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The

OFFICIAL BULLETIN OF THE FACULTY OF MECHANICAL ENGINEERING

MECHANICA

AUGUST 2026

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The Mechanica

The Official Biannual Bulletin of the Faculty of
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THE MECHANICA is the official bulletin of the Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia, created to highlight the faculty's vibrant achievements, innovations, and activities. This publication showcases the dedication of our researchers, staff, and students in advancing engineering knowledge, technological innovation, and meaningful industry collaboration.

Through stories of research breakthroughs, academic initiatives, student successes, and global partnerships, THE MECHANICA reflects the dynamic ecosystem that drives FKM forward. As we continue to strengthen our impact in line with the UTM ASCEND 2030 vision, this bulletin serves as a platform to celebrate our people, share our ideas, and inspire future engineering excellence.



**Prof. Ir. Ts. Dr.
Muhamad Azizi bin
Mat Yajid**

PATRON
Dean of the Faculty of Mechanical
Engineering

Welcome to The MECHANICA, Volume 02/2026, featuring another collection of stories that reflects the energy, achievements and growing impact of the Faculty of Mechanical Engineering, Universiti Teknologi Malaysia.

This issue highlights how FKM continues to connect engineering with industry, communities and global partners. From the UTM-AMVIP Asset Integrity Forum 2026 and collaborations with Neo Aeronautics and Shanghai Jiao Tong University, to student innovation, international mobility and professional certification, each story reflects our commitment to creating meaningful learning and research experiences.

Our students remain central to this journey. Through initiatives such as IDEX'26, SULAM-LEX, community programmes, and industry visits, they can apply knowledge beyond the classroom, strengthen problem-solving skills, and understand the real-world impact of engineering.

Research excellence is also strongly represented in this issue through the FKM RDCI Town Hall 2026, the research feature on next-generation biodegradable implants, and the inspiring journey of Prof. Dr. Omar Yaakob, whose contributions demonstrate how expertise, persistence and service can create lasting impact.

We hope this issue offers not only a record of achievements, but also inspiration to keep exploring, collaborating and creating meaningful change.

Bold. Prompt. Persistent.

The Editorial Team
The MECHANICA, Volume 02/2026



Powering a Resilient Future: 150 Industry Professionals Unite at UTM-AMVIP Asset Integrity Forum 2026

Written By Ts. ChM. Dr. Nor Suriani Sani and
Prof. Ir. Ts. Dr. Muhamad Azizi Mat Yajid
Edited by Nuratiqah Imani binti Noordin

For more details, visit the official news at:
<https://news.utm.my/2026/02/powering-a-resilient-future-150-industry-professionals-gather-at-utm-amvip-asset-integrity-forum-2026/>

Desaru, 5 February 2026 – Universiti Teknologi Malaysia (UTM), in collaboration with the Association of Materials, Vibration & Insulation Practitioners, Malaysia (AMVIP), successfully organised the Asset Integrity Management Forum & Technology Showcase 2026 at Four Points by Sheraton, Desaru, Johor. The event attracted more than 150 industry professionals from Malaysia's petrochemical, oleochemical, oil and gas, energy, marine and water sectors.

Carrying the theme "Maintenance, Inspection & Monitoring for Petrochemical, Oleochemical, Oil & Gas, Energy, Marine & Water Industries", the forum served as a platform for industry experts, researchers, academics, technology providers and decision-makers to exchange knowledge and strengthen collaboration in asset integrity management.



The event highlighted the importance of effective maintenance, systematic inspection, and smart monitoring technologies in ensuring the safe, reliable, and sustainable operation of critical industrial assets such as power plants, ports, offshore platforms, and pipelines.

In his welcoming remarks, Prof. Ir. Ts. Dr. Muhamad Azizi Mat Yajid highlighted the importance of industry-academia collaboration in producing practical industrial solutions. The programme was officiated by Assoc. Prof. Dr. Sabrinah Binti Adam, who reaffirmed UTM's commitment to sustainable university-industry partnerships.

The forum featured keynote presentations by experts from Malakoff Power Berhad, Johor Port Berhad and UTM. Participants were also introduced to various technologies, including corrosion monitoring systems, structural health monitoring solutions, UTM's R-WIPER raw-water pipeline exploration robot and a low-wind-speed horizontal-axis wind turbine.

Supported by various industry sponsors, the event aligned with UTM ASCEND 2030 by promoting impact-driven research, strategic industry engagement and sustainable innovation. The forum further strengthened UTM's role as a trusted partner in advancing safe, reliable and sustainable industrial practices in Malaysia.

McME 27

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Advancing Mechanical Engineering for Sustainable, Intelligent and Human-Centred Systems



About McME

The Multi-Disciplinary Conference on Mechanical Engineering (McME) 2027 provides a platform for researchers, academics, students, and industry professionals to share innovations, exchange knowledge, and foster collaboration in mechanical engineering.

Under the theme "Advancing Mechanical Engineering for Sustainable, Intelligent and Human-Centred Systems", the conference will showcase emerging technologies and engineering solutions that support sustainability, digital transformation, artificial intelligence, and human well-being.



Conference Tracks



Advanced Manufacturing and Materials



Thermal, Fluids and Energy Systems



Sustainable Mobility and Transportation



Robotics, Mechatronics and Intelligent Systems



Human Engineering and Ergonomics



Sustainable Engineering and Circular Systems



Digital Engineering and AI Applications



Special Track - 4th International Seminar on Aeronautics and Energy (ISAE) 2027



Date

4 - 5 MAY 2027



Venue

SERI PACIFIC HOTEL, KUALA LUMPUR, MALAYSIA



Target Audience

Researcher, Academics, Postgraduate Students, Industry Professional



Important Dates

- 1 Abstract Submission Deadline **30 Nov 2026**
- 2 Full Paper Submission **31 Mar 2027**
- 3 Early Bird Payment Deadline **15 Mar 2027**
- 4 Registration Deadline **30 Apr 2027**



Submission & Registration

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Conference Webpage



Publications

Accepted paper will be consider for publication opportunities in indexed publications:

- Jurnal Mekanikal (eISSN 2289-3873)
- Journal of Transport System Engineering (eISSN 2289-9700)

*Other indexed publications will be made available once confirmed.



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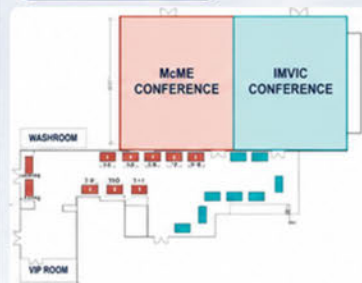


TABLE KEY

Each marker = one table 6 ft x 1.5 ft

- McME exhibition tables
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- Each table (6.0 ft x 1.5 ft) comes with a tablecloth, 3 covered chairs and a 13A power point.
- Placement is by tier, then booking order.
- Exhibitors supply their own display materials.

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UTM AND NEO AERONAUTICS ADVANCE FUTURE AIR MOBILITY

Established the Strategic Partnership with MoU Signing Ceremony

*Written By Dr Mohd Haziq Dzulkifli
Edited by Nuratiqah Imani binti Noordin*

Universiti Teknologi Malaysia (UTM) and Singapore-based Neo Aeronautics have established a three-year strategic partnership to strengthen research, innovation, and talent development in Advanced Air Mobility (AAM).

The partnership was formalized through a Memorandum of Understanding (MoU) document exchange ceremony held at the Faculty of Mechanical Engineering (FKM), UTM. Ir. Dr.-Ing. Mohd Nazri Mohd Nasir, a Senior Lecturer at FKM, plays a key role in driving the partnership and connecting UTM's academic and research expertise with Neo Aeronautics' industrial capabilities in electric vertical take-off and landing (eVTOL) technologies.

The collaboration will focus on four main areas: research and innovation; education and professional development; infrastructure, economic and community development; and strategic partnerships. It also supports the objectives of the Johor-Singapore Special Economic Zone by promoting cross-border cooperation in advanced technology, logistics, education and talent development. A key initiative under the partnership is the proposed establishment of the Aerial Innovations & Mobility Systems Satellite Laboratory (AiMS Lab) at UTM. The laboratory will be a collaborative platform for advanced research, engineering design, prototyping, structural testing, and technology certification for eVTOL and AAM systems.

Through this collaboration, UTM researchers and students will gain access to Neo Aeronautics' technical expertise and resources. Joint projects will support the development of the Crimson S8, a one-seater Personal Aerial Vehicle, and the SeaArcher, a cargo VTOL platform designed for humanitarian assistance, maritime oil-spill response, and firefighting operations.

The partnership will also provide FKM students with internship opportunities, industrial exposure, and hands-on aerospace engineering experience. Students will gain greater insight into designing and developing aerial systems that comply with aviation requirements set by regulatory bodies such as the Civil Aviation Authority of Malaysia (CAAM) and the United States Federal Aviation Administration (FAA).

To support faster and safer technology testing, UTM and Neo Aeronautics also plan to apply for a regulatory sandbox under the Pre-Defined Risk Assessment framework. This initiative is expected to streamline approval processes while providing a secure and legally compliant environment for rapid prototyping and flight testing.

Led at FKM by Ir. Dr.-Ing. Mohd Nazri Mohd Nasir, the collaboration reflects the faculty's commitment to strengthening university-industry partnerships, advancing future aerospace technologies, and preparing engineering graduates to contribute to Malaysia's growing Advanced Air Mobility ecosystem.

For more details, visit the official news at:
<https://news.utm.my/2026/06/utm-and-neo-aeronautics-forge-strategic-partnership-to-advance-advanced-air-mobility-in-southeast-asia/>





IDEX'26 Showcases Student Innovation for Real-World Challenges



*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

The Innovation and Design Exhibition 2026 (IDEX '26) successfully concluded on 18 January 2026 at the Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia. Organized by the Mechanical Engineering Students Association (MESA), the exhibition marked an important academic milestone for fourth-year Mechanical Engineering students enrolled in SEMM4533 – System Design, allowing them to turn classroom knowledge into practical engineering solutions.

This year's exhibition focused on five key themes: Plastic Pollution, Food Waste, Sustainable Living, Disaster Relief, and Differently Abled Solutions. Participating teams showcased innovative systems designed to address real-world societal and environmental challenges while incorporating sustainability, functionality, and social responsibility.

The projects reflected the students' creativity, technical understanding, and ability to apply engineering design principles in meaningful ways. A panel of 16 judges comprising academic staff and industry representatives evaluated the projects based on technical merit, practicality, sustainability, and potential impact. The exhibition also received strong support from the Faculty's leadership, with both Deputy Deans of FKM present. During the closing ceremony, Team C4, Clean Stream, was crowned the overall champion, followed by Team H4, Pill Dispenser Gocoh Gang, in second place and Team C5, Hydro Boi Nic, in third.

Beyond the competition, IDEX '26 served as a valuable platform for strengthening students' technical competencies, teamwork, creativity, and critical thinking. The exhibition demonstrated FKM's continued commitment to innovation-based learning and to developing future engineers capable of creating practical, sustainable, and socially responsible solutions for tomorrow's challenges.



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WELCOME TO FACULTY OF MECHANICAL ENGINEERING

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Innovating Sustainable Solutions

Strengthening Global Collaboration with **SHANGHAI JIAO TONG UNIVERSITY**

Written by Nuratiqah Imani binti Noordin

Edited by Ts ChM Dr Nor Suriani Sani



On 27 January 2026, the Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia, welcomed a delegation from the School of Materials Science and Engineering, Shanghai Jiao Tong University (SJTU), for a strategic academic and research engagement.

The delegation was led by Professor CHEN Ke, Vice Dean of the School of Materials Science and Engineering, SJTU, while FKM was represented by its Dean, Professor Ir. Ts. Dr. Zaini Ahmad. The meeting provided an important platform for both institutions to explore opportunities for deeper international cooperation in education, research, and innovation.

Discussions centred on expanding international student mobility, developing joint research initiatives in solidification materials and other advanced engineering fields, as well as establishing sustainable long-term institutional partnerships. Both universities expressed a shared commitment to strengthening global engagement and advancing research excellence through impactful collaboration.

The visit also highlighted FKM's participation in the Shanghai Jiao Tong University Southeast Asia Materials Forum in Singapore, themed "AI for Materials". The forum offers further opportunities for researchers from both institutions to exchange knowledge, explore emerging technologies, and initiate high-impact research collaborations.

Following the academic discussion, FKM hosted the delegation on a tour of selected areas within the Johor-Singapore Special Economic Zone (JS-SEZ). The visit provided first-hand exposure to the region's growing industrial ecosystem and economic development, while opening further possibilities for academic-industry collaboration and research aligned with regional needs.

Through engagements such as this, FKM continues to strengthen its international network and build strategic partnerships that support innovation, knowledge creation, and sustainable technological advancement.

ZIARAH KASIH RAMADAN 2026

Nurturing Compassion, Strengthening Community



Written by Nuratiqah Imani binti Noordin

Edited by Ts ChM Dr Nor Suriani Sani

The Program Ziarah Kasih Ramadan 2026, organized by the Welfare Bureau of the Recreation, Charity and Welfare Association (BRAKe), Faculty of Mechanical Engineering (FKM), was successfully held on 12 March 2026. The programme reflected FKM's continued commitment to fostering compassion, care and a strong sense of community among its members.

The programme was officially launched by YBrS. Professor Ir. Ts. Dr. Zaini bin Ahmad, Dean of the Faculty of Mechanical Engineering, at the foyer of Block E07 before the visiting convoy departed for the recipients' locations. The initiative was led by Mohd Zarieth Hafiz bin Mat Hussain, Head of the Welfare Bureau and Programme Director, together with members of the organizing committee.

The programme aimed to reach out to and support retired staff, widows of former staff members and members of the Faculty community in need. In conjunction with the holy month of Ramadan, the visits also included presenting hampers as a gesture of appreciation, care and solidarity.

A total of 25 recipient families were visited across several areas in Johor Bahru, including Kangkar Pulai, Taman Universiti, Mutiara Rini and Sri Pulai. Through these visits, the programme provided an opportunity to strengthen relationships and ensure that members of the wider FKM community continued to feel valued and remembered.

The success of Ziarah Kasih Ramadan 2026 was made possible through the support and contributions of all parties involved. More than a charitable initiative, the programme served as a meaningful reminder of the importance of empathy, togetherness and mutual support, while strengthening the bonds of ukhuwah within the Faculty of Mechanical Engineering.

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*Together, we build a **brighter future**.*



UTM Celebrates First **CAMPUS ASIA PLUS DUAL DEGREE GRADUATES**

*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

For more details, visit the official news at:
<https://news.utm.my/2026/04/utm-marks-historic-milestone-with-first-campus-asia-plus-dual-degree-graduates-at-kyushu-university/>

Universiti Teknologi Malaysia (UTM), through the Faculty of Mechanical Engineering (FKM), marked a historic milestone with the graduation of the first cohort of the CAMPUS Asia Plus Dual Degree Master's Programme under the Energy and Environmental Science and Technology (EEST) initiative. The achievement was celebrated in conjunction with the CAMPUS Asia Plus EEST Reunion Symposium FY2025, held on 24 March 2026 at Kyushu University, Japan. The symposium brought together partner universities from across Asia, including Kyushu University, Pusan National University, Shanghai Jiao Tong University and UTM.

It served as a platform for academic exchange, international collaboration and knowledge sharing, with students presenting their experiences from programmes such as Summer School, dual degree mobility and the Spring Seminar.

FKM proudly celebrated four graduates from the pioneer cohort: Wan Emily Shazelyn, Norsyaqim Iqbal, Sakamoto Takumu and Kawano Ryodai. Their participation reflected the programme's emphasis on academic excellence, cultural exposure, interdisciplinary learning and global collaboration, in line with its mission of "Connecting Asia to the World."

The event also featured academic presentations, student forums, discussions and the EEST conferment ceremony. Representing UTM, Prof. Ir. Ts. Dr. Zaini Ahmad, Dean of FKM, delivered the official greeting address, reaffirming the university's commitment to internationalization and strategic academic partnerships.

The pioneer cohort officially graduated on 25 March 2026, marking the successful implementation of a high-impact international dual degree programme. This milestone lays a strong foundation for future cohorts and further strengthens regional collaboration, student mobility and academic excellence across Asia.





FKM – Singapore Polytechnic Strengthens Community Engagement Through **SULAM-LEX 2026**

*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

The Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia, in collaboration with Singapore Polytechnic, successfully organised the SULAM-LEX FKM-SP 2026 programme from 6 to 17 April 2026 at Kampung Sungai Melayu, Iskandar Puteri. The initiative brought together students and participants from both institutions in a meaningful programme that combined academic learning with direct community engagement.

Through a series of collaborative activities, participants were given the opportunity to apply knowledge gained in the classroom to real community settings. The programme encouraged students to work closely with local residents, understand community needs and develop practical solutions while strengthening their communication, teamwork and problem-solving skills.

SULAM-LEX FKM-SP 2026 also served as a platform for cross-cultural learning and international collaboration. By bringing together students from Malaysia and Singapore, the programme promoted the exchange of ideas, perspectives and experiences, while fostering stronger ties between UTM and Singapore Polytechnic.

Beyond academic development, the initiative highlighted the importance of social responsibility and sustainable community development. It demonstrated how university-industry and international academic partnerships can contribute meaningfully to society through experiential and service-based learning.

The programme reflects FKM's continued commitment to nurturing well-rounded graduates who are not only technically competent, but also socially aware, adaptable and prepared to contribute positively to communities at both local and regional levels.



UTM Students Earn Prestigious

INTERNATIONAL WELDING ENGINEER CERTIFICATION



*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

Universiti Teknologi Malaysia (UTM) achieved another significant milestone on 29 April 2026 when two master's students from the Faculty of Mechanical Engineering (FKM), Ahmad Ariffuddin Arifin and Mohd Shukri Hamsah, successfully completed the internationally recognised International Welding Engineer (IWE) professional examination. Their achievement reflects both individual excellence and UTM's growing strength in globally benchmarked welding engineering education.

Both students completed all modules under the International Institute of Welding (IIW) Diploma programme, qualifying them for the IWE professional certification, one of the most highly regarded qualifications in the field. The programme requires comprehensive mastery of welding processes and technology, welding metallurgy, joint design and analysis, quality control, international standards, industrial safety, and structural integrity.

The achievement highlights UTM's strong professional training ecosystem, supported by industry-standard facilities, qualified instructors and strategic partners including WIM, TWI and CWIS. The programme also provides valuable exposure to current industry practices and international welding standards.



The achievement demonstrates UTM participants' ability to meet rigorous international standards while gaining industry-relevant skills. The IWE qualification also expands career opportunities across sectors such as oil and gas, marine, construction, aerospace and advanced manufacturing.

UTM is the first university in Malaysia accredited to conduct the IWE Professional Course under the IIW Diploma programme. This milestone strengthens UTM's position in welding engineering education while supporting the development of highly skilled, globally recognised engineering talent.

For more details, visit the official news at:
<https://news.utm.my/2026/04/dua-pelajar-utm-lulus-penuh-pensijilan-antarabangsa-kejuruteraan-kimpalan-bertaraf-global/>



FKM Strengthens Community Knowledge Transfer Through

TRASH TO TREASURE

*Written By Ts. ChM. Dr. Nor Suriani Sani
Edited by Nuratiqah Imani binti Noordin*

Kota Tinggi, 16 May 2026 - The Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia (UTM), successfully organised the Experiential Learning Programme: Trash to Treasure at Ruang Daya Cipta (RDC), Kota Tinggi. The programme was held in collaboration with the ULRF2252 Caring Society course under the School of Undergraduate Studies (UGS), UTM.

The programme brought together university students, researchers, school teachers and local communities to promote environmental awareness through interactive learning activities. A total of 10 schools around Kota Tinggi participated, involving nearly 50 students and 10 accompanying teachers.

Designed to encourage sustainability awareness among young learners, the programme introduced the principles of the 3Rs: Reduce, Reuse and Recycle through educational games, exploration activities and hands-on sessions. Participants learned about responsible waste management, sustainable living and the importance of protecting the environment.



In his welcoming address, Prof. Ir. Ts. Dr. Zaini Ahmad, Dean of FKM, highlighted the importance of universities contributing to society beyond teaching and research. He also noted that RDC Kota Tinggi serves as a strategic community living laboratory for knowledge transfer, social innovation and experiential learning.

The closing ceremony was officiated by YB Tuan Haji Manndzri Haji Nasib, Member of Parliament for Tenggara, who commended UTM's efforts in promoting sustainability awareness among the younger generation. Also present were representatives from FKM, UGS and the Kota Tinggi District Education Office.

The programme reflects FKM's continued commitment to strengthening community engagement, knowledge transfer and sustainability education. Through collaborations with schools, communities and local stakeholders, FKM continues to create meaningful impact beyond the university campus.

For more details, visit the official news at:
<https://news.utm.my/2026/05/41-mahasiswa-utm-anjur-program-trash-to-treasure-didik-murid-sekolah-amalan-kitar-semula/>



NGEE ANN POLYTECHNIC

Visits UTM Wind Turbine Facility

*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

From classroom concepts to real-world renewable energy, students from Ngee Ann Polytechnic, Singapore, experienced wind technology up close during a visit to Universiti Teknologi Malaysia (UTM) on 20 May 2026.

Centred on UTM's wind turbine facility, the visit offered students and representatives an opportunity to explore how renewable energy technologies support engineering education, research and practical applications.

Rather than learning about wind energy only through textbooks and lectures, participants could observe an engineering facility within a university environment and gain a clearer understanding of how sustainable technologies are studied and applied.

The programme also provided a platform for knowledge sharing and academic engagement, particularly in wind energy, sustainable engineering, and emerging renewable technologies. Such exposure helps students connect engineering principles with real-world challenges surrounding energy transition and environmental sustainability.

Beyond the technical learning experience, the visit highlighted the value of experiential learning. Direct exposure to engineering facilities can spark curiosity, strengthen understanding and inspire students to explore future careers and research opportunities in renewable energy and sustainable technology.

The engagement also strengthened academic connections between UTM and Ngee Ann Polytechnic, demonstrating how international institutional visits can encourage the exchange of ideas, broaden students' perspectives and create opportunities for future collaboration.

As the engineering sector continues to move towards cleaner and smarter technologies, experiences such as this are increasingly important in preparing the next generation of engineers to respond to global sustainability challenges.

Through educational visits and international engagement, UTM continues to promote renewable energy awareness, engineering innovation and collaborative learning, while inspiring young engineers to contribute towards a more sustainable future.

FROM CAD TO THE FACTORY FLOOR

FKM students step beyond the classroom and into a real manufacturing environment at Samtec Asia Pacific

*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

For students of SEMM 4513 Computer-Aided Design (CAD), engineering became more than lines, models and simulations when they visited Samtec Asia Pacific on 20 May 2026.

The industrial visit gave students from the Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia (UTM), a valuable opportunity to experience how engineering design is applied in a real manufacturing setting. From production workflows to quality requirements, students saw how ideas developed on screen are transformed into practical engineering solutions.

During the visit, the students were introduced to the manufacturing processes behind electronic interconnect products and gained a clearer understanding of how design, production, quality and efficiency work together in industry.

A major highlight was the opportunity to explore real plant-related engineering problems provided by Samtec. Instead of simply observing, students were encouraged to think like practising engineers—analyzing challenges, applying their CAD knowledge, and considering practical solutions in an actual industrial context.

The experience showed students that good engineering is not only about producing an accurate design. It also involves understanding manufacturability, reliability, cost, efficiency and the needs of the production environment.

Beyond technical learning, the visit also exposed students to the professional side of engineering. Through interaction with industry personnel, they gained insights into workplace communication, teamwork, problem-solving and the importance of adapting to real-world challenges.

Industrial exposure such as this plays an important role in connecting classroom learning with future careers. By stepping into an active manufacturing environment, students can see the relevance of what they learn, build confidence in applying their knowledge, and better understand the expectations of today's engineering industry.

The programme also reflects FKM's commitment to experiential learning and strong university-industry collaboration, ensuring that students are equipped not only with technical knowledge but also with practical awareness and industry-ready skills.

FKM extends its appreciation to Mr. Jeff Ibrahim, Plant Manager; En. Saiful Adli, Manufacturing Engineering Manager; and the Samtec Asia Pacific team for their warm hospitality and meaningful knowledge-sharing session.

For the students, the visit was more than an industry tour—it was a glimpse of where their CAD skills could take them next.



INSIDE AVIATION

Aeronautics students step beyond the classroom to experience airport operations and aerospace manufacturing firsthand

*Written by Ahamad Amirul Afhiq bin Ahamad
Edited by Nuratiqah Imani Binti Noordin*



From the fast-paced environment of an active airport to the precision-driven world of aerospace manufacturing, third-year Aeronautics students experienced both sides of the aviation industry in one exciting industrial visit. On 9 June 2026, students from the Bachelor of Mechanical Engineering (Aeronautics) programme visited Sultan Abdul Aziz Shah Airport and Zenix Aerospace UPECA as part of the SEMT3822 Aviation Management course. The visit gave students a valuable opportunity to step beyond lectures and see how aviation systems operate in real professional environments.

At Sultan Abdul Aziz Shah Airport, students gained a closer look at what keeps airport operations running smoothly. They observed how aircraft movements, passenger flow, ground activities and operational coordination come together in a busy aviation setting.

For the students, it was a chance to connect what they learned in class with what happens behind the scenes. Concepts such as operational planning, safety, efficiency and coordination became much easier to understand when seen in action. The experience then shifted from airport operations to aerospace manufacturing at Zenix Aerospace UPECA.

Here, students entered a very different side of the aviation ecosystem — one built around precision, quality and consistency. They were introduced to aerospace manufacturing practices and learned why every component must meet strict technical requirements and international standards.

The visit also highlighted the importance of quality control, supply chain reliability and risk management. Students gained a clearer understanding of how manufacturing decisions can influence aircraft performance, operational reliability and the wider aerospace supply chain. What made the programme especially valuable was the opportunity to experience two connected but very different parts of aviation in a single visit. At the airport, students saw how aviation operations are coordinated in real time. At the manufacturing facility, they discovered the level of engineering precision required before aerospace components ever reach an aircraft. Together, these experiences gave students a broader picture of how the aviation industry works as one interconnected ecosystem.

Beyond technical knowledge, the visit also exposed students to professional working environments and industry expectations. Seeing engineers, operators and technical teams at work helped them understand the importance of communication, teamwork, responsibility and attention to detail in the aviation sector. For aspiring aeronautical engineers, experiences like this can make classroom learning feel much more real.

FKM extends its appreciation to Malaysia Airports Holdings Berhad (MAHB) and Zenix Aerospace UPECA for their warm hospitality and valuable knowledge sharing. Through industry engagement and experiential learning, UTM continues to provide students with opportunities to explore the realities of engineering practice — helping them move from understanding aviation in the classroom to experiencing it where it truly happens.



PROF. DR. OMAR YAAKOB

From Malaysia's Shores to Global Recognition

Marine Technology | Marine Hydrodynamics | Ocean Energy

2026 MILESTONES

Jan 2026

Appointed to the WFO End of Life Committee under the Royal Academy of Engineering / Engineering X.

Apr 2026

Elected Fellow of the Academy of Sciences Malaysia (FASc), Engineering Sciences.

Jul 2026

Elected to the Council of the Royal Institution of Naval Architects (RINA) for a three-year term.

2026: A Year Of Recognition

For Professor Dr. Omar Yaakob, 2026 has become a defining year. In April, he was elected a Fellow of the Academy of Sciences Malaysia (FASc) under the Engineering Sciences discipline, recognizing a career of outstanding contribution to engineering and science. Just months later, he was elected to the Council of the Royal Institution of Naval Architects (RINA), beginning a three-year term on 1 July 2026. These honours are more than titles: they reflect decades of research, leadership and service to the maritime community.

Building Malaysia's Maritime Knowledge

Professor Omar joined UTM in August 1983 as an Assistant Lecturer in the Faculty of Mechanical Engineering. He was part of the pioneering team that developed UTM's Marine Technology curriculum, Marine Technology Laboratory and marine-related research activities. His early work focused on naval architecture, ship design, hydrodynamics, marine transportation and ship operations. By the early 2000s, he helped open a new research frontier in Malaysia: ocean renewable energy and the marine environment.

Research That Meets Real-World Needs

Professor Omar's research has always been closely connected to real-world challenges in the maritime and marine environment. His work initially covered ship design, hydrodynamics, marine transportation and ship operations, before expanding into ocean renewable energy and the marine environment.

He has since led research projects addressing practical challenges such as ship energy efficiency and emissions, ballast-water treatment, ship hydrodynamics and safety, marine current and wave energy, offshore wind resources, and the environmental impacts of maritime activities. Through this combination of fundamental engineering, applied research, and collaboration, Professor Omar has sought to develop technologies and knowledge that meet the needs of Malaysia and the wider maritime community.

From UTM to the World

His expertise has also carried Malaysian maritime knowledge onto international platforms. He has represented Malaysia in discussions on ocean renewable energy and marine environmental protection, including engagements linked to the United Nations and the International Maritime Organization. In January 2026, the Royal Academy of Engineering also appointed him to the WFO End of Life Committee, where his experience contributes to work on international regulation, standards, benchmarking and material-flow forecasting.

A Legacy That Keeps Moving Forward

More than four decades after beginning his academic career, Professor Omar continues to show that meaningful research is built over time – through curiosity, persistence, collaboration and relevance to society. His journey reminds young engineers that a single question about the sea can grow into research that influences laboratories, industries, professional institutions and future generations.

Beyond The Laboratory: A Public Voice

Few engineers write as regularly for the public as Professor Omar. Since 2012, he has contributed opinion pieces and commentary to national outlets including The Star, New Straits Times, Berita Harian, Utusan Malaysia, Bernama, Malaysiakini and Free Malaysia Today, and has appeared on Astro Awani. His topics range from ocean energy and maritime safety to education policy and research integrity in universities, a reminder that expertise built in the laboratory can also inform public debate.



Recreating The Human Bone Environment To Develop The Next Generation Of Biodegradable Implants



Written by
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Treating critical bone defects remains one of the greatest challenges in modern orthopedic medicine. Every year, millions of patients require bone grafts to repair fractures caused by trauma, disease, or congenital abnormalities. Although conventional metallic implants provide the structural support needed during healing, they often remain permanently in the body and may require a second surgery to remove after recovery. These additional procedures increase healthcare costs, prolong patient recovery, and expose patients to unnecessary surgical risks. Consequently, researchers worldwide are actively pursuing biodegradable metallic implants that can safely support healing and then gradually disappear once their role is complete.

Among the various biodegradable metals under investigation, iron (Fe) has emerged as a particularly promising candidate because of its excellent mechanical strength and compatibility with human bone. Unlike magnesium, which degrades too rapidly, or zinc, which may not always provide sufficient strength, iron offers a better balance between mechanical performance and structural stability. However, its naturally slow degradation remains a major limitation.

Developing an iron scaffold that degrades at an appropriate rate while maintaining sufficient strength throughout healing has become a key challenge in bone tissue engineering. Addressing this challenge requires a deeper understanding of how implant design and physiological conditions influence degradation inside the human body.

Dr Muhammad Azfar Noordin, who leads a team of researchers in the Department of Applied Mechanics and Design, Faculty of Mechanical Engineering, Universiti Teknologi Malaysia (UTM), has taken an important step toward advancing biodegradable bone implant development through a more physiologically relevant experimental approach. Rather than relying solely on conventional laboratory immersion tests, the research integrates a reconstructed cancellous bone structure with a dynamic simulated body fluid (SBF) system to more closely replicate the conditions implants experience in the human body after implantation, as illustrated in Figure 1.

By recreating the dynamic flow of body fluids through the porous bone environment, this innovative testing platform provides a more realistic assessment of scaffold degradation and mechanical performance. The findings offer valuable insights into how biodegradable porous iron implants interact with their surrounding physiological environment, bringing researchers closer to designing safer, more reliable, and clinically relevant bone scaffolds for future orthopedic applications.

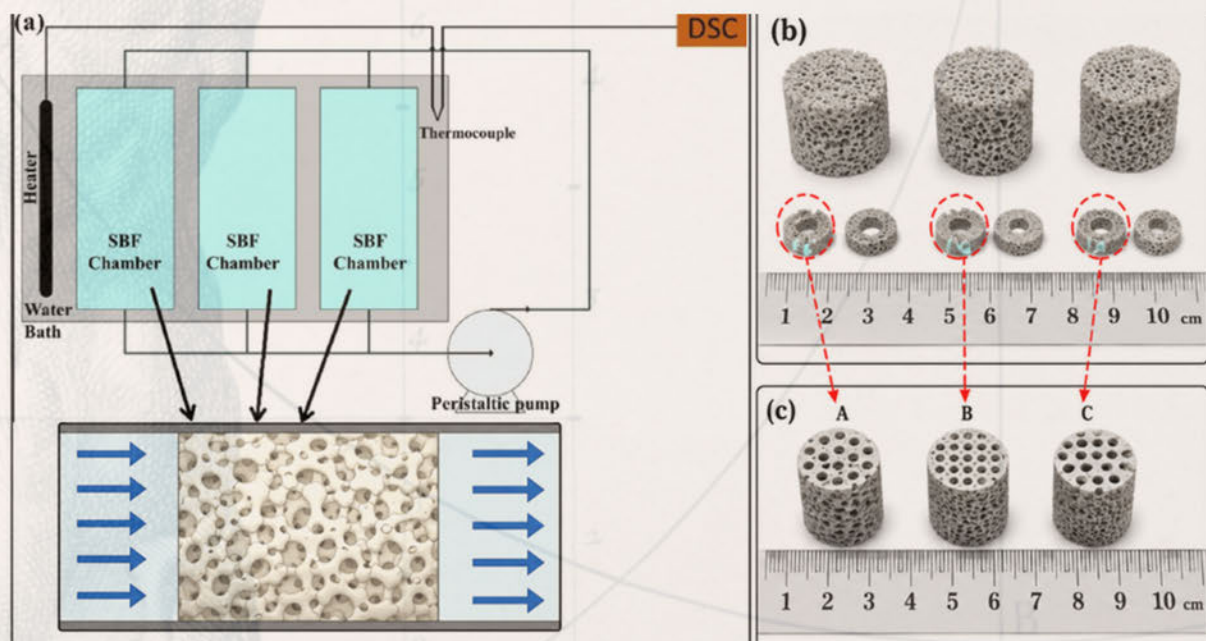
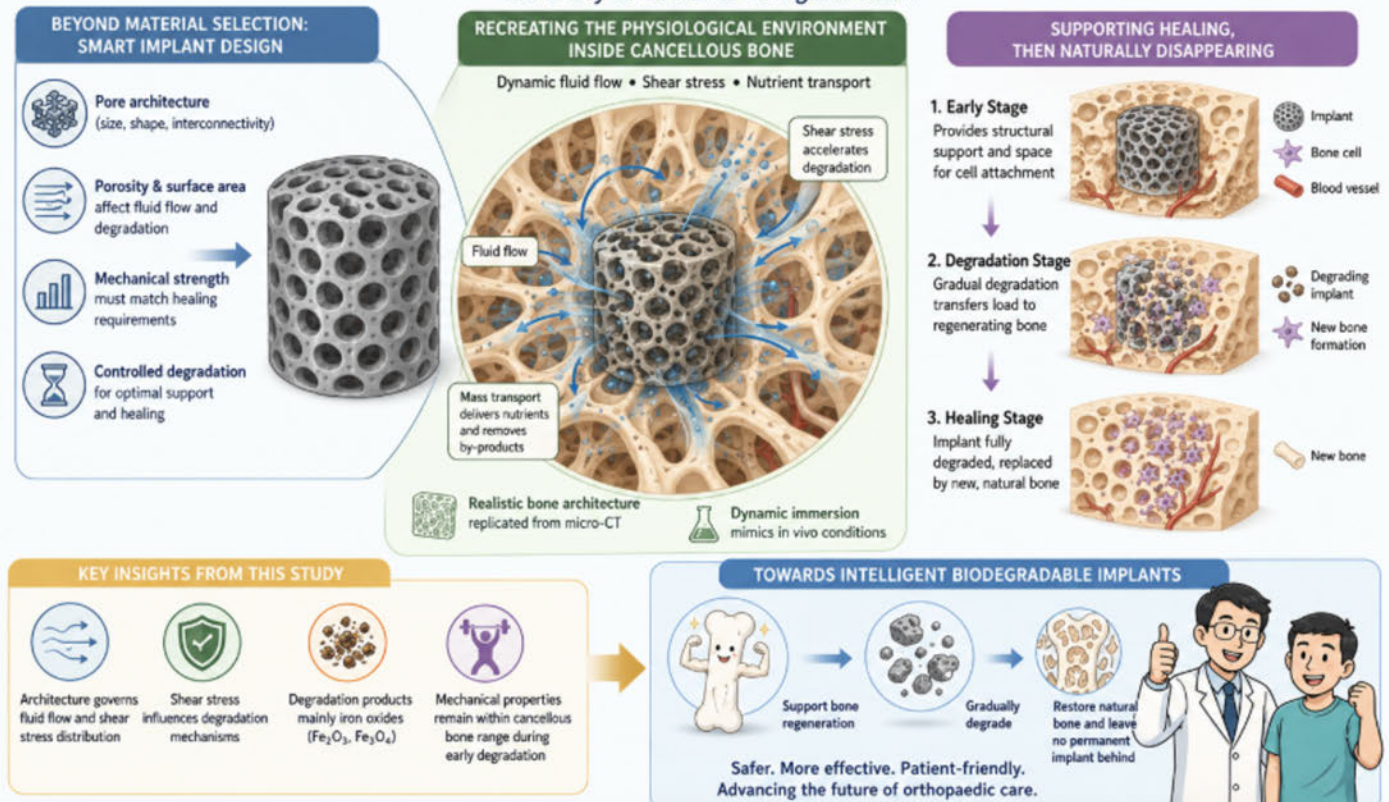


Figure 1: Schematic diagram of the test rig and specimens: (a) Schematic diagram of test rig, (b) The 3D printed cancellous bone specimen and integration of porous Fe with the cancellous bone and (c) Porous Fe specimens

DESIGN + ENVIRONMENT = SUCCESSFUL BIODEGRADABLE IMPLANTS

Understanding how implant architecture interacts with the physiological environment is the key to better bone regeneration.



Most laboratory studies evaluate biodegradable implants by immersing them in simulated body fluid under either static or simple flowing conditions. While these approaches provide useful baseline information, they do not accurately represent the complex environment found inside cancellous bone. Human cancellous bone contains an interconnected porous network through which bone marrow continuously circulates, transporting nutrients, oxygen, and metabolic waste while generating fluid-induced shear stress that influences both bone remodeling and implant degradation. Replicating these physiological conditions is essential for producing more realistic predictions of implant performance.

To recreate this environment, the research team harvested bovine cancellous bone and reconstructed its intricate internal architecture using high-resolution micro-computed tomography (micro-CT). The researchers then reproduced the three-dimensional bone model through stereolithography (SLA) additive manufacturing, enabling them to integrate porous iron scaffolds within an anatomically representative cancellous bone structure. Simulated body fluid was circulated continuously through the system at a controlled flow rate, reproducing the movement of bone marrow within living bone and exposing the scaffolds to realistic mechanical and chemical conditions.

Researchers fabricated three porous iron scaffold designs with approximately 80% porosity using precision computer numerical control (CNC) machining. Although all specimens possessed similar overall porosity, each employed a different pore configuration and surface area. This allowed the researchers to isolate the influence of pore architecture on degradation behaviour while keeping other important variables, including porosity, material composition, temperature, and flow conditions, constant throughout the investigation.

The scaffolds were immersed under dynamic conditions for 7, 14, and 28 days before undergoing detailed microstructural, chemical, and mechanical characterization.

The study shows that scaffold degradation depends not only on material composition but also on pore architecture and fluid flow. Surprisingly, the scaffold with the lowest exposed surface area showed the highest degradation rate, indicating that pore configuration and fluid-induced shear stress can be more important than surface area alone.

Microscopic and chemical analyses revealed iron oxides, mainly Fe_2O_3 and Fe_3O_4 , as the dominant degradation products. Regions exposed to higher shear stress also experienced greater material loss, suggesting that scaffold geometry can be designed to control degradation behaviour.

Although Young's modulus and yield strength decreased by approximately 65–78% over 28 days, the degraded scaffolds retained mechanical properties comparable to natural cancellous bone. This suggests they can continue supporting bone healing while gradually transferring load back to the regenerated tissue.

The research also introduces a more realistic dynamic testing method for biodegradable implants. By combining cancellous bone-like structures with fluid-flow conditions, the approach can improve predictions of implant performance and support the development of personalized biodegradable scaffolds for orthopaedic, craniofacial, and dental applications.

KEEPING THE CRANES MOVING: How Data Can Make Port Maintenance Smarter

A Malaysian container-terminal study shows why the smartest maintenance plan is not to maintain everything the same way.

WHEN ONE CRANE STOPS, THE PORT FEELS IT

At a busy container terminal, a quay crane does much more than lift boxes. It connects a ship to the entire landside cargo flow. When a critical crane system fails, vessel operations can slow, containers can queue, and delays can spread across the terminal. That makes maintenance more than a workshop issue; it becomes part of keeping the whole port moving. The challenge is that a quay crane contains many systems, and they do not all carry the same risk. Treating every component with the same maintenance schedule wastes time and money while leaving the most important systems exposed. The research therefore asked a simple question: can real breakdown data tell us where maintenance effort matters most?

LET THE BREAKDOWN HISTORY SPEAK

The study examined three years of breakdown records from 53 quay cranes across four fleets at a Malaysian container terminal. Instead of relying mainly on expert opinion, the team used the frequency, duration, and type of past failures to calculate how critical each major crane system was. The team then combined the data using a Data-Driven Analytical Hierarchy Process (DD-AHP). In lay terms, it is a structured way of turning breakdown history into a priority list. The higher the score, the more attention a system deserves because its failure has a greater potential to disrupt operations.

ONE SYSTEM STOOD OUT CLEARLY

The ranking produced a clear result. The Main Hoist, which lifts and lowers containers, recorded an overall criticality score of 0.721. That was far above Power and Control (0.112) and the Trolley system (0.065). Gantry, Auxiliary, Boom Hoist, and Structure ranked lower.



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This does not mean you can ignore the lower-ranked systems. It means their failures occur less often and have less operational impact. The ranking shows where limited maintenance resources, sensors, spare parts, and technical attention can make the biggest difference.

SMARTER MAINTENANCE MEANS DIFFERENT MAINTENANCE

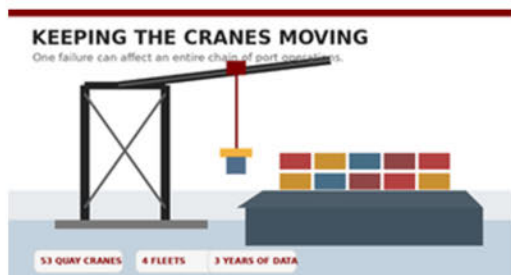
Because the Main Hoist was classified as very high criticality, the study recommends predictive maintenance that uses condition data to detect problems before a breakdown occurs. Power and Control, ranked at medium criticality, is better suited to planned preventive work supported by condition monitoring. Lower-criticality systems such as the Trolley, Gantry, Boom Hoist and Auxiliary systems can generally be managed with corrective maintenance and basic preventive care. Structure is a special case: although it ranked very low, cracks, fatigue, or corrosion cannot be allowed to run to failure safely, so periodic inspections and non-destructive testing remain essential.

FROM "FIX EVERYTHING" TO "FOCUS WHERE IT MATTERS"

The team also stress-tested the ranking using 10,000 Monte Carlo simulation runs, supporting the robustness of the maintenance priorities. The bigger lesson is straightforward: smarter maintenance is not about doing more work everywhere. It is about using evidence to decide what needs close monitoring, what needs routine care, and what can be repaired when necessary. For busy ports, that can mean using people, time, and money better while keeping the cranes and the cargo moving.

RESEARCH NOTE

This feature article is based on findings from the funded research project "Reliability, Availability, Maintainability Analysis and Maintenance Strategy for Container Port Handling Equipment" (Chargeline No. R.J130000.7.709.4J753). For further details, please refer to our published article: Jalal MR, Kader ASA, Hamid MFA, Kang HS. "A stochastic Petri Net-based approach for operational performance estimation of quay cranes." *Quality and Reliability Engineering International*. 2023;39:1660-1680.



WHY RELIABILITY MATTERS



FIELD TO DATA



THE DATA-DRIVEN RANKING



FKM RDCI TOWN HALL 2026

Shaping the Future of Research Excellence

*Written by Nuratiqah Imani binti Noordin
Edited by Ts. ChM. Dr. Nor Suriani Sani*

How can FKM build a stronger, more collaborative and globally visible research ecosystem? That question took centre stage at the FKM RDCI Town Hall 2026, held on 6 May 2026, bringing the faculty community together to shape the next chapter of research, development, commercialization and innovation (RDCI).

Prof. Ir. Ts. Dr. Zaini bin Ahmad, Dean of the Faculty of Mechanical Engineering (FKM), Universiti Teknologi Malaysia, officiated the programme. His presence reinforced the importance of collective leadership and faculty-wide participation in strengthening FKM's research performance and future direction.

Aligned with UTM ASCEND 2030 and MyRA, the Town Hall provided an important platform for academic staff, researchers and technical personnel to understand FKM's research priorities, exchange perspectives and explore how individual and collective efforts can contribute to greater institutional impact.

A major highlight was the presentation of the faculty's new Research Group (RG) structure and research niches. The initiative aims to strengthen research focus, encourage greater collaboration across expertise and position FKM's research groups to respond more effectively to emerging engineering challenges.

Participants were also introduced to the "5 Big Things RDCI 2030", a set of strategic initiatives designed to drive FKM towards higher-impact research, stronger innovation outcomes, wider collaboration and greater visibility. Discussions extended beyond research outputs to the future development of research infrastructure, laboratories and the wider innovation ecosystem, recognising that world-class research requires both strong talent and an enabling environment.

Adding an interactive dimension to the programme, a poster exhibition and engagement sessions gave participants the opportunity to explore ongoing initiatives, exchange ideas and provide feedback. Rather than functioning as a one-way strategic briefing, the Town Hall created space for the FKM community to contribute directly to the faculty's research agenda.

The key message was clear: research excellence is a shared responsibility. Every academic, researcher and technical team member has a role in strengthening the quality, relevance and impact of FKM's work – from producing meaningful research and developing new technologies to building partnerships with industry, society and international collaborators.

Through the FKM RDCI Town Hall 2026, the faculty reaffirmed its commitment to creating a research culture that is more focused, connected and impact-driven. With a clearer strategic direction and the collective strength of its community, FKM is positioning itself to advance engineering knowledge, inspire innovation and contribute solutions that matter.

One faculty. One direction. Shaping FKM research excellence together.



FROM FKM TO MICRON

Turning mechanical engineering fundamentals into a career at Micron Semiconductor

*Written by Dr. Muhammad Faiz Hilmi bin Rani
Edited by Nuratiqah Imani binti Noordin*

A 2025 graduate of the Bachelor of Mechanical Engineering programme at Universiti Teknologi Malaysia (UTM), Wang Shi Xian is now beginning his professional journey in Singapore as a Process and Equipment Engineer at Micron Semiconductor. His interest in engineering began in secondary school, driven by a fascination with robotics, machines, and advanced technology. That curiosity eventually led him to pursue Mechanical Engineering at UTM, where he built a strong technical foundation in areas such as thermodynamics, fluid dynamics and solid mechanics.

But for Shi Xian, university was not only about mastering equations and theories. His time at FKM also strengthened his analytical thinking, problem-solving skills and ability to approach engineering challenges systematically. Hands-on learning played an important role in preparing him for industry. For his Final Year Project, Shi Xian investigated journal bearing performance through experimental work and Computational Fluid Dynamics (CFD) simulation. The project gave him valuable experience connecting engineering theory with simulation, data, and real-world performance.

He also took part in a collaborative design project with Dyson, which exposed him to real-world engineering challenges and showed him how technical knowledge, design decisions, and teamwork come together in an industrial environment. Interestingly, the semiconductor industry was not originally part of his career plan. As developments in artificial intelligence, automation and emerging technologies continued to grow, Shi Xian became increasingly curious about the industries that enable them. This led him to explore semiconductor manufacturing, where he discovered that mechanical engineers play an important role in equipment performance, process optimization, troubleshooting, and data analysis.

Today, he applies these skills at Micron.

As a Process and Equipment Engineer, Shi Xian analyses process data, investigates abnormalities, identifies root causes and works with engineers across different functions to develop practical solutions. Every improvement must also be carefully evaluated to ensure that product quality and manufacturing reliability are maintained. His transition from student to engineer has reinforced one important lesson: university provides the foundation, but industry teaches engineers how to apply that knowledge to real problems. In the workplace, problems are often more complex than textbook exercises. They require engineers to ask the right questions, think critically, communicate clearly and continue learning as technologies evolve.

For current FKM students, Shi Xian encourages them to look beyond examinations and assignments. Rather than focusing only on getting the correct answer, he believes students should understand why engineering solutions work and how to apply that knowledge in practice. He also advises graduating students to start preparing early for their careers. Shi Xian began updating his résumé, exploring possible career paths and practising interview skills during his final year. His early preparation paid off when he secured his offer from Micron Singapore around the beginning of his final semester.

His journey from FKM to Micron shows that a Mechanical Engineering degree can open doors far beyond traditional mechanical industries. From journal bearings and CFD simulations at UTM to advanced semiconductor manufacturing in Singapore, Shi Xian is now applying the fundamentals he learned at FKM in one of today's most dynamic technology sectors. Sometimes, the most exciting engineering career is the one you never originally planned.





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