The phase behavior of surfactant-oil-water (SOW) systems plays a significant role on the performance of numerous products. From laundry detergents to personal hygiene and cosmetic products, to drug and nutrient delivery formulations, to surfactant-based enhanced oil recovery and remediation processes. This presentation will begin with a brief introduction of the hydrophilic-lipophilic-difference + net-average curvature (HLD-NAC) framework that predicts the phase behavior of SOW systems, along with its advantages and limitations. A new molecular thermodynamic model – the Integrated Free Energy Model (IFEM) - will also be introduced and compared against the HLD-NAC framework. We will briefly discuss how the molecular interactions in IFEM help explain, and predict, complex empirical parameters such as the equivalent alkane carbon number (EACN) that quantifies the hydrophobicity of solvents, drugs and other hydrophobic species. We will discuss why a molecule like benzene (EACN~0) is less hydrophobic than cyclohexane (EACN~3), and normal hexane (EACN=3). We will briefly describe how HLD-NAC + IFEM can be used to predict the properties of surfactants formulations: phase transitions, solubilisation capacity, interfacial tension, density, the formation and stability of emulsions around the phase inversion point, and predict elements of ternary phase diagrams. Selected examples on the use of the HLD-NAC framework in the design of remediation process and drug delivery formulations will be discussed.

THURSDAY, JANUARY 22, 2015
COOKIES AND COFFEE -- 1:45 P.M.
SEMINAR -- 2:00 P.M.
SARKEYS ENERGY CENTER, ROOM M-204

THIS IS A REQUIRED SEMINAR FOR CHE 5971

Accommodations on the basis of disability are available by contacting the office.