MONASH University
Engineering

Final Year Project 2014
12 Credit Points / 1 person

Biodiagnostics: Particle Sorting

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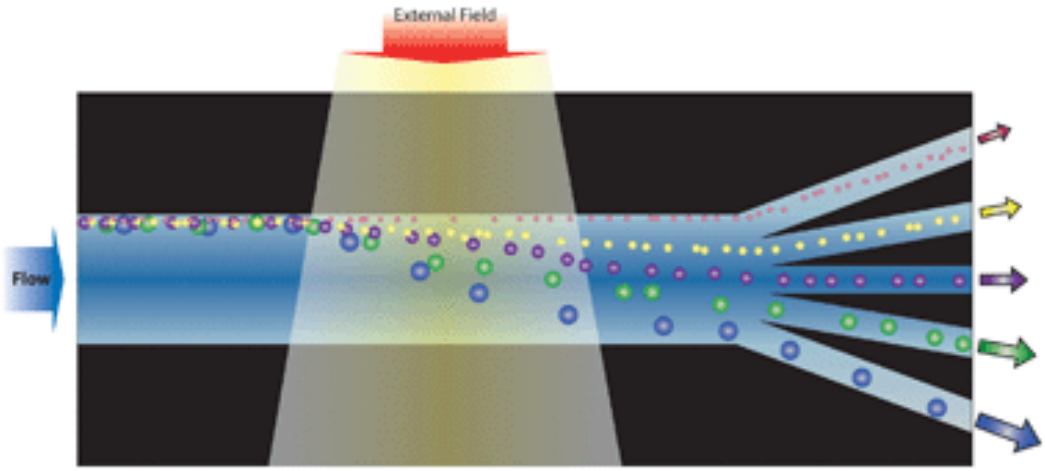
Department:	**Mechanical & Aerospace, Laboratory for Micro Systems**
Suitability:	**Mechatronics or Mechanical students with an interest in biomedical devices**

The Challenge

The miniaturisation of fluidic systems for chemical and biological analysis has become an important research field. The goal is to produce hand-held biodiagnostic laboratories which can be taken to the patient, this has particular advantages in the developing world. The area is collectively termed micro total analysis systems (μTAS) or "lab on a chip." The first stage of analysing a sample is to sort the particulate matter (eg cells or pathogens), the separate components can then be quantified.

One suitable technology for this such sorting purpose is the use of acoustic radiation forces generated by ultrasonic excitation of the fluid volume. The result is a force-field which acts on suspended particles. An example of the collection of randomly orientated particles into lines is shown in the figures.



Particle separation using surface acoustic waves

The goal of this project is to use travelling surface acoustic waves – essentially miniature earthquake waves on a piezoelectric substrate – to separate particles of different sizes with high fidelity. Future applications of this work include sorting different cell types in lab-on-a-chip environment.

Project activities include design and characterisation of microfluidic systems. This challenging project is suited to final-year students with an interest in microfluidics and biomedical applications, and have an aptitude for data analysis (matlab) and problem solving.

The Laboratory for Micro Systems is housed in the "New Horizons" building.