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Research Keywords

Biophysics, Assembly of biomacromolecules, Condensation of biomolecules

Academic Career

B.E., 2007, Tsinghua University; Ph.D., 2012, University of California, Santa Barbara (advisor: Jacob Israelachvili); Postdoc, 2013-2014, Caltech (advisor: James Heath); Postdoc, 2014-2017, University of Chicago (advisor: Matthew Tirrell); Assistant Professor, 2017-2023, Nanyang Technological University Singapore; Associate Professor (Tenured), 2023-2024, Nanyang Technological University Singapore; Associate Professor (Tenured), 2024-present, Tsinghua University

Selected Publications

Extreme pH Tolerance in Peptide Coacervates Mediated by Multivalent Hydrogen Bonds for Enzyme-Triggered Oral Drug Delivery. Chen, S., et al. *J. Am. Chem. Soc.*, 147(11), 9704-9715 (2025);

Solvent gradient mediates the self-assembly of insect cuticle protein into nanocages. Li, H., et al. *Nat. Nanotechnol.*, 19(8), 1171-1180 (2024)

Hydrogen-bonds mediate liquid-liquid phase separation of mussel derived adhesive peptides. Guo, Q., et al. *Nat. Commun.*, 13, 5771 (2022)

Liquid-liquid phase separation of the green mussel adhesive protein pvfp-5 is regulated by the post-translated dopa amino acid. Deepankumar, K., et al. *Adv. Mater.*, 34(25), 2103828 (2022)

Bio-inspired functional coacervates. Chen, S., et al. *Aggregate*, 3(6), e293 (2022); Multivalent counterions diminish the lubricity of polyelectrolyte brushes. Yu, J., et al. *Science*, 360(6396), 1434-1438 (2018)

Multivalent ions induce lateral structural inhomogeneities in polyelectrolyte brushes. Yu, J., et al. *Sci. Adv.*, 3(12), eaao1497 (2017)

Why My Lab?

My lab can offer...

My lab focus on the intersection of polymer physical chemistry and biomaterials, with an emphasis on integrating polymer physics principles into the study of biomacromolecules. We work on the self-assembly and phase separation of biomacromolecules, and the investigation of their structural and functional properties. Recently, our research has made significant strides in peptide-based material design and self-assembly, liquid-liquid phase separation analysis, and the development of bio-inspired adhesive materials. We also perform Molecular Dynamics simulation on biomacromolecules.