

The Science of Ice Cream Making: Scientific Studies on the Processing and Microstructure of UConn Ice cream

Mentors: Dr. Anson Ma, Assistant Professor, Institute of Materials Science & Department of Chemical Materials, and Biomolecular Engineering; Sahil Vora, Graduate Student; Meaghan Sullivan, David Troiani, Leonora Yokubinas, Undergraduate Research Assistants.

My research team is interested in understanding the microstructure, flow behavior, and processing of complex fluids. Many fluids that we counter in daily life belong to the class of “complex fluids”; e.g., shampoo, mayonnaise, ketchup. Understanding the processing of complex fluids is important because processing conditions define the microstructure and properties of the final product. For instance, in the production of ice cream, the smoothness of the ice cream depends on the ice crystal size, which is affected by the composition, dispersion, and freezing of the ice cream mix. Smooth ice cream generally requires an ice crystal size smaller than 50 μm . During the transportation and storage of ice cream, there is inevitable variation in temperature, known as heat shock. One important aspect is being able to protect the ice cream from heat shock, which may lead to the migration and subsequent merging of ice crystals. We are currently collaborating with the UConn Dairy Bar to investigate how the composition of ice cream mixes and processing conditions during mixing and freezing affect the microstructure and hence the sensory properties of ice cream. By joining our team, you will be given the opportunity to visit the Dairy Bar with on-site production facilities and learn first-hand about the production of ice cream. You will also learn about different experimental techniques to characterize the flow properties of ice cream mixes and the microstructure of ice cream.