

The Spring 2022 Seminar Series in Chemical Engineering
Presents:

**Sphericity and Symmetry Breaking in
Asymmetric Diblock Copolymer Melts**

March 10, 2022, 12:45-1:45 pm Chafee Hall, Room 273
Zoom Simulcast: <https://uri-edu.zoom.us/j/93044052368>



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Abstract: Block polymers have captured the interest of scientists and engineers for more than half a century. In general, the phase behavior of A-B diblock copolymers, the simplest category of such self-assembling macromolecules, has been accepted as thoroughly understood. Experiments and theory conducted over the past decade have revealed remarkable phase complexity in the limit of asymmetric compositions, where the A block is considerably shorter than the B block, resulting in the formation of nanoscale micelles. Small-angle x-ray scattering (SAXS) measurements have revealed the formation of various low symmetry Frank-Kasper phases and a dodecagonal quasicrystal, reflecting fascinating analogies with the phase behavior of metal alloys. These findings will be discussed in the context of a competition between the tendency to form spherical particles and the constraints associated with filling space at uniform density.

Bio: **Frank S. Bates** is a Regents Professor and a member of the Chemical Engineering and Materials Science department at the University of Minnesota. He received a B.S. in Mathematics from SUNY Albany and M.S. and Sc.D. degrees in Chemical Engineering from MIT. Between 1982 and 1989 Bates was a member of the technical staff at AT&T Bell Laboratories then joined the University of Minnesota where he served as department Head from 1999 to 2014. He was named a Regents Professor in 2007. Bates conducts research on a range of topics related to polymers, including the thermodynamics, dynamics, structure, and properties of block polymers, polymer blends and solutions. He is a member of the US National Academy of Engineering and the National Academy of Sciences, the American Academy of Arts and Sciences, and the National Academy of Inventors.

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