TheStar

Taylor's Medical and Engineering students strike gold with innovative polymer radiation shield

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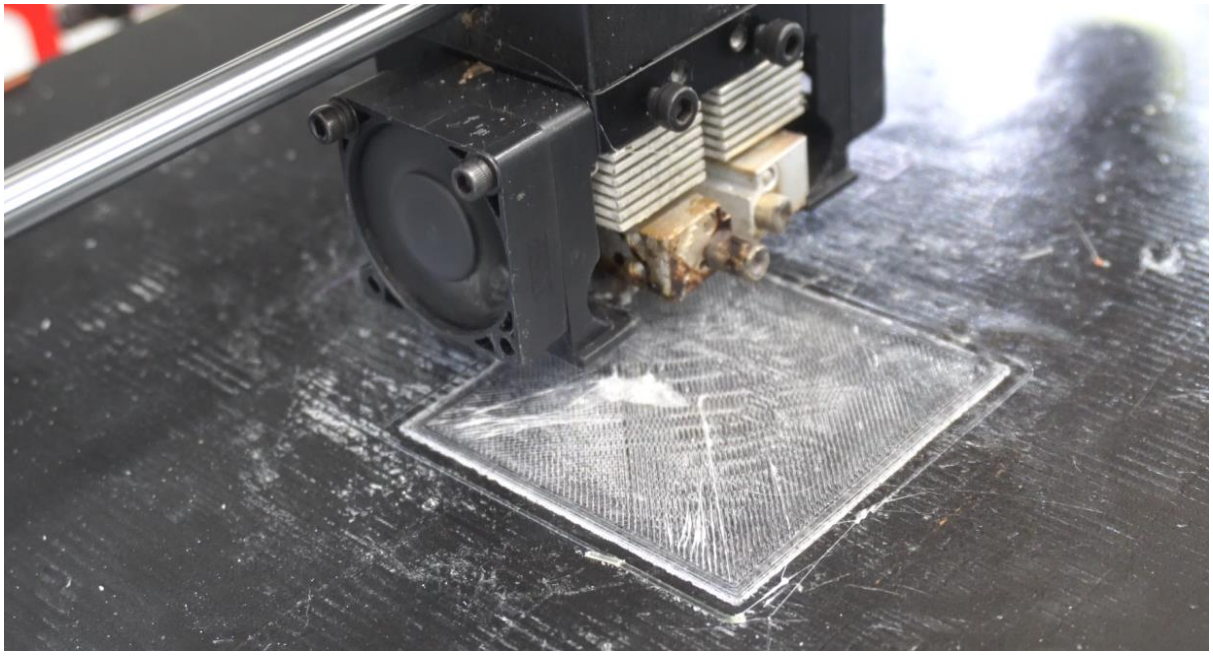

Bi-PETG material for Team U34's radiation shield being 3D printed at Taylor's.

THE way forward towards a technological future lies in constant innovation to discover new ways to continuously benefit society – enhancing life for the benefit of all.

In the spirit of innovation, a team of five students from Taylor's University (Team U34) embarked on a quest to innovate game-changing ideas for the industry, resulting in the development of the "Bismuth-PETG filament" prototype for 3D printing of radiation shields.

Consisting of undergraduates from the university's School of Medicine and School of Engineering, the Taylor's team developed the prototype as a continuation of an engineering final year project (FYP) and collaborated to include medical aspects that would benefit the healthcare field.

Team U34 won first place and took home the S$8,000 prize for its polymer radiation shield prototype.

The team also won the gold medal and S$8,000 prize for their prototype's entry in the 2021 inter-university Engineering Innovation Challenge jointly organised by Institution of Engineers Singapore (IES) and Singapore's Ministry of Education.

"Bismuth (Bi) and polyethylene terephthalate glycol (PETG) were chosen to form a Bi-based polymer composite, which can be used to 3D print customised radiation shields that suit individual needs.

"Conventional radiation shields used in radiological departments consist of lead-based protective equipment to protect healthcare workers from excessive exposure to ionising radiation," explained Bachelor of Medicine, Bachelor of Surgery (MBBS) student Shannen Kay Chan, 21.

The team researched on the effectiveness and drawbacks of using lead-based products as a radiation shield compared to the polymer prototype developed during the course of the challenge, and tested its efficacy at a hospital.

“Despite its effectiveness, lead-based material is toxic and non-environmental friendly. Furthermore, lead-based personal protective garment is heavy and may add to musculoskeletal burden to the personnel after long-term use. We found that the Bismuth-PETG material was non-toxic, inexpensive, and easily customisable for use in the healthcare industry,” Chan shared.

Multidisciplinary education is embedded within the Taylor’sphere ecosystem at Taylor’s University, where students are nurtured based on three intelligences of intellect, practical wisdom and craft.

Supported by world-class facilities, hands-on experiences, and a network of expert academics, Taylor’sphere is designed to ensure high-calibre graduates that are ready for the industry.

One of the team’s supervisors and medical physicist at the School of Medicine, Prof Dr Yeong Chai Hong aims for her students to practically apply what they learnt in their studies and described them as highly committed, innovative and willing to take on challenges outside their field.

“Initially, we did not aim to win the competition but through collaboration and communication with experts from other disciplines, our students could achieve much more together than what they could individually.

“In multidisciplinary collaborations, we can understand each other's needs, integrate knowledge of different fields, and fill the gaps to produce a more rounded product/service,” she said.

Chan revealed her main challenge as a medical student when working on the prototype was understanding the engineering terminology and concepts used.

“As students, multidisciplinary projects such as this are like training grounds before entering into the working world, whereby you have to collaborate with colleagues whom you are not familiar with or have a different knowledge and skills from you,” she expressed.

Fellow MBBS student and team member Alantino Raven Daniel, 23, shared: “As future leaders in healthcare, we hope to launch our product in the market and through the assistance of technology and collaboration from different fields, we will be able to provide better facilities and safer options for both patients and healthcare workers.”