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ILASS-Americas 2002 Conference

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University of Illinois at Urbana-Champaign

Local Arrangements Rolf Reitz
Chair University of Wisconsin - Madison
Session IA: Drops

Chairperson: B. T. Helenbrook, Clarkson

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Chairpersons: J. A. Drallmeier, Missouri-Rolla & A. M. Lippert, G. M.

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11:40 am  A Fully Nonlinear Primary Atomization Model, S.S. Yoon and S.D. Heister, School of Aeronautics and Astronautics, Purdue University, West Lafayette, IN .......... 36

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### Session IIB: Automotive Spray II

**Chairpersons: J. A. Drallmeier, Missouri-Rolla & A. M. Lippert, G. M.**

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12:05 pm  Images of Spray-Wall Impingement, J.W. Powell and C.F. Lee, Department of Mechanical and Industrial Engineering, University of Illinois at Champaign-Urbana, Urbana, IL .................................................. 63

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**Chairperson: R. J. Schick, Spraying Systems**

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Formation of Electrostatic Sprays Operating in Multi-Jet Mode Using Various Tip Configurations, A. Abosaid and P.E. Sojka, Maurice J. Zucrow Laboratories, School of Mechanical Engineering, Purdue University, West Lafayette, IN .......... 70

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4:05 pm  Nozzle Design and Liquid Property Effects on Spray Flight Time and Liquid Impaction for Road Side Spraying of Weeds, D. Downey, D.K. Giles, and D.C. Slaughter, Biological and Agricultural Engineering Department, University of California-Davis, Davis, CA ........................................ 120

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Thursday, May 16th

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Chairpersons: N. Ashgriz, University of Toronto & R. K. Madabhushi, UTRC

8:40 am  Irreversible Entropy Production in Two-Phase Flows with Evaporating Drops, N.A. Okong’o and J. Bellan, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA ................................................................. 133

9:05 am  Direct Numerical Simulation of Multicomponent-Fuel Drop-Laden Temporal Mixing Layers with Phase Change, P.C. Le Clercq and J. Bellan, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA .................................................. 140

9:30 am  Properly Constrained Interphase Momentum Transfer Models for Constant-Density Two-Phase Flow: Resolution of the Ill-Posedness Issue in Canonical Problems, S. Subramaniam, Department of Mechanical and Aerospace Engineering, Rutgers, The State University of New Jersey, Piscataway, NJ ........................................ 149

9:55 am  Adaptive, Spectral/hp, Two-Fluid Simulations, B.T. Helenbrook, Department of Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY; and T.J. Baker, Mechanical and Aerospace Engineering Department, Princeton University and Geometricon, L. L. C., Princeton University, NJ ........................................ 156

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8:40 am  Measurement of Gasoline Spray Propagation by means of Synchrotron X-Ray, Y. Yue, C. Powell, R. Cuenca, R. Poola, and J. Wang, Argonne National Laboratory, Argonne, IL; and S. E. Parrish, General Motors, Warren, MI ............................... 161


Session VIA: Modeling II

Chairpersons: N. Ashgriz, University of Toronto & R. K. Madabhushi, UTRC

10:50 am Fuel Spray Modeling of Outward-Opening Pintle Injectors, C.O. Iyer and Z. Han, Ford Research Laboratory, Ford Motor Company, Dearborn, MI

11:15 am Energy Distribution and Crown Development in Droplet Splashing, M.F. Trujillo, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM; and C.F. Lee, Department of Mechanical and Industrial Engineering, University of Illinois at Champaign-Urbana, Urbana, IL

11:40 am Modeling Collisions Among Drops with a Non-Uniform Spatial Distribution, S.L. Post, Department of Mechanical Engineering-Engineering Mechanics, Michigan Technological University, Houghton, MI; and J. Abraham, School of Mechanical Engineering, Purdue University, West Lafayette, IN

Session VIB: Diagnostics II

Chairpersons: C. Presser, NIST & S. M. Jeng, University of Cincinnati


11:15 am Preliminary Visualizations of Acoustic Waves Interacting with Subcritical and Supercritical Cryogenic Jets, B. Chehroudi, Engineering Research corporation, Inc., Edwards AFB, CA; and D.G. Talley, Air Force Research Laboratory, AFRL/PRSA, Edwards AFB, CA

11:40 am Optimization of Atomized Liquid Sprays by Use of Ultrasound, L.K. Jameson and B. Cohen, Kimberly-Clark Corporation, Roswell, GA

12:05-1:30 pm Lunch Break, Annual Business Meeting, Exhibits, and Posters
### Session VIIA: Modeling III

**Chairpersons: S. Subramaniam, Rutgers & M. F. Trujillo, Los Alamos**

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<tr>
<td>1:30 pm</td>
<td>Theory of Micro- and Macro- Encapsulation</td>
<td>S.P. Lin and J.N. Chen</td>
<td>Department of Mechanical and Aeronautical Engineering, Clarkson University, Potsdam, NY</td>
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<td>2:20 pm</td>
<td>Dynamic Stretching of a Thin Planar Liquid Bridge</td>
<td>C. Mehring, J. Xi, and W.A. Sirignano</td>
<td>Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA</td>
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<td>2:45 pm</td>
<td>Kinetic Equations for Dispersed Phase of Particles/Droplets in Turbulent Two-Phase Flow</td>
<td>R.V.R. Pandya and F. Mashayek</td>
<td>Department of Mechanical Engineering, University of Illinois at Chicago, Chicago, IL</td>
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### Session VIIB: Diagnostics III

**Chairpersons: T. D. Fansler, G. M. & P. L. Kelly-Zion, Trinity**

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<td>1:30 pm</td>
<td>Measuring Droplet Arrival Times Using Phase Doppler Interferometry</td>
<td>J.F. Widmann and C. Presser</td>
<td>National Institute of Standards and Technology, Gaithersburg, MD</td>
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<td>1:55 pm</td>
<td>Investigation of Spray Detonation Characteristics Using a Controlled, Homogeneously Seeded Two-Phase Mixture</td>
<td>B.M. Knappe and C.F. Edwards</td>
<td>Department of Mechanical Engineering, Stanford University, Stanford, CA</td>
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<tr>
<td>2:20 pm</td>
<td>Measuring Charge-To-Mass Ratio of Individual Droplets Using Phase Doppler Interferometry</td>
<td>T. Gemci, R. Hitron, and N. Chigier</td>
<td>Spray Systems Technology Center, Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA</td>
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<td>2:45 pm</td>
<td>Investigation of the Internal Flow of a Pressure-Swirl Atomizer with Macrolaminated Geometry using Refractive Index Matching Fluid Method</td>
<td>Z. Ma and S.-M. Jeng</td>
<td>Department of Aerospace Engineering and Engineering Mechanics, University of Cincinnati, Cincinnati, OH; and M.A. Benjamin, Parker Hannifin Corporation, Mentor, OH</td>
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3:10-3:40 pm  *Break, Exhibits, and Posters*
**Session VIIIA: Modeling IV**

*Chairpersons: S. Subramaniam, Rutgers & M. F. Trujillo, Los Alamos*

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<td>3:40 pm</td>
<td><strong>Droplet Dispersion in the Wake of a Square Cylinder at Low Reynolds Number</strong></td>
<td>G.B. Jacobs and F. Mashayek, Department of Mechanical Engineering, University of Illinois at Chicago</td>
<td>Chicago, IL</td>
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<td><strong>A Model for Preferential Vaporization of Sprays of Complex Liquid Mixtures Using Continuous Thermodynamics</strong></td>
<td>D. Wang and C.F. Lee, Department of Mechanical and Industrial Engineering, University of Illinois at Champaign-Urbana</td>
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<td>3:40 pm</td>
<td><strong>Characterization of a Spray Jet in Crossflow Using Planar Imaging Techniques</strong></td>
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4:30-5:30 pm  *Technical Committee Meetings*

6:00-9:30 pm  *Pyle Center Banquet*

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**Friday, May 17th**

7:00 – 8:00 am  Registration, Continental Breakfast, Exhibits, and Posters

8:00 am  Invited Presentation:  **Some Recent Developments in the Understanding of DI Diesel Fuel Jets**, Dennis L. Siebers, Combustion Research Facilities, Sandia National Laboratories, Livermore, CA | 271 |

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Chairperson: S. H. Collicott, Purdue

8:40 am  A Description of the Pressure Swirl Atomizer Internal Flow, D. Donjat, ONERA/DMAE 2, Toulouse, France; Snecma Control Systems, Moissy-Cramayel, France; J.L. Estivalezes, ONERA/DMAE 2, Toulouse, France; and M. Michau, Snecma Control Systems, Moissy-Cramayel, France ......................................................... 277

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Chairperson: H. E. Snyder, Inhale Therapeutic

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9:30 am  Drop Size Distributions for Detergent Slurry Sprays Formed Using a Pressure Swirl Atomizer, S. R. Pidaparthy and P.E. Sojka, Maurice J. Zucrow Laboratories, School of Mechanical Engineering, Purdue University, West Lafayette, IN ........... 308

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**Chairperson:** G. Smallwood, NRC, Canada & S. T. Sander, Wisconsin-Madison

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<td><strong>Droplet Size and Volume Fraction in the Near-Injector Region for Room Ambient and Combusting Sprays</strong></td>
<td>J. Labs and T. Parker, Engineering Division, Colorado School of Mines, Golden, CO</td>
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<td>Z. Liu and P.E. Sojka, Maurice J. Zucrow Laboratories, School of Mechanical Engineering, Purdue University, West Lafayette, IN</td>
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<td>11:40 am</td>
<td><strong>Diesel Engine Injection Rate-Shape Optimization Using Genetic Algorithms and Multi-Dimensional Modeling for a Range of Operating Modes</strong></td>
<td>R.P. Hessel and R.D. Reitz, Engine Research Center, University of Wisconsin-Madison, Madison, WI</td>
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<td>12:05 pm</td>
<td><strong>Air Entrainment into Diesel Sprays under Hot Ambient Conditions</strong></td>
<td>D. Rhim and P.V. Farrell, Engine Research Center, University of Wisconsin-Madison, Madison, WI</td>
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### Session XB: Rocket/Propulsion

**Chairperson:** D. Talley, Air Force Research Lab

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<td>M.A. Chaker, Gas Turbine Division, Mee Industries Inc., Monrovia, CA</td>
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<td>11:15 am</td>
<td><strong>Injection of Supercritical Methane/Ethylene Jets into a Quiescent Subcritical Environment</strong></td>
<td>K.-C. Lin and P.J. Kennedy, Taitech, Inc., Beavercreek, OH; and T. A. Jackson, Air Force Research Laboratory, Propulsion Directorate Wright-Patterson AFB, OH</td>
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<tr>
<td>11:40 am</td>
<td><strong>A Review on Penetration Heights of Transverse Liquid Jets in High-Speed Flows</strong></td>
<td>K.-C. Lin and P.J. Kennedy, Taitech, Inc., Beavercreek, OH; and T. A. Jackson, Air Force Research Laboratory, Propulsion Directorate Wright-Patterson AFB, OH</td>
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<tr>
<td>12:05 pm</td>
<td><strong>Near-Field Spray Characterization of a Liquid Fuel Jet Injected into a Crossflow</strong></td>
<td>M.Y. Leong and D.J. Hautman, United Technologies Research Center, East Hartford, CT</td>
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Chairperson: G. Smallwood, NRC, Canada & S. T. Sander, Wisconsin-Madison


1:55 pm  Effects of Multiple Injection on Liquid and Vapor Fuel Distribution in an HSDI Diesel Engine, W.S. Mathews, R.E. Coverdill, C.F. Lee, and R.A. White, Department of Mechanical and Industrial Engineering, University of Illinois at Champaign-Urbana, Urbana, IL................................................................. 360

2:20 pm  The Influence of Multiple Injection on HSDI Diesel Combustion, W.S. Mathews, R.E. Coverdill, C.F. Lee, and R.A. White, Department of Mechanical and Industrial Engineering, University of Illinois at Champaign-Urbana, Urbana, IL....................... 365

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Chairperson: J. B. Ghandhi, Wisconsin-Madison


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