

LSU College of Engineering

Chemical Engineering

LECTURE SERIES



Dr. Brent Sumerlin

George B. Butler Professor
University of Florida
Tuesday, December 3
10:30-11:30 pm
1124 Patrick Taylor Hall

Photoactivation for polymerization, depolymerization, and additive manufacturing

Relying solely on mild ultraviolet or visible irradiation of thiocarbonylthio compounds, a new avenue to polymer-protein conjugates, semi-telechelic polymers, and well-defined ultra-high molecular weight (UHMW) block polymers has been developed. This photomediated polymerization approach reaches number-average molecular weights in excess of 8.00×10^6 g/mol with degrees of polymerization above 85,000, making these, to our knowledge, the highest molecular weight polymers ever achieved via a living polymerization. Ironically, the same chemistry that enables the synthesis of these polymers can also be harnessed to facilitate reversion to monomer (i.e., depolymerization), suggesting programmed polymer design can enable a low-energy approach to polymer life-cycle circularity. The utility of these techniques is further demonstrated in the area of soft-matter additive manufacturing.