

## Dr Philip Cox

Senior Lecturer

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### About

A biologist by training (University of Wolverhampton) with a PhD in Biochemical Engineering (University of Birmingham), Dr Cox' background has always had a strong structural and imaging focus to it. His PhD studies involved the growth and measurement of filamentous fungi in submerged culture. Since moving to food processing and food microstructure research he has continued this fascination and has used it to develop a variety of new analytical and process tools.

### Research

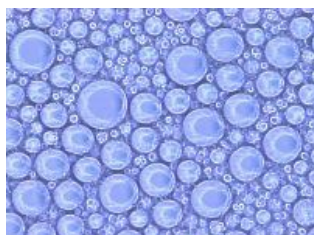
#### Current projects

Industrially sponsored projects:

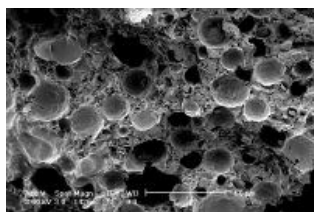
Emulsion structuring in Lipsticks, Emulsion structuring in mascara, Hydrophobins for technological applications, heat and mass transfer in industrial batch scale cosmetics production, odour, removal for industrial hydrocolloids, healthy indulgence of high fat foods.

Research council funded projects:

Whipping of dairy cream alternatives, Hydrophobins for stabilisation of air filled emulsions, Self Structuring in the Human GI tract to combat obesity.



A tri-phasic emulsion constructed from an oil/water emulsion with an equal volume of hydrophobin stabilised air filled emulsion (seen as the phase bright droplets) to remove 50% of the lipid from products without affecting their oral properties.



An electron micrograph of emulsified cocoa butter containing 50% water. This dramatically reduces the lipid content of chocolate made with the butter and can be used to test the psychology behind indulgent eating-behaviour.

#### Publications

- 1) K. Mehauden, P.W. Cox, S. Bakalis, M.J.H. Simmons, G.S. Tucker and P.J. Fryer. (2007). A novel method to evaluate the applicability of time temperature integrators to different temperature profiles. *Innovative Food Science & Emerging Technologies*, 8, 507-514
- 2) Tucker, G.S., Brown, H.M., Fryer, P.J., Cox, P.W., Poole, F.L. Lee, H-S., Adams, M.W. (2007). A sterilisation time-temperature integrator based on amylase from the hyperthermophilic organism *Pyrococcus furiosus*. *Innovative Food Science and Emerging Technologies (IFSET)*, 8, 63-72
- 3) Mousavi, R., Miri, T., Cox, P.W., Fryer, P.J. (2006). Characterization of the ice crystal structure of food materials using X-ray micro-computed tomography *International Journal of Food Science and Technology*, in press
- 4) Mousavi, R., Miri, T., Cox, P.W. & Fryer, P.J. (2005). Ice crystal visualisation in frozen solids using X-ray micro computed tomograph. *Journal of Food Science* 70, 7, 437-442.
- 5) Norton, I.T., Cox, P.W. Spyropoulos, F. (2008) The role of hydrocolloids in the formation of Health foods. *Gums and Stabilisers in the Food Industry* 14 ISBN 978-0-85404-4610-0.
- 6) Spyropoulos, F. Cox, P.W., Fryer, P.J., Norton, I.T., (2008) Immiscible liquid liquid mixing. In *Food Mixing – Principles and Applications*, Ed. P.J. Cullen, pub Blackwell, in press.
- 7) P.W. Cox, F. Spyropoulos & I.T. Norton (2008). Food microstructure design for combating dietary related chronic diseases. Keynote lecture. International Conference on Engineering in Food, Vina del Mar, Chile, April 2008.

### Expertise

Fat replacement technologies for emulsion based foods, food process and safety analysis; primarily using hydrophobin proteins for micron sized air cell generation and fat

