Technical Talk: From Kitchen to Printer – Will 3D Food Printing Work in Malaysia?

By

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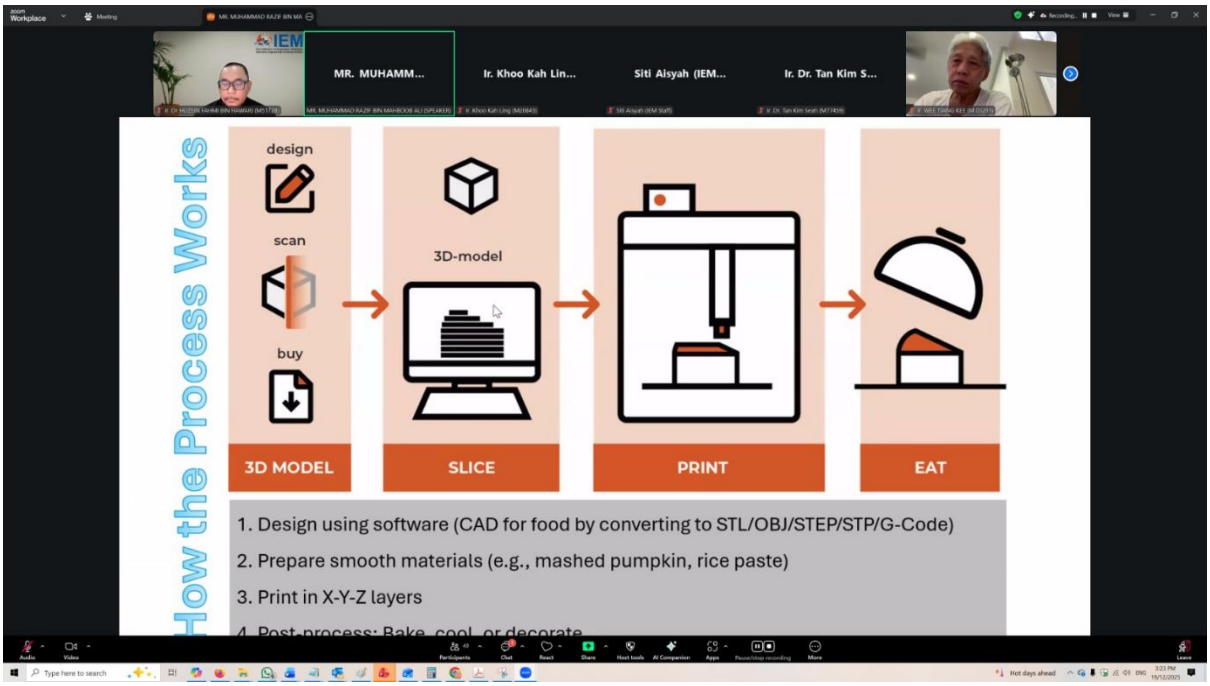
The Institution of Engineers, Malaysia (IEM), through the Electronic Engineering Technical Division (eETD), successfully organised a technical talk titled *"From Kitchen to Printer: Will 3D Food Printing Work in Malaysia?"* on Friday, 19 December 2025, from 3.00 PM to 5.00 PM via webinar. The session was attended by 50 participants and was accredited with 2 BEM CPD hours (Ref. No.: IEM25/HQ/581/T(w)). The session was delivered by Engr. Muhammad Razif B. Mahboob Ali, Lecturer from the School of Engineering, INTI International College Penang, and a practicing rapid prototype engineer. The talk examined the feasibility, engineering foundations, and societal implications of implementing 3D food printing technology within the Malaysian context.

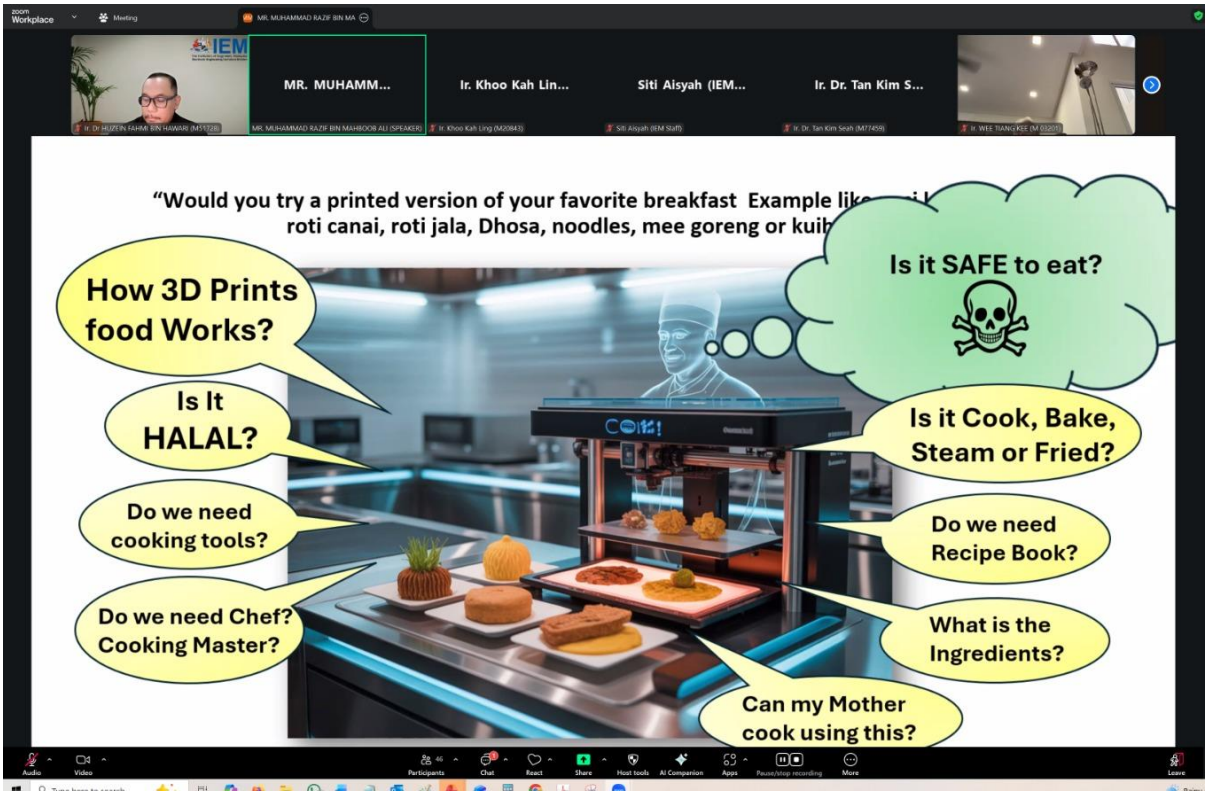
The presentation began with a reflection on Malaysia's diverse culinary heritage, particularly its breakfast culture shaped by Malay, Chinese, Indian, and colonial influences. The speaker emphasised that Malaysian cuisine represents a shared national identity and cultural integration. Building upon this foundation, the talk introduced 3D food printing as an emerging technology that integrates engineering innovation with culinary arts. A central question was posed: *Can 3D food printing be practically and socially adopted in Malaysia while preserving cultural authenticity?* From an engineering standpoint, 3D food printing applies additive manufacturing principles to edible materials. The process involves designing food structures using computer-aided design (CAD) software, converting the designs into machine-readable formats such as STL or G-code, and depositing food paste layer-by-layer through controlled extrusion systems along X-Y-Z axes.



The technology integrates multiple engineering domains, including material rheology and flow control, mechatronics systems, automation, software-based customisation, and food safety engineering. By adapting conventional 3D printing motion systems and extrusion mechanisms for edible materials such as chocolate, mashed vegetables, rice paste, or cookie dough, traditional culinary processes can be transformed into programmable, repeatable, and precision-based manufacturing operations. The presentation highlighted several advantages of adopting 3D food printing technology in Malaysia. These include customised nutrition for elderly individuals, hospital patients, athletes, and children with specific dietary requirements through controlled nutrient composition. The technology also supports food waste reduction by converting surplus or imperfect produce into printable food paste.

Additionally, it enables creative and cultural innovation by producing visually appealing designs of traditional Malaysian dishes while maintaining authentic taste. The automation potential makes it suitable for institutional catering in hospitals, schools, airlines, and large-scale food service operations. The integration of sustainable alternative proteins, such as plant-based blends, algae, or insect-based ingredients, further strengthens its relevance to sustainability goals. Moreover, portion consistency and quality control can be enhanced in mass production environments. Real-world applications were discussed, including soft-texture hospital meals in Japan and Europe, artistic food plating in fine dining establishments, research into space food systems, and the use of 3D printing technology as a STEM education tool. Malaysia presents strong potential for the adoption of 3D food printing due to its multicultural culinary creativity, growing interest in smart kitchen technologies, expanding halal innovation and export markets, and ongoing research initiatives within local universities.

Nevertheless, several challenges must be addressed before widespread implementation can occur. These include high initial equipment costs (approximately RM15,000–RM40,000), public perception concerns regarding safety and authenticity, issues related to texture and taste consistency, halal certification and regulatory compliance requirements, and the need for technical training and interdisciplinary collaboration. The speaker emphasised that 3D food printing is not intended to replace traditional chefs, but rather to complement and enhance efficiency, precision, and innovation in food preparation.



The session successfully bridged engineering principles with food innovation and sustainability. It demonstrated how additive manufacturing can extend beyond plastics and metals into edible materials, contributing to healthcare solutions, sustainable food production, and smart living technologies. From the perspective of IEM eETD, the event reinforced its commitment to advancing engineering applications in emerging technologies aligned with sustainability, automation, and Industry 4.0 transformation.

Overall, the program successfully highlighted the role of engineering innovation in redefining traditional industries while supporting sustainability and cultural preservation. It underscored the importance of interdisciplinary collaboration in shaping the future of food technology and demonstrated how engineering solutions can contribute meaningfully to societal advancement.