



Rensselaer

The HOWARD P. ISERMANN
DEPARTMENT OF CHEMICAL AND
BIOLOGICAL ENGINEERING

CBE Seminar Series – Fall 2022

Dr. Gila Stein

Associate Head, Director of Graduate Studies, and Prados Professor
Department of Chemical and Biomolecular Engineering
The University of Tennessee, Knoxville

Seminar: Wednesday, November 2, 2022
9:30 a.m. (Ricketts 203)

“Engineering Surface-Active Bottlebrush Polymer Additives for Commodity Polymers”

Abstract:

Surface-active polymeric additives can tailor the surface properties of commodity polymers, thereby broadening their applications. In this talk, I will show that highly branched “bottlebrush” polymer additives are strongly attracted to surfaces. This surface attraction emerges from an interplay of enthalpic and entropic contributions that are controlled by the polymer chemistries and architectures, respectively. Surface attraction is observed under surprisingly broad conditions, including systems where enthalpic interactions between the bottlebrush polymer and commodity polymer are attractive, repulsive, or approximately athermal, as long as the average chain length of the commodity polymer is much longer than that of the “branches” on the bottlebrush polymer. Uniquely, the bottlebrush additive can be attracted to an air surface even when it incorporates chemistries that are “high energy” relative to the host polymer. We have leveraged these attributes to engineer bottlebrush polymer additives for polymer coatings that tailor surface wettability, enhance adherence at substrates, and improve fouling resistance in marine environments.

Biography:



Dr. Gila Stein received her BS in Chemical Engineering from Drexel University in 2002 and obtained a PhD in Chemical Engineering from the University of California, Santa Barbara, in 2006. She then joined the National Institute of Standards and Technology, where she was a National Research Council Postdoctoral Fellow in the Center for Nanoscale Science and Technology from 2007-2008. Gila joined the University of Houston as an Assistant Professor of Chemical and Biomolecular Engineering in 2009, received the Henley Professorship in 2012, and was promoted to Associate Professor in 2015. She joined the University of Tennessee as an Associate Professor of Chemical and Biomolecular Engineering in 2016, where she holds the Prados Professorship, and was promoted to Professor in 2020. Gila was appointed Associate Department Head and Director of Graduate Studies in August of 2022. Gila has served as an Associate Editor of *Macromolecules* since 2021.

Refreshments will be available at 9:00 a.m. in the Ricketts Coonley Lounge (RI 120).

For more information, please contact Lisa Martin (swishl@rpi.edu)