Title: Sequence-dependent phase separation and aggregation in model proteins

Abstract:

Biomolecular phase separation has emerged as an organizing principle underlying subcellular organization and controlling many processes in living systems. The time and length scales relevant for phase transitions of biomolecules far exceed those accessible thought atomistic simulations, so coarse-grained, physics-oriented models are appropriate. A specific principle of molecular organization turns out to be competition between macroscopic phase separation and formation of finite-size aggregates, which is also relevant for micelle formation by surfactants. Early work [1] identified significant changes in the observed phase separation behavior with minor changes in sequence. A subsequent study [2] quantified these differences and obtained an approximate order parameter for determining the type of behavior observed and suggested that phase separation dominates at the limit of long, disordered chains. The existence of systems with both types of behavior was reported in [3]. Recent experimental studies for sequence-controlled synthetic polymers will also be discussed.

References:

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3. A. Z. Panagiotopoulos, "Phase Separation and Aggregation in Multiblock Chains," arXiv preprint arXiv:2302.07169 (2023), https://doi.org/10.48550/arXiv.2302.07169.