



## Calendar details

Date:	<b>Tuesday, 3 August 2021</b>
Time:	<b>5:00 PM to 6:00 PM (Melbourne, Australia)</b>
Event Registration Link:	<a href="https://www.eventbrite.com.au/e/australian-society-of-rheology-industry-lecture-3-august-2021-registration-162984361613">https://www.eventbrite.com.au/e/australian-society-of-rheology-industry-lecture-3-august-2021-registration-162984361613</a>

## Invited lecture

**Speaker: Prof. Phil Threlfall-Holmes** (TH Collaborative Innovation)

**Presentation Title: Droplet size distribution control in formulated product sprays**

### Abstract

Formulated products are sprayed in a whole host of applications: from spray drying in powder products manufacture, to painting, agrochemicals, ink-jet printing and consumer personal care products. However, the spray is typically only an intermediate process, a means to an end rather than the beneficial end-use that makes the product valuable. Formulated products often (even typically) have a rich multiphase microstructure - which we experience as exciting rheology - either as an unavoidable consequence of the combination of ingredients in the formulation, or as a necessary and intentional design for product performance in end application. So we often have to work with the constraint of rheology that is not ideal for spray performance. Also, historically most sprays research funding has been for automotive diesel injectors and aerospace kerosene atomisers. It's only in recent years that general theory of spray performance of non-Newtonian fluids has been published, and application to real industrial fluids still requires experience and experiment. A recurrent commercial issue is the desire to control, not just average droplet size, but the width of the droplet size distribution – and especially, to reduce the amount of the smallest droplets. In some cases it is possible to reduce the fines fraction in a spray, by the addition of trace amounts of a polymer to impart very weak non-linear visco-elasticity to the fluid. However, if the polymer is overdosed, the spray size distribution will get wider, not narrower as intended. So to find the correct dose, we need to measure very weak non-linear visco-elasticity. This is very challenging. I will talk about the use in an industrial lab setting, of the handful of experimental techniques for doing so, especially the Rayleigh-Ohnesorge Jet Extensional Rheometer (ROJER).

### Speaker's biography



Prof. Phil Threlfall-Holmes founded TH Collaborative Innovation (THCi) in 2014 as an independent consultancy to help people in industry solve hard spray science problems. The majority of the business is in new product development for multinational companies; clients also include small businesses and universities. He helps companies integrate the mechanical engineering of spray devices and the process engineering of their application, with the rheology and formulation physics of the sprayed fluid. Before THCi, he spent 18 years in ICI and AkzoNobel in process engineering front-end design, plant support and R&D roles. He is currently a Visiting Professor in Mechanical Engineering at The University of Leeds.

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