



White named 2016 MRS Outstanding Young Investigator for innovations in photo-responsive materials

Timothy J. White, senior research engineer at the US Air Force Research Laboratory (AFRL), has been named a 2016 Materials Research Society (MRS) Outstanding Young Investigator. White was cited “for innovations in the preparation and applications of photo-responsive materials.” He will be presented with the award at the 2016 MRS Spring Meeting in Phoenix, Ariz.

White has made many contributions to the fields of photopolymerization, optics, liquid crystals, and especially the combination of these three, where he was able to fabricate polymer actuators with unprecedented responsive properties. He has led work in understanding new materials, liquid-crystal glassy and elastomeric solids, in particular how they can have large, fast, and reversible mechanical response

to light. He leads a research program that spans several disciplines—synthetic chemistry, advanced processing (especially of patterning and liquid-crystal alignment), mechanics, optics, and the linkage of these fields to theoretical physics.

White’s work is generally focused on stimuli-responsive soft materials. A primary focus of his current research is assimilating these disciplines to locally self-organize the orientation of liquid crystals to prepare polymeric sheets with complex director profiles imprinted within them. This is a step forward from the novel responses already shown in liquid-crystalline materials with homogenous orientation in that unique topographical surface features or foldable structures can be prepared by localizing the mechanical response within the elastic sheets. White’s

research activities have initiated a shift toward the preparation of arbitrary, switchable, reversible shape development potentially useful in applications in aerospace, medical devices, optics and photonics, and microfluidics.

Concurrently, White’s research has been exploring the use of mechanical effects within low-molar mass liquid-crystalline systems to enable new mechanisms in which the selective reflection inherent to the cholesteric liquid-crystal phase can be regulated with electric field or light. In this way, White and co-workers at AFRL are extending the utility of these materials beyond displays in opening up new application avenues in optics and photonics in generating addressable optical filters with control of position or bandwidth.

White earned his MS and PhD degrees in chemical and biochemical engineering from the University of Iowa. He has received the 2012 Air Force Early Career Award, the 2013 American Chemical Society PMSE Division Award, and the 2013 SPIE Early Career Achievement Award. His research currently focuses on a range of topics relating to polymers, liquid crystals, and polymer/liquid-crystal composites with specific emphasis on the development of stimuli-responsive materials for applications in optics, photonics, and flow control.

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