Chicago Section IFT
the First Section

The 50th Fred W. Tanner Lecture

When: Monday, May 14, 2012, 5:00 PM
Where: Intercontinental Hotel, Chicago O'Hare

Presentation: "The Science of Ice Cream: Controlling the Fat"

This year's Tanner Lecture award winner: **Dr. Richard W. Hartel**

Dr. Hartel is the Winder Bascom Professor of Food Engineering at the University of Wisconsin, Madison. He is internationally known and recognized as an authority on the phase transition of food systems including candy, ice cream, dairy fats, and chocolate. His research has focused on controlling phase transitions in food systems through the application of computer modeling and phase/state transitions.

Much of his research has been adopted by the industry from controlling sugar crystallization in hard candy to controlling blooming in chocolate and dairy fats. Dr Hartel has published extensively in referred journals and authored numerous book chapters.

In addition, he has edited 13 books and holds 3 US patents. Dr. Hartel has received numerous prestigious awards for his research from IFT and the American Oil Chemists Society and is a Fellow in both societies as well as editor in chief of JAM Oil Chem. Soc. He also serves on the editorial boards of numerous food journals.

Presentation Abstract: Besides contributing to the creaminess, the fat phase is an important element in the physical and sensory properties of ice cream. Through formulation and processing, ice cream emulsions can destabilize. Fat destabilization in ice cream may be defined as the formation of partially coalesced clusters of fat globules. Higher fat destabilization means more and larger clusters of partially coalesced fat that can lead to buttering. Thus, controlling the extent and nature of destabilization is critical to appearance and melt down rate.

The prevailing theory for partial coalescence is that fat crystals at the oil water interface penetrate between the fat globules leading to formation of clusters. However, the exact mechanism(s) of partial coalescence remains elusive, in part due to the inability to observe two globules as they interact. Recent studies using a micro manipulator microscope technique have shown that fat crystals extending through the fat globule interface into the aqueous phase are not needed for partial coalescence.

In model systems particle at the interface (Pickering emulsions) or within the interior of the droplet exhibited a range of behavior from either no coalescence to complete coalescence. Between these were conditions where coalescence was partially arrested by the solid phase, whether at the surface or interior. These new findings will be discussed in the context of partial coalescence of ice cream.