University of Birmingham

Professor Serafim Bakalis

Senior Lecturer

School of Chemical Engineering (/schools/chemical-engineering/index.aspx)

Contact details

Telephone +44 (0)121 414 5383 (tel:+44 121 414 5383)

Email s.bakalis@bham.ac.uk (mailto:s.bakalis@bham.ac.uk)

School of Chemical Engineering
The University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

Dr Serafim Bakalis is a University Academic Fellow, tenuring from 2005 to present.

This prestigious research post has enabled him to develop a wide range of skills and techniques, interacting with leading industries while still continuining to contribute to teaching and administration within the School of Chemical Engineering.

Qualifications

- PhD Food Engineering, Rutgers University, New Brunswick, NJ, 1999
- MSc Food Engineering, Rutgers University, New Brunswick, NJ, 1996
- BSc Chemical Engineering, National Technical University of Athens, 1994

Research

Dr Bakalis' research spans a range of engineering related aspects with an emphasis in understanding the effect of processing on microstructure control and extension of traditional unit operations to include performance of formulations of various consumer products. For example, he is currently the PI of an EPSRC/DTI funded project aiming at delivering low salt products without compromising their sensory attributes. The current areas of research in more detail are as follows:

Processing

- Develop and apply Positron Emission Particle Tracking (PEPT) and computational dynamic techniques to investigate mixing processes (funded from Huntsman)
- Develop Multiple PEPT technique to non invasively investigate rotation of solid bodies and multiphase flows (funded from EPSRC)
- Characterization and exploration of thermal processes using Time Temperature Integrators (TTIs)
- Optimization of food processes under uncertain conditions. Optimization techniques include minmax and global optimization methods (funded from EPSRC)
- Use and develop X-Ray microCT in understanding flow the effect of formulation and processing in porous structures. Link data with measurements obtain from other techniques / to obtain mass transfer prediction across different scales (funded from Johnson & Matthew)

Delivery specific functions to the consumer

- Develop in-vitro and in-silica models of performance of complex microstructures in the mouth in view to optimize the design of structures that control the delivery of salt (funded from EPSRC/DTI)
- Design and manufacture structures using advance structuring processing methods to deliver controlled salt profiles in the mouth (funded from EPSRC/DTI)
- Numerical investigation of momentum and mass transport under conditions relevant to the human gut (funded from Unilever)
- In collaboration with the Neurophysiology group at the Nathan Kline Institute for Psychiatric Research develop electroencephalography based methods to investigate multisensory integration during consumption of food products (funded from the Welcome Trust Fund)
- Using state of the art measurement techniques (PEPT, PIV) to understand phenomena in a washing machine, in view to produce fast parallel experimental methods to evaluate cleaning formulations

Chemical Engineer-Product Development Scientist , EV.GE. PISTIOLAS S.A, Greece.08/01 – 02/05

As a member of a multidisciplinary team designed an industrial process for the production of ready to eat breakfast cereal and snack food using extrusion. Designed pilot scale equipment and pilot plant for production of quick cooking rice. Investigated and modelled the effect of various processing parameters on the self life of beans, lentils and rice.

Research Fellow, University of Birmingham, U.K. 11/99 – 07/01

Developed a method and conducted experiments to measure velocity distributions using Positron Emitting Particle Tracking (PEPT) in a pilot scale heat exchanger. Used commercial finite element software (FIDAP and FLUENT) to simulate heat and momentum transport in processes such as extrusion, canning and tubular heat exchangers.

First Class Airman-Chemist, HELLENIC AIR FORCE-Petroleum Distribution Command, Greece: 08/01-09/02

Analyzed fuels for aircrafts in the quality control laboratory of the Hellenic Air Force. Responsible for security and intelligence for the Command and 14 of its subunits.

Other activities

- Member of the: Institution of Chemical Engineers (IChemE), Institute of Food Technologists (IFT), Greek chamber of Engineers
- Member of the Scientific Committee of the Food Faraday Knowledge Transfer Network
- Secretary of the IChemE Food & Drink Subject Group Management Committee

Publications

1. Mehauden K, Cox PW, Bakalis S, Simmons MJH, Tucker GS, Fryer PJ. 2007. A novel method to evaluate the applicability of time temperature integrators to different temperature profiles. Innovative Food Science & Emerging Technologies. 507-14.

2. Yang, Z, Fan, X , Fryer, PJ, Parker, DJ, Bakalis, S. 2007. Improved multiple-particle tracking for studying flows in multiphase systems. American Institute of Chemical Engineers Journal, 53 1941-51.

3. Yang Z, Fryer PJ, Bakalis S, Fan X, Parker DJ, Seville JPK. 2006. An improved algorithm for tracking multiple, freely moving particles in a Positron Emission Particle Tracking system. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 564 (2006) 332-38.

4. Rigby, SP, Watt-Smith, MJ, Chigada, P, Chudek, JA, Fletcher, RS, Wood, J, Bakalis, S , Miri, T. 2006. Studies of the entrapment of non-wetting fluid within nanoporous media using a synergistic combination of mri and micro-computed x-ray tomography. Chemical Engineering Science, 61 (2006) 7579-92.

5. Yang, Z, Parker, DJ, Fryer, PJ, Bakalis, S , Fan, X. 2006. Multiple-particle tracking-an improvement for positron particle tracking. Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 564(1):332-8.

6. Bakalis, S, Cox, PW, Russell, AB, Parker, DJ , Fryer, PJ. 2006. Development and use of positron emitting particle tracking (PEPT) for velocity measurements in viscous fluids in pilot scale equipment. Chemical Engineering Science 61(6):1864-77.

7. Karathanos, VT, Bakalis, S, Kyritsi, A , Rodis, PS. 2006. Color degradation of beans during storage. International Journal of Food Properties 9(1):61-71.

8. Bakalis, S , Karathanos, VT. 2005. Study of rehydration of osmotically pretreated dried fruit samples. Drying Technology 23(3):533-49.

9. Taoukis, P.S., Giannakourou, M.C., Koutsoumanis, K. and Bakalis, S. 2005. Modelling the effect of house hold chilled storage conditions on the risk distribution of meat products . Acta Hort. (ISHS) 674:435-439.

10. Bakalis, S, Fryer, PJ , Parker, DJ. 2004. Measuring velocity distributions of viscous fluids using positron emission particle tracking (pept). AIChE Journal 50(7):1606-13.

11. Bakalis, S, Cox, PW, Wang-Nolan, W, Parker, D , Fryer, PJ. 2003. Use of positron-emission particle tracking (pept) technique for velocity measurements in model food fluids. Journal of Food Science 68(9):2684-92

12. Cox, PW, Bakalis, S, Ismail, H, Forster, R, Parker, DJ , Fryer, PJ. 2003. Visualisation of three-dimensional flows in rotating cans using positron emission particle tracking (pept). Journal of Food Engineering 60(3):229-40