



The Australian Society of Rheology is presenting a national series of lectures, which is open to anyone interested in the flow and deformation of matter. The next event in the series will be held online.

Calendar details

Date:	Tuesday, April 5, 2022
Time:	9:00 to 10:30 AM (Melbourne, Australia)
Event Registration Link:	https://www.eventbrite.com.au/e/australian-society-of-rheology-seminar-5-april-2022-registration-297472958627

Invited lecture

Associate Professor Elke Scholten

(Physics and Physical Chemistry of Foods, Wageningen University, Netherlands)

Presentation Title: Effect of droplet-droplet interaction strength on the rheological properties of emulsions

Abstract: Food structure design is an important aspect to create foods with tailored functionality, such as their rheological behavior and subsequent sensory perception. One way to change these properties is by controlling the interactions between dispersed oil droplets to form so-called attractive emulsions, which alters the droplet distribution within the system. The type and strength of the droplet-droplet interactions have a great influence on the rheological properties.

In this presentation, I will discuss different ways to control droplet-droplet interaction strength using different type of interactions. In more dilute conditions, the effect of droplet cluster properties on rheological properties of emulsions will be discussed and briefly linked to sensory perception. In more concentrated emulsions, such attractive emulsions will be compared to repulsive emulsions. The interactions strength shows a clear effect on the rheological properties, both below and above the maximal packing fraction. Depending on the strength of the interactions, we find either a one-step continuous yielding or a two-step yielding behavior using both small (SAOS) and large (LAOS) amplitude oscillatory shear measurements, as a result of the interplay between structure breakdown and build-up at different distinct time scales. This behavior can be assigned to different events, such as cage breaking, jamming events, network densification, etc. Based on the differences in the rheological characteristics, we propose a more differentiated categorisation of emulsions based on their droplet interaction strength, including, for example, weak attractive glasses and gelled glasses.



Speaker's biography



Dr. Elke Scholten is an Associate Professor in the group of Physics and Physical Chemistry of Foods at Wageningen University in the Netherlands. She has a background in Physical Chemistry, and obtained her MSc degree from Utrecht University, and a PhD degree from Wageningen University.

Her research group focusses on food structuring approaches with a variety of food grade materials to change characteristics in a variety of foods systems, including gels, emulsion-filled gels and emulsions using dairy and plant-based ingredients. She aims to unravel relationships between the structure of food systems to the mechanical properties, lubrication properties and sensory perception of such foods using a combination of rheology, tribology, and microscopy techniques. This knowledge is used to provide new guidelines for the reformulation of foods, such as fat reduction, ingredient flexibility, and the design of plant-based foods.

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