



MIT ChemE

Spring 2025 Seminars

Biopolymer Physics in Health and Sustainability



Pamela C. Cai '16

Postdoctoral Fellow
University of Chicago

Thursday, February 6, 2025 - 4:15pm, 66-110

Biopolymers, or naturally derived polymers, are crucial components of life, making up our genetic code, giving structure to living matter, and supporting disease progression. However, their physical behavior and how that can be leveraged for therapeutic gain is not well-characterized. Biopolymers from natural sources, such as seaweed, are also poised to be sustainable solutions to our plastic pollution problem, which grows exponentially every year. With over 400 million tons of plastic waste produced annually, we urgently need replacement materials with recyclability and biodegradability. In my talk, I will introduce an analytical theory that uses molecular-level parameters to predict the rheological behavior of both naturally occurring biopolymer networks and engineered biopolymer networks for applications such as tissue engineering or drug delivery. In a separate project, I reimagine plastics by using biopolymer-based materials with both recyclability and biodegradability while also exhibiting similar physical properties as conventional plastics. Together, these two studies highlight the importance of understanding the physics of biopolymer interactions to gain both fundamental insight and engineering principles for applications in health and sustainability.

kbriana@mit.edu

cheme.mit.edu/events/