

Prof. Chris D. Rielly



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Chris Rielly has a degree in Chemical Engineering from Imperial College, London and a Ph.D. from the same institution in the field of two-phase flow and mixing in bubble columns and stirred tank reactors. From 1986 to 1999 he was a lecturer in Chemical Engineering at the University of Cambridge, working on various aspects of food process engineering, multi-phase fluid mechanics and mixing. Since 1999 he has been Professor of Chemical Engineering at Loughborough

University and is currently Head of Department. He has over 120 publications in peer-reviewed journals and conference proceedings and has supervised more than 25 PhD students and PDRAs. He is an academic consultant to BHR Group's Fluid Mixing Processes Industrial Consortium, Chair of the IChemE's Fluid Mixing Subject Group and member of the EPSRC peer review College.

Research Interests

Chris Rielly has 25 years of experience in experimental and computational fluid mechanics, applied to multi-phase flow, mixing and control of chemical reactors, fermenters and crystallisers, e.g. using techniques such as multi-phase PIV, coupled CFD and population balance models, direct nucleation control and model predictive control. Other research interests include dispersion and deagglomeration of formulated nano-particulate products and spray drying and spray-freeze-drying of nano-dispersed ceramics, foods and pharmaceuticals. Within the CMAC project, we will use PAT tools to monitor and control nucleation and growth in continuous flow crystallisers, to achieve a target size distribution and morphology of a particulate product. In addition, we will use combinations of computational fluid dynamics and population balances to model these processes and hence to explore optimal operating conditions.

Representative Publications

Saleemi, A. N., Rielly, C. D., & Nagy, Z. K. (2012). Monitoring of the combined cooling and antisolvent crystallisation of mixtures of aminobenzoic acid isomers using ATR-UV/vis spectroscopy and FBRM. *Chemical Engineering Science*, 77, 122-129.

Saleemi, A. N., Rielly, C. D., & Nagy, Z. K. (2012). Comparative investigation of supersaturation and automated direct nucleation control of crystal size distributions using ATR-UV/vis spectroscopy and FBRM. *Crystal Growth and Design*, 12(4), 1792-1807.

Saleemi, A. N., Rielly, C. D., & Nagy, Z. K. (2012). Monitoring of the combined cooling and antisolvent crystallisation of mixtures of aminobenzoic acid isomers using ATR-UV/vis spectroscopy and FBRM. *Chemical Engineering Science*.

Abu Bakar, M. R., Nagy, Z. K., Rielly, C. D., & Dann, S. E. (2011). Investigation of the riddle of sulfathiazole polymorphism. *International Journal of Pharmaceutics*, 414(1-2), 86-103. doi:10.1016/j.ijpharm.2011.05.004

Nagy, Z. K., Aamir, E., & Rielly, C. D. (2011). Internal Fines Removal Using Population Balance Model Based Control of Crystal Size Distribution under Dissolution, Growth and Nucleation Mechanisms. *Crystal Growth & Design*, 11(6), 2205-2219. doi:10.1021/cg101555u

Aamir, E., Nagy, Z. K., & Rielly, C. D. (2010). Evaluation of the Effect of Seed Preparation Method on the Product Crystal Size Distribution for Batch Cooling Crystallization Processes. *Crystal Growth & Design*, 10(11), 4728-4740. doi:10.1021/cg100305w

Abu Bakar, M. R., Nagy, Z. K., & Rielly, C. D. (2010). Investigation of the Effect of Temperature Cycling on Surface Features of Sulfathiazole Crystals during Seeded Batch Cooling Crystallization. *Crystal Growth & Design*, 10(9), 3892-3900. doi:10.1021/cg1002379

Aamir, E., Nagy, Z. K., & Rielly, C. D. (2010). Optimal seed recipe design for crystal size distribution control for batch cooling crystallisation processes. *Chemical Engineering Science*, 65(11), 3602-3614. doi:10.1016/j.ces.2010.02.051

Abu Bakar, M. R., Nagy, Z. K., & Rielly, C. D. (2010). A combined approach of differential scanning calorimetry and hot-stage microscopy with image analysis in the investigation of sulfathiazole polymorphism. *Journal of Thermal Analysis And Calorimetry*, 99(2), 609-619. doi:10.1007/s10973-009-0001-z