



THE QUEEN'S  
ANNIVERSARY PRIZES  
FOR HIGHER AND FURTHER EDUCATION  
2011

## The Engineering Doctoral Centre in Formulation Engineering

University of Birmingham  
Chemical Engineering

### What is Formulation Engineering ?

- *Delivering the right molecule to the right place at the right time.*
- Concerned with the manufacture of products where the microstructure of the product is key to its performance
- Microstructure
  - of a food determines its taste
  - of a tablet determines how the drug is released, or the detergent action
  - of a catalyst determines the efficiency of reaction

*'..an excellent centre that is well marketed and targeted at newer, more dynamic areas of engineering.'* EPSRC Review of the EngD scheme, 30 March 2007

### Industrial Partners



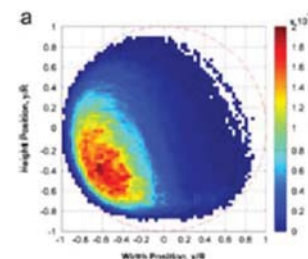
#### Johnson Matthey

Precipitation of iron oxide catalyst using (T) good mixing and (B) bad mixing leads to very different morphology and catalyst activity

**Chemical Industry: Johnson Matthey** Six PhDs, five EngDs and two research council projects worth £1.04 million. Two major themes : (i) control + optimisation of catalyst microstructure and (ii) reaction engineering of multiphase systems.

The similarity of different industry sectors.

**Food Industry: Kraft.** Four EngDs. Chocolate can exist in different crystal forms. The glossy attractive material has the same composition as the ugly bloomed form, and the job of the formulation engineer is to ensure that the process produces the former (Cadbury)



C. Mac Namara et al. / Chemical Engineering Science 75 (2012) 14–27



#### Personal Care: Procter and Gamble

- Three PhDs, three EngDs, and two EPSRC grants. Research has led to significant improvements in product design via better understanding of how consumer products perform (EngD on tomography of washing machines), and new products, such as novel fragrance capsules

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