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Singapore designs smart fabric as medical support for elderly

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A chain mail fabric that can stiffen on demand



Scientists from Nanyang Technological University, Singapore (NTU Singapore) and the California Institute of Technology (Caltech), United States, have developed a new type of 'chain mail' fabric that is flexible like cloth but can stiffen on demand.

The lightweight fabric is 3D-printed from nylon plastic polymers and comprises hollow octahedrons (a shape with eight equal triangular faces) that interlock with each other.

Potential applications may include bullet-proof or stab-proof vests, configurable medical support for the elderly, and protective exoskeletons for high-impact sports or workplaces like construction sites.

"With an engineered fabric that is lightweight and tuneable – easily changeable from soft to rigid – we can use it to address the needs of patients and the ageing population, for instance, to create exoskeletons that can help them stand, carry loads and assist them with their daily tasks," said Asst. Prof Wang from NTU's School of Mechanical and Aerospace Engineering, who started this research when he was a post-doc researcher at Caltech.

Moving forward, the team is looking to improve the material and fabric performance of their chain mail and to explore more methods of stiffening it, such as through magnetism, electricity or temperature.