



6th International Conference on
COMPUTATIONAL FLUID DYNAMICS
in the Oil & Gas, Metallurgical and Process
Industries

Trondheim, Norway 10-12 June 2008

Keynotes

Drag reduction and viscoelastic turbulence in polymer solutions: toward a unified framework,

Michael Graham, University of Wisconsin, USA

Multiscale modeling of solidification processes,

Cristoph Beckermann, University of Iowa, USA

Numerical methods for predicting Eulerian multiphase flows,

Sergio Vásquez, ANSYS, UK

Tomographic methods for measurements and visualization of complex flowing systems,

Horst-Michael Prasser, ETH Zürich, Switzerland

Bubble dynamics and transfer processes in pure and contaminated system,

Dieter Bothe, RWTH Aachen, Germany

Dissipative particle dynamics and related methods for multiphase fluid flow in fractured and porous media,

Paul Meakin, Idaho National Laboratory, USA

Drag Reduction / Acoustics

CFD08-023: *DNS Experiments in Taylor-Couette Geometry: Case of Drag-reducing Fluids*, S.Guillou & R.Makhloufi, Laboratoire Universitaire des Sciences Appliquées de Cherbourg, France

CFD08-094: *Drag Reduction in Swirling Pipeflow*,

F.Nygård & H.I.Andersson, NTNU, Norway

CFD08-096: *High Frequency Dynamics in Centrifugal Compressors*,

A.Twerda, D.Meulendijks, J.Smeulers, R.van den Handel & L.van Lier., TNO S&I, The Netherlands

CFD08-101: *A Phenomenological Model of Aero-Acoustic Wave Propagation in Low Mach Number Corrugated Pipe Flow*, M.Popescu & S.T.Johansen, SINTEF, Norway

Meshfree Methods

CFD08-016: *Ball Motion in a Full Scale Two Chamber Cement Mill*,
P.W.Cleary, CSIRO, Australia

CFD08-030: *Dissipative Particle Dynamics Beyond Polymer Science*,
J.C.Arce & H-J.Bart, TU Kaiserslautern, Germany

CFD08-047: *On the Feasibility of Using the Mesh-free SPH Method for Modelling Thermo-Mechanical Responses in Arc Welding*, R.Das & P.W.Cleary,
CSIRO, Australia

CFD08-048: *Modelling Brittle Fracture and Fragmentation of a Column During Projectile Impact Using a Mesh-Free Method*, R.Das & P.W.Cleary,
CSIRO, Australia

CFD08-079: *A meshfree CFD-Population Balance Equation coupled Model*,
S.Tiwari, C.Drumm, V.K.Sharma, J.Kuhnert, M.Attarakih, A.Klar & H.-J.Bart,
Fraunhofer Institut Techno-und Wirtschaftsmathematik, Germany

CFD08-093: *Finite Pointset Method (FPM): New Meshfree Flow Solver with Applications to Industry*, J.Kuhnert, Fraunhofer ITWM, Germany

CFD08-103: *Simulation of Mud Loss Using Coupled CFD and DEM*,
P.Skjetne, H.Laux & A.Lavrov, SINTEF Norway

CFD08-127: *Particle-Fluid Multiphase Flow Modelling Using Computational Fluid Dynamics (CFD) and Discrete Element Modelling (DEM)*, W.S.Wong, S.Cole & J.Favier, DEM Solutions Ltd., Scotland

Solidification

CFD08-017: *Prediction of Feeding, Freezing and Defect Creation in Low Pressure Die Casting*, P.W.Cleary, CSIRO, Australia

CFD08-024: *Influence of Forced Convection to the Directional Solidification of AlSi Alloys – Comparison of Experiment and Simulation*,
J.Dagner, J.Friedrich & G.Müller, Fraunhofer IISB, Germany

CFD08-058: *Modelling of Convective Phenomena in Crystal Growth of Silicon for Photovoltaic Applications*,
J.Dagner, T.Jung, A.Yeckel & J.Friedrich, Fraunhofer IISB, Germany

CFD08-125: *Modelling of MC-Silicon Ingot Casting*,
E.A.Meese, SINTEF, Norway

Population Balance:

CFD08-004: *Prediction of Inclusion Size and Composition in Liquid Steel*,
L.Claudotte, P.Gardin, M.Simonnet, N.Rimbert, B.Oesterlé & J.Lehmann,
ArcelorMittal Research S.A., France

CFD08-020:
Modelling of Bubble Column with Bubble Number Density Equation Using Least-Squares Method, Z.Zhu, C.A.Dorao & H.A.Jakobsen, NTNU, Norway

CFD08-025: *A Population Balance Approach for Polydispersed Bubbly Flows Considering size Dependent Bubble Forces*, E.Krepper, T.Frank, D.Lucas, H-M.Prasser & P.J.Zwart, Forschungszentrum Dresden-Rossendorf, Germany

CFD08-041:
Comparison of Supersonic Droplet Mixing and Evaporation Simulation Between the Full Multiphase, Musig and H-Musig Models,
M.Darwish & F.Moukalled, American University of Beirut, Lebanon

CFD08-060: *CFD Modelling Coupled to Population Balance to Describe Bubble Size Distribution in Agitated Vessels and Bubble Columns*,
M.Petitti, A.Nasuti, D.Marchisio, M.Vanni, G.Baldi, N.Mancini & F.Podenzani,
Politecnico Di Torino, Italy

CFD08-074: *Population Balance Modelling Applied to the Study of Droplet Behaviour*, L.E.Patruno, C.A.Dorao, H.A.Jakobsen & H.F.Svendsen, NTNU, Norway

CFD08-076: *Dynamic Modelling of Liquid Extraction Columns Using the Direct Primary and Secondary Particle Method (DPSPM)*,
M.Attarakih, D.Zeidan, C.Drumm, H.Allaboun, S.Tiwari, H.-J.Bart & J.Kuhnert, Al-Balqa Applied University, Jordan

CFD08-080: *Implementation of the Sectional Quadrature Method of Moments in a CFD code*, C.Drumm, M.Attarakih, S.Tiwari, J.Kuhnert & H.-J. Bart, Lehrstuhl f. Th. Verfahrenstechnik, Germany

Multiphase Pipe Flow:

CFD08-010: *CFD-Analysis of Terrain-induced Slug Flow Regimes in Multiphase Pipeline Systems*, A.Ragab, W.Brandstaetter, G.Ruthammer & S.Shalaby,
University of Leoben, Austria

CFD08-012: *Numerical Prediction of Horizontal Stratified Flows*,
T.Höhne & C.Vallée, Forschungszentrum Dresden-Rossendorf (FZD), Germany

CFD08-013: *Large-scale 3D Simulation of Stratified Gas-liquid Flow Transition and Slug Formation in Oil Transport Pipes*,
D.Lakehal & D.Caviezel, ASCOMP GmbH, Switzerland

CFD08-037: *Computational Study of Stratified Gas/Liquid Flow in Horizontal and Inclined Pipes*, W.A.S.Kumara, B.M.Halvorsen & M.C.Melaen, Telemark University College, Norway

CFD08-054: *Pneumatic Transport of Solid Particles: Simulation and Validation in a Circular Pipe*, D.Suzzi, T.Hoermann & Andreas Reisinger, The Virtual Vehicle Competence Center, Austria

CFD08-104: *Modelling of Breakup and Coalescence in Vertical Bubbly Two-Phase Flows*, S.Lo & D.Zhang, CD-adapco, UK

CFD08-122: *Liquid-Liquid Flow in Horizontal Pipe*, C.Conan, A.Pouplin, O.Masbernat, S.Decarre & A.Line, Laboratoire de Génie Chimique, France

CFD08-123: *Multi-Dimensional Simulations of Stratified to Dispersed Flow Transitions in Gas-Oil Two-Phase Flow in Pipelines*, H.Laux, S.T.Johansen, K.M.Bansal T.J.Danielson, A.Goldszal & J.I.Monsen, SINTEF, Norway

Fluidized Bed:

CFD08-019: *Application of CFD Modelling to Investigate Fluidized Limestone Reactors for the Remediation of Acidic Drainage Waters*, R.Vuthaluru, M.Tade, H.Vuthaluru, Y.Tsvetnenko, L.Evans & J.Milne, Curtin University of Technology, Australia

CFD08-038: *A Discrete Element Study of Moisture Dependent Particle-Particle Interaction During Granulation in a Spout Fluidized Bed*, M.S.van Buijtenen, N.G.Deen, S.Heinrich, S.Antonyuk & J.A.M.Kuipers, University of Twente, The Netherlands

CFD08-045: *Experimental and Numerical Investigation Into Gas Vortex Structures Above A Gas-Solid Fluidised Bed After Successive Single Bubble Eruptions*, S.Vun, J.Naser, P.Witt & W.Yang, Swinburne University of Technology, Australia

CFD08-053: *Role of Flow Structure on Ozone Decomposition in Gas-solid Fluidized Beds – A Multiscale Mass Transfer Model*, W.Dong, W.Wang & J.Li, Chinese Academy of Sciences, China

CFD08-056: *Evaluation of Eulerian-Eulerian CFD Models for Predicting the Hydrodynamics of Circulation Fluidized Bed*, A.Almuttahir & F.Taghipour, University of British Columbia, Canada

CFD08-057: *CFD Simulations of Heat Transfer in Rotating Fluidized Beds in a Static Geometry*, J.De Wilde, Université Catholique de Louvain, Belgium

CFD08-081: *Numerical Study of Bubbling Fluidized Bed Using a Kinetic Theory for Granular Materials Including Normal Stress Effects*, D.Dimitrova & A.Sadiki, Department of Energy and Power Plant Technology, Germany

CFD08-097: *CFD Study of a Rotating Chimney for Rotating Fluidized Beds*,
J.De Wilde, Université catholique de Louvain, Belgium

Flotation:

CFD08-007: *Coupling of CFD and Discrete Calculation of the PBE: Application to the Inclusion Removal by Flotation*,
J.P.Bellot, O.Mirgaux, D.Ablitzer & E.Waz , Ecole des Mines de Nancy, France

CFD08-029: *Numerical Modelling of Non-Newtonian Slurry in a Mechanical Flotation Cell*,
C.Bakker, C.J. Meyer & D.A.Deglon, University of Cape Town, South Africa

CFD08-040: *A Numerical Model for a Flotation Cell*,
M.Streng & O.Wünsch, University of Kassel, Germany

CFD08-052: *Development of Automatic Algorithm for Combining CFD and Multiblock Modelling and Application to Flotation Cell*,
M.Seppälä, M.Laakkonen, M.Manninen, V.Alopaeus & J.Aittamaa,
VTT Technical Research Center of Finland, Finland

Mixing / Separation:

CFD08-006: *A Novel Method to include the Free Surface in a CFD Model of Jet Injection into Partially-Baffled Mixing Vessels*, J-P.Torré, P.Higgins, C.Xuereb & D.F.Fletcher, Sydney University, Australia

CFD08-046: *Application of CFD for Efficient Hydrodynamic Design of Pump-Mix Mixer Settlers*, K.K.Singh, S.M.Mahajani, K.T.Shenoy & S.K.Ghosh,
Indian Institute of Technology, India

CFD08-078: *A Computational Study of the Coalescence Process Between a Drop and an Interface in an Electric Field*,
K.E.Teigen, S.T.Munkejord & E.Bjørklund, NTNU, Norway

CFD08-087: *CFD Analysis for Performance Improvement of Electrostatic Precipitators in the Cement Industry*, S.Srivastava, V.Vitankar, J.V.Joshi, M.C.Agarawal & B.Basu, Grasim Industries Limited, Mumbai, India

Oil/Gas Applications

CFD08-018: *Extreme Wave Interaction With a Floating Oil Rig*
P.Cleary & M.Rudman, CSIRO, Australia

CFD08-036: *A Model of Convection of Non-Newtonian Slurry in a Vertical Fracture*,
D.Eskin, DBR Technology Center, Canada

CFD08-059: *Analytical Treatment of Single-Well Push-Pull “Echo” Tests*, S.G.Johnsen & C.H.Whitson, SINTEF, Norway

CFD08-062: *Computational Modelling of Internal Waves in Gas-oil-water Separators with Verification Against Experimental Data*, A.R. Kristoffersen, K.Sveen, I.Fosse & D.Wood, Aibel AS, Technology & Products, Norway

CFD08-128: *Simulation of Lifeboat Launching under Storm Conditions*, H.J.Mørch, S.Enger, M.Peric & E.Schreck, Agder University, Norway

Flashing Flows

CFD08-035: *Three-Dimensional Modelling of Industrial Flashing Flows*, C.Marsh & A.O’Mahony, CFD Design & Engineering, New Zealand

CFD08-086: *Flash Vessel Process Design*, L.Gunnewiek & U.Shah, Hatch Limited, Canada

Furnace Modelling

CFD08-022: *CFD Modelling of Molten Matte and Slag flows in a Circular 3-phase Smelting Furnace*, J.J.Bezuidenhout, J.J.Eksteen & S.M.Bradshaw, University of Stellenbosch, South Africa

CFD08-031: *CFD Based Approach to Control Ash Related Problems in a Large Scale Tangentially Fired Boiler*, H.Vuthaluru, R.Vuthaluru, H.Yurismono & M.Parinussa, Curtin University of Technology, Australia

CFD08-084: *A Coupled Numerical Study of Slab Temperature and Gas Temperature in the Walking-Beam Type Slab Reheating Furnace*, C-T.Hsieh, M.-J.Huang, S.-T.Lee & C.-H.Wang, National Taiwan University, Taiwan

CFD08-099: *Using Computational Fluid Dynamics to Optimize a Waste Heat Boiler Design*, S.Thakre, T.Kumaresan, B.Basu, M.Patel, T.Mukhopadhyay, R.Chugh, K.Khandelwal & Y.Mathur, Aditya Birla Science and Technology Centre, India

Validation/Measurements

CFD08-032: *UDV Measurements and CFD Simulation of two-phase Flow in a Stirred Vessel*, S.Haavisto, J.Syrjänen, A.Koponen & M.Manninen, VTT Technical Research Centre of Finland, Finland

CFD08-073: *Experimental Study on Solids Circulation Patterns and Bubble Behavior Using Particle Image Velocimetry Combined with Digital Image Analysis*, J.A.Laverman, I.Roghair, M. van Sint Annaland, J.A.M.Kuipers, University of Twente, The Netherlands

CFD08-102: *Accuracy of Bubble velocity Measurement with a Four-Point Optical Fibre Probe*, W.Bai, N.G.Deen, Robert F.Mudde & J.A.M.Kuipers, University of Twente, The Netherlands

Bubble & Droplet Dynamics

CFD08-069: *Direct Numerical Simulation of the Lift Force in Bubbly Flows*, W.Dijkhuizen, M.van Sint Annaland & J.A.M.Kuipers, University of Twente, The Netherlands

CFD08-070: *Numerical Derivation of the Drag Force Coefficient in Bubble Swarms Using a Front Tracking Model*, W.Dijkhuizen, I.Roghair, M.van Sint Annaland & J.A.M.Kuipers, University of Twente, The Netherlands

CFD08-071: *Front Tracking Simulations on Liquid-Liquid Systems; an Investigation of the Drag Force on Droplets*, I.Roghair, W.Dijkhuizen, M.van Sint Annaland & J.A.M.Kuipers, University of Twente, The Netherlands

CFD08-072: *Simulation of Free-Rising Bubble with Soluble Surfactant Using Moving Mesh Finite Volume/ Area Method*, Ž.Tuković & H.Jasak, Faculty of Mechanical Engineering and Naval Architecture, Croatia

CFD08-077: *The Influence of Viscosity and Surface Tension on Droplets Impinging on an Oblique Wall*, J.Urban, B.Weigand, M.Eyselein & R.Tatschl, ITLR, Universität Stuttgart, Germany

CFD08-091: *Numerical Investigation on the Rise Behaviour of Single Gaseous Bubbles in Quiescent Liquids*, H.Weking & B.Weigand, Universität Stuttgart, Germany

CFD08-098: *VOF-Based Simulation of Reactive Mass Transfer Across Deformable Interfaces*, D.Bothe, M.Kröger, A.Alke & H.J.Warnecke, RWTH Aachen University, Germany

CFD08-113: *Movement of Bubbles under a Solid Surface*, A.Perron, L.Kiss, S.Poncsák & P.Chartrand, ARDC, Canada

Particle Tracking

CFD08-043: *Influence of Particle Agglomeration and Agglomerate Porosity on the Simulation of Gas Cyclones*, J.Lipowsky & M.Sommerfeld, Center for Engineering Sciences MLU Halle-Wittenberg, Germany

CFD08-050: *Numerical Study and Experimental Validation of Particle Strand Formation*, D.Kahrimanovic, S.Pirker & C.Kloss, Johannes Kepler University, Austria

CFD08-051: *Implementation and Experimental Validation of a Stochastic Interparticle Collision Model*, C.Kloss & S.Pirker,
Johannes Kepler University, Austria

CFD08-092: *Dynamics of Sheared Suspensions: Simulation of Hydrodynamic Interactions and Collisions*, E.Climent, M.Abbas, O.Simonin & M.Maxey,
Laboratoire Génie Chimique, France

Lattice Boltzmann:

CFD08-066: *Towards the Construction of Lattice Boltzmann Models for Two Phase Flow Simulation at High Pressures*, P.M.Dupuy, L.E.Patrano, M.Fernandino, H.A.Jakobsen & H.F.Svendsen, NTNU, Norway

CFD08-068: *Effects of Heterogeneity on the Drag Force in Random Arrays of Spheres*, S.H.L.Kriebitzsch, M.A.van der Hoef, J.A.M.Kuipers,
University of Twente, The Netherlands

CFD08-089: *Fluid-Particle Interaction Force for Polydisperse Systems from Lattice Boltzmann Simulations*, S.Sarkar, M.A.v.d.Hoef & J.A.M.Kuipers,
University of Twente, The Netherlands

CFD08-105: *Determination of Aerodynamic Coefficients of Agglomerates Using the Lattice-Boltzmann Method*,
M.Dietzel & M.Sommerfeld, MLU Halle-Wittenberg, Germany

Industrial Applications

CFD08-027: *Study and Optimization of Spacer Filament Geometry for Spiral Wound Membrane*, K.K.Lau, M.Z.Abu Bakar, A.L. Ahmad & S.H.Chang,
Universiti Teknologi Petronas, Malaysia

CFD08-033: *CFD Simulation of a Honeycomb Monolith Photoreactor*,
S.H.Chong, V.Pareek, S.Wang, M.O.Tade & H.M.Ang,
Curtin University of Technology, Australia

CFD08-064: *A Particle Tracking Technique to Estimate Disinfection Efficacy in Drinking Water Treatment Plants*,
B.A.Wols, J.A.M.H.Hofman, W.S.J.Uijtewaai, L.C.Rietveld, G.S.Stelling & J.C.vanDijk, Delft University of Technology, The Netherlands

Bubble Columns

CFD08-039: *CFD-Modelling of the Bubble Size in a Bubble Column Using the One-group Interfacial Area Concentration Equation*,
R.Hansen, T.Solberg & B.H.Hjertager, Aalborg University Esbjerg, Denmark

CFD08-063: *Development and Initial Application of a Combined Volume of Fluid and Discrete Phase Modelling Approach to Gas Stirred Vessels*,
S.W.P.Cloete, J.J.Eksteen & S.M.Bradshaw, University of Stellenbosch, South Africa

CFD08-082: *Design of Bubble Column Reactor by Population Balance Approach*,
A.S.Kumar, V.Vitankar & B.Basu, Aditya Birla Science and Technology, India

CFD08-083: *Computational Fluid Dynamics of Gas-liquid Flows in Bubble-columns Including Bubble Population Balances*,
S.Bove, T.Solberg & B.H.Hjertager, Aalborg University Esbjerg, Denmark

Metallurgical Applications:

CFD08-009: *CFD Modelling of a Reactive Gas Stirred Three Phase Silicon Reactor*,
J.E.Olsen, D.Darmana, A.Ashrafian & K.Tang, SINTEF, Norway

CFD08-100: *Design Optimization of the De-duster to Reduce Alumina Carry Over Load on the Dry Scrubbing System*, T.Kumaresan, S.Thakre, B.Basu, B.Jain, K.Pandey, R.Singh & R.Somani, Aditya Birla Science and Technology Centre, India

CFD08-114: *A Reactor Model for Ladle Refining of Silicon Metal*,
A.Ashrafian, S.T.Johansen, S.Gaal & B.Andresen, SINTEF, Norway

CFD08-119: *CFD Modelling of Aluminum Mixing in a HDGL Zinc Pot*,
E.van Vliet, T.Lucas, T.Peeters, M.Huisert & R.Mallens,
Corus Research, The Netherlands

Heat & Mass Transfer

CFD08-014: *CFD-based Adsorption Modelling: From Pilot to Industrial Scale*,
F.Augier, C.Laroche & E.Brehon, IFP-Lyon, France

CFD08-026: *A Vof-based 3D Numerical Investigation of Evaporating, Deformed Droplets*, J.Schlottke, E.Dülger & B.Weigand, Universität Stuttgart, Germany

CFD08-067: *CFD Model for Particulate Fouling – Modelling Particle Adhesion on Surface with XDLVO Theory*, U.Ojaniemi, T.Pättikangas, M.Riihimäki & M.Manninen, VTT Technical Research Centre of Finland, Finland

CFD08-121: *Flow and Heat Transfer in Pipe Caused by Localized Cold Spot*,
U.Mme, S.T.Johansen, S.Sarkar, R.Moe, A.Goldszal, H.Holm & Y.Ladam,
NTNU, Norway