Pickering emulsions – which are emulsions solely stabilized by solid particles – are particularly known to be of great importance in food, pharmaceutical, agricultural and personal care formulations. Therefore, strategies for the design of stable particle-stabilized emulsions, control over droplet size and surface morphology are fundamentally and technologically important. Solid-stabilized emulsions have also been used to engineer new materials such as colloidosomes for drug delivery, to synthesize surface anisotropic particles, and for the production of porous metals and ceramic materials. In this talk, stabilization of emulsions using oppositely charged particles (OCPs) will be discussed. In first part of the talk, we will discuss the flexibility offered by OCPs in i) engineering surface morphology (texture) of droplets ii) controlling the size of the emulsion drops iii) designing chemically heterogeneous droplet surfaces.

Figure 1: Microscopy image showing the surface morphology of emulsion drops stabilized by a mixture of PS particles of sizes - 2.2 μm (+) and 9 μm (-).

The second part of the talk will be dedicated to the provide insights into the mechanism of formation of emulsions when OCPs are used. One of the key finding of using OCPs is the ability to tuned droplet size by using OCPs at different mixing ratio. A modified limited coalescence model that captures the variation of droplet size with mixing ratio will be discussed in detail.