

October 11, 2023 | Behrakis 010 | 12:00 PM

Hosted by the Department of Chemical Engineering

**Distinguished Seminar Speaker**  
***Going Green to Improve Materials:  
From Biomedical Hydrogels to Water Separation Membranes***

**Prof. Jessica Schiffman**

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**Abstract:** In this presentation, we explore the benefits of developing greener technologies by re-engineering materials using bioinspired or green chemistries. By eliminating or reducing toxic solvents, we can improve medical devices, water purification membranes, and wearable electronics. We discuss ongoing research examples, starting with investigating polymer coatings' effects on bacterial adhesion under quiescent conditions. Understanding structure-property relationships enables us to control bacterial adhesion, potentially reducing the need for high concentrations of antibiotics to combat microbial biofilms. Additionally, we demonstrate how water and salt are used to manufacture ultrafiltration membranes in our work on engineering greener water separation membranes. The membranes are formed through the electrostatic complexation between oppositely-charged polymers, leveraging salt-driven plasticization to enable membrane formation and create robust textiles. Our findings showcase the potential of green engineering to create multifunctional materials that positively impact human health and the environment. By considering the fundamental properties of materials and their interactions, we can develop more sustainable technologies for various applications, advancing the field of green chemistry and materials science.

**Biography:** Jessica D. Schiffman is a Full Professor and the Gary R. Lapidus Professor in chemical engineering at the University of Massachusetts Amherst. She also directs the undergraduate materials engineering certificate and holds a faculty position in the materials science and engineering graduate program. Schiffman obtained her B.S. in Ceramic and Materials Engineering from Rutgers University, M.Eng. in Materials Science and Engineering, and Ph.D. in Materials Science and Engineering from Drexel University. Her research group focuses on polymer-based materials addressing challenges in human health, the environment, and industry. Schiffman received multiple research awards, including the ACS Applied Materials & Interfaces Young Investigator Award. She was recognized as an Emerging Investigator by Biomaterials Science and an Influential Researcher by Industrial & Engineering Chemistry Research. Schiffman is also dedicated to mentoring and teaching, receiving the Distinguished Graduate Mentor Award, ADVANCE Faculty Mentor Award, and Outstanding Teaching Award.