

“Pixelated Polymers: Programming Function into Liquid Crystalline Polymer Networks and Elastomers”

Wednesday
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3:00 pm
Wu and Chen Auditorium
Levine Hall



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Abstract

Liquid crystalline materials are pervasive, enabling devices in our homes, purses, and pockets. It has been long-known that liquid crystalline materials in polymeric forms also exhibit exceptional characteristics in high performance applications, such as transparent armor or bulletproof vests. This talk will generally focus on a specific class of liquid crystalline polymeric materials referred to as liquid crystalline elastomers. These materials were predicted by de Gennes to have exceptional promise as artificial muscles, owing to the unique assimilation of anisotropy and elasticity. Subsequent experimental studies have confirmed the salient features of these materials, which, with respect to other forms of stimuli-responsive soft matter, are actuation cycles of up to 400%, as well as “soft elasticity” (stretch at minimal stress). This presentation will survey our efforts in directing the self-assembly of these materials to realize distinctive functional behavior.

Bio

Timothy J. White received his Ph.D. in Chemical and Biochemical Engineering in 2006 from the University of Iowa. Subsequently, he joined the Air Force Research Laboratory where he served as a Senior Research Engineer and Technology Advisor of the Photonic Materials Branch in the Materials and Manufacturing Directorate. In this capacity, Professor White led a large interdisciplinary team executing basic, applied, and developmental research projects. In July of 2018, he joined the faculty at the University of Colorado Boulder and leads the “Responsive and Programmable Materials” Group (<https://www.colorado.edu/research/rpmgroup/>), pursuing research generally focused on programming functional responses in organized materials. Professor White has published nearly 140 papers in peer-reviewed journals, including publications. He has been honored with the 2016 Materials Research Society “Outstanding Young Investigator” award, the 2013 SPIE Early Career Achievement award, the 2013 American Chemical Society PMSE Division Award for “Cooperative Research in Applied Polymer Science”, and the 2012 Air Force Early Career Award. Professor White has been active in the materials research community in leadership activities with the American Chemical Society (POLY), Materials Research Society, and SPIE.

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