

*Program*

# **FLUIDIZATION XI**

*Present and Future for Fluidization Engineering*

**May 9 -14, 2004**

**Hotel Continental Terme,  
Ischia (Naples), Italy**

**Conference co-chairs:**

**Prof. Umberto Arena**

Dip. Scienze Ambientali,  
Seconda Università di Napoli,  
Caserta, Italy

**Dr. Riccardo Chirone**

Ist. Ricerche sulla Combustione,  
C.N.R., Napoli, Italy

**Prof. Michele Miccio**

Dip. Ingegneria Chimica e Alimentare,  
Università di Salerno, Fisciano (SA), Italy

**Prof. Piero Salatino**

Dip. Ingegneria Chimica,  
Università di Napoli Federico II  
Napoli, Italy

# **ECI**

**Engineering Conferences International  
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## Conference Schedule

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## Sunday, May 9, 2004

16.00-19.00	Registration
18.00-20.00	Conference Welcome
20.00-21.30	Dinner

## Monday, May 10, 2004

07.00-08.00	Breakfast Buffet
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### **INVITED LECTURE I**

*Chair: J. Davidson*

08.20-09.40	<b>Advances in gas-liquid-solid fluidization</b>
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Liang-Shih Fan  
Ohio State University, USA

### **SESSION I: LIQUID-SOLID, GAS-LIQUID-SOLID AND DENSE-GAS FLUIDIZATION**

*Chair: A. Marzocchella*

09.40-10.00	<b>GLS1 Influence of hydrodynamics on fluidized bed coating at supercritical fluid conditions</b> Vogt, C. <sup>1</sup> , Schreiber, R., Werther, J. and Brunner, G. Technical University Hamburg-Harburg, GERMANY <sup>1</sup> BASF AG, D67056 Ludwigshafen, GERMANY
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10.00-10.20	<b>GLS2 Assessment of hydrodynamics in lab-scale three-phase internal loop airlift reactors</b> Olivieri, G., Marzocchella, A. and Salatino, P. Università di Napoli "Federico II", ITALY
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10.20-10.40	<b>GLS3 On the mechanism of liquid injection into fluidized bed reactors</b> Bruhns, S. <sup>1</sup> and Werther, J. Technical University Hamburg-Harburg, GERMANY <sup>1</sup> BASF AG, D67056 Ludwigshafen, GERMANY
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10.40-11.00	Coffee Break
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### **SESSION II: HYDRODYNAMICS -BFB**

*Co-chairs: J. Werther and M. Poletto*

11.00-11.20	<b>HB1 Structuring fluidized bed operation in a nature inspired way</b> Coppens, M.O. Delft University of Technology, THE NETHERLANDS
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11.20-11.40	<b>HB2 Hydrodynamics and gas-mixing in the splash zone of bubbling fluidized bed reactors</b> Solimene, R., Marzocchella, A., Ragucci, R. and Salatino, P. Università di Napoli "Federico II", ITALY
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- 11.40-12.00      **HB3    Structural modifications of a fluidized bed: inventory and fluidizing flowrate effect**  
Delebarre, A., Ramos, L., Morales, J.M. and Levol, E.  
Ecole des Mines de Nantes, FRANCE
- 12.00-12.20      **HB4    Application of electrical capacitance tomography to fluidized beds operating in different regimes of fluidization**  
Pugsley, T.S.  
University of Saskatchewan, CANADA
- 12.20-12.40      **HB5    Transport equation for modeling particle contacts**  
Gera, D.<sup>1</sup>, Syamlal, M.<sup>1</sup> and O'Brien, T.J.<sup>2</sup>  
<sup>1</sup> Fluent Incorporated, USA  
<sup>2</sup> US Department of Energy, USA
- 12.40-13.00      **HB6    Predicting the transition from bubbling to slugging fluidization using CFD**  
Lettieri, P.<sup>1</sup>, Saccone, G.<sup>2</sup> and Cammarata, L.<sup>1</sup>  
<sup>1</sup>University College London, UK  
<sup>2</sup>Universita' di Napoli "Federico II", ITALY
- 13.00-14.00      **Lunch Break**
- 14.00-16.00      **POSTER SESSION I**

**LIQUID-SOLID, GAS-LIQUID-SOLID AND DENSE-GAS FLUIDIZATION**

- GLS4    Ultrasonic signals analysis for phase holdups in a gas-liquid-solid fluidized bed**  
Zheng, Y. and Vatanakul, M.  
University of New Brunswick, CANADA

**HYDRODYNAMICS -BFB**

- HB7    Estimation of solids flow properties in gas- solid fluidized beds**  
Mostoufi, N.<sup>1</sup> and Chaouki, J.<sup>2</sup>  
<sup>1</sup>University of Tehran, IRAN  
<sup>2</sup>École Polytechnique de Montréal, CANADA
- HB8    Characteristics of fluidized beds of silicon particles with and without tube internals**  
Luo, W., Liang, W., Wang, G. and Wang J.  
Tsinghua University, PR CHINA
- HB9    Hydrodynamics of a flow of a gas-solid two-phase mixture through a packed structure**  
Wang, Z.L., Ding, Y.L., and Ghadiri, M.  
University of Leeds, UK
- HB10    Experimental study and CFD modeling of bubble formation in a 2D bubbling fluidized bed**  
Kallio S.<sup>1</sup>, Ojaniemi, U.<sup>2</sup>, Hermanson, A.<sup>1</sup>, Fagerudd, K.<sup>1</sup>, Engblom, M.<sup>1</sup> and Manninen, M.<sup>2</sup>  
<sup>1</sup>Åbo Akademi University, FINLAND  
<sup>2</sup>VTT Processes, FINLAND
- HB11    Discharge from a high pressure fluidized bed through an orifice**  
Tallon, S.<sup>1</sup> and Davies, C.E.<sup>2</sup>  
<sup>1</sup>Industrial Research Ltd, NEW ZEALAND  
<sup>2</sup>Massey University, NEW ZEALAND
- HB12    Penetration of single and multiple horizontal jets into fluidized beds**

Donald, A., Bi, H., Grace, J.R., and Lim, C.J.  
University of British Columbia, Canada

### **AGGLOMERATION, MIXING AND SEGREGATION**

**AMS1 DEM-CFD simulation of the gas fluidization of a mixture of two solids**

Di Renzo, A. and Di Maio, F.P.  
Università della Calabria, ITALY

**AMS2 Comparison of continuum models using the kinetic theory of granular flow with discrete particle models and experiments: extent of particle mixing induced by bubbles**

Bokkers, G.A., Van Sint Annaland, M. and Kuipers, J.A.M.  
University of Twente, THE NETHERLANDS

**AMS3 Fully 3D DEM simulations of fluidised beds including granulation**

Thornton, C.<sup>1</sup> and Kafui, K.D.<sup>2</sup>  
<sup>1</sup>University of Birmingham, UK  
<sup>2</sup>Aston University, UK

**AMS4 Influence of inclined plates on separation behaviour of fluidised suspensions - enhanced elutriation**

Doorodchi, E.<sup>1</sup>, Zhou, J.<sup>1</sup>, Fletcher, D.F.<sup>2</sup> and Galvin K.P.<sup>1</sup>  
<sup>1</sup> University of Newcastle, AUSTRALIA  
<sup>2</sup> University of Sydney, AUSTRALIA

16.00-16.20

Coffee Break

### **SESSION III: AGGLOMERATION, MIXING AND SEGREGATION**

*Co-chairs: F. Wei and M.L. Mastellone*

16.20-16.40

**AMS5 Particle motion and defluidisation by sintering in the fluidised bed polyethylene process**

Seville, J.P.K.<sup>1</sup>, Salleh, A.M.<sup>1</sup>, Ingram, A.<sup>1</sup>, Mc Cormack, A.<sup>1</sup>, Greenwood, R.<sup>1</sup> and Reiling, V.<sup>2</sup>  
<sup>1</sup>University of Birmingham, UK  
<sup>2</sup>BP Chemicals, FRANCE

16.40-17.00

**AMS6 Agglomeration and defluidization phenomena in a gas-solids fluidized bed operated with different liquid feedings**

Mastellone, M.L. and Arena, U.  
Seconda Università di Napoli, ITALY

17.00-17.20

**AMS7 Segregating fluidization of beds of two dissimilar solids: the effect of component concentration, density and size**

Formisani, B., Girimonte, R. and Mortara, M.  
Università della Calabria, ITALY

17.20-17.40

**AMS8 Mechanistic study of defluidization**

Wang, X.S. and Rhodes, M.J.  
Monash University Clayton, AUSTRALIA

17.40-18.00      **AMS9 The similar particle assembly (SPA) model, an approach to large-scale discrete element (DEM) simulation**  
Kuwagi, K. <sup>1</sup>, Takeda, H. <sup>2</sup> and Horio, M. <sup>3</sup>  
<sup>1</sup>Okayama University of Science, JAPAN  
<sup>2</sup>Rflow Co. Ltd., JAPAN  
<sup>3</sup>Tokyo University of Agri. and Technol., JAPAN

18.00-18.20      **AMS10 CFD-DPM simulation of the mixing-segregation phenomena in a magnetically assisted fluidized bed with constant gradient (MAFBCG)**  
Pinto-Espinoza, J. <sup>1</sup> and Jovanovic, G.N. <sup>2</sup>  
<sup>1</sup>Instituto Tecnológico de Durango; MÉXICO  
<sup>2</sup>Oregon State University, USA

18.20-19.20      **WORKSHOP I**  
**FLUIDIZATION IN NATURAL PHENOMENA**  
*Chair: P. Salatino*

20.00-              **Dinner**

## **Tuesday, May 11, 2004**

07.00-08.00      **Breakfast Buffet**

08.20-09.40      **INVITED LECTURE II**  
*Chair: J.M. Matsen*  
**Granular flows and gas-fluidization**  
Charles S. Campbell  
University of Southern California, USA

09.40-10.00      **SESSION IV: HEAT AND MASS TRANSFER**  
*Chair: K.-E. Wirth*  
**HMT1 Simulation of an oil droplet impact on a FCC particle in feed nozzle conditions**  
Ge, Y. and Fan, L.-S.  
Ohio State University, USA

10.00-10.20      **HMT2 Surface to bed heat transfer in fluidised beds**  
Di Natale, F. <sup>1</sup>, Lancia, A. <sup>1</sup>, Musmarra, D. <sup>2</sup> and Nigro, R. <sup>1</sup>  
<sup>1</sup>Università di Napoli "Federico II", ITALY  
<sup>2</sup>Seconda Università di Napoli, ITALY

10.20-10.40      **HMT3 Experimental study of droplet vaporization kinetics in a warm fluidized bed**  
Leclère, K. <sup>1</sup>, Briens, C. <sup>2</sup>, Gauthier, T. <sup>1</sup>, Bayle, J. <sup>1</sup>, Guigon, P. <sup>3</sup> and Bergougnou, M. <sup>2</sup>  
<sup>1</sup>Institut Français du Pétrole, FRANCE  
<sup>2</sup>University of Western Ontario, CANADA  
<sup>3</sup>Université de Technologie de Compiègne, FRANCE

10.40-11.00      **Coffee Break**

## **SESSION V: HYDRODYNAMICS - RISERS/DOWNERS**

*Co-chairs: J.R. Grace and T.M. Knowlton*

- 11.00-11.20**      **HRD1**    **An experimental investigation of the transition dense-dilute regime in fast fluidisation**  
Kuestner, S., Ocone, R. and Geldart, D.  
Heriot-Watt University, UK
- 11.20-11.40**      **HRD2**    **Particle clustering pattern and its relationship with gas-solids flow behavior in a CFB downer reactor**  
Zhang, M., Qian, Z., Wei, F. and Jin, Y.  
Tsinghua University, PR CHINA
- 11.40-12.00**      **HRD3**    **Line-and-sinker measurement of solids circulation rate in a high-temperature circulating fluidized bed**  
Muir, J.R., Brereton, C.M.H., Grace, J.R. and Lim, C.J.  
University of British Columbia, CANADA
- 12.00-12.20**      **HRD4**    **Gas-solid flow behaviors in a 0.42m diameter CFB downer with nozzle gas injection**  
Zhang, M.<sup>1</sup>, Qian, Z.<sup>1</sup>, Yu, H.<sup>1</sup>, Wei, F.<sup>1</sup>, Huziwara, W.K.<sup>2</sup>, de R.Pinho, A.<sup>2</sup>, Ramos, J.G.F.<sup>2</sup> and Silva, M.<sup>2</sup>  
<sup>1</sup>Tsinghua University, PR CHINA  
<sup>2</sup>Petrobras, BRAZIL
- 12.20-12.40**      **HRD5**    **Measurement of velocity and concentration of particles in CFB by means of a novel telemetric probe**  
Mirek P., Pisarek, J. and Nowak, W.  
Technical University of Czestochowa, POLAND
- 12.40-13.00**      **HRD6**    **Characterisation of local flow structures in a high loaded riser-reactor at elevated temperatures**  
Strabel, M. and Wirth, K.E.  
University of Erlangen, GERMANY

**13.00-14.00**                      **Lunch Break**

**14.00-16.00**                      **POSTER SESSION II**

**HEAT AND MASS TRANSFER**

- HMT4**    **3D modelling of radiative heat transfer in a circulating fluidized bed combustor**  
Hua, Y.<sup>1,2</sup>, Flamant, G.<sup>1</sup>, Lu, J.<sup>2</sup>, Gauthier, D.<sup>1</sup> and Li, H.<sup>3</sup>  
<sup>1</sup>Institut de Science et de Génie des Matériaux et Procédés, CNRS-IMP, FRANCE  
<sup>2</sup>Huazhong University of Science and Technology, PR CHINA  
<sup>3</sup>University of Science and Technology, China

- HMT5**    **Heat transfer in a membrane assisted fluidised bed with immersed horizontal tubes**  
Deshmukh, S.A.R.K., Volkens, S., Van Sint Annaland, M. and Kuipers, J.A.M.  
Twente University, THE NETHERLANDS

**HYDRODYNAMICS - RISERS/DOWNERS**

- HRD7**    **Hydrodynamic performance of a circulating powder-particle fluidized bed**  
Nakazato, T., Mahmoud, E.A., Nakagawa, N. and Kato, K.  
Gunma University, JAPAN

- HRD8 Experimental study of gas-solid flow in risers**  
Van Engelandt, G., Heynderickx, G.J. and Marin, G.B.  
Ghent University, Belgium
- HRD9 Analysis of mesoscale structures in a circulating fluidized bed using a phase doppler particle analyzer**  
Bergenblock, T.<sup>1</sup>, Johnsson, F.<sup>1</sup>, Leckner, B.<sup>1</sup>, Onofri, F.<sup>2</sup> and Tadrif, L.<sup>2</sup>  
<sup>1</sup>Chalmers University of Technology, SWEDEN  
<sup>2</sup>IUSTI-CNRS, University of Provence, FRANCE
- HRD10 Gas/solids mixing-behaviour in the entrance region of a downer and its effect on the residence time distribution of the gas**  
Brust, H. and Wirth, K.E.  
University of Erlangen, GERMANY
- HRD11 Particle velocity and particle clustering in downflow reactors: measurements using a CREC-GS-optiprobe**  
Nova, S., Krol, S. and de Lasa, H.  
University of Western Ontario, CANADA
- HRD12 Comparison of FCC particle flow in a twin-riser system**  
Yan, A.-J. , Zhu, H.-Y. and Zhu, J.  
University of Western Ontario, CANADA
- HRD13 The influence of the distributor pressure drop on the hydrodynamics of a circulating fluidized bed**  
Guo, Q.<sup>1</sup>, Werther, J.<sup>2</sup> and Hartge, E.U.<sup>2</sup>  
<sup>1</sup>Tsinghua University, PR CHINA  
<sup>2</sup>Technical University Hamburg-Harburg, GERMANY
- SCALE UP, DYNAMICS AND CHAOS**
- SDC1 Monitoring fluidized bed hydrodynamics using power-law statistics of pressure fluctuations**  
Gheorghiu S., van Ommen, J.R. and Coppens, M.O.  
Delft University of Technology, THE NETHERLANDS
- SDC2 Study of circulating fluidized-bed operating regimes: dynamic behavior after solids flow shutoff**  
Mei, J.S.<sup>1</sup>, Monazam, E.R.<sup>2</sup> and Shadle, L.J.<sup>1</sup>  
<sup>1</sup>U.S. Department of Energy, USA  
<sup>2</sup>REM Engineering Services PLLC, USA
- SDC3 Application of chaos analysis to fluidized bed drying of pharmaceutical granulate**  
Chaplin, G.<sup>1</sup>, Pugsley, T.<sup>1</sup> and Winters, C.<sup>2</sup>  
<sup>1</sup>University of Saskatchewan, CANADA  
<sup>2</sup>Merck Frosst Canada & Co., CANADA
- SDC4 Scale-up of a fluidised bed granulation process from batch to continuous based on similarity of growth kinetics**  
Boerefijn, R.<sup>1</sup>, Klaver, M.<sup>1</sup> and Hounslow, M.J.<sup>2</sup>  
<sup>1</sup>Unilever R&D, THE NETHERLANDS  
<sup>2</sup>University of Sheffield, UK
- SDC5 Evolution of multi-scale heterogeneity in fluidization - the pseudo-particle approach**  
Zhang, J., Ge, W., and Li, J.  
Academia Sinica, PR CHINA

## HYDRODYNAMICS: SPOUTED/TURBULENT

### HST1 Classification and determination of flow regimes in spout-fluidized beds

Zhang, J.-Y. and Tang, F.  
Fuzhou University, PR CHINA

### HST2 3-D discrete element method simulation of a spouted bed: predictions of particle motion

Takeuchi, S., Wang, X.S. and Rhodes, M.J.  
Monash University Wellington RD, AUSTRALIA

### HST3 Flow regimes recognition of spouted beds through mutual information function

Xu, J.<sup>1</sup>, Bao, X.<sup>1</sup>, Wei, W.<sup>1</sup>, Bi, H.T.<sup>2</sup>, Grace, J.R.<sup>2</sup> and Lim, J.C.<sup>2</sup>  
<sup>1</sup>China National Petroleum Co., University of Petroleum, P. R. CHINA  
<sup>2</sup>University of British Columbia, CANADA

16.00-16.20 Coffee Break

## SESSION VI: SCALE UP, DYNAMICS AND CHAOS

*Co-chairs: L. Glicksman and M. Horio*

16.20-16.40 SDC6 Scaling relationships for fluidized beds, recent progress

Glicksman, L.R.  
Massachusetts Institute of Technology, USA

16.40-17.00 SDC7 Reliable validation of the simplified scaling rules for fluidized beds

van Ommen, J.R.<sup>1</sup>, Sanderson, J.<sup>2</sup>, Nijenhuis, J.<sup>1</sup>, Rhodes, M.J.<sup>2</sup> and van den Bleek, C.M.<sup>1</sup>  
<sup>1</sup>Delft University of Technology, THE NETHERLANDS  
<sup>2</sup>Monash University, AUSTRALIA

17.00-17.20 SDC8 Influence of the fluid inlet conditions on the dynamics of dense fluidized beds

Sierra, C. and Tadrist, L.  
Polytech' Marseille, FRANCE

17.20-17.40 SDC9 Dynamics of gas-solid fluidized beds - inclusion of the air supply system

Srdjan, S., Leckner, B. and Johnsson, F.  
Chalmers University of Technology, SWEDEN

17.40-18.00 SDC10 Dynamics and control of fluidised beds

Croxford, A.J., Lim, C.N., Gilbertson, M.A. and Harrison, A.J.L.  
University Walk Bristol, GREAT BRITAIN

18.00-18.20 SDC11 Relationships between chaotic invariants and cluster characteristics in CFB's

Sutton, C.R., Sharma, A.K., Tuzla, K. and Chen, J.C.  
Lehigh University, USA

## WORKSHOP II

18.20-19.20 CHOKING

*Co-Chairs: M.J. Rhodes and W.-C. Yang*

20.00- Dinner

**Wednesday, May 12, 2004**

07.00-08.20                      **Breakfast Buffet**

**SESSION VII: HYDRODYNAMICS: SPOUTED/TURBULENT**

*Co-chairs: J. Chen and F. Johnsson*

- 08.40-09.00            **HST4    Gas bypassing in deep fluidized beds**  
Reddy Karri, S.B., Issangya, A. and Knowlton, T.M.  
Particulate Solid Research Inc., USA
- 09.00-09.20            **HST5    Transition to turbulent fluidization**  
Bi, H.T.  
University of British Columbia, CANADA
- 09.20-09.40            **HST6    Comments and experimental data on the transition from bubbling to turbulent fluidization**  
Newton, D., Fiorentino, M. and Smith, G.B.  
BP Chemicals Ltd., UK
- 09.40-10.00           **HST7    Comparison of PIV measurements and a discrete particle model in a rectangular 3D spout-fluid bed**  
Link, J.M., Deen, N.G. and Kuipers, J.A.M.  
University of Twente, THE NETHERLANDS

**SESSION VIII: CHEMICAL, PETROCHEMICAL, MATERIAL SYNTHESIS**

*Co-chairs: D.L. Keairns and F. Berruti*

- 10.00-10.20           **CPM1   Rocky road to commercialization: breakthroughs and challenges in the commercialization of fluidized bed reactors**  
Bolthrunis, C.O., Silverman, R.W., and Ferrari, D.C.  
Badger Technologies, USA
- 10.20-10.40           **CPM2   The carbochlorination of titaniferous feedstocks in a fluidized bed**  
Luckos, A. and den Hoed, P.  
Mintek, SOUTH AFRICA
- 10.40-11.00                      **Coffee Break**
- 11.00-11.20           **CPM3   Regeneration characteristics of hydrodesulfurization catalyst by combustion in an internally circulating fluidized bed**  
Jung, D.S.<sup>1</sup>, Roh, S.A.<sup>1</sup>, Kim, S.D.<sup>1</sup> and Guy, C.<sup>2</sup>  
<sup>1</sup>Korea Advanced Institute of Science and Technology, KOREA  
<sup>2</sup>Ecole Polytechnique Montreal, CANADA
- 11.20-11.40           **CPM4   Alternative FCC-feedstocks: recycling of used frying oil**  
Reichhold, A., Ramakrishnan, C. and Wlaschitz, P.  
Vienna University of Technology, AUSTRIA
- 11.40-12.00           **CPM5   Predictive modeling of riser and downer circulating fluidized beds: application to fluid catalytic cracking**  
Bolkan, Y.<sup>1</sup>, Zhu, J.<sup>2</sup>, Berruti<sup>2</sup>, F. and Milne, B.<sup>1</sup>  
<sup>1</sup>University of Calgary, CANADA  
<sup>2</sup>University of Western Ontario, CANADA

- 12.00-12.20      **CPM6 Cyclone performance in turbulent fluidized bed synthol reactors**  
Smit, P.W., Baloyi, S. and Shingles, T.  
Sasol Technology (Pty) Ltd. SOUTH AFRICA
- 12.20-12.40      **CPM7 Simulation of chemically reactive fluidized beds**  
Syamlal, M.<sup>1</sup>, O'Brien, T.J.<sup>2</sup> and Guenther, C.<sup>1</sup>  
<sup>1</sup>Fluent Inc., USA  
<sup>2</sup>National Energy Technology Laboratory, USA
- 12.40-13.00      **CPM8 Coating fine iron particles with an oxidation-resistant  $\gamma$  alumina nanolayer using ALD in a fluidized bed reactor**  
Wank, J.R.<sup>1</sup>, Hakim, L.<sup>1</sup>, George, S.M.<sup>1</sup>, Weimer, A.<sup>1</sup> and Buechler, K.J.<sup>2</sup>  
<sup>1</sup>University of Colorado, USA  
<sup>2</sup>ALD NanoSolutions, Inc., USA
- 13.00-14.00      **Lunch Break**
- 14.00-15.00      **WORK-IN-PROGRESS POSTER SESSION**
- 20.00-              **Dinner**

### Thursday, May 13, 2004

- 07.00-08.00      **Breakfast Buffet**
- 08.20-09.40      **INVITED LECTURE III**  
*Chair: D. Geldart*  
**Cohesion in fluidization**  
Jonathan P.K. Seville  
University of Birmingham, UK
- 09.40-10.00      **SESSION IX: ASSISTED FLUIDIZATION**  
*Chair: S. Mori*
- 09.40-10.00      **AF1 Fine particle fluidization effects of mechanical/acoustic vibrations**  
Xu, C. , Cheng, Y. and Zhu, J.  
University of Western Ontario, CANADA
- 10.00-10.20      **AF2 Fluidization of nanoparticles**  
Nam, C.H., Pfeffer, R. and Dave, R.N.  
New Jersey Institute of Technology, USA
- 10.20-10.40      **AF3 The influence of AC electric fields on bubbles in gas-solids fluidized beds**  
Kleijn van Willigen, F., van Ommen, J.R., van Turnhout, J. and van den Bleek, C.M.  
Delft University of Technology, THE NETHERLANDS
- 10.40-11.00      **Coffee Break**

### **SESSION X: FINE PARTICLES**

Co-chairs: H.O. Kono and R. Boerefijn

- 11.00-11.20      **FP1      The transition to the bubbling regime of fluidized beds operating at high temperature**  
Formisani, B. and Girimonte, R.  
Università della Calabria, ITALY
- 11.20-11.40      **FP2      A new method to determine the minimum bubbling velocity in fine powder aerations by using experimentally measured elastic deformation coefficient**  
Wiratni, W. and Kono, H.O.  
West Virginia University, USA
- 11.40-12.00      **FP3      Effect of cohesive interparticle forces on minimum fluidization velocity at high temperatures**  
Ammendola, P. and Chirone, R.  
Istituto di Ricerche sulla Combustione - CNR, ITALY
- 12.00-12.20      **FP4      Discrete particle simulation of the homogeneous fluidization of Geldart A particles**  
Ye, M., van der Hoef, M.A. and Kuipers, J.A.M.  
University of Twente, THE NETHERLANDS
- 12.20-12.40      **FP5      The use of aeration to obtain uniform flows of fine particles during the discharge from a hopper loaded with segregated solids**  
Barletta, D., D'Arco, A., Donsi, G., Ferrari, G. and Poletto, M.  
Università di Salerno, ITALY
- 12.40-13.00      **FP6      Fluidization characteristics of ultrafine particles in conical bed**  
Tong, H., Qiu, Q. and Li, H.  
Chinese Academy of Sciences, PR CHINA

13.00-14.00      **Lunch Break**

14.00-16.00      **POSTER SESSION III**

**CHEMICAL, PETROCHEMICAL, MATERIAL SYNTHESIS**

- CPM9      Mass synthesis of carbon-encapsulated magnetic nanoparticles in a fluidized bed reactor**  
Wang, Q., Ning, G., Wei, F. and Luo, G.  
Tsinghua University, PR CHINA
- CPM10      Experiment and simulation on the gas flow feature in the feedstock injection zone of FCC riser**  
Cai, F., Song, W., Sun, G., Fan, Y. and Shi, M.  
University of Petroleum, PR CHINA

**ASSISTED FLUIDIZATION**

- AF4      Effect of vibration addition on bubble size and velocity in two-dimensional fluidized bed**  
Kage, H.<sup>1</sup>, Funaoka, S.<sup>1</sup>, Kohno, H.<sup>1</sup>, Tao, Z.<sup>1</sup>, Yamamura, M.<sup>1</sup> and Hironao, O.<sup>2</sup>  
<sup>1</sup>Kyushu Institute of Technology, JAPAN  
<sup>2</sup>Chiba University, JAPAN

**AF5 Hydrodynamics of carbon nanotubes in a nano-agglomerates fluidized bed**  
Yu, H., Wei, F., Wang, Y. and Luo, G.  
Tsinghua University, PR CHINA

**AF6 Fluidization behavior of rotating fluidized beds**  
Arastoopour, H., Ahmadzadeh, A. and Teymour, F.  
Illinois Institute of Technology, USA

#### FINE PARTICLES

**FP7 Simulations of multiparticle collisions in cohesive granular materials**  
Leszczynski, J.S.  
Czestochowa University of Technology, POLAND

**FP8 Fluidized bed elutriation of fine particles under the presence of particle aggregates**  
Ruiz, R.S., Tovar, H. and Vizcarra, M.G.  
Universidad Autónoma Metropolitana-Iztapalapa, MÉXICO

**FP9 Numerical simulation of gas fluidization of mixtures of cohesive and cohesionless powders**  
Xu, B.H.<sup>1</sup>, Williams, R.A.<sup>1</sup> and Yu, A.B.<sup>2</sup>  
<sup>1</sup>University of Leeds, UK  
<sup>2</sup>University of New South Wales, AUSTRALIA

**FP10 Effect of the cohesive particles on elutriation of the particles from fluidized bed**  
Li, J.<sup>1</sup>, Nakazato, T.<sup>2</sup> and Kato, K.<sup>2</sup>  
<sup>1</sup>Nippon Refine Co. Ltd., JAPAN  
<sup>2</sup>Gunma University, JAPAN

#### ENERGY AND ENVIRONMENTAL

**EE1 Combustion of sewage sludge in bubbling fluidised beds**  
Harris, A., Stuart, S., Dennis, J., Hayhurst, A. and Davidson, J.  
University of Cambridge, UK

**EE2 Attrition of granular activated carbon during filter backwashing**  
Fitzpatrick, C.S.B.  
University College London, UK.

**EE3 Selective absorption reaction of HCl included in fuel gas produced by gasification of wastes into slaked lime in a fluidized bed**  
Itaya, Y.<sup>1</sup>, Kurachi, S.<sup>1</sup>, Kondo, M.<sup>2</sup>, Hamai, M.<sup>2</sup> and Mori, S.<sup>1</sup>  
<sup>1</sup>Nagoya University, JAPAN  
<sup>2</sup>Toyota Motor Co., JAPAN

**EE4 Modeling hydrocarbon oxidation and pollutant formation in FBC of liquid fuels**  
Faravelli, T.<sup>1</sup>, Frassoldati, A.<sup>1</sup>, Ranzi, E.<sup>1</sup> and Miccio, F.<sup>2</sup> Miccio, M.<sup>3</sup>  
<sup>1</sup>Politecnico di Milano, ITALY  
<sup>2</sup>Istituto di Ricerche sulla Combustione - CNR, ITALY  
<sup>3</sup>Università di Salerno, ITALY

**EE5 Fluidization of sand polluted with oil**  
Alappat, B.J.<sup>1</sup>, Déon, S.<sup>2</sup>, Pré, P.<sup>2</sup> and Delebarre, A.<sup>2</sup>  
<sup>1</sup>Indian Institute of Technology Delhi, INDIA  
<sup>2</sup>Ecole des Mines de Nantes, FRANCE

16.00-16.20 Coffee Break

**SESSION XI: ENERGY AND ENVIRONMENTAL**

*Co-chairs: F. Winter and F. Scala*

- 16.20-16.40 EE6 **A model of desulfurization and regeneration characteristics in a fluidized bed hot gas cleanup system**  
Choi, J.-H.<sup>1</sup>, Yi, C.-K.<sup>2</sup>, Son, J.-E.<sup>2</sup> and Kim, S.D.<sup>3</sup>  
<sup>1</sup>Konkuk University, KOREA  
<sup>2</sup>Korea Institute of Energy Research, KOREA  
<sup>3</sup>KAIST, KOREA
- 16.40-17.00 EE7 **An investigation of the influence of fuel feed design and fuel type on the performance of large-scale CFB boilers by means of a 3D combustor model**  
Luecke, K., Hartge, E.U. and Werther, J.  
Technical University Hamburg-Harburg, GERMANY
- 17.00-17.20 EE8 **Fluidized bed pyrolysis of a recycled polypropylene**  
Ponte, M., Mastellone, M.L., Perugini F. and Arena, U.  
Seconda Università di Napoli, ITALY
- 17.20-17.40 EE9 **Distribution of fly ash, circulating and dense bed particles: from laboratory to large-scale CFBCs**  
Winter, F. and Liu, X.  
Vienna University of Technology, AUSTRIA
- 17.40-18.00 EE10 **Effects of char inventory and size distribution on nitric oxide formation in CFB combustion of coal**  
Kallio S., Konttinen, J. and Kilpinen, P.  
Åbo Akademi University, FINLAND
- 18.00-18.20 EE11 **A 1-D zone model for the axial burning profile of liquid fuels in bubbling fluidized beds**  
Scala, F.<sup>1</sup>, Miccio, F.<sup>1</sup> and Miccio, M.<sup>2</sup>  
<sup>1</sup>Istituto di Ricerche sulla Combustione - CNR, ITALY  
<sup>2</sup>Università di Salerno, ITALY

20.00- Gala Dinner

**Friday, May 14, 2004**

07.00-08.40 Breakfast Buffet

09.00-10.40 **WORK-IN-PROGRESS POSTER SESSION**

10.40-11.00 Coffee Break

11.00-12.20 **WORK-IN-PROGRESS POSTER SESSION**

13.00-14.00 Lunch Break