

MATERIALS AND BIOMATERIALS SCIENCE AND ENGINEERING**From Surface Forces to Functional Materials:
Exploring Soft Matter in Nanoscale Confinement**

ABSTRACT: The behavior of complex fluids undergoes a profound transformation when confined to nanoscale geometries. A fundamental comprehension of the emergent forces and dynamics under such extreme confinement is paramount for advancing applications ranging from catalysis and lubrication to energy storage and the fabrication of novel soft materials. This presentation will elucidate how varying degrees of nanoconfinement influence the structural organization and interfacial properties of diverse soft matter systems, encompassing both synthetic and biological materials. The first part of the presentation will focus on the nanoconfinement-induced intermolecular interactions of ionic liquids, detailing their intricate molecular orientation, organization, and assembly at interfaces, and the resulting impact on their rheological properties. The second part will shift to biological macromolecules, exploring the mechanisms that govern the self-assembly of silk fibroin proteins into hierarchical structures across multiple length scales. The presentation will conclude with a forward-looking perspective on how these fundamental insights can inform the rational design of these two critical material classes with precisely tailored interfacial properties, ultimately enabling the creation of superior functional materials and devices.

BIOGRAPHY: Dr. Younjin Min is an Associate Professor at the University of California, Riverside, holding joint appointments in the Department of Chemical and Environmental Engineering and the Materials Science and Engineering Program. Before joining UC Riverside in 2019, she was a faculty member at the University of Akron. Her research group investigates a broad range of topics, including intermolecular interactions, adhesion, friction, colloidal science, thin-film fabrication, polymer synthesis, and the application of biomaterials for biomedical purposes. Dr. Min earned her Ph.D. in Chemical Engineering from the University of California, Santa Barbara, and she was a postdoctoral researcher at MIT. She has received numerous prestigious awards, such as the Polymer Processing Society (PPS) Early Career Award, the American Chemical Society Petroleum Research Fund (ACS-PRF) Doctoral New Investigator Award, the James M. Lee Memorial Award, and the Schlinger Scholarship for Excellence in Chemical Engineering Research.

**Younjin Min**University of California,
Riverside**Refreshments: 1:45pm, Seminar: 2-3pm**