Best presenter in ICFEE2020, Kyoto, Japan

The Sleek Pump is used to collect stingless honey bee without degrading its quality. This invention is recognized by the Malaysian Government as it was awarded as the runner-up in Malaysia Commercialisation Year 2020. Kindly scan the QR code below to watch an explanation video on the pump.



Reported by Dr. Mohd Hazwan Yusof



Interaction of minister with the winner of MCY2020 (AP. Dr. Firdaus)



Sleek Pump product on Sinar Harian newspaper

Apart from invention, our team members are also active in joining international and local conferences. Dr. Hazwan was awarded as the best presenter in an international conference, ICFEE2020, Kyoto, Japan. We also collaborate with Universiti Teknologi Petronas (UTP) to conduct the 1<sup>st</sup> tele-conference in UMP, which is Symposium On Energy Systems since 2017. In 2018, VIT from India joins the collaboration to make it an international tele-conference.



# HEG Human Engineering Group

## PHYMILL

This project was lead by Ts. Dr. Mohd Azrul Hisham Mohd Adib who was also a lecturer at the Faculty of Mechanical and Automotive Engineering Technology, UMP. PhyMill is an automatic exercise device to train walking movement for patients undergoing rehabilitation treatment. The development of this product was achieved with help and advice from a physiotherapy expert in Kuantan Physical Therapy-Physiotherapy Centre, Mrs. Narimah Daud.



## ISN INSPIRE 2020

Human Engineering Group (HEG) was invited to exhibit our research products at the ISN INSPIRE 2020, held in the National Sports Institute Malaysia in Kuala Lumpur. Among the notable guests was the Minister of Youth and Sports, YB Dato' Sri Reezal Merican Naina Merican. HEG was represented by Dr. Zulkifli and Dr. Hasnun. The minister visited our booth, where we have showcased some products such as the agility training device, the instrumented insole, among others.



### Bandana Protecting your head

This bandana was produced for sepak takraw sports athlete. It protects the player's head when he receives the ball from the opponent by reducing the impact.

Reported by Dr. Zulkifli Ahmad@Manap

### "Discussion with medical doctor from "Paediatric department of IIUM Hospital and Rehabilitation Department IIUM".



## AGILITY TRAINING DEVICE

The agility training device was a product funded by UMP under the UMP-Community Technology Solution Platform Grant. This product helps the coach to monitor the agility of a badminton player through the use of ultrasonic sensor and Android app. The device consists of six units that communicates via Bluetooth. The aim of this project was to benefit the community, thus two units of the device were delivered to badminton school teams in Pekan through Pejabat Pendidikan Daerah, (PPD) Pekan.



## research activities



# Manufacturing Technology Group



Manufacturing is the value-added production of merchandise using machines and formulation while industrial engineering deals with the optimization of complex processes and systems to eliminate waste of time, money, materials, man-hours and machine time. Manufacturing Technology Group (MTG) presents its expertise for a total solution. Under the leadership of CEO and support from group mentor and other group members, MTG has achieved various recognitions from the public. Backed by the state-of-the-art facilities in its laboratories, the team is able to perform its full potential as competent researchers. The answer to overcoming problems in the manufacturing process and the industrial system is here in Manufacturing Technology Group (MTG).

The Manufacturing Technology Group was established in 2011. It is a group developed within the Universiti Malaysia Pahang (UMP) to emphasize any research activities related to the manufacturing process area in order to help the growing economy. The main objective of this group is to enhance the manufacturing process productivity as well as minimizing the environmental burden.

### Our research areas:

- Joining, Welding and Laser Processing (JWL)
- Machine Design and System
- Surface Engineering
- Solidification, Casting and Semisolid Metal Processing



### Collaborative Research Opportunity, Laser Processing Research between UMP and UKM

**"The main objective MTG is to enhance the manufacturing process productivity as well as minimizing the environmental burden."**



In CITREx 2020, MTG participated for five projects. "Enhancement of Brazing Joint Strength by Laser Surface Texturing" by Dr. Aiman won Gold Medal and awarded 1<sup>st</sup> place in Best Invention in Manufacturing.



**Automatic Mackintosh Structure with Digital Counting Platform**, developed by Assoc. Prof. Ir. Dr. Akhtar

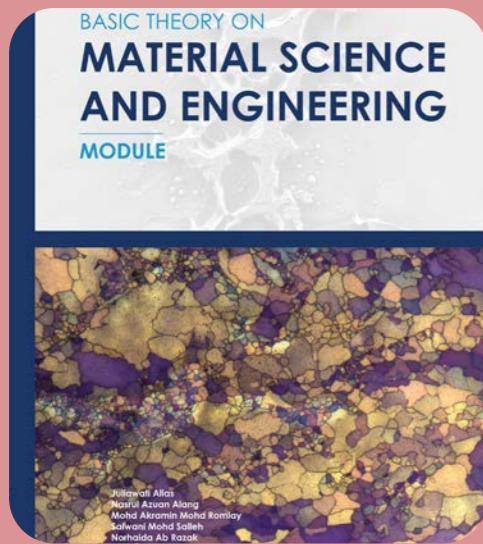


Reported by Dr. Aiman Mohd Halil

# SUPREME

**S**tructural Materials Degradation (SMD) had been rebranded to a new name, Structural Performance Materials Engineering (SUPREME). This new focus group focuses on six main areas : i) metallurgy; ii) corrosion and protection; iii) polymer; composite and membrane material; iv) plasticity; v) fracture mechanics; and vi) finite element modelling.

Due to the Movement Control Order (MCO) during the COVID-19 pandemic, SUPREME external activities including visits had been restricted and most activities were conducted internally and online. The following are the activities in 2020.



## MODULE

*Basic Theory on Material Science and Engineering module is an outcome of collaborative works between Dr. Juliawati Alias, Dr. Salwani Mohd Salleh, Dr. Norhaida Ab Razak, Dr. Mohd Akramin Mohd Romlay and Dr. Nasrul Azuan Alang from Structural Performance and Material Engineering (SUPREME) focus group.*



## Structural Performance Materials Engineering



Carbon Membrane Research by Dr Norazliane



One-day Training on Abaqus

A one-day training on Abaqus had been conducted on 9 February 2020 by Dr. Nasrul Azuan Alang. The participant consist of lecturers and postgraduate students. This training was designed to provide insight and understanding regarding the failure of material under creep loading.

A sharing session was carried out by Dr. Ahmad Syahrizan Sulaiman in Prediction Fatigue Life using Autodesk. The initiative of sharing session not only provides education to everyone but it could be a potential platform for other SUPREME members to share knowledge in their field of expertise.

An online guest lecture entitled Virtual Work Principle and Finite Element Method (FEM) by Prof. Emeritus Masanori Kikuchi from Tokyo University of Sciences was held on 24 July 2020. This online lecture was intended for the student to grasp the basic concept of FEM and its application.

Portable carbon membrane for hydrogen purification by Dr. Norazliane won a gold medal and Special Award of CENLAB at Creation, Innovation, Technology and Research Exposition (CITREx) 2020 organised by UMP on 12 till 13 February 2020.

Reported by Dr. Norhaida Ab. Razak

## PUBLICATION

The publication by FTKMA in 2020 was generally good, with 158 publications consist of Web of Science, Scopus, proceeding, book, chapter in book and module. Of the 158 publications, 65 percent are from the Scopus index journal or proceeding. Meanwhile, 26 percent are from Web of Science (WOS) index journal. Other publications came from university news portal, module, chapter in book and magazine.

All the journals were produced from various focus groups in FTKMA. Publication is one of the essential pillars in FTKMA to get recognized locally or internationally. The citation for FTKMA for last year was 4,570. It was increased by 614 citations compared with previous year. Figure 1 shows the numbers of publication and Figure 2 shows the citation numbers from various focus groups.

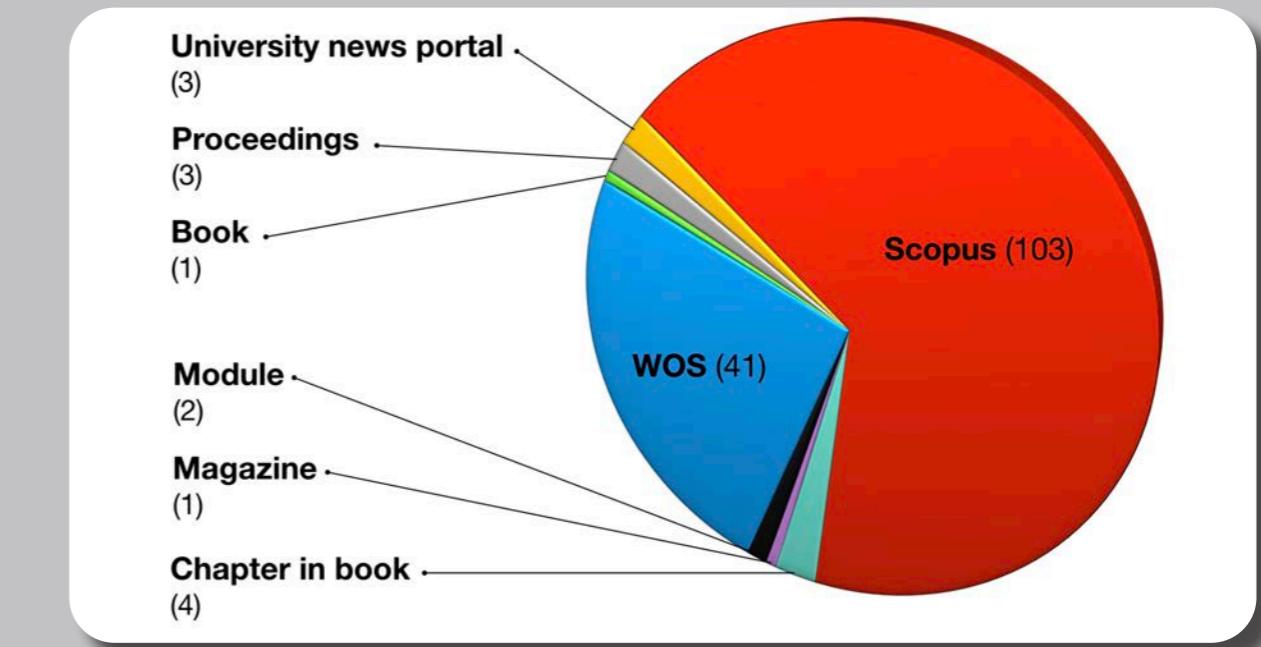


Figure 1: Publication in FTKMA

FTKMA had a good citation counts for its publication in the year 2020. AERG had the highest number of citations (1102) followed by AFFG (1067) and ESFG (1042). The high number of citations shows that publication by FTKMA researchers was recognised around the world.

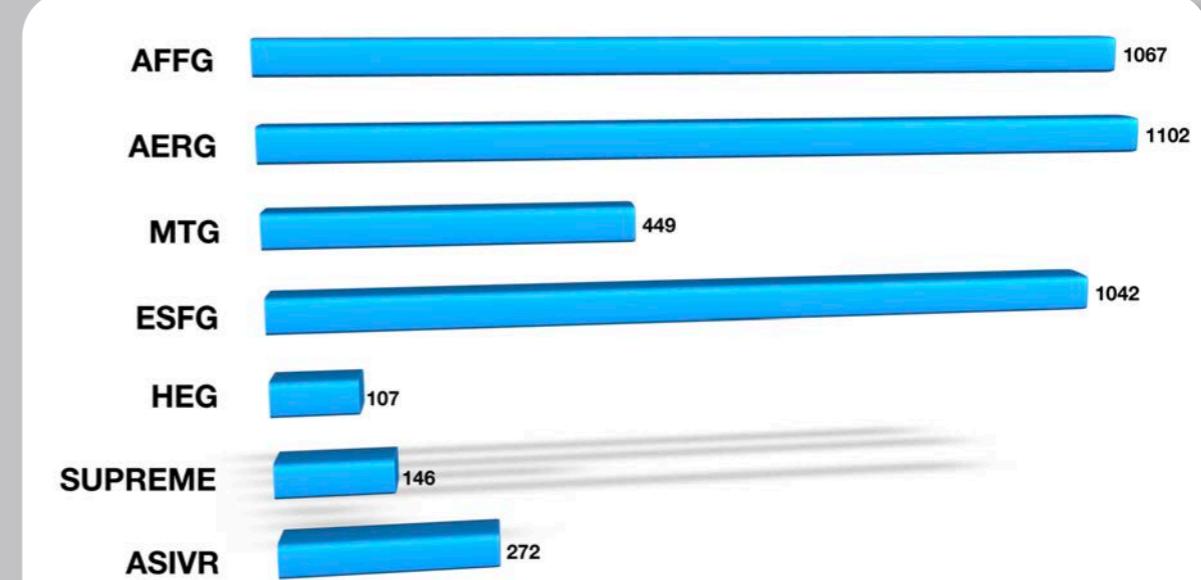


Figure 2: FTKMA citation numbers

# RESEARCH GRANTS

FTKMA managed to secure around RM6.7 million grant in values from various grants internally and externally through focus groups. The manufacturing technology focus group managed to secure RM1.6 million grants. The type of grants were UMP internal fund, International grant, Fundamental Research Grant Scheme (FRGS), MTUN-Pre-commercialization fund, LAB 2 Market, Industry and Agency. FTKMA secured five grants from various industries in Malaysia. For international grant, FTKMA researchers secured eight grants from overseas. This shows that FTKMA researchers were recognized by industry and internationally. Figure 3 shows the focus group performances in securing the numbers of grants, and Figure 4 shows the values of the grant secured by the focus group.

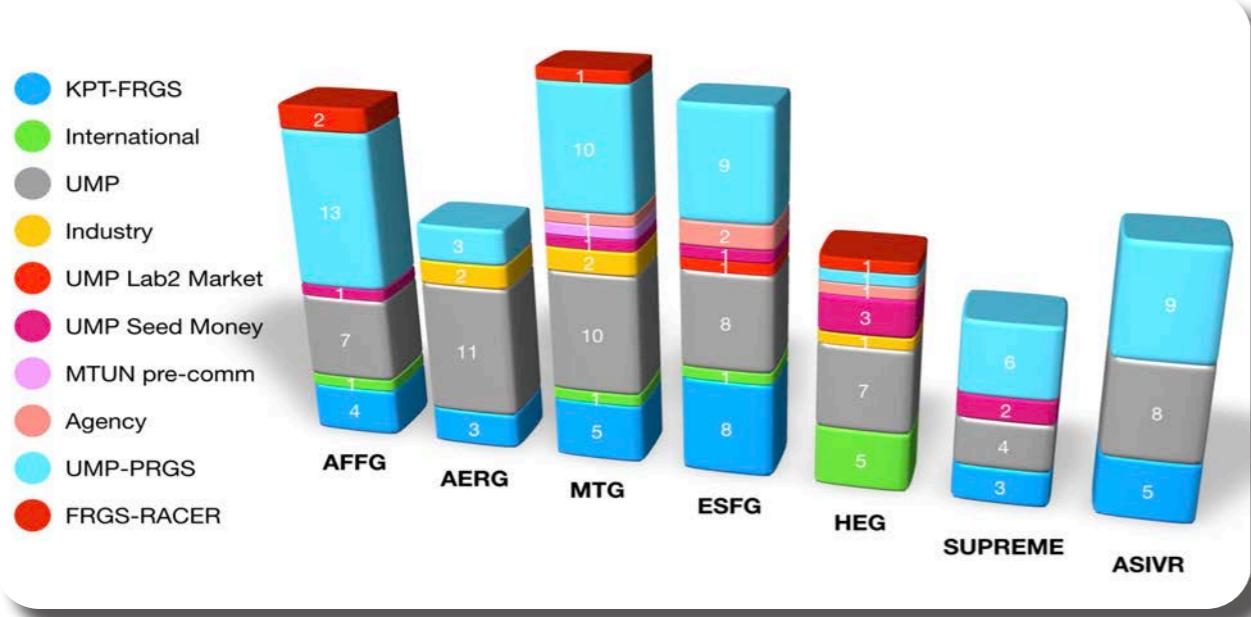


Figure 3: Performances of focus group secures the numbers of grants

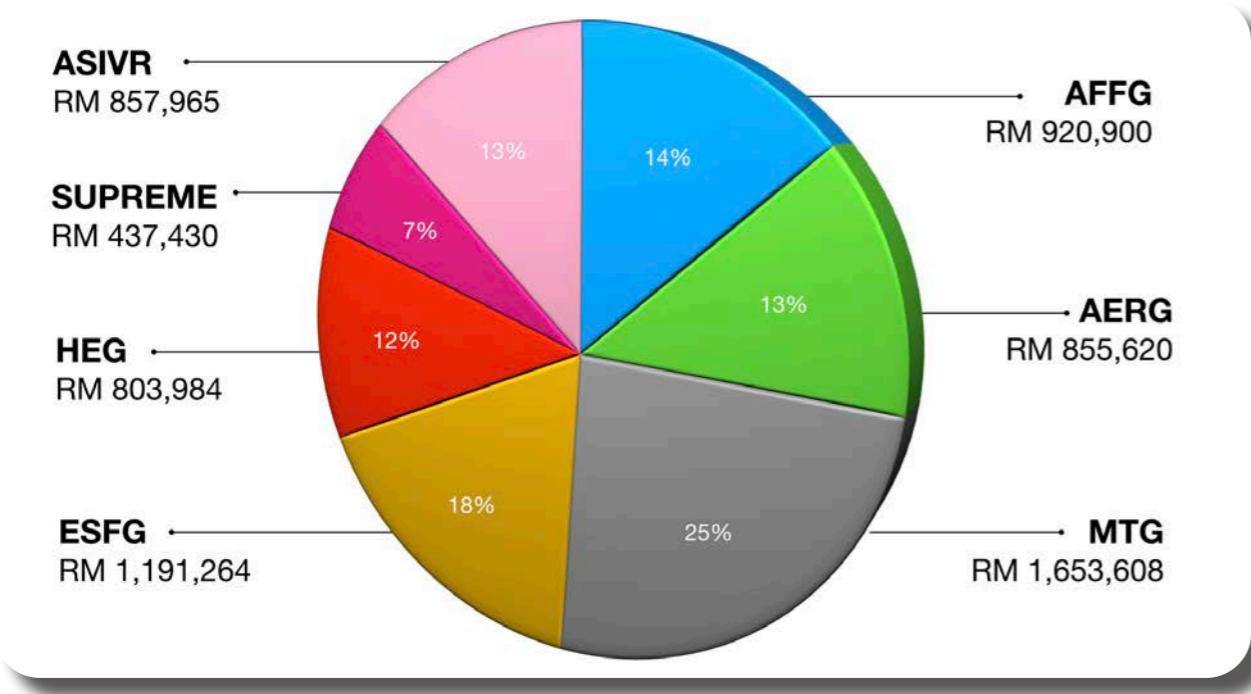


Figure 4: Values of the grant secures by focus group



## CREATIVE CORNER

### The importance of adaab in learning in the era of pandemic

By Dr Mohd Adnun Hamidi

In this era of pandemic, both students and lecturers are affected. Learning sessions that were previously held through face-to-face and in conventional methods needs to be done online either by synchronous or asynchronous mode.

Nevertheless, the noble relationship between lecturer and student are still the same as between *Muallim* (teacher) and *Thullab* (student). *Adaab* (moral and ethic) must be uphold so that the student can earn the wisdom of the knowledge.

Before the pandemic, students can meet lecturers face-to-face as the method of engagement is much simpler. Now, students can only represent themselves through online video calls, emails, and even WhatsApp messages.

Regardless, students must uphold their *adaab*. Hereby I would like to share *adaab* in messaging lecturers:

1. Mind your time of message. Avoid late night, or even after office hour
2. State your full name
3. ID Number
4. Name of programme
5. State your question or request.
6. Apology or thank you note as you are taking his or her time

Hopefully, by this sharing, students can be more conscious and gain the wisdom of knowledge.

## FTKMA IS ON THE MOVE

By Dr Azizuddin

Our FTKMA is on the move  
Any obstacles, we cut it loose  
Professors and lecturers, take responsibility  
Admins and technicians, always ready

Automotive, Manufacturing, also Industrial  
Thermofluid, Ergonomics as well as Material  
Energy, Vibration, Human Engineering too  
These are Mechanical for me and you

KPI achievement, the Dean's priority  
Make it done with high integrity  
Teaching and research, the prime target  
Consultation work, do not forget

Engineering Technology, the core gateway  
BVA programme, automotive per se  
BHA degree, the German collaboration  
DMM course, the feeder function

Lab experiment, hands-on methodology  
Simulation software, modelling strategy  
Masters study, the chance to further  
PhD journey, to explore and discover

ICMER and IPCME, the proud organizer  
SES and HUMENS, the get together  
JMES journal, the chance to publish  
Publication wise, we have accomplished

IT'S MEchanical, the fame landmark  
Standing tall in the middle of the park  
Common interest in Focus Group  
Accreditation effort, to close the loop

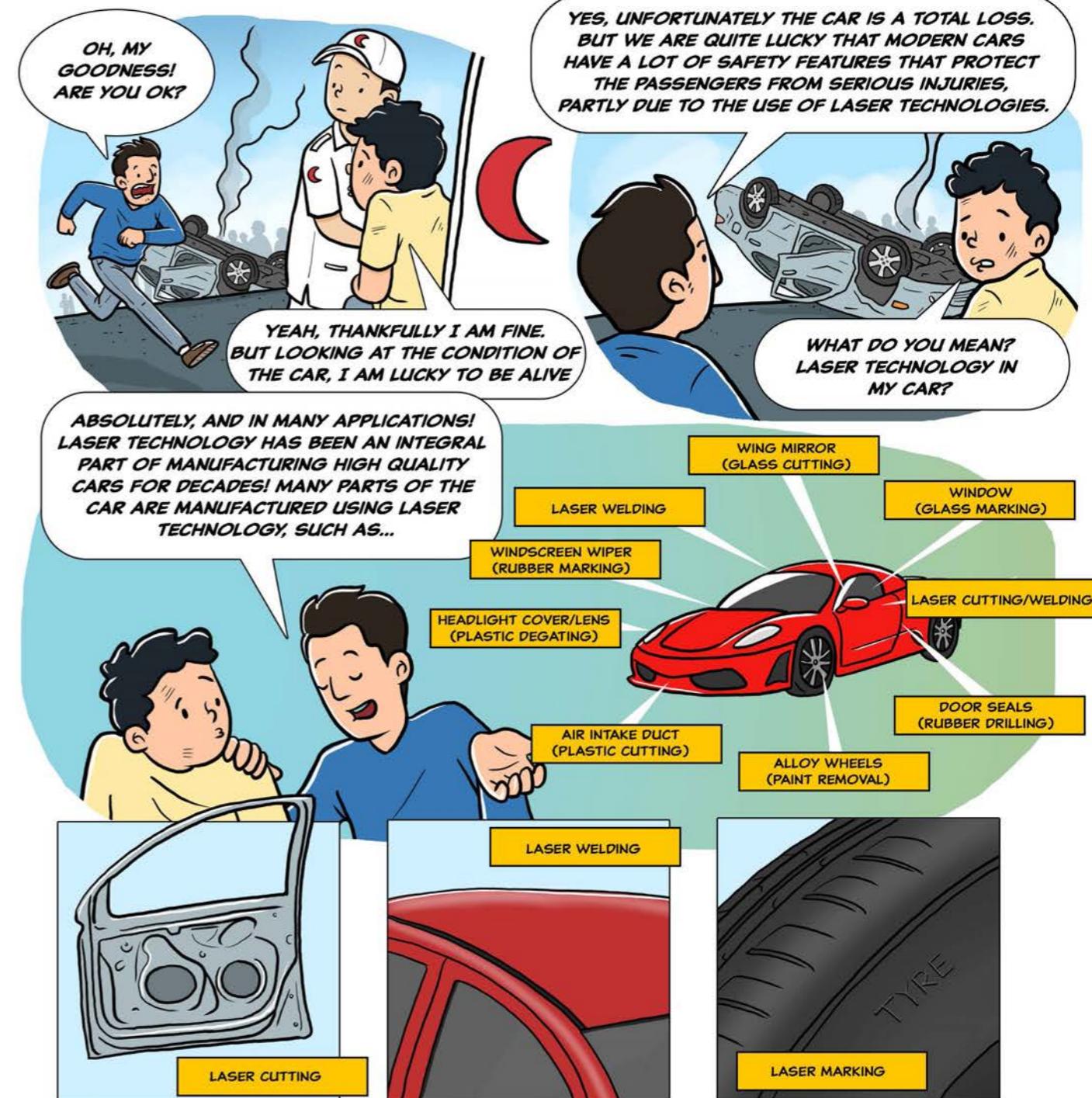
Honour the job, rewarded with promotion  
P.Eng and C.Eng, the common mission  
Pride and success, the path we choose  
FTKMA indeed is on the move

IT'S MEchanical

## creative corner

### SAFE AND HIGH-QUALITY CARS, THANKS TO LASERS!

JOINING, WELDING AND LASER PROCESSING LAB (JWL)  
FACULTY OF MECHANICAL AND AUTOMOTIVE  
ENGINEERING TECHNOLOGY,  
UNIVERSITY MALAYSIA PAHANG



SPECIFICALLY, SOME OF THE LASER TECHNOLOGY INCLUDES...  
LASER CUTTING OF VARIOUS PARTS LIKE THE CAR DOOR, LASER WELDING OF STRUCTURES SUCH AS THE CAR ROOF, AND LASER MARKING FOR LABELLING TYRES, GLASSES AND ENGINE BLOCKS. IT IS PARTLY DUE TO THESE LASER TECHNOLOGIES; MODERN CARS HAVE BECOME MUCH SAFER AND BETTER FOR OUR BENEFIT!

AT OUR JOINING, WELDING AND LASER PROCESSING LAB, VARIOUS ASPECTS OF LASER TECHNOLOGY ARE AVAILABLE TO BE EXPLORED.

FOR MORE INFORMATION, CONTACT: MAHADZIR@UMP.EDU.MY OR VISIT [HTTPS://FTKMA.UMP.EDU.MY/MFG/JWL](https://ftkma.ump.edu.my/mfg/jwl)





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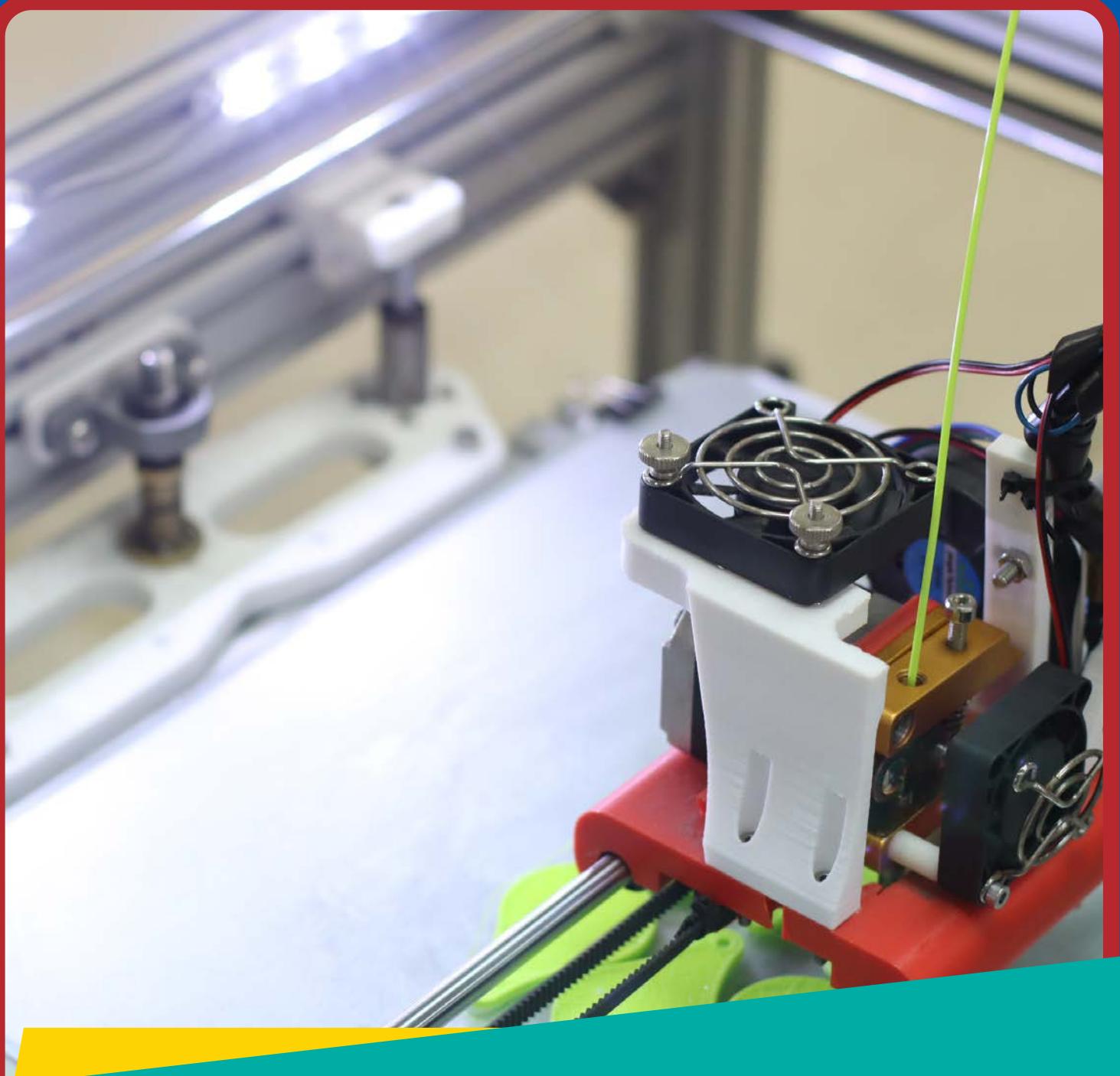


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# IT'S MEchanical

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