

**Patrick S. Doyle**

Robert T. Haslam Professor of Chemical Engineering  
Graduate Officer  
Department of Chemical Engineering, MIT

Singapore-MIT Alliance for Science and Technology (SMART)

<http://doylegroup.mit.edu>

**Title:**

Microfluidic Technologies to Manufacture Soft Matter Materials

**Abstract:**

In this talk I will describe how microfluidic technologies and various fields (light, temperature and flow) can be used to synthesize new functional soft matter materials. I will begin by introducing Flow Lithography- a new way of interfacing lithography and microfluidics to “optically stamp” complex and functional microparticles. This technique takes advantage of the unique ability to finely structure flows and chemical gradients in microfluidic devices. The process allows one to create particles with complex non-spherical shapes, chemical patterns, and loaded cargo. After describing the fundamental aspects of the process, I will describe applications of the complex particles ranging from multiplexed bioassays to anti-counterfeiting to drug delivery. I will also describe new flow-through arrays which are capable of generating large-scale particle arrangements.