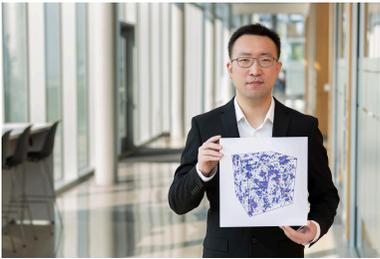


USU Engineering Professor Published in One of World's Oldest Scientific Journals | College of Engineering

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Sept. 9, 2021 — Research by a Utah State University College of Engineering professor is featured on the September cover of one of the world's oldest scientific publications.



Mechanical engineering assistant professor Haoran Wang's research is featured on the cover of one of the oldest academic journals in the world. (Matt Jensen/USU)

Assistant professor of mechanical and aerospace engineering Haoran Wang co-authored the report “[Nematic liquid crystalline elastomers are aeolotropic materials](#),” which is the cover story in the September issue of Proceedings of the Royal Society A.

Wang and his co-authors provide a theory that better explains how external stimuli, such as light, heat or electromagnetic fields activate the large deformation of liquid crystal elastomers. Liquid crystal elastomers can be used to make soft robots, which are better than traditional robots at mimicking the motion of human and animal bodies. The technology can be used in deep-ocean or space exploration and has medical applications, such as use in artificial muscles. Much of the research about these materials is related to chemistry and physics while their application for engineering is less explored.

Although liquid crystal elastomers have been researched before, the theory Wang and his co-authors put forth captures the direction-dependent behavior of the material, or the anisotropic response, which is not predicted by the conventional models. It also provides a stronger theoretical

foundation that will be critical as the development of practical uses for the material continues. To support their theories, Wang and the other researchers set up a computational model to track the movement of each atom in liquid crystal elastomers.

Wang plans on continuing to research liquid crystal elastomers by further developing the mechanical theories and computational models for the materials.

The Proceedings of the Royal Society A is a journal with a rich history that can be traced back to 1665 when the Royal Society of London published the journal Philosophical Transactions of the Royal Society. In the 1800s the society began their second publication, Proceedings of the Royal Society of London. In 1905 this journal was split into two separate publications, one of which was The Proceedings of the Royal Society A. At over 355 years old, Philosophical Transactions is considered the oldest scientific journal in the world.

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