

# SEMINAR

School of Biological and Health Systems Engineering

## A Journey into the Structural Features of Intrinsically Disordered Proteins

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**9:00 a.m. - 9:50 a.m., SCOB 210**

**Faculty Host: Xiaojun Tian**



**Abstract** Intrinsically disordered proteins (IDPs) play crucial roles in various intracellular processes, including signaling and regulation, the formation of membraneless organelles, and even the development of pathological aggregates. However, their lack of traditional, well-defined three-dimensional structures poses significant challenges for modeling these proteins. In this talk, I will share our explorations into the structural features of IDPs across three different scenarios. First, I will discuss the dominant nonspecific interactions and the successful application of homopolymer models in understanding the liquid-liquid phase separation of IDPs. Second, I will explore the specific interactions that occur within disordered domains involved in transcription. Finally, I will present our findings on how the interplay between nonspecific and specific interactions drives liquid-liquid phase separation and aggregation.

**Biosketch** Dr. Zheng earned his Ph.D. in Chemistry from Rice University in 2013, followed by a three-year postdoctoral research fellowship at the National Institutes of Health. In 2017, he joined the faculty at ASU Polytechnic, where he established an independent computational chemistry lab. Dr. Zheng's primary research focus is on uncovering the underlying principles governing intrinsically disordered proteins. His lab has made various contributions to the development of computational methods for studying these proteins, utilizing a diverse array of models ranging from polymer and coarse-grained to all-atom simulations. His research has been supported by multiple grants from the NSF and NIH.