

Fall 2021 Department of Chemical and Biological Engineering Seminar Series  
H. M. Comer 1026  
11:00-11:50AM

**October 7, 2021**

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*Liquid Crystals and the Color of Chirality*

*Abstract:* Nature continues to be a source of inspiration for designing new functional materials. For example, through 3D photonic nanostructures that are elegantly designed at multiple length scales, living materials can create iridescent colors without using dyes or pigments but through light interference. Among these nanostructures is the helicoidal (chiral) arrangement of nanofibers of chitin or cellulose, which is known as the origin of vivid colors in beetles and Pollia berries. I will present our recent efforts in the design of 3D photonic architectures based on chiral liquid crystals. We exploit microfluidic and 3D printing technologies to study the effect of geometrical confinement, curvature, surface property, and flow-induced alignment on the organization, phase behavior, and optical response of the chiral molecules. This fundamental understanding aids the design of hierarchies of ordered chiral nanostructures with tuned disorder domains, offering unprecedented control over structural-color effects. These 3D engineered chiral photonic materials are of interest for current and emerging applications ranging from optical sensors, smart fabrics, and wearable robotics.

*Bio:* Dr. Sanaz Sadati is an Assistant Professor in the Department of Chemical Engineering at the University of South Carolina since 2019. She completed her doctoral studies in Materials Science and Polymer Physics at the ETH Zürich in Switzerland, where she studied the complex flow of polymer melts under the mentorship of Prof. Hans Christian Oettinger. Dr. Sadati received two Swiss National Science Foundation Postdoctoral Fellowship awards to conduct research at Harvard and the University of Chicago, where she worked with Prof. Juan de Pablo. She received her BS and MS degrees in Polymer Engineering from Amirkabir University of Technology.