

# Chemical Engineering Seminars – MT 2007

*Week 1: Tuesday 9 October, 4:15-5.15 pm  
Lecture Room 2, Thom Building, Engineering Science*

## Chemical Engineering DPhil students Showcase

### (1) “Measuring Laminar Burning Velocities”

Steve Marshall

#### **Abstract**

The laminar burning velocity of a fuel is the rate of normal propagation of a 1D flame front relative to the movement of the unburned gas as it is pushed outwards by the expansion of the burned gas during combustion. This is a fundamental property of a fuel that affects many aspects of its combustion behaviour. Experimental values are required to validate chemical kinetics software such as CHEMKIN to help kineticists understand their simulations and also to provide input for models of flashback, minimum ignition energy and turbulent combustion. Fuels with faster burning velocities can also lead to increased power in spark ignition engines.

Many different methods have been used to measure laminar burning velocities, but the constant volume vessel is considered both the most versatile and accurate especially as it allows for determination of burning velocity as a function of temperature and pressure from a single experiment. Such a vessel is being used in the Engines Lab to determine laminar burning velocities of gaseous and liquid fuels using both pressure record data and schlieren photography. It is hoped to further understand mixing rules, cellularity and the effect of residuals as well as producing useful data not currently available for fuels such as toluene and iso-octane.

#### **Bio-sketch**

Steve Marshall is just starting the 2nd year of his DPhil in the Internal Combustion Engines group, supervised by Prof. Richard Stone. He is at Magdalen College, where he also read for his undergraduate degree.

### (2) “Stem cells – differentiation and cryopreservation”

Nuala Trainor

#### **Bio-sketch**

Nuala Trainor is reading for a DPhil in Engineering Science in collaboration with the Nuffield Orthopaedic Centre and the Rutherford Appleton Lab (CCLRC). She is developing microfabricated bioreactors for the growth of stem cells in three dimensions under the supervision of Prof. Zhanfeng Cui.

She received a Bachelor in Applied Science (BASc) degree from the University of Toronto in Chemical Engineering and Applied Chemistry.

She is a member of the MCR at Lady Margaret Hall.