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Study Introduces Framework to Understand New Class of Curved Lattice Materials

Framework could be used in the production of improved mechanical metamaterials found in bioengineering

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SWANSEA UNIVERSITY



A new study from Swansea University has introduced a framework to calculate the material properties of a new class of two-dimensional curved hexagonal lattices that could be used in the production of improved mechanical metamaterials found in bioengineering, stretchable electronics, impact absorption, and soft robots.

The research published in the *Composite Structures* journal, outlines how the research team from the university's Faculty of Science and Engineering pioneered the new framework of calculations, known as generalized closed-form expressions.

Dr. Shuvajit Mukherjee who coauthored the study said: "This paper represents fundamental analytical approaches to obtain the most general closed-form expressions of the equivalent material properties of 2D hexagonal lattices. This work captures a large class of geometry. Introduction of the curved beam as constituent beam members of the unit cell of the lattice enrich the design space and enhance the flexibility of the structure."

Coauthor, professor Sondipon Adhikari said: "The introduction of a curved beam element in the unit cell results in increasing the flexibility of the lattice and it also expands the design space for lattice materials. The closed-form expression can be utilized as a benchmark solution for future numerical and experimental investigations. It also can be exploited to obtain user-defined mechanical properties."

- *This press release was originally published on the [Swansea University website](#)*

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