The William G. Lowrie Department of Chemical and Biomolecular Engineering

Cordially invites you to attend a seminar on

**Using Light to Make and Control Advanced Soft Materials**

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**Abstract**

Compared to other stimuli, light provides a powerful means to control chemical processes because it can be patterned in both time and space with high specificity. In this talk, novel methods to both manipulate soft material behavior and to enable fabrication of polymeric materials with light will be presented. In the first part of the talk, a novel method to control reversible photoactuation of polymer sheets into shapes with specific curvature will be presented. We demonstrate that by controlling the spatial absorbance of gold nanoparticles within liquid crystal elastomer nanocomposites, arbitrary photothermal profiles can be prescribed. Upon illumination with visible light, these materials buckle out of plane into complex shapes. In combination with theory and finite-element models, we demonstrate the inverse design of these materials for full shape control. In the second part of the talk, novel photopolymerization platforms towards mechanically robust and responsive materials will be discussed. We show that by incorporating dynamic covalent bonds within semi-crystalline photopolymers, novel materials that can be reconfigured over their lifetime are realized. Finally, incorporation of these materials with DLP-based 3D printing is shown to enable the fabrication of high-performance constructs that are amenable to full recycling and repolymerization.

Please click the link below to join the webinar:

<https://osu.zoom.us/j/99363702903?pwd=OVZuMjdPZkVKbDR2ZGQwWm8zS1BSUT09>

Password: 641155

**Bio**

Dr. Alexa S. Kuenstler is currently an Arnold O. Beckman Fellow in the Chemical Sciences in the lab of Prof. Christopher N. Bowman at the University of Colorado Boulder. At CU, Alexa is working to develop new functional material systems using dynamic covalent chemistry and additive manufacturing. Previously, Alexa received a BS from the University of Rochester and subsequently completed a PhD in Polymer Science and Engineering at the University of Massachusetts Amherst under the guidance of Prof. Ryan C. Hayward. At UMass, Alexa devised new light-active materials capable of on-demand shape morphing and actuation using a variety of photothermal and photochemical moieties. This thesis work was recognized by the American Physical Society’s Division of Polymer Physics as a finalist for the Padden Award, the Division’s highest graduate-level honor

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**Alexa Kuenstler**

*Postdoctoral Research Associate*

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**Tuesday, February 8, 11:30 AM**

**Virtual Webinar**