MIXING SHORT COURSE: Sunday, 8:00 – noon, Moriarity Room
Lunch for short course instructors and participants: noon – 1:30 pm, Location TBA

NAMF Council Meeting: Sunday, 2:00 – 4:00 pm, Maquilla Conference Room

Exhibit Set-up: Sunday, 1:00 – 4:00 pm, Moriarity Room

REGISTRATION: Sunday, 2:00 – 6:00 pm, Lower Foyer

WELCOME RECEPTION, EXHIBIT, AND SALMON BBQ: Sunday, 4:30 – 7:30 pm
Grand Moriarity Room for Reception and Exhibit and BBQ on the Patio

SESSION 1: FUNDAMENTALS OF MIXING TECHNOLOGY
Sunday, 7:30 – 10:00 pm, Walbran
Co-Chairs: David Dickey and Midey Chang-Mateu

7:30 Opening comments from Conference Chair
Prof. Suzanne Kresta, University of Alberta

7:35 Can We Use CFD to Predict Mixing Time in Stirred Tanks?
Minye Liu and Richard Grenville, DuPont.

8:00 Mixing Times Deduced from CFD Results Using a New Eigenvalue Approach
Fabio Chiti, Waldemar Bujalski, Ed Wynn, Don Jones, Univ. Birmingham, UK

8:25 Low-Frequency Acoustic Mixing for Process Intensification
Scott Coguill, Harold Howe, Todd McAdams, Joel Pierce, Resodyn Corp.; Tom Post, consultant.

8:50 A Different Approach to Low Shear Mixing
Christine Wolfe, Fluent; Sanjida Tamanna and Wojciech Wyczalkowski, Philadelphia Mixing Solutions.

9:15 Modeling Dissolution Kinetics of Liquid-Liquid Dispersion Systems Using Local Rates of Turbulent Dissipation
Solomon Ibermere and Suzanne Kresta, Univ. of Alberta.

9:40 Numerical Simulation of a Solubility Process in a Stirred Tank Reactor
Hugo Hartmann, Jos Derksen, H.E.A. van den Akker, Kramers Laboratorium voor Fysische Technologie, TU Delft.

SOCIAL HOUR AND EXHIBIT: Sunday, 10:05 – 11:30 pm, Grand Moriarity

MONDAY Breakfast: 7:00 – 8:00 am, Cedar Dining Room
SESSION 2: STATIC MIXERS
Monday, 8:00 – 11:50 am, Walbran
Co-Chairs: Al Taweel and Steve Strand

8:00 INVITED PLENARY
Current State of the Art: Design, Application and Research of Static Mixers
Art Etchells, DuPont Fellow; Shaffiq Jaffer, Procter & Gamble; Chris Meyer, Sulzer.

9:00 CFD Calculation of the Striation Thinning in a Static Mixer Under Laminar Flow Conditions

9:25 The Influence of Initial Coefficient of Variation (CoV₀) on Turbulent Liquid Blending in Static Mixers
R. Wadley and Mic Dawson, BHR Group.

9:50 Break

10:20 NAMF Student Finalist: Drop Breakup in an SMX Static Mixer in Laminar Flow, Shiping Liu, Andrew Hrymak and Philip Wood, McMaster University

10:45 A Novel Technique to Support the Optimization of Static Mixers in Turbulent Regimes
Sabine Sulzer and Felix Moser, Sulzer.

11:10 A Miscible Liquid-Liquid Non-Intrusive Injector for Static Mixers in Turbulent Flow
Julian Fasano, Mixer Engineering Co.; Eric Janz, Chemineer; Kevin Myers, Univ. of Dayton.

11:35 Evaluation of Static Mixers for Rapid Mixing in a Potable Water Treatment Works
Yanming Zhang and Jose Ferandes, Yorkshire Water Services Ltd.

Lunch: noon – 1:00 pm, Cedar Dining Room

SOCIAL HOUR AND EXHIBIT: Monday, 5:00 – 5:40 pm, Grand Moriarity
DINNER: Monday, 5:40 – 7:00 pm, Cedar Dining Room

SESSION 3: MODEL NON-NEWTONIAN FLUIDS
Monday: 7:00 – 10:00 pm, Walbran
Co-Chairs: Patrick Spicer and Bernie Gigas

7:00 Mixer Power Revisited: Effects of Viscoelasticity
Gary Patterson, Univ. Missouri-Rolla.

7:25 Measuring the Viscosity of Viscous Two-Phase Mixtures
David Todd, Polymer Processing Institute, NJIT.

7:50 Technical Basis for Testing Scaled Pulsed Jet Mixing Systems in Non-Newtonian slurries

8:15 Break

8:45 Mixing Non-Newtonian Slurry Using an Air Sparging System
Chris Barringer, Feng Wen, Brigette Rosendall, Jonathan Berkoe, Bechtel.

9:10 Two-Phase Gas/Solvent Injector for Viscous Liquids
Steven Strand, The Dow Chemical Company.

9:35 The Use of Enzymes to Determine Mixing Efficiency in a Viscous Slurry
SOCIAL HOUR AND EXHIBIT: Monday, 10:00 – 11:30 pm, Grand Moriarity

TUESDAY  Breakfast: 7:00 – 8:00 am, Cedar Dining Room

SESSION 4: MIXING AND REACTION, MICROREACTORS
   Tuesday: 8:00 – 11:50 am, Walbran
   Co-Chairs: Philippe Tanguy and Brian Johnson

8:00  The Use of Reactive Flow Modeling in the Initial Design Scale-Up and the Subsequent Plant Start-Up of an Industrial Pre-Mixed Gaseous Reactor
   Paul Gillis and Kuochen Tsai, The Dow Chemical Company.

8:25  Feasibility of Cartesian Methods for Reacting Mixing Tank Simulations
   Jeremy Thornock and Philip Smith, Univ. of Utah.

8:50  NAMF Student Finalist: High Velocity Surface Feed for Competitive Reactions
   Sujit Bhattacharya and Suzanne Kresta, University of Alberta.

9:15  Multi-phase Plumes: Mixing and Chemical Reaction, FMPSG/IChemE Student Competition Winner
   Sean McHugh, Univ. of Cambridge.

9:40  CFD Analysis of Reactive Flows in a Confined Impinging-Jets Reactor
   Ying Liu and Rodney Fox, Iowa State Univ.

10:05  Break

10:30  Experimental Study of Confined Jet Mixing with Excitation
   David Kamau and John Turner, Univ. of Manchester, UK.

10:55  Experimental Investigation of Mixing in Rectangular Micromixers Using µ-LIF and µ-PIV
   Marko Hoffmann, Michael Schlüter, Norbert Räbiger, Univ. Bremen, Germany.

11:20  Split-and-Recombine Micro Mixers for High and Low Reynolds Number Applications

11:45  Laminar Mixing for Improved Transport to Reactive Boundaries in Microchannels
   Abraham Stroock, NAMF Start-up Grant Holder, and Joseph Kirtland, Cornell Univ.

Lunch: 12:10 – 1:30 pm, Cedar Dining Room

INFORMAL DISCUSSION, Model Fluids for non-Newtonian Fluids
   Maquilla+McBride, 3:30 – 5:00 pm, Chaired by Art Etchells and Will Hartt

SOCIAL HOUR AND EXHIBIT: Tuesday, 4:30 – 5:40 pm, Grand Moriarity

DINNER: Tuesday, 5:40 – 7:00 pm, Cedar Dining Room

SESSION 5: MULTIPHASE MIXING
   Tuesday: 7:00-10:00 pm, Walbran
   Co-Chairs: Chad Bennington and Abe Strook
7:00  Particle motions in and around closed streamline regions and the impact on mixing and demixing
Jeff Morris, NAMF Start-up Grant Holder, Levich Institute and Dept. of Chemical Engineering, City College of New York

7:25  Advanced Image-Analysis Techniques for the Characterization of the Complex Dispersions Occurring in Bioreactors
Enrique Galindo, Teresa Brito, Ma. Soledad Córdova-Aguilar, Blanca Taboada, Leticia Vega-Alvarado, Gabriel Corkidi, Universidad Autonoma de Mexico; Patricia Larralde-Corona, Centro de Biotechnologia Genomica IPN.

7:50  Judicious Design of Liquid-Liquid Contactors/Reactors
F. Azizi and A.M. Al Taweel, Dalhousie Univ. Halifax, NS.

8:15  Break

8:45  NAMF Student Finalist: Effect of Surfactant Concentration on Drop Size Distribution for Dilute Liquid-Liquid Dispersions in a Batch Rotor Stator
Richard Calabrese and Gustavo Padron, Univ. of Maryland.

9:10  Achieving Optimal Residence Time Distribution of Powder Flowing Through a Hopper
Werner Himmelsbach and Wolfgang Keller, EKATO, Germany.

9:35  Mixing Characteristics of New Continuous Mixer for Advanced Wet-Grinding System
Hiroyuki Matsumoto and Mutsuo Kuramoto, Kansai Paint, Japan.

SOCIAL HOUR AND EXHIBIT: Tuesday, 10:00 – 11:30 pm, Grand Moriarity

WEDNESDAY  Breakfast: 7:00 – 8:30 am, Cedar Dining Room

SESSION 6: INDUSTRIAL MIXING
Wednesday: 8:30 – 11:50 am, Walbran
Session Chairs: Ramesh Hemrajani and Minye Liu

8:30  Mixing Dynamics in Agitated Pulp Stock Chests
Chad Bennington, UBC.

8:55  Mixing Performance of Laboratory Process Development Equipment
Otute Akiti, Agnes Yeboah, Victor Rosso, Erik Rubin, John Venit, Bristol Myers Squibb Co.

9:20  KT-3: A Novel Tickler for Solids Removal From Slurry Storage Tanks and Reactors
Richard Cope and Kishore Kar, Dow.

9:45  Hydrodynamic Performance and Industrial Applications of MAXBLEND for Polymerization Reactors
Katsuhide Takenaka, Ryuichi Yatomi, Shoji Morinaga, SHI Mechanical & Equipment Inc., Japan.

10:10  Break

10:35  Characterization of the Retreat Curve Agitator in Glass-Lined Vessels
David Willecox and Dave Murphey, Abbott Laboratories, IL.

11:00  Numerical and Physical Investigations of the Mixing Characteristics of the MAXBLEND Impeller

4 of 7
POSTER SESSION, SOCIAL HOUR AND EXHIBIT:
Wednesday, 4:30 – 5:40 pm, Grand Moriarity
Chair: Hanh Vo

P1 Using Ultrasonic Doppler Velocimetry (UDV) to Measure Local Flow Velocities in Pulp Mixing Chests
Farhad Ein-Mozaffari, David Buckingham, Chad Bennington, Guy Dumont, UBC.

P2 Computational Simulation of Confined Jet Mixing
David Kamau and John Turner, Univ. of Manchester, UK.

P3 The Influence of Additive Viscosity on Turbulent Liquid Blending in Static Mixers
M.K. Dawson, BHR Group, UK.

P4 Better Understanding of Mixing Processes in the Fine Chemicals and Pharmaceutical Industries. FMP Addresses Industrial Needs
David Brown, BHR Group, UK and Francois Ricard, GSK, UK.

P5 Measurement and Simulation of Turbulent Flow in an In-line Rotor-Stator Mixer
Richard Calabrese, Karl Kevala, Kenneth Kiger, Univ. of Maryland.

P6 Fluid Dynamics and Mixing in Large Scale Gas to Liquid Reactors
Alex Bakopoulos, Germany.

P7 Using Optical Methods for the Identification and Characterization of Complex Structures Occurring in Multiphase Dispersions
Othón Escobar, Jean Brière, Blanca Taboada, Gabriel Corkidi, Rufino Díaz-Uribe, Enrique Galindo, Ma. Soledad Córdova-Aguilar, Universidad Nacional Autónoma de Mexico.

P8 Application of the Interfacial Energy Balance to Compute Interfacial Area Concentration Distribution
Richard Long, New Mexico State University.

P9 CFD Simulations of Liquid Homogenization in Tanks Stirred with Different Number of Rushton Turbines
Milan Jahoda, M. Moštěk, Alena Kukuková and Vaclav Machoň, Prague Institute of Chemical Technology, Czech Republic.

P10 Contour™ – A New Mixer Concept for Gas Mixing in Large Ducts
Felix Moser and Sabine Sulzer, Chemtech, Switzerland

P11 Simulation of Mixing Dynamics in Agitated Pulp Stock Chests Using CFD
C. Ford, F. Ein-Mozaffari, F. Taghipour, Chad Bennington, UBC.

DINNER: Wednesday, 5:40 – 7:00 pm, Cedar Dining Room
SESSION 7 IN HONOR OF PROF. ALVIN NIENOW:
TURBULENCE CHARACTERIZATION
Wednesday: 7:00 – 10:00 pm, Walbran
Co-Chairs: Bob Brodkey and Richard Calabrese

7:00 INVITED PLENARY
Viscous Dissipation Rate of Turbulent Energy in Stirred Reactors: Improved Estimation from Direct Measurements
Michael Yianneskis, King’s College London, UK.

8:00 Micromixing in a Baffled in an Unbaffled Vessel with a Rushton Turbine
Alvin Nienow, Melissa Assirelli, Waldemar Bujalski, Ed Wynn, Univ. of Birmingham; Archie Eaglesham, Huntsman Polyurethanes, Belgium.

8:25 Break

8:45 Trailing Vortices Study in a Rushton Turbine Flow Using Proper Orthogonal Decomposition
Julien Moreau, Institut de Mécanique des Fluides de Toulouse and Alain Liné, INSA Toulouse.

9:10 A Review of Turbulence Models and their Applicability to Different Mixing Problems
Liz Marshall, Christine Wolfe, André Bakker, Sergio Vasquez, Fluent Inc.

9:35 Computational Reactor Engineering for Increased Sustainability
Harry van den Akker, TU Delft.

SOCIAL HOUR AND EXHIBIT: Wednesday, 10:00 – 11:30 pm, Grand Moriarity

THURSDAY Breakfast: 7:00 – 8:30 am, Cedar Dining Room

SESSION 8: SOLID-LIQUID MIXING
Thursday: 8:30 – 11:50 am, Walbran
Co-Chairs: Liz Marshall and Mike Yianneskis

8:30 High Speed, High Resolution Resistance Tomography Visualisation of Solid-Liquid Mixing
Ken Primrose, Industrial Tomography Systems (ITOMS), UK.

8:55 Solids Suspension Agitation in Non-Standard Geometries
Emily Mitchell and Kevin Myers, Univ. of Dayton; Eric Janz, Chemineer; Julian Fasano, Mixer Engineering Co.

9:20 Extension of an Improved Correlation for “Just Suspended” Speed
Lars Uby, ITT Flygt, Sweden.

9:45 Solids Suspension in Agitated Vessels with Single and Multiple Impellers
Kurt Svihla, Hong Xu, Anup Paul, Chokri Guetari, ANSYS, USA; Ian Hamill ANYSYS, UK.

10:10 Break

10:35 Acoustic Monitor for Solids Measurements in Liquid Slurries
A. Scherbakov, E. Dievendorf, Y. Sehgal, A.S. Sangani, L.L. Tavlarides, Syracuse Univ., NY.

11:00 Dispersion of Floating Solid Particles in Aerated Stirred Tank Reactors
Yoshinori Kawase and Atsushi Tagawa, Toyo Univ.; Naoki Dohi, Mitsubishi Chemical Engineering Co; Japan.

11:25 Some Effects of Equipment and Process Variables on the Suspension of Buoyant Particles in Gas Sparged Vessels
11:50  NAMF Council Election Ballot

Lunch: noon – 1:00 pm, Cedar Dining Room

NAMF GENERAL MEETING: Thursday, 4:30 – 5:30 pm, Grand Moriarity
SOCIAL HOUR AND EXHIBIT: Thursday, 5:30 – 6:00 pm, Grand Moriarity
AWARDS DINNER: Thursday, 6:00-7:30 pm, Walbran

SESSION 9: MIXING IN BIOLOGICAL SYSTEMS
    Thursday: 8:00 – 9:15 pm, Walbran
    Session Chairs: Enrique Galindo and Piero Armenante

8:00  Design of a Thermophilic Treatment Process for Sewage Sludge
      Bruce Nauman and Mathew Armstrong, Rensselaer Polytechnic Institute, NY.

8:25  Innovative Bioreactor Mixing System: Disposable Bag and Cryogenic Levitating Impeller
      Ronald J. Weetman, consultant; Jeff Craig and Alexander Terentiev, LevTech, KY.

8:50  Dynamic Modelling of Local Reaction Conditions in an Agitated Aerobic Fermenter
      Marko Laakkonen, Pasi Moilanen, Ville Alopaeus, Juhani Aittamaa, Helsinki Univ. of Tech., Finland.

SESSION 10: LIQUID-LIQUID SYSTEMS:  Just when you thought you understood…
    Thursday: 9:20 – 10:00 pm, Walbran
    Session Chair: Shaffiq Jaffer

9:20  Continuous Phase Viscosity: The Liquid-Liquid Pot Thickens
      David Brown, BHR Group, UK

      Richard Calabrese, Karl Kevala, Kenneth Kiger, Univ. of Maryland.

SOCIAL HOUR AND EXHIBIT: Thursday, 10:00 – 11:30 pm, Grand Moriarity

FAREWELL BRUNCH: Friday, 8:30 – 10:30 am, Cedar Dining Room
   PLEASE SIGN UP BY MONDAY NOON