



Technical Talk: Manipulating Materials for Sustainability and Performance: Route for Advanced Healthcare and Electronics.

By

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The Institution of Engineers, Malaysia (IEM), through the Electronic Engineering Technical Division (eETD), in collaboration with the IEEE Malaysia Section, successfully organised a Technical Talk titled “Manipulating Materials for Sustainability and Performance: Route for Advanced Healthcare and Electronics.” The event was held on Tuesday, 9 September 2025, at the Frontier Research Hall, Universiti Teknologi PETRONAS (UTP), and featured Prof. Shweta Agarwala from Aarhus University, Denmark.

A total of 17 participants attended, comprising academic staff, researchers, and students. The programme was designed to provide participants with insights into responsible innovation through sustainable materials, with a particular focus on printed and flexible devices and their transformative potential in healthcare and electronics. In her presentation, Prof. Agarwala emphasised the urgent need to balance the rapidly growing global demand for advanced technologies with the principles of sustainability and ethical responsibility. She explained that the development and integration of novel materials, including bio-derived polymers and nanocomposites, are key to achieving this balance. These materials have the potential to preserve biodegradability while improving mechanical performance, flexibility, and overall functionality.

Prof. Agarwala further elaborated on how manipulating the structural properties of materials inspired by nature can unlock new possibilities for innovation. By tailoring molecular structures and composite arrangements, researchers are able to create scalable, energy-efficient, and environmentally responsible solutions adaptable to a wide range of applications. Her lecture provided an in-depth exploration of this materials-centric approach, demonstrating how it can drive both technological advancement and global sustainability goals.



Figure 1: Prof. Shweta delivering his opening remarks.

Among the examples showcased, Prof. Agarwala presented the use of biodegradable implants, responsive drug delivery systems, and energy-efficient wearable and flexible medical devices in healthcare. She also highlighted advancements in sustainable materials for electronics, underscoring their ability to support low energy consumption, recyclability, and compatibility with printed and flexible form factors. These innovations demonstrate how responsible material design can enhance performance while aligning with global sustainability initiatives.

The technical talk further underscored the importance of interdisciplinary research at the intersection of materials science, electronics, and healthcare. The insights shared pointed towards new pathways for materials-centric innovation, offering practical solutions to pressing environmental and technological challenges. The session also sparked engaging discussions among participants, paving the way for potential future research collaborations in sustainable technologies.

Overall, the event was a resounding success, providing participants with valuable exposure to cutting-edge research on sustainable materials and their applications in healthcare and electronics. It also reinforced IEM eETD's and IEEE's shared commitment to advancing professional development while promoting responsible, knowledge-driven innovation for the betterment of society.



Figure 2: Group photo of the speakers and the participants