Abstract:

The modelling and simulation of “simple” suspensions of Brownian and non-Brownian particles dispersed in Newtonian media has been studied extensively in the last decades and several rheological responses can now be reproduced numerically and understood.

Much less investigated is the case of “complex” suspensions of particles interacting with non-Newtonian media. In this talk, I will present recent advances in this field using particle-based models such as Smoothed Particle Hydrodynamics or its stochastic version, Smoothed Dissipative Particle Dynamics.

As an application of the present simulation framework, two particulate systems will be considered and their rheology discussed in relation to experimental findings: 
1) shear-thinning of a non-colloidal suspension interacting with a 'nominally-Newtonian' fluid.
2) shear-thickening of a non-colloidal suspension interacting with a highly elastic polymeric matrix.