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# Prof. Xiongwei Ni



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**Xiongwei Ni** graduated with a BSc (Eng) in Thermal Engineering, Chong-qing University, China in 1982. He did his PhD in Fuel and Energy, Leeds University in 1986. He was a postdoc at the University of Edinburgh and applied the first generation of particle image velocimetry to channel flow. He was then involved in the development of oscillatory flow technology at its inception in 1988 at the University of Cambridge. He has over 20 years' research experience and is the world expert in the science

and technological applications of oscillatory baffled reactors (OBR). In 1999, Xiongwei was promoted to the Chaired Professor of Reaction Engineering in Chemical Engineering at Heriot-Watt University. Xiongwei is the lead author or principal co-author of over 180 scientific papers on OBR related research as well as 8 patents. He was the keynote speaker at American Institute of Chemical Engineering Annual Meetings, Process Intensification Conferences, Scientific Update Conferences, Industrial Seminars of Process Engineering, Society of Chemical Industry Symposia and the Royal Society of Chemistry Symposia. A chartered Chemical Engineer and a Fellow of IChemE, he is the UK representative in Process Intensification in the European Federation of Chemical Engineering. He span off a company, NiTech Solutions Ltd, in December 2004 specializing continuous manufacturing and crystallization, has directly involved in a large number of continuous crystallization of APIs, fine chemicals and food products, and has gained significant insight into this type of operation.

## Research Interests

My research is focused on multiphase mixing, reaction and crystallization in a continuous manner; I am interested in research and development of novel plug flow technologies for manufacturing chemicals, biochemicals and pharmaceuticals with step change benefits. Many of the concepts my group

(www.COBRA.hw.ac.uk) work with are based on continuous oscillatory baffled reactors and crystallizers, which are our core expertise. The central research themes of my group are to understand what controls particle/crystal/droplet/bubble/cell size in a given reactor or crystallizer environment and to facilitate best fluid mechanical conditions in order to achieve the desired outcomes. It is often the interactions with chemists or biologists that lead to the most exciting ideas and projects. All research projects in my group involve a combination of theoretical and experimental analysis, focusing on fundamental science and phenomena as well as their implications for specific systems.

## Representative Publications

C.J. Callahan and X. Ni, "Probing into nucleation mechanisms of cooling crystallization of sodium chlorate in a stirred tank crystallizer and an oscillatory baffled crystallizer", *Crystal Growth & Design*, Vol. 12 (5), 2012, 2525-2532.

C.J. Brown and X. Ni, "Evaluation of growth kinetics of antisolvent crystallisation of paracetamol in an oscillatory baffled crystalliser utilizing video imaging", *Crystal Growth & Design*, Vol. 11(9), 2011, 3994-4000.

C.J. Brown and X. Ni, "Evaluating the rate of cyclopentane hydrate formation in an oscillatory baffled column using laser induced fluorescence and energy balance", *the Chemical Engineering Journal*, Vol. 157, 2010, 131-139.

S. Lawson, G. Steele, P. Shering, I. Laird, L. Zhao and X. Ni, "Continuous crystallisation of pharmaceuticals using a continuous oscillatory baffled crystalliser", *Organic Process Research & Development*, Vol. 13, 2009, 1357-1363.

X. Ni and A. Liao, "Effects of cooling rate and solution concentration on solution crystallisation of L-glutamic acid in an oscillatory baffled crystalliser", *Journal of Crystal Growth and Design*, Vol. 8, No. 8, 2008, 2875-2881.

X. Ni, H. Jian and A.W. Fitch, "Evaluation of turbulent integral length scale in an oscillatory baffled column using large eddy simulation and digital particle image velocimetry", *the Trans IChemE*, Vol. 81, No. A8, 2003, 842-853.

X. Ni, D. Mignard, B. Saye, J.C. Johnstone and N. Pereira, "On the evaluation of droplet breakage and coalescence rates in an oscillatory baffled reactor", *Chemical Engineering Science*, 57, No. 11, 2002, 2101-2114.

X. Ni, Y. Sommer de Gélécourt, M.H.I. Baird and N.V.Rama Rao, "Scale-up of single phase axial dispersion in batch and continuous oscillatory baffled tubes", *the Canadian Journal of Chemical Engineering*, Vol. 79, No. 3, 2001, 444-448.