

second

# international workshop on granulation

Sheffield, 22-25 June 2004

Throughout the process industries, two recurring themes are:

- how can I formulate a new or better product?
- how can I use knowledge at one length scale to understand the behaviour at another?

This workshop will address these two issues in one of the fastest moving areas of process science — granulation. This technique of taking small particles and arranging them together opens up many formulation possibilities for the chemicals, food and pharmaceutical industries.

The event is organised by the Department of Chemical and Process Engineering at the University of Sheffield, on behalf of the IChemE Particle Technology Subject Group and the EFCE Working Party on Agglomeration. The workshop will consist of:

- a 2-day course (22-23 June)
- a 2-day meeting (24-25 June)

The 2-day course on granulation is suitable for PhD students and will also be of benefit to those involved in research in an industrial context. It is organised by Dr David York (P&G) and Professor Jonathan Seville (University of Birmingham).

The 2-day meeting consists of presentations by leading international speakers from industry and academia who will give examples of how formulation and science can be combined.

Papers are organised to reflect both granulation as a process and granules as products. In this way researchers, formulators and operators can all expect to find information of relevance to their interests. Selected papers presented at the meeting will be published in a special issue of Chemical Engineering Science.

**Dr Agba Salman**  
**Professor Mike Hounslow**  
Particle Products Group

# Course on Granulation

Sheffield, 22-23 June 2004

This two-day course on Granulation is organised by Dr David York (Procter & Gamble) and Professor Jonathan Seville (University of Birmingham).

- Welcome and Introduction
- Basic reasons for agglomerating: desired and undesired
- Key transformations that occur in typical agglomeration units
- Agglomeration regime map
- Practical training on agglomeration
- Influence of raw material properties — liquids and powders
- Practical training on above
- Typical unit operation equipment for agglomeration: batch vs continuous, high vs low shear, mechanical vs air fluidisation
- Typical plant design aspects: feed control, recycle loops, stability and control
- Basic characterisation of agglomerates



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## Scientific Committee

Prof Karl Sommer, TU München, Germany  
Prof John Dodds, Centre de Recherche Poudres et Procédés, France  
Prof Hans Kuipers, Twente University of Technology, The Netherlands  
Prof Michael Adams, University of Birmingham, UK  
Dr David York, Procter & Gamble, UK  
Prof Jonathan Seville, University of Birmingham, UK  
Prof Stef Simons, UCL, UK  
Dr Tibor Nagy, Gedeon Richter Ltd, Hungary  
Dr James N. Michaels, Merck and Co. Inc., USA  
Prof Mojtaba Ghadiri, University of Leeds, UK  
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Prof Jim Litster, University of Queensland, Australia  
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Prof Masayuki Horio, Tokyo University of Agriculture and Technology, Japan  
Mr Klaus Eichler, TTC, Germany  
Dr Judith Bonsall, Unilever, UK  
Prof Mike Hounslow, University of Sheffield, UK  
Dr Agba Salman, University of Sheffield, UK

# Granulation Meeting Program

Sheffield, 24-25 June 2004

Thursday 24th June

## Session I: High Shear Processes

### Introduction

Agba Salman, University of Sheffield

### High Shear Granulation in the Pharmaceutical Industry; Inhomogeneity Phenomena

K. van den Dries<sup>1</sup> and H. Vromans<sup>1&2</sup>

1- N.V. Organon 2- University of Utrecht, The Netherlands

### Predictive Scale-up of High Shear Granulation by Mechanistic and Multivariate Process Modelling — Examples from the Pharmaceutical Industry

I. Niklasson Björn, M. Karlsson, A. Jansson and S. Folestad, AstraZeneca, Sweden

### Wet Granulation in a Batch High Shear Mixer

K. Saleh, L. Vialatte and P. Guigon, Université de Technologie de Compiègne, France

### Mechanisms in High Viscosity Immersion

S.L. Rough<sup>1</sup>, D.I. Wilson<sup>1</sup>, A.E. Bayly<sup>2</sup> and D.W. York<sup>2</sup>

1- University of Cambridge 2- Procter & Gamble Ltd, UK

### Agglomeration Properties for Gluten and Gluten free Cereals Flours by Water Addition and Shearing

A. Hebrard and D. Oulahna, Ecole des Mines d'Albi-Carmaux, France

### Concepts to Improve the Efficiency of Food Agglomeration

S. Palzer, Nestlé, Switzerland

## Session II: Fluidized Bed Processes

### Introduction

David York, Procter & Gamble

### Studies of Fluid Bed Granulation in an Industrial R&D Context

R. Boerefijn, Unilever Research Vlaardingen Laboratory, The Netherlands

### Spray Granulation, Agglomeration and Coating Processes Using Continuous Fluidized Bed Technology

M. Jacob, Glatt, Germany

### The Dependence of Granule Size and Structure on Droplet Size During Gas Fluidised Bed Melt Binder Granulation

A. McCormack<sup>1</sup>, P.C. Knight<sup>1</sup>, R.W. Greenwood<sup>1</sup>, J.P.K. Seville<sup>1</sup> and A.J. van der Goot<sup>2</sup>

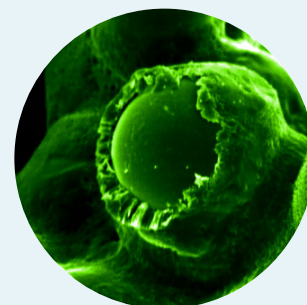
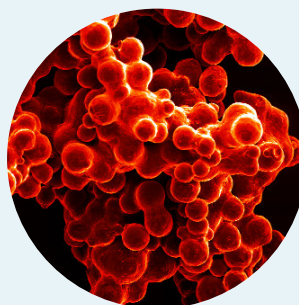
1- University of Birmingham 2- Wageningen University, The Netherlands

### On the Predictability of Fluidized Bed Spray Granulation: Analysis of Particle Populations and Transport Phenomena

S. Heinrich, M. Peglow, M. Henneberg, J. Drechsler and L. Mörl, Otto-von-Guericke University, Germany

### Particle Design and Performance Test for Novel Dry CO<sub>2</sub> Sorbent

S. Kimura, M. Adachi, K. Nishii, R. Noda and M. Horio, Tokyo University of Agriculture and Technology, Japan



**Preliminary DEM Simulations of Fluidized Bed Granulation**  
C. Thornton and D. Kafui, University of Birmingham

**Validation of a Multi Fluid Model with a Discrete Particle Model and Well-Defined Experiments**

G.A. Bokkers, M. van Sint Annaland and J.A.M. Kuipers  
University of Twente, The Netherlands

**Breakage Kinetics During Fluidised Bed Granulation**

H.S. Tan, A.D. Salman and M.J. Hounslow, University of Sheffield

**Single and Bulk Compressions of Soft Granules: DEM Simulation and Experimental Evaluation**

A. Samimi, A. Hassanpour and M. Ghadiri, University of Leeds

**Correlating Repeated Impact Testing to Pneumatic Transport Attrition**

G.M.H. Meesters<sup>1,2</sup>, B. van Laarhoven<sup>2</sup> and S. Schaafsma<sup>2</sup>  
1- Delft University of Technology 2- DSM-Research, The Netherlands

**Computer-aided Design of Granule Microstructure**

F. Stepanek, Imperial College

Friday 25th June

**Session III: Compaction Processes**

**Introduction**

Jonathan Seville, University of Birmingham

**Dry Granulation of Organic Powders: Dependence of Pressure 2D — Distribution on Different Process Parameters**

T. Lecompte<sup>1</sup>, P. Doremus<sup>1</sup>, J. Le Thiesse<sup>2</sup>, J. Masteau<sup>2</sup>, L. Perier-Camby<sup>3</sup> and G. Thomas<sup>3</sup>  
1- INPG 2- Rhodia 3- Ecole Nationale Supérieure des Mines de St Etienne, France

**Compression Behaviour of Agglomerates and the Evolution in Tablet Structure**

G. Alderborn, Uppsala University, Sweden

**Effect of Process Parameters on Melt Granulation and Tablet Pressing of Pharmaceutical Materials**

G. Walker, Queen's University Belfast

**Particle Properties and Adhesive Forces as Parameter of Agglomeration**

K. Sommer, TU München, Germany

Abstracts are online at: [www.sheffield.ac.uk/granulation](http://www.sheffield.ac.uk/granulation)

This meeting is sponsored by:



**Session IV: Granule Properties**

**Introduction**

Mike Hounslow, University of Sheffield

**The Relationship Between Surface Properties and Binder Performance in Granulation**

S.J.R. Simons<sup>1</sup>, D. Rossetti<sup>1</sup>, P. Pagliai<sup>1</sup>, R. Ward<sup>2</sup> and S. Fitzpatrick<sup>2</sup>  
1- University College London 2- Merck Sharp & Dohme, UK

**Behavior of Dry Binderless Granules Under Impact and Diametric Compression**

Y.S. Cheong<sup>1</sup>, A.D. Salman<sup>1</sup>, A.F. Routh<sup>1</sup>, M.J. Adams<sup>2</sup>, C. Thornton<sup>2</sup>, D.K. Kafui<sup>2</sup> and M.J. Hounslow<sup>1</sup>  
1- University of Sheffield 2- University of Birmingham

**Characterising the Strength of Granules**

O. Zhupanska and B. Scarlett, University of Florida, USA

**An Experimental Study of the Impact Breakage of Single Wet Granules**

J.S. Fu<sup>1</sup>, A.D. Salman<sup>1</sup>, G.K. Reynolds<sup>1</sup>, M.J. Adams<sup>2</sup> and M.J. Hounslow<sup>1</sup>  
1- University of Sheffield 2- University of Birmingham

Any company or organisation interested in sponsoring or exhibiting at the meeting please contact the organiser.

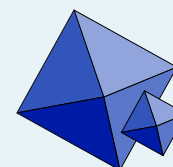
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Particle Products Group

# second international workshop on granulation



Sheffield, 22-25 June 2004

Halifax Hall of Residence, The University of Sheffield, Endcliffe Vale Road, Sheffield, S10 3ER

## Registration Form

Please complete your details:

Title: \_\_\_\_\_ First Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Company/Institute: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Please indicate if you have any special needs or dietary requirements:

\_\_\_\_\_

## Workshop Fees

### Course on Granulation (22-23 June):

- £200 Course fee excluding accommodation

### Granulation Meeting (24-25 June):

- £200 Non-members of the IChemE Particle Technology Subject Group  
(includes £10 PTSG membership fee)
- £190 Members of the IChemE Particle Technology Subject Group
- £120 Students
- £35 Advance order of Special Issue of Chemical Engineering Science containing papers from  
this meeting (special rate for delegates)
- I wish to attend the Meeting Dinner on 24 June (no additional charge)

### Accommodation:

The meeting registration fee includes accommodation for the night of 24 June.

I require additional accommodation on (£50/night):

- 21 June     22 June     23 June     25 June

Please note that fees must be paid in advance and are non-refundable after 1 May 2004. Fees are payable to The University of Sheffield. Early registration (before 1 May 2004) qualifies for a discount of £20.

I enclose a total payment of: \_\_\_\_\_

Please send this form with payment to the following address:

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