Watching ink dry: how to control deposition from drying droplets?

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In a digital age, inkjet printing is an attractive technology for manufacturing functional surfaces and materials. However, to realise the potential of droplet technology we must control the distribution of the active materials that are deposited when the droplet dries. In the absence of any control technologies, the well-known coffee-ring morphology is often obtained, in which the contact line of the droplet is pinned and most of the solutes/particles in the droplet are deposited in a ring at the contact line. To avoid the coffee ring effect (CRE), we require a more detailed understanding of the surprisingly complex drying behaviour of a droplet on a surface: we need to watch ink dry! This talk will describe some of our experiments to study the evaporation of droplets on surfaces and present some strategies to obtain uniform deposits from droplets, or specified non-uniform patterns.