# Oil-in-water microfluidics on the colloidal scale: new routes to self-assembly and the glass transition

M. Meissner[1*], A.M. Seddon[1,2], J. E. Eggers[3] and C. Patrick Royall[1,4]

*[1]H. H. Wills Physics Laboratory, University of Bristol, Tyndall Avenue, Bristol, UK*
*[2]Bristol Centre for Functional Nanomaterials, University of Bristol, Tyndall Avenue, Bristol, UK*
*[3]School of Mathematics, University of Bristol, University Walk, Bristol, UK*
*[4]School of Chemistry, University of Bristol, Bristol, UK*

**m.meissner@bristol.ac.uk*

Microfluidic emulsification is a field largely focused on water-in-oil systems due their applications in lab on a chip technology. Current work on the inverse oil-in-water systems largely concerns droplets with sizes on the order of 10s of micrometres, large enough that Brownian motion is negligible [1,2]. Reducing the length scale to the colloidal range opens a wide range of new possibilities. In particular, emulsion droplets form exciting colloidal model systems, as they have negligible friction at their surfaces, with intriguing consequences for the jamming-glass transient crossover [3], and absorption of, for example, lipids enables new and exciting directions in self-assembly[4].

Here we introduce a new methodology to produce a colloidal model system of fluorescently labelled emulsion droplets suitable for particle resolved studies with confocal microscopy [4]. To this end, we demonstrate a reliable method of generating a wide range of oil in water emulsions at the micron length scale. We have developed Norland Optical Adhesive (NOA) flow focussing devices inspired by [6], the excellent solvent compatibility and surface properties of NOA allowing generation of droplets of a variety of oils with polydispersity as low as 3%. The structures we analyse in 3d with confocal microscopy and reveal a new *thermal* system to tackle the crossover between jamming and the glass transition [3].

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