

# First Latin American SCAT Summer School

Universidad Técnica Federico Santa María, Valparaíso

## An introduction to Microfluidics



One of a series of mini-courses taking place 6-12 January 2007

### Description

This course will consist of a set of lectures (approximately three/four 50 min. sessions) that will introduce the new discipline of microfluidics. This topic is concerned with fluid flowing in channels that range in size from 0.1 microns (1 micron =  $10^{-6}$ m) to 1 millimetre. At these scales, the Reynolds number is small, typically  $< 1$ , and the flow is in the laminar regime. This makes mixing, which is generally by diffusion, quite challenging. However, the flow can also be manipulated in different ways (e.g., using electric fields) opening up the possibility of pumping with no moving parts. Scaling devices down often introduces new physics and effects that need to be considered which are usually ignored in conventional devices, e.g., surfaces now play a very important role. Moreover, for gas flow, the assumptions underlying the Navier-Stokes equations begin to break down. This makes modelling gaseous transport very challenging.

### The course will broadly cover:

- ▶ Introduction to the field of microfluidics
- ▶ The view from the top (microfluidics from a macroscopic perspective)
- ▶ The view from the bottom (microfluidics from a microscopic perspective)
- ▶ Consequence of scaling down, important dimensionless parameters

### Advanced topics:

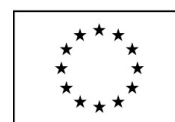
- ▶ Gas-phase flow at the micro-scale
- ▶ Mixing
- ▶ Digital microfluidics through manipulating droplets

### Lecturer:

**Dr David Emerson**, Head of the Computational Engineering Group  
Daresbury Laboratory, United Kingdom

This course will be in English.

For more information, email [info@scat-alfa.eu](mailto:info@scat-alfa.eu) or visit [www.scat-alfa.eu](http://www.scat-alfa.eu)



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