

**International Symposium on Mixing in Industrial Processes 6**

Niagara Falls, Ontario, Canada

August 17-21, 2008

**Final Program**

**Sunday August 17, 2008**

**Registration: 3:00-6:00pm Skylight Foyer**

**Dinner: 5:00pm - 6:30pm – Sunhill Dining Room**

Conference Sessions will be held in Amphitheatre

<b>Session 1: Multiphase Mixing 1 – Liquid-Liquid System</b>			
<b>Co-Chairs: C. Bennington &amp; A. Etchells</b>			
1.1	Dispersive Mixing of Immiscible Liquids and Gases Using Rotor-Stator Devices and Membranes	Erich J. Windhab	6:30 PM – 7:10 PM
1.2	Fundamental Experimental and Numerical Analysis of Stirred Liquid/Liquid Systems for PVC-Production in Slim Reactors with Multi-Stage Stirrers	Sebastian Maaß, Florian Metz, Torsten Rehm and Matthias Kraume	7:10 PM – 7:35 PM
1.3	Dispersion of High Viscosity Liquid-Liquid Systems by Flow Through SMX Static Mixer Elements	N.V.Rama Rao, M.H.I. Baird, A.N.Hrymak, and P.E. Wood	7:35 PM – 8:00 PM
1.4	Emulsification using a SMX Sulzer Static Mixer in Turbulent Flow for a Microencapsulation Process	Félicie Theron, Nathalie Le Sauze, and Alain Ricard	8:00 PM – 8:25 PM
Break			
1.5	High-Speed Visualization of Multiphase Dispersions in a Mixing Tank	Eliane Guevara-López, René Sanjuan-Galindo, Ma. Soledad Córdova-Aguilar, Gabriel Corkidi, Gabriel Ascanio and Enrique Galindo	8:45 PM – 9:10 PM
1.6	Using Static Mixers to Intensify Diesel Desulfurization Operations	A.M. Al Taweel, F. Azizi and A. Uppal	9:10 PM – 9:35 PM
1.7	Positron Emission Particle Tracking Inside Caverns Formed during Mixing of an Industrial Slurry	L. Adams, F. Chiti, A. Guida, S. Jaffer, A.W. Nienow and M. Barigou	9:35 PM – 10:00 PM
Evening Social Hour & Vendor Displays Garden View Foyer			10:00 PM – 11:00 PM

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**Monday August 18, 2008**

**Breakfast: 7:00am - 8:00am– Sunhill Dining Room**

<b>Session 2: Mixing of Viscous and Complex Fluids</b>			
<b>Co-Chairs: M. Dawson &amp; M. Liu</b>			
2.1	Innovations and Trends in Viscous Mixing	Philippe A. Tanguy	8:00 AM – 8:40 AM
2.2	Mixing by Rotary Jet Heads: Indications of the Benefits of Head Rotation Under Turbulent and Transitional Flow Conditions	Mikkel Nordkvist, Marie Vognsen, Alvin W. Nienow, John Villadsen and Krist V. Gernaey	8:40 AM – 9:05 AM
2.3	Cavern Formation in Agitated Pulp Suspension Stock Chests using Side-Entering Impellers	Leo K. Hui, Chad P.J Bennington and Guy A. Dumont	9:05 AM – 9:30 AM
2.4	Analysis of Cavern Formation in Mixing Yield Stress Fluids using Tomography and CFD Modeling	Leila Pakzad, Farhad Ein-Mozaffari and Philip Chan	9:30 AM – 9:55 AM
<b>Break</b>			
2.5	Novel Static Mixers for Surge Dampening	E. Bruce Nauman and Oliver J. Smith IV	10:25 AM – 10:50 AM
2.6	Mixing Performance Experiments in an Agitated Vessel Subjected to Unsteady Rotational Speeds	Koji Takahashi, Kazunari Kurisaka and Hitoshi Sekine	10:50 AM – 11:15 AM
2.7	Processing and Curing of New Isocyanate-Based Bituminous Products	MJ Martín-Alfonso, P Partal, FJ Navarro, M García-Morales and C Gallegos	11:15 AM – 11:40 AM
2.8	Mixing Analysis of a Newtonian Fluid in a 3D Planetary Pin Mixer	Robin Kay Connelly and James Valenti-Jordan	11:40 AM -12:05 PM
2.9	Flow and Mixing Characteristics of S-Type Plate Static Mixer with Splitting and Inverse Recombination	Kazuo Ohkawa, Yushi Hirata and Yoshiro Inoue	12:05 PM – 12:30 PM
<b>Lunch – Sunhill Dining Room</b>			12:30 – 1:30PM

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**Dinner: 5:00pm - 6:30pm – Sunhill Dining Room**

<b>Session 3: Measurement and Characterization of Mixing</b>			
<b>Co-Chair: A. Hrymak and P. Anderson</b>			
3.1	Necessity of Development Based on Consistent Viewpoint	Kohei Ogawa	6:30 PM – 7:10 PM
3.2	Techniques For Visualisation of Cavern Boundaries in Opaque Industrial Mixing Systems	Mark Simmons, Iwan Edwards, Jonathan Hall, Xianfeng Fan, David Parker and Hugh Stitt	7:10 PM – 7:35 PM
3.3	Quantifying Mixing: The Exposure Dimension	Suzanne M. Kresta, Joelle Aubin and Alena Kukukova	7:35 PM – 8:00 PM
3.4	A Measure of Mixing from Lagrangian Tracking and its Application to Granular and Fluid Flow Systems	J. Doucet, F. Bertrand and J. Chaouki	8:00 PM – 8:25 PM
<b>Break</b>			
3.5	Structured Fluids, Microstructural Heterogeneity and Mixing	Patrick Spicer	8:45 PM – 9:10 PM
3.6	Chaotic Flow in Laminar Mixing in Stirred Vessels	Gabriel Ascanio and Fernando J. Muzzio	9:10 PM – 9:35 PM
3.7	A Mapping Method Based On Gaussian Quadrature: Application To Viscous Mixing	Vincent Stobiac, Mourad Heniche, Christophe Devals, François Bertrand, Philippe Tanguy	9:35 PM – 10:00 PM
Evening Social Hour & Vendor Displays Garden View Foyer			10:00 PM – 11:00 PM

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**Tuesday August 19, 2008**

**Breakfast: 7:00am - 8:00am– Sunhill Dining Room**

<b>Session 4: Industrial Mixing and High Shear Mixing Devices</b>			
<b>Co-Chairs: D. Dickey &amp; S. Kresta</b>			
4.1	Mixing and Chemical Reactions: An Industrial Perspective	Richard K. Grenville	8:00 AM – 8:40 AM
4.2	Some Mixing Effects to Consider on Scale-Up, Process Relocation, and/or Vessel Modification	Edward L. Paul	8:40 AM – 9:05 AM
4.3	In-Mixer Measurements to Describe the Mixture Kinetics during Concrete Mixing	Bogdan Cazacliu	9:05 AM – 9:30 AM
4.4	Studies on Horizontal Mixing Vessels	Nobuyuki Kasahara, Shin Tatematsu, Shigeki Kobayashi, Yasuhiko Matsuoka and Hiroki Nagai	9:30 AM – 9:55 AM
<b>Break</b>			
4.5	The Influence of Added Stream Viscosity on Static Mixer Blending in the Turbulent and Transitional Flow Regimes	M K Dawson	10:25 AM – 10:50 AM
4.6	A Simple Measurement Method for Determining the Constants for the Prediction of Turbulent Power in a Silverson MS 150/250 In-Line Rotor Stator Mixer	M. Cooke, J. Naughton and A.J. Kowalski	10:50 AM – 11:15 AM
4.7	Power Draw in Radial Flow Batch Rotor-Stator Mixers	Richard V. Calabrese and Gustavo A. Padron	11:15 AM – 11:40 AM
4.8	Flow Pattern, Periodicity and Energy Dissipation in a Batch Rotor Stator Mixer	Andrzej W. Pacek, Michael Baker and Adi T. Utomo	11:40 AM -12:05 PM
4.9	Investigation of Fluid Dynamics, Mixing and Flash Nanoprecipitation in a Multi-Inlet Vortex Reactor	Chungyin Cheng, Michael G. Olsen and Rodney O. Fox	
<b>Lunch – Sunhill Dining Room</b>			12:30 – 1:30PM

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**NAMF Executive Meeting- Studio 11: 4:00pm – 6:00pm**

**Dinner: 6:00pm - 7:30pm – Sunhill Dining Room**

Session 5: Poster Session – 7:30 PM – 11:00 PM			
Grant Event Room A / Skylight Foyer			
5.1	Novel Propeller Design Optimized for Stationary Sump Axial Focused Pumping Employing Circular Rake, Helical, Parabolic Camber and Skewed Blade Design Concepts: Validated By CFD & PIV	Robert W. Higbee, Wojciech Wyczalkowski and Binxin Wu	Complex Fluids Mixing
5.2	Hydrodynamics and Flow Patterns of a Planetary Mixer	Hidalgo-Millán, A., Ramos, E., Ascanio, G. and Medina Torres, L.	Complex Fluids Mixing
5.3	New Impeller Meets Challenges of Gas Dispersion	Bob Higbee, Peter Knights, Binxin Wu and Wojtek Wyczalkowski	Complex Fluids Mixing
5.4	Use of PLIF and PIV to Characterize the Laminar Mixing of Viscous Fluids in a Model High Throughput Experimentation Stirred Reactor	Kenneth Chung, Mark Simmons, Mostafa Barigou, Jonathan Hall and Hugh Stitt	Complex Fluids Mixing
5.5			
5.6	An Innovative Approach for Treatment of Large Wastewater Lagoons	Terri Griffin, Binxin Wu and Wojtek Wyczalkowski	Industrial Mixing
5.7	Validation of Zonal Models for Stirred Vessels with Radial and Axial Impellers Using PEPT	Jonathan Hall, Iwan Edwards, Mark Simmons and Hugh Stitt	Industrial Mixing
5.8	Momentous Flow Technology – The New Way of Mixing	Todd Hutchinson, Binxin Wu and Wojtek Wyczalkowski	Industrial Mixing
5.9	Temperature Effects on Gas Dispersion and Solid Suspension in Three Phase Stirred Reactors	Yuyun Bao, Lei Chen, Zhengming Gao, Xinnian Zhang, John M. Smith and Rex B.Thorpe	Multiphase Mixing
5.10	CFD and Population Balance Modeling of Gas-Liquid Flow via QMOM with a Moment Correction Function	Jolius Gimbut, Zoltan Nagy and Chris Rielly	Multiphase Mixing
5.11	The Effect of Blade Shape of Disk Turbine on the Flow Fields in Stirred Tanks	Zhipeng Li and Zhengming Gao	Multiphase Mixing
5.12	Effect of the Mixing in the Stability of (DI-Lactide-Co-Glycolic Acid) Nanoparticles for Controlled Release of Clozantel in Pharmaceutical Applications	A. Faustino Vega, Ma. Josefad Bernad, L. Medina Torres, R. Herrera Najera, G. Ascanio, J.A. Gallegos-Infante and H. Alonso Fileto-Pérez	Multiphase Mixing
5.13	Break up of Nanoparticle Clusters with Different Process Devices	Gül Özcan-Taşkin , Gustavo Padron, Warren Eagles, Caroline Sauter, Heike P. Schuchmann, Jerzy Baldyga, Chris D. Rielly, Liansong Xie, and Olaf Behrend	Multiphase Mixing

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5.14	Micro Fluidic Device for the Self-Synchronized Mixing of Water-in-Oil Droplets	Maria Pilar Carreras, Stephan Mohr, Peter Fielden and Nick Goddard	Multiphase Mixing
5.15	Changing the Practice of Low Shear Mixing with a Novel Impeller Design	Terri Griffin, Binxin Wu and Wojtek Wyczalkowski	Multiphase Mixing
5.16	Controlling Unidirectional Solidification Processes using Nucleators	Mohammad Behshad Shafii and Ehsan Alavi Dehkordi	Complex Fluids Mixing
5.17	Computational Modeling of Industrial Pulp Stock Chests	Sujit Bhattacharya, Ali Soltanzadeh, Clara Ford, Fariborz Taghipour, Chad P.J. Bennington And Guy A. Dumont	Numerical and Computation Fluid Dynamics Models
5.18	Improvements of the Inline Mixer Compax for Turbulent Flow	Sebastian Hirschberg, Rudolf Koubek and Felix Moser	Numerical and Computation Fluid Dynamics Models
5.19	CFD Simulations of Coaxial Mixers in Transition Flow Regime	Christian Rivera, Mourad Heniche and Philippe Tanguy	Numerical and Computation Fluid Dynamics Models
5.20	Modeling Flow and Residence Time Distribution in Reactor with Plunging Jets with/without Agitation	Hua Bai, Amber Stephenson, Jorge Jimenez and Dennis Jewell	Numerical and Computation Fluid Dynamics Models
5.21	The Use of a Zonal Model and Multimodal Tomography to Explore Mixing in a Concentrated Precipitation	I. Edwards, S.A. Axon, M. Barigou, J.F. Hall and E.H. Stitt	Numerical and Computation Fluid Dynamics Models
5.22	CFD Simulation Of Power and Mixing Time for a Rushton Turbine in a Baffled-Tank Reactor	R. Zadghaffar, J.S. Mogaddas , M. Ahmadlouydarab and J. Revstedt	Numerical and Computation Fluid Dynamics Models
5.23	Modeling Mixing of Species with Different Viscosity in a Non-Symmetric Impinging Jet Mixer With LES	Minye Liu and Jim Tilton	Numerical and Computation Fluid Dynamics Models
5.24	Mixing Performance in a Vessel with a Rising Free Surface	Grace Neal, Mark Simmons, Alan Hough and Peter Fryer	Turbulent Mixing
5.25	Mixing Phenomenon in a Confined Plane Wake in a Pipe	Guiren Wang and Hong Jiang	Turbulent Mixing
5.26	Evaluation of mixing capacity of an impeller based on new concept of mixing spectrum	Katagiri Nobutatsu, Ookawara Shinichi, Yoshikawa Shiro, and Ogawa Kohei	Measurement and Characterization of Mixing

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**Wednesday August 20, 2008**

**Breakfast: 7:00am - 8:00am– Sunhill Dining Room**

<b>Session 6: Multiphase Mixing 2 – Solid Containing Systems</b>			
<b>Co-Chairs: P. Tanguy &amp; C. Gallegos</b>			
6.1	Mixing and Gas Dispersion in Mineral Flotation Cells	Geoffrey Evans, Elham Doroodchi, Graeme Lane, Peter Koh and Phil Schwarz	8:00 AM – 8:40 AM
6.2	Quantitative Design of Industrial Powder Mixing Processes	Fernando Muzzio	8:40 AM – 9:05 AM
6.3	De-agglomeration processes in high-shear devices	Jerzy Baldyga, Lukasz Makowski, C. Sauter, H.P. Schuchmann and Wojciech Orciuch	9:05 AM – 9:30 AM
6.4	An Investigation of the Erosion Wear of Pitched Blade Impellers in a Solid-Liquid Suspension	Tomáš Jirout and Ivan Fořt	9:30 AM – 9:55 AM
<b>Break</b>			
6.5	Effect of Two Types of Impellers on the Stability of Non-Newtonian Dispersion	L. Medina Torres, R. Herrera Najera, G. Ascanio, J.A. Gallegos-Infante and H. A. Fileto-Pérez	10:25 AM – 10:50 AM
6.6	Determination of Velocity Field and Solids Distribution in a Stirred Polydisperse System by Positron Emission Particle Tracking <b><i>IChemE Student Award Winner</i></b>	Antonio Guida, Fabio Chiti, Alvin W. Nienow and Mostafa Barigou	10:50 AM – 11:15 AM
6.7	Application of Fluorescent PIV and Digital Image Analysis to Measure Turbulence Properties of Solid-Liquid Stirred Suspensions	Heema Unadkat, Chris Rielly and Zoltan Nagy	11:15 AM – 11:40 AM
6.8	Why Mixers Fail: Specifications Versus Reality	Todd M. Hutchnson and Wojciech Wyczalkowski	11:40 AM -12:05 PM
6.9	Nucleation, particle growth and agglomeration of nanoparticles in a fast precipitation reaction in CIJR	Peter J. Unwin, Shad W. Siddiqui and Suzanne M. Kresta	12:05 PM – 12:30 PM
<b>Lunch – Sunhill Dining Room</b>			12:30 PM – 1:30PM

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<b>Session 7: Multiphase Mixing 3 – Gas-Liquid Systems</b>			
<b>Co-Chairs: E. Galindo &amp; A. Nienow</b>			
7.1	Gas Dispersion and Solid Suspension in Cold-Gassed, Hot-Sparged and Boiling Three Phase Stirred Reactors	Zhengming Gao	1:45 PM – 2:25 PM
7.2	Gas/Liquid Contacting in SMX Static Mixers for the Processing of Highly Viscous Liquids	Tobias Lang, Jens Hepperle and Manfred Piesche	2:25 PM – 2:50 PM
7.3	A Study of Mixing by PIV and PLIF in Bioreactor of Cells Animals Culture	M-L. Collignon, M. Crine, E. Verdin, J-F Chaubard, L. Peeters, S. Dessoy and D. Toye	2:50 PM – 3:15 PM
7.4	Solids Distribution and Rising Velocity of Buoyant Solid Particles in a Tank Stirred with Multiple Impellers: A Simplified Approach for the Study of Sparged Gas-Liquid Reactors	R.S. Ghadge, D. Pinelli, D. Fajner, G. Montante, A. Paglianti, F. Magelli	3:15 PM – 3:40 PM
<b>Break</b>			
7.5	Gassed Power, Hold-Up and Mass Transfer Under High Intensity Sparging and Agitation; Issues with Heterogeneous Gas Flows	Alvin W. Nienow, Klaus Gezork, Waldemar Bujalski and Michael Cooke	4:10 PM – 4:35 PM
7.6	Gas-Liquid Mixing Studies in Industrial Reactors: Comparison of Different Agitation Systems	Madan Somasi, Richard Cope, Juergen Lueske, Kishore Kar, Andrea Gnagnetti, Alessandro Baldelli and Luciano Piras	4:35 PM – 5:00 PM
7.7	Mass Transfer Characteristics by Surface Aeration of Large Paddle Impeller: Application to a Polymerization Reactor with Liquid Level Change	Ryuichi Yatomi, Katsuhide Takenaka, Koji Takahashi and Philippe A. Tanguy	5:00 PM – 5:25 PM

**Dinner at the Falls**

Banquet at Edgewaters Restaurant – Niagara Falls, ON, Canada

Bus Pickup – 7:00pm

Dinner: 7:30pm - 10:30pm – Including Fireworks and Light Show at the Falls

Bus Pickup – 10:30pm

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**Thursday August 21, 2008**

**Breakfast: 7:00am - 8:00am– Sunhill Dining Room**

<b>Session 8: Numerical and Computational Modeling of Mixing</b>			
<b>Co-Chairs: E. Windhab &amp; R. Calabrese</b>			
8.1	Numerical Modeling of Surfactant-Covered Drops in Confined Geometries	Patrick Anderson	8:00 AM – 8:40 AM
8.2	CFD Simulations of Strain Rate Distribution of Newtonian Model Fluids in a Planetary Mixer Bowl	Laurent Bouvier, Frédéric Auger, Marie-Hélène Morel, Andreas Redl and Guillaume Delaplace	8:40 AM – 9:05 AM
8.3	An Improved Inline Mixer for Laminar Flow	Sebastian Hirschberg, Rudolf Koubek, Felix Moser and Joachim Schöeck	9:05 AM – 9:30 AM
8.4	A Novel, Efficient, Method for Computation of Residence Time Distribution from Velocity Fields Obtained using Computational Fluid Dynamics	James N. Tilton and Minye Liu	9:30 AM – 9:55 AM
<b>Break</b>			
8.5	Mixing by Solid Particles	Jos Derksen	10:25 AM – 10:50 AM
8.6	CFD Modeling of Gas-Liquid-Solid Mechanically Agitated Contactor	Ranganathan Panneerselvam, Sivakumar Savithri and Gerald Devasagayam Surender	10:50 AM – 11:15 AM
8.7	Analysis of Two-Zone Models for Stirred Tanks	Ville Alopaeus, Pasi Moilanen and Marko Laakkonen	11:15 AM – 11:40 AM
8.8	LES and RANS Simulations of Hydrodynamics in Mixing Tank: Comparison to PIV Experiments	Angélique Delafosse, Alain Line, Jérôme Morchain and Pascal Guiraud	11:40 AM -12:05 PM
8.9	Prospective on Deploying Computational Fluid Dynamics (CFD) and Discrete Element Modelling (DEM) for Solid-Liquid Mixing	Richard D. Laroche	12:05 PM – 12:30 PM
<b>Lunch – Sunhill Dining Room</b>			12:30 – 1:30PM