

## The 4th Frank Morton Lecture

**7 May, 2008**

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## Bubbles, Bread and Bio-Fuels

The 4th Frank Morton Memorial Lecture

# University of Birmingham – Wednesday 7 May 2008

## Frank Morton Award

The lecture is the fourth in a series initiated by the Institution of Chemical Engineers to celebrate the life of the pioneering educator and past president, Professor Frank Morton, who taught at Birmingham University and the University of Manchester. Morton, who died in 1999, also inspired the eponymous student sports day which continues to feature as a major event in the chemical engineering calendar. Previous lecturers have included David Faraday, Geoff Moggridge and David Shallcross

We are delighted to announce the recipient of this award in 2008 is Dr Grant Campbell, who will use lively demonstrations illustrating work undertaken in the Satake Centre for Grain Process Engineering School of Chemical Engineering and Analytical Science, at the University of Manchester.

## Bubbles, Bread and Biofuels – and the best education ever devised?

Chemical engineering is sometimes described as "simply the best education ever devised". Is this bold claim true? Chemical engineering combines an understanding of the fundamental laws of the universe with the power of mathematics, the pragmatism of experience and the judgement of a "systems" perspective, in order to provide solutions to

practical problems. Perhaps this combination does qualify as an unbeatable education. Certainly, chemical engineering is a versatile education, interacting with subjects as diverse as bubbles, bread and biofuels...

Bubbles are magical – transient, effervescent, insubstantial, playful – and also useful. It has been suggested that the 21st century will be known as "The Foam Age", when the unique properties of foams (such as lightness combined with strength combined with unusual deformation properties) are exploited for clever applications. Foams are complex and their scientific study is still in its infancy. Much of what we know about the practical handling and use of foam we have learnt through experience – and much of that experience has been with food foams, of which the original (and still the best!) is bread.

Bread is quite simply the world's most important food, with respect to its cumulative impact on world history and its ongoing global significance and relevance. Securing the bread supply has driven technological, scientific, political and social development throughout Western history. Cereals feed the world, with more than 50% of our global food supply coming from just maize, rice and wheat, of which wheat is "the king of grains" and the world's most extensively-grown and traded cereal. But why are bread and wheat so supreme? Wheat is, after all, neither the highest-yielding cereal



nor the most nutritious. However, wheat has a unique advantage that underpins its supremacy. Wheat flour alone is able, when mixed with water, to form a dough capable of retaining fermentation gases in bubbles to create highly-raised bread. Wheat is the world's most important cereal because it gives us bread, and bread is the world's most important food because of its bubbles.

Now, in the 21st century, our daily bread faces a new threat as the world turns to biofuels to alleviate its thirst for oil. Biofuels, at least in the medium term, will come predominantly from cereals, including wheat – in the UK, we simply grow more wheat than any other agricultural crop, and the technology to convert wheat to bioethanol is well established. The "fuel versus food" issue is the subject of heated debate. Nevertheless, there is a pressing need to achieve more sustainable production of bioethanol from cereals. This task is squarely the remit of chemical engineers: outstanding 21st century professionals who are capable of combining cereal science and an understanding of the socio-economic issues embodied in bread for the benefit of humankind.



## Lecture and presentation

7 May 2008

17:30 – 18:00

Registration and light refreshments

18:15 – 19:15

Lecture, question and answer session

19:15 – 19:30

Frank Morton Medal presentation

## Venue

University of Birmingham,  
Chemical Engineering Department,  
Building 11

## Who should attend?

In addition to chemical engineers, the audience will include teachers and pupils from schools in the West Midlands who are participating in IChemE's whynotchemeng campaign. The lecture will be lively, interactive and highly participative.