

Department of Mathematics, Temple University

Colloquium

L. Pamela Cook

Unidel Professor of Mathematics,

University of Delaware



will speak on

Modeling and simulation of the flow of transiently networked (entangled) fluids

ABSTRACT: In highly concentrated surfactant solutions the surfactant molecules self-assemble into long flexible "wormy" structures. Properties of these wormlike micellar solutions make them ideal for use in oil recovery and in body care products (shampoo). In solution the "worms" entangle, but also continuously break and reform, thus earning the name 'living polymers'. In flow these liquids exhibit spatially inhomogeneous shear-banding structures. In this talk a rheological equation of state that is capable of describing these fluids is described. The resultant governing equations consist of a coupled nonlinear partial differential equation system describing conservation of mass, of momentum, and the (reaction-diffusion) constitutive equation. The model is interrogated under various imposed flow conditions and model predictions are contrasted with experimental results. As time permits, generalizations of the model to capture behaviors under changing concentration or temperature will be discussed.

Monday, April 21, 2014, at 4:00pm.

Coffee, tea, and refreshments from 3:30pm Room 617,
Wachman Hall