2009 technical program features some 350 papers and presentations!

**STLE’s Annual Meeting & Exhibition** is the prime venue for technical professionals who want to present, discuss and debate their latest works. These are the presentations that will influence the fast-moving field of tribology and lubricants today and in the future.

With dozens of sessions and more than 350 30-minute technical presentations over four days, STLE’s 2009 technical program is the best way for you to keep abreast with advances in virtually every area of tribology. Throw in education courses, special events, a trade show, the Commercial Marketing Forum and professional networking, and STLE’s 64th Annual Meeting & Exhibition is the premier tribology event of 2009.

The following pages summarize the 2009 technical program presentations and presenters, as of the end of November. Changes will occur as we get closer to the show. Please check [www.stle.org](http://www.stle.org) for updates and presentation abstracts. The Program Guide and errata, distributed in Lake Buena Vista, will have the most up-to-date information.

**May 18 – 21, 2009 ✶ Disney’s Coronado Springs Resort ✶ Lake Buena Vista, Florida**

### Monday, May 18, 2009

**Session 1A ✶ Coronado C**

**PRACTICAL LUBRICATION SOLUTIONS I**

Session Chair: W. Needelman, Donaldson Co., Minneapolis, MN

8:30 am – 9 am

**Establishment of a Lubrication Program for Virginia Department of Transportation**

C. Stevens, Virginia Department of Transportation, Lynchburg, VA, E. Myers, ExxonMobil Lubricants and Specialties, Richmond, VA

9 am – 9:30 am

**Reliable Filtration of High-Viscosity Gear Oils in Draglines**

C. Bauer, Pall Corp., Port Washington, NY

9:30 am – 10 am

**Dry Air Purging for Water Contamination Control**

W. Needelman, G. LaVallee, Donaldson Co., Minneapolis, MN

10 am – 10:30 am ✶ Break

---

**Session 1B ✶ Coronado D**

**ENGINE & DRIVETRAIN I**

Session Chair: Victor W. Wong, Massachusetts Institute of Technology, Cambridge, MA

8 am – 8:30 am

**The Contact Properties of Wet Clutch Friction Material**

M. Ingram, H. Spikes, Imperial College, London, United Kingdom, J. Noles, R. Watts, Infineum USA Ltd, Linden, NY, S. Harris, Infineum UK Ltd, Abingdon, United Kingdom

8:30 am – 9 am

**Pin Boss Stress Analysis Coupled with Oil Film Pressure of a Diesel Engine Piston Receiving High Combustion Pressure**

S. Chun, Hoseo. University, Asan, South Korea

---

**Session 1C ✶ Coronado E**

**FLUID FILM BEARINGS I – MODELING**

Session Chair: I. Santos, Technical University of Denmark, Lyngby, Denmark

8 am – 8:30 am

**Non-Newtonian Effects in Bearing Behavior: Some Considerations Concerning The Constitutive Laws**

B. Bou-Said, INSA Lyon, Villeurbanne, France
Session 1C  *  continued

8:30 am – 9 am
A Navier-Stokes-Thermal Parametric Study Of A Six-Pocket Hydrostatic Cryogenic Journal Bearing
S. Moldovan, M. Braun, A. Balasoiu, University of Akron, Akron, OH

9 am – 9:30 am
Mechatronics Applied to Elastohydrodynamics
I. Santos, M. Haugaard, Technical University of Denmark, Lyngby, Denmark

9:30 am – 10 am
Imbalance Response of a Partially Sealed Squeeze Film Damper for the Flexible Rotor Model
C. Xing, M. Braun, University of Akron, Akron, OH

10 am – 10:30 am  *  Break

Session 1D  *  Coronado F/G

LUBRICATION FUNDAMENTALS I – ZDDPS AND OTHER ANTI-WEAR ADDITIVES IN ENGINE OILS

Session Chair: J. Martin, Ecole Centrale de Lyon, Ecully, France

8 am – 8:30 am
Nanoscale Properties of In-Situ Formed Tribofilms
P. Aswath, R. Mourhatch, B. Kim, University of Texas at Arlington, Arlington, TX

8:30 am – 9 am
Studies of Antiwear Film On 52100 Steel Using Synchrotron Light-Based Techniques
J. Zhou, J. Thompson, J. Cutler, Canadian Light Source Inc, Saskatoon, SK, Canada, M. Kasrai, M. Bancroft, The University of Western Ontario, London, ON, Canada, E. Yamaguchi, Chevron Oronite Co. LLC, Richmond, CA

9 am – 9:30 am
Boundary Film Formation Properties of ZDDP with Other Metal Containing Additives

9:30 am – 10 am
Tribological Characteristics of Ashless Phosphorus and Phosphorus-Sulphur Based Antiwear Additives
J. Benedit, Imperial College, London, United Kingdom, R. Mufti, Castrol Ltd, Pangbourne, United Kingdom, H. Spikes, Imperial College, London, United Kingdom

10 am – 10:30 am  *  Break

Session 1F  *  Fiesta 5

COMMERCIAL MARKETING FORUM I

Session Chair: TBD

8 am
TBD

8:30 am
TBD

9 am
Polartech Additives, Inc.

9:30 am
ARN Engineering and MISCO

10 am – 10:30 am  *  Break

Session 1G  *  Yucatan 1

NANOTRIBOLOGY I – MODELING AND SIMULATION

Session Chair: A. Martini, Purdue University, West Lafayette, IN
Session Vice-Chair: A. Vadakkepatt, Purdue University, West Lafayette, IN

8 am – 8:30 am
Understanding Atomic Stick-Slip Friction of Metals Through Accelerated Molecular Dynamics Simulation
A. Martini, Y. Dong, Z. Gao, Purdue University, West Lafayette, IN, A. Voter, D. Perez, Los Alamos National Laboratory, Los Alamos, NM, Y. Mishin, V. Ivanov, George Mason University, Fairfax, VA

9 am – 9:30 am
Nanoscale Modeling of Friction Based on Thermal Activation of Dislocation Motion
Y. Liao, A. M’ndange-Pfupfu, S. Esaramoorthy, L. Marks, Northwestern University, Evanston, IL

9:30 am – 10 am
Molecular Dynamics and Finite Element Coupling Method for Nanoscale Adhesive Contact Problems
G. Liu, R. Tong, L. Liu, T. Liu, Northwestern Polytechnical University, Xi’an, China

10 am – 10:30 am  *  Break

Save $75 on your meeting registration fee!
April 20 is the Early Bird registration deadline for STLE’s 2009 Annual Meeting & Exhibition. A $75 fee is added to registrations made after that date. The fastest way to register is online at www.stle.org. You also can use the registration form on page 75.
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<td>Session Chair: D. McCoy, The Elco Corp., Cleveland, OH</td>
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<tr>
<td>1:30 pm – 2 pm</td>
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<tr>
<td>Tribological Characterization of Naphthenic-Based Bitumen Oils</td>
</tr>
<tr>
<td>L. Bastardo-Zambrano, Nynas AB, Nynashamn, Sweden</td>
</tr>
<tr>
<td>2 pm – 2:30 pm</td>
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<tr>
<td>Directional Friction: Concept and its Realization Using the Hydro-Dynamic Lubrication Technology</td>
</tr>
<tr>
<td>Z. Zhang, Q. An, East China University of Science and Technology, Shanghai, China, C. Zhang, University of Saskatchewan, Saskatoon, SK, Canada</td>
</tr>
<tr>
<td>2:30 pm – 3 pm</td>
</tr>
<tr>
<td>Reducing The Total Cost Of Ownership in An Oil Flooded Rotary Screw Air Compressor Through The Use Of Synthetic Lubricants</td>
</tr>
<tr>
<td>R. Peterson, ExxonMobil Lubricants &amp; Specialties, Fairfax, VA</td>
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<tr>
<td>3 pm – 3:30 pm ✷ Break</td>
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<tr>
<td>3:30 pm – 4 pm</td>
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<tr>
<td>H1: Conversion to PAG – A Destination and Journey</td>
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<tr>
<td>L. Kerley, ExxonMobil Lubricants &amp; Specialties, Fairfax, VA, A. Walton, Hershey Co., Memphis, TN</td>
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<tr>
<td>4 pm – 4:30 pm</td>
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<tr>
<td>Recalibrated Equations for Determining Effect of Oil Filtration on Rolling Bearing Life</td>
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<tr>
<td>W. Needelman, Donaldson Co., Minneapolis, MN, E. Zaretsky, NASA Glenn Research Center, Cleveland, OH</td>
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<tr>
<td>4:30 pm – 5 pm ✷ Business Meeting</td>
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<td><strong>ENGINE &amp; DRIVETRAIN II</strong></td>
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<tr>
<td>Session Chair: Victor W. Wong, Massachusetts Institute of Technology, Cambridge, MA</td>
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<tr>
<td>1:30 pm – 2 pm</td>
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<tr>
<td>The Relationship Between Oil Condition and Measured Piston Ring and Cylinder Liner Wear for Heavy Duty Diesel Engines</td>
</tr>
<tr>
<td>J. Truhan, P. Kodali, Caterpillar Inc., Peoria, IL</td>
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<tr>
<td>2 pm – 2:30 pm</td>
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<tr>
<td>Advanced Diagnostics for In-Situ Measurements of Lubricant Composition at the Piston and Liner Interface</td>
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<tr>
<td>S. Watson, V. Wong, Massachusetts Institute of Technology, Cambridge, MA</td>
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<tr>
<td>2:30 pm – 3 pm</td>
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<tr>
<td>Temperature Measurements of Piston and Liner in an Operating Gasoline Engine</td>
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<tr>
<td>P. Lee, University of Leeds, Leeds, United Kingdom</td>
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<tr>
<td>3 pm – 3:30 pm ✷ Break</td>
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<td>3:30 pm – 4 pm</td>
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<tr>
<td>Evaluation of Lube Oil Effects on Diesel After Treatment By Accelerated Techniques</td>
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<tr>
<td>B. Bunting, T. Toops, Oak Ridge National Laboratory, Knoxville, TN, K. Nguyen, University of Tennessee Knoxville, Knoxville, TN</td>
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<tr>
<td>4 pm – 4:30 pm</td>
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<tr>
<td>Using a Chemistry-Sensitive Oil Filter to Control Lubricant Acidity</td>
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<tr>
<td>S. Watson, V. Wong, Massachusetts Institute of Technology, Cambridge, MA</td>
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<tr>
<td>4:30 pm – 5 pm</td>
</tr>
<tr>
<td>Using Linear Sweep Voltammetry for Diesel Engine Oil Condition Monitoring</td>
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<tr>
<td>A. Fentress, J. Sander, Lubrication Engineers, Wichita, KS, J. Ameye, Fluitec International/CleanOil, Calgary, AB, Canada</td>
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<tr>
<td>5 pm – 5:30 pm</td>
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<tr>
<td>Magnetoreological Smart Automotive Engine Mount</td>
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<tr>
<td>H. Hirani, Indian Institute of Technology Bombay, Mumbai, India</td>
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<th>Session 2C ✷ Coronado E</th>
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<td><strong>FLUID FILM BEARINGS II – THEORETICAL AND EXPERIMENTAL ASPECTS</strong></td>
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<tr>
<td>Session Chair: B. Bou-Said, INSA-LaMCoS, Villeurbanne, France</td>
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<tr>
<td>1:30 pm – 2 pm</td>
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<tr>
<td>Experimental Investigation of Water-Lubricated Foil Journal Bearings</td>
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<tr>
<td>P. Hryniewicz, Polish Academy of Sciences, Gdansk, Poland, A. Olszewski, M. Wodtke, Gdansk University of Technology, Gdansk, Poland</td>
</tr>
<tr>
<td>2 pm – 2:30 pm</td>
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<tr>
<td>Analysis of Flow and Pressure Fields Inside a Shallow, Single Pocket Hydrostatic Bearing</td>
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<tr>
<td>F. Horvat, M. Braun, The University of Akron, Akron, OH</td>
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<tr>
<td>2:30 pm – 3 pm</td>
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<tr>
<td>Mist(eriou)s Mechanisms of Lubrication of the Pumpless Refrigeration Compressors</td>
</tr>
<tr>
<td>V. Dunaevsky, Ingersoll Rand Climate Control Technologies, Minneapolis, MN</td>
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<tr>
<td>3 pm – 3:30 pm ✷ Break</td>
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<td>3:30 pm – 4 pm</td>
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<tr>
<td>On the Experimental Identification of Active Lubricated Bearings Parameters</td>
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<tr>
<td>I. Santos, Technical University of Denmark, Lyngby, Denmark</td>
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<tr>
<td>4 pm – 4:30 pm</td>
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<tr>
<td>Momentum and Thermal Parametric Analyses of a Self-Acting, Self-Circulating Porous Slider Bearing</td>
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<tr>
<td>J. Johnston, M. Braun, G. Young, The University of Akron, Akron, OH</td>
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<tr>
<td>4:30 pm – 5 pm</td>
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<tr>
<td>Feasibility of Applying Active Lubrication to Dynamically Loaded Fluid Film Bearings</td>
</tr>
<tr>
<td>E. Estupinan, I. Santos, Technical University of Denmark, Lyngby, Denmark</td>
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Monday, May 18, 2009

Session 2C  * continued

5 pm – 5:30 pm
Analysis of a Thrust Bearing With Flexible Pads and Flexible Supports
P. Klit, K. Thomsen, The Technical University of Denmark, Copenhagen, Denmark

5:30 pm – 6 pm
Thermal Effects in a Porous Bearing With Liquid Metal Lubricant Self Circulation
A. Balasoiu, M. Braun, S. Moldovan, Univ. of Akron, Akron, OH

6 pm – 6:30 pm  * Business Meeting

Session 2D  * Coronado F/G
LUBRICATION FUNDAMENTALS II

Session Chair: TBD

1:30 pm – 2 pm
Impact of Organic Friction Modifiers on Lubricant Load Carrying Capacity
D. Chasan, P. Fasano, Ciba, Tarrytown, NY, T. Habereder, Ciba, Basel, Switzerland

2 pm – 2:30 pm
Nano-Scale Properties of Thermal and Tribo-Chemical Films Generated by Fluorothiophosphates as Antiwear Additives
X. Chen, R. Mourhatch, B. Kim, P. Aswath, University of Texas at Arlington, Arlington, TX

2:30 pm – 3 pm
Experimental Study of Fundamental Differences in Wear Protection of Various Antiwear Additives in Boundary Lubrication Conditions

3 pm – 3:30 pm  * Break

3:30 pm – 4 pm
Fuel/Biofuel Dilution and its Effects on Engine Oil

4 pm – 4:30 pm
Role of Soot and Carbon Black on Wear of Ferrous Surfaces
M. Patel, P. Aswath, University of Texas at Arlington, Arlington, TX

4:30 pm – 5 pm
Detection of Biodiesel in Used Crankcase Engine Oil and Some Performance Considerations
M. Boons, M. Morcos, W. Hartgers, S. Roby, G. Parsons, Chevron Oronite LLC, Richmond, CA

5 pm – 5:30 pm
Thermolysis of Bismuth Carboxylates in the Presence of Polysulfides
N. Eckert, R. Hart, The Shepherd Chemical Co., Norwood, OH

Session 2F  * Fiesta 5
COMMERCIAL MARKETING FORUM II

Session Chair: TBD

1:30 pm
The Lubrizol Corp.

2 pm
The Lubrizol Corp.

2:30 pm
Troy Chemical Corp.

3 pm
TBD

3:30 pm
The Lubrizol Corp.

4:00 pm
Croda, Inc.

4:30 pm
Albemarle Corp.

Session 2G  * Yucatan 1
NANOTRIBOLOGY II – FUNDAMENTALS

Session Chair: S. Eswaramoorthy, Northwestern University, Evanston, IL
Session Vice-Chair: A. M’ndange-Pfupfu, Northwestern University, Evanston, IL

1:30 pm – 2 pm
Vapor Phase Lubrication Insights Via Substrate and Gaseous Precursors
M. Dugger, Sandia National Laboratories, Albuquerque, NM

2 pm – 2:30 pm
Development of Self-Healing Boundary Lubrication Molecules
S. Kim, E. Hsiao, Pennsylvania State University, University Park, PA

2:30 pm – 3 pm
In-situ Transmission Electron Microscopy Studies of Nanotribology
S. Eswaramoorthy, L. Marks, Northwestern University, Evanston, IL
### Monday, May 18, 2009

#### Session 2G * continued

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<th>Time</th>
<th>Session</th>
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<tr>
<td>3 pm – 3:30 pm</td>
<td>Break</td>
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</tbody>
</table>
| 3:30 pm – 4:00 pm | Advancement in Nano Tribology with the Use of the Single Point Nanoscratching Technique  
E. Poiré, EP Laboratories, Inc., Irvine, CA |
| 4:00 pm – 4:30 pm | A Novel Tribometer for the Measurement of Friction in MEMS  
I. Ku, T. Reddyhoff, Imperial College, London, United Kingdom, J. Choo, National University of Singapore, Singapore, Singapore, A. Holmes, H. Spikes, Imperial College, London, United Kingdom |
| 4:30 pm – 5:00 pm | Stick Slip Friction at Nanolevel  
K. Singh, S. Baghmar, University of Mississippi, Oxford, MS |
| 5:00 pm – 5:30 pm | An Analytical Solution to an Archard-type Fractal Rough Surface Contact Model  
R. Jackson, Auburn University, Auburn, AL |

#### Session 2H * Yucatan 2

**SPECIAL SESSION ON COATINGS I**

**Panel Discussion – “Tribology of Coatings: A Roadmap for Future Scientific Inquiries”**

Session Chair: S. Ingole, Texas A&M, University at Galveston, Galveston, TX

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<tr>
<th>Time</th>
<th>Panel: Tribology of Coatings: A Roadmap for Future Scientific Inquiries</th>
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<td>1:30 pm – 5:30 pm</td>
<td>Panel: Tribology of Coatings: A Roadmap for Future Scientific Inquiries</td>
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<tr>
<td>5:30 pm – 6:00 pm</td>
<td>Business Meeting</td>
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### Tuesday, May 19, 2009

#### Session 3A * Coronado A

**HYDRAULIC FLUIDS**

Session Chair: L. Rudnick, Ultrachem, Inc, New Castle, DE  
Session Vice-Chair: J. Sherman, BASF, Wyandotte, MI

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
</table>
| 9:00 am – 9:30 am | A Comparative Study of Novel Synthetic Hydraulic Fluids for Hydraulic Equipment  
S. El Houssamy, Egyptian Petroleum Research Institute, Cairo, Egypt |
| 9:30 am – 10:00 am | Impact of Fresh and Sheared Oil Viscosity Requirements on the Formulation of Hydraulic Fluids  
| 10:00 am – 10:30 am | Shear and Wear of Hydraulic Fluids using Star and Linear PMA Viscosity Modifiers  
B. Schober, B. Filippini, Lubrizol Corp., Wickliffe, OH |
| 10:30 am – 11:00 am | Hydraulic Efficiency Development  
F. Herrero, Lubrizol, Ltd., Hazelwood, United Kingdom, B. Schober, Lubrizol Corp., Wickliffe, OH |

#### Session 3B * Coronado B

**WEAR I**

**Panel Discussion – “The Impact of Fuel Economy and Emissions Regulations on Wear of Engines and Drivetrains”**

Session Chair: D. Eberle, Southwest Research Institute, San Antonio, TX

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<thead>
<tr>
<th>Time</th>
<th>Panel: Wear of Engines and Drivetrains</th>
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</table>
| 11:00 am – 11:30 am | Wear Analysis of Automobile Clutch Plates – A High Resolution Microscopic Approach  
A. Basu, A. Pandey, V. Choudhary, Indian School of Mines University, Dhanbad, India |
Session 3C  ✷  Coronado C
CONDITION MONITORING I
Mini Course and Papers: Mobile Oil Analysis Labs

Session Chair: TBD
Session Vice-Chair: C. Chichester, Dow Corning Corp., Midland, MI

Rapid and accurate assessment of fluid condition can often be of paramount importance in ensuring reliable equipment operation in modern industrial environments. Equipment operators increasingly demand shorter turn around times from industrial laboratories in order to make informed decisions about corrective actions to be carried out, should the evaluation results so indicate. Should doubt arise in regard to the obtained data and require repetition of procedures, additional time delay might result in detrimental impact on system components and/or fluid condition. A convenient way to overcome these difficulties is through employment of mobile laboratories equipped with analytical instruments mirroring those found in off-site facilities as closely as possible. This mini-course will present several options for outfitting a mobile laboratory, provide a guided, hands-on tour of the instruments installed and explain which ASTM and/or ISO methods can currently be performed to provide fluid and system assessment expected to be found in a standard laboratory assay.

8 am – 8:30 am
Pros and Cons of Commercial Labs, In-House Testing, at Line Tests, and Mobile Labs
G. Staniewski, Ontario Power Generation, Pickering, ON, Canada

8:30 am – 10 am
Mobile Fluid Condition Monitoring Laboratory; The Future of Modern Industrial Maintenance Practices
J. Duchowski, HYDAC Technology Corp., Sulzbach, Germany

10 am – 10:30 am  ✷  Break

10:30 am – 11 am
“Site-Direct” Oil Analysis Completes the Condition Monitoring Goal of Continuous Machine Monitoring
J. Poley, CMI, Miami, FL

11 am – 11:30 am
Novel Corrosion Sensor Based on Capacitive Coupled Electrodes for the Determination of Oil Corrosiveness
C. Schneiderhofer, N. Doerr, AC2T Research GmbH, Wiener Neustadt, Austria, B. Jakoby, Johannes Kepler University Linz, Linz, Austria

11:30 am – 12 pm
Performance of FTIR and Chemometrics for Oil Condition Monitoring of Gas Engine Oils
A. Grafl, N. Doerr, AC2T research GmbH, Wiener Neustadt, Austria

Session 3D  ✷  Coronado D
ENGINE & DRIVETRAIN III – FRICTION & FUEL ECONOMY

Session Chair: B. Bunting, Oak Ridge National Laboratory, Knoxville, TN
Session Vice-Chair: P. Lee, University of Leeds, Leeds, United Kingdom

8 am – 8:30 am
Development of Fuel Efficient Lubricants as Measured by the Sequence VID Engine Test
T. Miller, A. Boffa, J. Martinez, J. Wang, Oronite, Richmond, CA

8:30 am – 9 am
Motored Engine Friction and Lube Oil Characteristics
B. Bunting, Oak Ridge National Laboratory, Knoxville, TN, J. Qu, Oak Ridge National Laboratory, Oak Ridge, TN, K. Nguyen, W. Rohr, University of Tennessee Knoxville, Knoxville, TN

9 am – 9:30 am
Measuring the Friction and Film Thickness in Real Journal Bearings
R. Baker, C. Hamer, PCS Instruments, London, United Kingdom

10 am – 10:30 am  ✷  Break

10:30 am – 11 am
Liner Surface Improvements for Low Friction Piston Ring Pack
C. Anderberg, Powertrain, Göteborg, Sweden, F. Cabanettes, Z. Dimkovski, B. Rosén, Halmstad University, Halmstad, Sweden

11 am – 11:30 am
Ionic Liquids as Possible Additives for Drivetrain Fluids
M. Fox, University of Leeds, Leeds, United Kingdom

11:30 am – 12 pm
Property-Blending Relationships and Tribological Behavior of Ionized Vegetable Oils in Lubricant Formulations
B. Zhmud, M. Roegiers, E-ION s.a., Brussels, Belgium

Session 3E  ✷  Coronado E
FLUID FILM BEARINGS III – GAS BEARINGS

Session Chair: I. Santos, Technical University of Denmark, Lyngby, Denmark

8 am – 8:30 am
Developments in the Modeling of Compliant Foundation Foil Gas Bearings
R. Bruckner, NASA Glenn Research Center, Brookpark, OH

8:30 am – 9 am
Design of a High-Speed, Oil-Free Bearing Test Rig
M. Conlon, A. Dadouche, W. Dmochowski, R. Payette, B. Liko, J. Bedard, National Research Council Canada, Ottawa, ON, Canada
Session 3E  continued

9 am – 9:30 am
Experimental Analysis of Circular Air Bearing Dynamic Coefficients
P. Matta, M. Arghir, Université de Poitiers, Poitiers, France

9:30 am – 10 am
A Test Rig for Evaluating Gas Lubricated Bearing Performance
N. Ene, F. Dimofte, A. Afjeh, The University of Toledo, Toledo, OH

10 am – 10:30 am  Break

10:30 am – 11 am
Tests of Wave Bearings with PVD Coatings for Aerospace Transmissions
F. Dimofte, The University of Toledo at NASA GRC, Cleveland, OH, N. Ene, The University of Toledo, Toledo, OH, R. Handschuh, T. Krantz, U.S. Army Research Laboratory at NASA GRC, Cleveland, OH, F. Oswald, NASA Glenn Research Center, Cleveland, OH

11 am – 11:30 am
Application of Modified Direct Algorithm for Multi-Objective Optimization of Air Bearings
N. Wang, C. Chan, Chang Gung University, Tao-Yuan, Taiwan

11:30 am – 12 pm
Multi-Objective Optimization of Air Bearing Using Genetic Algorithms
N. Murmu, Central Mechanical Engineering Research Institute, Durgapur, India

Session 3F  Coronado F/G
LUBRICATION FUNDAMENTALS III

Session Chair: P. Aswath, University of Texas at Arlington, Arlington, TX

8 am – 8:30 am
Carbon Nano-Onions as Lubricants. Experimental and Computer Modeling
J. Martin, University of Lyon -Ecole Centrale de Lyon, Ecully, France, N. Matsumoto, N. Ohmae, University of Kobe, Kobe, Japan, L. Joly-Pottuz, University of Lyon INSA-MATEIS, Villeurbanne, France, E. Bucholz, S. Sinnott, University of Florida, Gainesville, FL

8:30 am – 9 am
Effect of Boron Containing Additives on Antiwear Performance and the Properties of Tribofilms Generated by ZDDP and Fluorinated ZDDP
R. Mourhatch, P. Aswath, University of Texas at Arlington, Arlington, TX

9 am – 9:30 am
Comparison of Passenger Vehicles to Air Pollution in America and the Search of Environmentally Benign Engine Oil Additives
K. Komvopoulos, A. Tsai, University of California, Berkeley, CA

9:30 am – 10 am
Comparison of the Experimental Results on Boundary Lubrication Film’s Molecular Orientation Measured by High Sensitivity Polarized Reflection Infrared Spectroscopy with its Molecular Dynamics Simulation Results with Discover, MS
T. Suzuki, AIST, Tsukuba, Japan, W. Suetaka, Tohoku Univ, Sendai, Japan, T. Ikeshoji, AIST, Tsukuba, Japan

10 am – 10:30 am  Break

10:30 am – 11 am
Design of Smart Nanocomposite Coatings for Extreme Tribological Conditions Under Boundary Lubrication
A. Erdemir, O. Eryilmaz, M. Urgen, Argonne National Laboratory, Argonne, IL, K. Kazmanli, Istanbul Technical University, Maslak, Turkey

11 am – 11:30 am
Development and Characterization of Thermal Films on Ferrous Substrates from Antiwear Additives
B. Kim, P. Aswath, University of Texas at Arlington, Arlington, TX

11:30 am – 12 pm
Simulations of Lubricants Between Aluminum and Alumina Surfaces: From Quantum Chemistry to Continuum Models
L. Kong, C. Denniston, M. Muser, University of Western Ontario, London, ON, Canada, Y. Qi, General Motor Research, Detroit, MI
**Session 3G ✷ Fiesta 3/4**

**METALWORKING I**

Session Chair: S. Erhan, Polartech Additives, Inc., Bedford Park, IL
Session Vice-Chair: R. Butler, Chemtool, Inc., Crystal Lake, IL

8 am – 8:30 am

Friction in Metal Forming Processes – A Study Using Experiments and Simulation
P. Menezes, K. Kishore, S. Kailas, Indian Institute of Science, Bangalore, India, M. Lovell, University of Wisconsin-Milwaukee, Milwaukee, WI

8:30 am – 9 am

Friction and Transfer Layer Formation in FCC Metals: Role of Surface Texture and Roughness Parameters
P. Menezes, K. Kishore, S. Kailas, Indian Institute of Science, Bangalore, India, M. Lovell, University of Wisconsin-Milwaukee, Milwaukee, WI

9 am – 9:30 am

Environmentally-Friendly Machining Temperature Analysis for Reaming with Minimum Quantity Lubrication
S. Kurgin, J. Dasch, D. Simon, General Motors, Pontiac, MI, G. Barber, X. Wang, Q. Zou, Oakland University, Rochester, MI

9:30 am – 10 am

The Influence of Amine Structure on Performance of Registered Biocides in Metalworking Fluids
P. Brutto, C. Coburn, D. Green, A. Jones, C. Nash, ANGUS Chemical Co., Buffalo Grove, IL, J. Pohlman, Dow Biocides, Buffalo Grove, IL, B. Pyzowski, R. Swedo, ANGUS Chemical Co., Buffalo Grove, IL

10 am – 10:30 am ✷ Break

10:30 am – 11 am

Microbial Biofilms in Metalworking Fluid Systems
T. Williams, D. Reynolds, Rohm and Haas Co., Spring House, PA

11 am – 11:30 am

Non-Tuberculous Mycobacterial Biofilm Development in Metalworking Fluids using the CDC-Bioreactor
L. Rossmoore, C. Cuthbert, C. Cribbs, K. Rossmoore, Biosaan Laboratories, Inc., Warren, MI

11:30 am – 12 pm

A Method to Predict the Useful Life of Water Dilutable Metal Removal Fluids
J. Burke, Houghton International, Valley Forge, PA

**Session 3I ✷ Fiesta 7/8**

**ENVIRONMENTALLY FRIENDLY FLUIDS**

Session Chair: D. Smith, Omni Tech International, Ridgefield, CT
Session Vice-Chair: B. Sharma, NCAUR/USDA/ARS, Peoria, IL

8 am – 8:30 am

Soybean Lubricant Market Opportunities
D. Smith, OmniTech International, LTD, Midland, MI

8:30 am – 9 am

Formulating and Testing of Engine Oils with Bio-Content
F. Lockwood, D. Dotson, The Valvoline Co., Lexington, KY, D. Smith, Omni Tech International, Midland, MI

9 am – 9:30 am

Biobased Electro rheological (ER) Fluids from Suspensions of Modified Starch in Soy Oil
R. Narayan, D. Graiver, Z. Yang, Michigan State University, East Lansing, MI

9:30 am – 10 am

Heavy Duty Engine Oils with Vegetable Oil and PAO Blends
K. Hope, Chevron Phillips Chemical Co., Kingwood, TX, B. Garmier, Renewable Lubricants Inc., Hartville, OH

10 am – 10:30 am ✷ Break
Session 3I  ✷ continued

10:30 am – 11 am  
Polyalkylene Glycols and Their Use in Hydraulic Fluids for Environmentally Sensitive Areas  
M. Greaves, The Dow Chemical Co., Horgen, Switzerland, G. Khemchandani, The Dow Chemical Co., Freeport, TX

11 am – 11:30 am  
Biodegradable Lubricants – Real World Performance  
M. Miller, Terresolve Technologies, Eastlake, OH

11:30 am – 12 pm  
Conversion to and Performance of Biodegradable Lubricants in Over-Water Applications  

Session 3J  ✷ Yucatan 1  
NANOTRIBOLOGY III – NANOPARTICLE RESEARCH

Session Chair: M. Zou, University of Arkansas, Fayetteville, AR  
Session Vice-Chair: D. Demydov, University of Arkansas, Fayetteville, AR

8 am – 8:30 am  
Preparation and Tribological Properties of Lubricating Oil-based Nanofluids Containing Metal or Graphite Nanoparticles  
C. Cheol, O. Jemyung, J. Mihee, KEPRI, Daejeon, South Korea

8:30 am – 9 am  
In-Situ Studies for Lubrication Mechanisms of Nanoparticles  
F. Dassenoy, M. Belin, L. Joly-Pottuz, J. Martin, ECL, Ecully, France, B. Reynard, G. Montagnac, ENS, Lyon, France

9 am – 9:30 am  
Advanced Lubrication for Loaded Components  
A. Adhvaryu, Caterpillar Inc., Peoria, IL, A. Malshe, University of Arkansas, Fayetteville, AR, A. Erdemir, Argonne National Lab., Argonne, IL, W. Jiang, nanoMech LLC, Fayetteville, AR

9:30 am – 10 am  
Design and Study of Molybdenum Sulfide Nanoparticles Based on Multicomponent Chemistry Using Phosphorous and Boron Components  
D. Demydov, A. Malshe, University of Arkansas, Fayetteville, AR, A. Adhvaryu, Caterpillar Inc., Peoria, IL

10 am – 10:30 am  ✷ Break

10:30 am – 11 am  
Fundamental Understanding Role of Metallic Nanoparticles on the Behavior of MoS2 Nanoparticles through the Study of Chemo-mechanical Properties of Tribofilm  
W. Zhang, D. Demydov, A. Malshe, University of Arkansas, Fayetteville, AR, A. Adhvaryu, Caterpillar Inc., Peoria, IL, A. Erdemir, Argonne National Laboratory, Argonne, IL

11 am – 11:30 am  
New Inorganic Fullerenes Nanoparticles (MoxW1-xS2): Influence of the Stoichiometry on the Tribological Properties  
F. Dassenoy, J. Tannous, M. Belin, J. Martin, A. Bruhacs, W. Tremel, LTDS, Ecully, France

11 am – 11:30 am  ✷ Break

Session 3K  ✷ Yucatan 2  
SPECIAL SESSION ON COATINGS II

Session Chair: TBD  
Session Vice-Chair: S. Ingole, Texas A&M University at Galveston, Galveston, TX

8 am – 8:30 am  
Genesis of Superlow Friction with Nano-smooth Diamond Coatings  
M. De Barros Bouchet, C. Matta, Ecole Centrale de Lyon, Ecully, France, T. Gries, L. Vandenbulcke, CNRS, UPR3021, Orleans, France, J. Martin, Ecole Centrale de Lyon, Ecully, France

8:30 am – 9 am  
Tribochemical Effects on Friction and Wear Behavior of ta-C Coatings in Presence of Alcohols and a-C:H Coatings in Dry Conditions  
C. Matta, Argonne National laboratory, Argonne, IL, M. De Barros Bouchet, B. Vacher, Ecole Centrale de Lyon, Ecully, France, O. Eryilmaz, Argonne National laboratory, Argonne, IL, T. Le Mogne, J. Martin, Ecole Centrale de Lyon, Ecully, France, A. Erdemir, Argonne National laboratory, Argonne, IL

9 am – 9:30 am  
Wear Mechanisms of DLC Coatings  
K. Wang, Texas A&M University, College Station, TX, C. Lin, Baker Hughes Inc., Houston, TX, G. Fox, H. Liang, Texas A&M University, College Station, TX

9:30 am – 10 am  
Tribological Behavior of Flame Sprayed HA Based Composite Coatings  
V. Panavekar, Texas A&M University, Galveston, TX

10 am – 10:30 am  ✷ Break

10:30 am – 11 am  
Anti-Friction Coatings, Can This Established Technology Meet Future Challenges of Friction Reduction?  
M. Jungk, V. Clerici, Dow Corning GmbH, Wiesbaden, Germany
2009 STLE 64th ANNUAL MEETING & EXHIBITION

Tuesday, May 19, 2009

Session 3K  * continued

11 am – 11:30 am
Fretting of WC/a-C:H and Cr2N Coatings Under Grease Lubricated and Unlubricated Conditions
B. Leonard, F. Sadeghi, Purdue University, West Lafayette, IN, R. Evans, G. Doll, P. Shiller, The Timken Co., Canton, OH

11:30 am – 12 pm
Friction and Wear Performance of WC/a-C:H Thin Films in Lubricated Rolling Contact
R. Evans, The Timken Co., Canton, OH

Session 4A  ✷ Coronado A
SYNTHETIC LUBRICANTS

Session Chair: L. Rudnick, Ultradchem, Inc, New Castle, DE
Session Vice-Chair: J. Sherman, BASF, Wyandotte, MI

2 pm – 2:30 pm
Potential Biodegradable Lubricant Materials: Saturated Branched-Chain Fatty Acid Isomers

2:30 pm – 3 pm
Corrosion Properties of Ionic Liquids at Elevated Temperatures and Humid Conditions
N. Doerr, C. Gabler, A. Schneider, AC2T research GmbH, Wiener Neustadt, Austria

3 pm – 3:30 pm  * Break

3:30 pm – 4 pm
The Tribological Properties of Phosphonium Derived Ionic Liquids
I. Minami, Iwate University, Morioka, Japan

4 pm – 4:30 pm
Anti-Oxidant Impact Upon Sludge Formation
M. Hoey, P. Rabbat, Ciba Corp., Tarrytown, NY

4:30 pm – 5 pm
Aspects of Selecting the Optimum Fire Resistant Water Glycol Hydraulic Fluid
M. Greaves, Dow Chemical Co., Horgen, Switzerland, J. Knoell, Dow Chemical Co., Freeport, TX

5 pm – 5:30 pm
High Temperature Fretting Wear Mechanisms of a Ti Alloy: A Tribochemical Approach
C. Mary, T. Le Mogne, J. Martin, S. Fouvy, Laboratory of Tribology and Dynamics of Systems (LTDS), Ecully, France

Session 4B  ✷ Coronado B
WEAR II

Session Chair: TBD

2 pm – 2:30 pm
Wear Performance of Various Coatings for Stamping Dies
C. Yao, R. Zhang, G. Barber, Oakland University, Rochester, MI

2:30 pm – 3 pm
Dry and Wet Contact Analysis for the Study of Friction and Wear Trends
S. Cai, Penn State University, Hazleton, PA, Y. Zhao, Minnesota State University, St Cloud, MN

3 pm – 3:30 pm  * Break

3:30 pm – 4 pm
Wind Turbine Gearboxes: Ensuring Reliability with Optimized Oil Conditioning
D. Kolstad, Porous Media, St Paul, MN

4 pm – 4:30 pm
Wear Test for Motor, Hydraulic and Gear Oils
A. Kiehn, Bardahl Mfg Corp, Seattle, WA

4:30 pm – 5 pm
Material Properties Important to the Metal to Metal Sliding Contact
T. El-Wardany, T. Luo, H. Zhang, J. Milton-Benoit, United Technologies Research Center, East Hartford, CT

5 pm – 5:30 pm
Hard Particle Contaminants Affect Performance of Lubricants and Bearings
M. Moon, Bel-Ray Co., Inc., Farmingdale, NJ

Session 4C  ✷ Coronado C
CONDITION MONITORING II

Session Chair: TBD

2 pm – 2:30 pm
Recent Advances in Miniature Infrared Spectroscopy
R. Butler, Chemtool, Inc., Crystal Lake, IL

2:30 pm – 3 pm
Methods for Trending In-Service Grease Consistency with Small Sample Quantities
R. Wurzbach, L. Williams, MRG Power Labs, York, PA

3 pm – 3:30 pm  * Break

3:30 pm – 4 pm
Asset Health Management Best Practices
T. O’Hanlon, Reliabilityweb.com & Uptime Magazine, Fort Myers, FL

4 pm – 4:30 pm
Experiences in Lubrication of Ammonia Compressors
I. Mayr, AMI Agrolinz Melamine International, Linz, Austria, F. Novotny-Farkas, OMV Refining & Marketing, Schwechat, Austria, A. Schneider, Austrian Center of Competence for Tribology, Wiener Neustadt, Austria

4:30 pm – 5 pm
Hard Particle Contaminants Affect Performance of Lubricants and Bearings
M. Moon, Bel-Ray Co., Inc., Farmingdale, NJ

5 pm – 5:30 pm
IR Thermography – A Useful Tool for the Condition Monitoring of Power Plant Mechanical and Electrical Components
K. Malik, Ontario Power Generation, Pickering, ON, Canada
Tuesday, May 19, 2009

5:30 pm – 6 pm  
**Online Wear Monitoring of Spur Gears**  
H. Hirani, Indian Institute of Technology Bombay, Mumbai, India

6 pm – 6:30 pm  
**Acoustic Emission Activities During Incipient Damage Monitoring Under Different Loadings in Rolling Contact Fatigue Process**  
Z. Rahman, H. Ohba, Toyo Electric Mfg. Co., Ltd, Yokohama, Japan, T. Yoshioka, T. Yamamoto, Tokyo University of Agriculture and Technology, Tokyo, Japan

### Session 4D  
**Coronado D**  
**ENGINE & DRIVETRAIN IV – FUEL IMPACT**

**Session Chair:** Victor W. Wong, Massachusetts Institute of Technology, Cambridge, MA

**2 pm – 2:30 pm**  
**A Study of Biodiesel Fuel Impact on Lubricants**  
D. Chasan, V. Bajpai, P. Fasano, E. Ng. Ciba, Tarrytown, NY

**2:30 pm – 3 pm**  
**Modified Artificial Ageing Procedure to Investigate the Influence of Fuel Quality on Engine Oil Condition**  
A. Grafl, C. Schneidhofer, N. Doerr, AC2T research GmbH, Wiener Neustadt, Austria

3 pm – 3:30 pm  
**Break**

3:30 pm – 4 pm  
**Impact of Bioethanol-Containing Fuels on Engine Oil Performance**  
K. Baumann, F. Novotny-Farkas, OMV Refining & Marketing, Schwechat, Austria

4 pm – 4:30 pm  
**Hard Deposits in the Combustion Chamber of Biogas Fuelled Stationary Gas Engines**  
N. Doerr, C. Besser, C. Schneidhofer, AC2T research GmbH, Wiener Neustadt, Austria

4:30 pm – 5 pm  
**Tribological Aspects of a Diesel Injector Operation with Charcoal-Oil Slurries**  
V. Soloiu, G. Molina, Georgia Southern University, Statesboro, GA

Session 4E  
**Coronado E**  
**FLUID FILM BEARINGS IV – MODELING**

**Session Chair:** M. Braun, University of Akron, Akron, OH

**2 pm – 2:30 pm**  
**Comparison of Numerical Methods for Rapid Solutions of Reynolds Equation**  
N. Wang, S. Chang, Chang Gung University, Tao-Yuan, Taiwan

2:30 pm – 3 pm  
**Incompressible and Analytical Study on Strong Coupling Thrust Gas Dearing with Double Herringbone**  
S. Yao, Harbin Engineering University, Harbin, China

3 pm – 3:30 pm  
**Break**

3:30 pm – 4 pm  
**Typical Strong Coupling Gas Bearings and Their Comparison**  
S. Yao, Harbin Engineering University, Harbin, China

Session 4F  
**Coronado F/G**  
**LUBRICATION FUNDAMENTALS IV**

**Session Chair:** TBD

**2 pm – 2:30 pm**  
**Design of Experiment Approach Towards Development of Better Greases**  
A. Suresh, P. Aswath, University of Texas at Arlington, Arlington, TX

2:30 pm – 3 pm  
**Non-Newtonian Effects on Film Formation in Grease Lubricated Radial Lip Seals**  
P. Baart, P. Lugt, SKF Engineering & Research Centre, Nieuwegein, Netherlands, B. Prakash, Luleå University of Technology, Luleå, Sweden

**3 pm – 3:30 pm**  
**Break**

3:30 pm – 4 pm  
**Activation Energy of Tribochemical and Heterogeneous Catalytic Reactions**  
C. Kajdas, Warsaw University of Technology, Plock, Poland, A. Kulczycki, Institute for Fuels and Renewable Energy, Warsaw, Poland, K. Kurzydlowski, Warsaw University of Technology, Warsaw, Poland, G. Molina, Georgia Southern University, Statesboro, GA

**4 pm – 4:30 pm**  
**Influence of Viscosity Modifiers on Hydrodynamic Friction**  
J. Holtzinger, Imperial College, London, United Kingdom, R. Mufti, Castrol Ltd, Pangbourne, United Kingdom, H. Spikes, Imperial College, London, United Kingdom
**Session 4F  continued**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>4:30 pm – 5 pm</td>
<td>A New Film Forming Lubricant with Anti-Corrosion Properties</td>
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<tr>
<td></td>
<td>J. Kimler, Lonza Inc., Allendale, NJ</td>
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<tr>
<td>5 pm – 5:30 pm</td>
<td>Friction Coefficient Comparison of the DLC Films in Ocean Water, Air and Vacuum</td>
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<td>R. Statuti, L. Santos, P. Radi, V. Trava-Airoldi, INPE, Sao Jose dos Campos, Brazil</td>
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<tr>
<td>5:30 pm – 6 pm</td>
<td>Business Meeting</td>
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**Session 4G  Fiesta 3/4**

**METALWORKING II**

Session Chair: R. Evans, Quaker Chemical Corp., Conshohocken, PA

Session Vice-Chair: R. Butler, Chemtool, Inc., Crystal Lake, IL

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>2 pm – 2:30 pm</td>
<td>Evaluating the Performance of New MWF Additives by Laboratory Based Test Methods and Correlating Them to Field Performance</td>
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<td>S. Erhan, A. Nilpawar, S. Morton, R. Stubbs, Polartech Additives Inc., Bedford Park, IL</td>
</tr>
<tr>
<td>2:30 pm – 3 pm</td>
<td>Real-Time Testing of Bioburdens in Metalworking Fluids Using Adenosine Triphosphate as a Biomass Indicator</td>
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<tr>
<td>3 pm – 3:30 pm</td>
<td>Break</td>
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<tr>
<td>3:30 pm – 4 pm</td>
<td>Emulsifiers with Improved Lubricity and Foam Suppressing Properties for Water Miscible Cooling Lubricants</td>
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<td>M. Stolz, L. Boesing, Sasol Olefins &amp; Surfactants, Marl, Germany</td>
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**Session 4H  Fiesta 5**

**COMMERCIAL MARKETING FORUM IV**

Session Chair: TBD

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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>2 pm</td>
<td>Afton Chemical Corp.</td>
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<td>2:30 pm</td>
<td>Afton Chemical Corp.</td>
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<td>3 pm – 3:30 pm</td>
<td>Break</td>
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<tr>
<td>3:30 pm</td>
<td>Lanxess Corp.</td>
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<tr>
<td>4 pm</td>
<td>Kyowa Hakko USA</td>
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<td>4:30 pm</td>
<td>Lonza Inc.</td>
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**Session 4I  Fiesta 7/8**

**ENVIRONMENTALLY FRIENDLY FLUIDS**

Session Vice-Chair: B. Sharma, NCAUR/USDA/ARS, Peoria, IL

Session Chair: S. Erhan, NCAUR/USDA/ARS, Peoria, IL

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>2 pm</td>
<td>Tribological and Mechanical Properties of Nanostructured Hydrogenated Amorphous Carbon and Titanium Diboride Films</td>
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<td>B. Zhao, Y. Chung, Northwestern University, Evanston, IL</td>
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<td>2:30 pm</td>
<td>Tribological Investigation of Amorphous Carbon Films Using In-Situ TEM Nanomanipulation</td>
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<td>A. M’ndange-Pfupfu, Northwestern University, Evanston, IL, O. Eryilmaz, A. Erdemir, Argonne National Laboratory, Argonne, IL, L. Marks, Northwestern University, Evanston, IL</td>
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<tr>
<td>3 pm – 3:30 pm</td>
<td>Break</td>
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</table>
3:30 pm – 4 pm
Morphology and Wear Mechanisms of PA66/Carbon Nanotubes Injection Moulding Products
Y. Chen, The University of Hertfordshire, Hatfield, United Kingdom, L. Qiu, X. Liu, Taiyuan University of Technology, Taiyuan, China, Y. Xu, The University of Hertfordshire, Hatfield, United Kingdom

4 pm – 4:30 pm
Measurement of Vertically Aligned Carbon Nanotube Array Bulk Friction in Contact with Silicon
C. Korach, SUNY-Stony Brook, Stony Brook, NY

4:30 pm – 5 pm
The Influence of Nano-Particles on the Functional Mechanisms of Additives in Automotive Lubricants
J. Choo, PETRONAS Research Sdn. Bhd., Kajang, Malaysia

5 pm – 5:30 pm  *  Business Meeting

2 pm – 2:30 pm
Comparison of the Friction Properties of DLC Coatings in DLC/DLC Contacts
B. Vengudusamy, Imperial College London, London, United Kingdom, R. Mufti, Whitchurch Hill, Pangbourne, Reading RG8 7QR, United Kingdom, H. Spikes, Imperial College London, London, United Kingdom

2:30 pm – 3 pm
Material Flow and Stress Analysis at the Interface of Sliding Contacts of Boronized Refractory Metal Using 3D CFD Modeling
S. Ingle, Texas A&M University, Galveston, TX, S. Nagdewa, H. Kim, Andong National University, Andong, South Korea

3 pm – 3 pm  *  Break

3:30 pm – 4 pm
Cryogenic Friction Studies of Polymeric Solids
D. Burris, University of Delaware, Newark, DE, W. Sawyer, University of Florida, Gainesville, FL

4 pm – 4:30 pm
Expanding the Operational Range and Functionality of Temperature-Adaptive Solid Lubricant Coating Materials
C. Muratore, UTC/Air Force Research Laboratory, Wright-Patterson AFB, OH, J. Hu, UDRI/Air Force Research Laboratory, Wright-Patterson AFB, OH, B. Phillips, A. Voevodin, Air Force Research Laboratory, Wright-Patterson AFB, OH

4:30 pm – 5 pm
Investigation of Contact Pressure Limits of Molybdenum Disulfide Solid Lubricant Films
R. Colbert, J. Keith, University of Florida, Gainesville, FL, D. Burris, University of Delaware, Newark, DE, W. Sawyer, University of Florida, Gainesville, FL

5 pm – 5:30 pm
The Effect of Methane and Acetylene in the Surrounding Test Environment on Tribological Behavior of Non to Highly Hydrogenated DLC Films
O. Eryilmaz, A. Erdemir, G. Kartal, Argonne National Laboratory, Argonne, IL

5:30 pm – 6 pm
Friction and Wear Maps as a Function of Humidity Gradient for DLCH35%
P. Radi, L. Santos, R. Statuti, L. Bonetti, V. Trava-Airoldi, INPE, Sao Jose dos Campos, Brazil

6 pm – 6:30 pm  *  Business Meeting
<table>
<thead>
<tr>
<th>Session 5A</th>
<th>Coronado A</th>
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<tbody>
<tr>
<td><strong>AEROSPACE</strong></td>
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<tr>
<td>Session Chair: J. Lucero, NASA Glenn Research Center, Cleveland, OH</td>
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<tr>
<td><strong>8:30 am – 9 am</strong></td>
<td>Metalworking Fluid Management Program: Extending the Life of Metalworking Fluids</td>
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<tr>
<td>M. Hoff, Master Chemical Corp., Perrysburg, OH, B. LaFoe, MSC Filtration Technologies, Enfield, CT, M. Weismiller, Master Chemical Corp., Perrysburg, OH</td>
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<tr>
<td><strong>9 am – 9:30 am</strong></td>
<td>Novel High Temperature Perfluoropolyalkylether Lubricants And Their Additives</td>
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<tr>
<td>R. Sapienza, W. Ricks, METSS Corp., Westerville, OH, J. Howell, Dupont-Krytox, Deepwater, NJ</td>
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<td><strong>9 am – 9:30 am</strong></td>
<td>Evaluation of an Alkyl Sulfate Series of 1-Butyl-3 Methylimidazolium Based Room Temperature Ionic Liquids for Use as Space Lubricants</td>
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<td>W. Morales, K. Street, NASA Glenn Research Center, Cleveland, OH, R. Richard, Cleveland State University, Cleveland, OH</td>
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<tr>
<td><strong>10 am – 10:30 am</strong></td>
<td>Break</td>
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<tr>
<td><strong>10:30 am – 11 am</strong></td>
<td>Thermal Conductivity Measurements of Select Coolants for Military Applications</td>
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<tr>
<td><strong>11 am – 11:30 am</strong></td>
<td>Development and Transition of Fire Resistant Hydraulic Fluids for Military Aircraft</td>
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<td>C. Snyder, L. Gschwender, US Air Force, Dayton, OH</td>
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<tr>
<td><strong>11:30 am – 12 pm</strong></td>
<td>Performance Mapping of Foil Journal Bearings</td>
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<td>B. Puleo, R. Bruckner, NASA Glenn Research Center, Brookpark, OH</td>
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<tr>
<th>Session 5B</th>
<th>Coronado B</th>
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<tbody>
<tr>
<td><strong>WEAR III</strong></td>
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<tr>
<td>Session Chair: TBD</td>
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<tr>
<td><strong>8:30 am – 9 am</strong></td>
<td>Lubrication of High-Power Sliding Electrical Contacts Using Metal and Carbon Brushes</td>
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<tr>
<td>N. Argibay, J. Bares, W. Sawyer, UF Tribology Lab, Gainesville, FL</td>
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<tr>
<td><strong>9 am – 9:30 am</strong></td>
<td>Vapor Phase Lubrication of Self-Mated Copper Sliding Electrical Contacts</td>
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<tr>
<td>J. Bares, N. Argibay, N. Mauntler, D. Dickrell, G. Bourne, W. Sawyer, University of Florida, Gainesville, FL</td>
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<tr>
<td><strong>9:30 am – 10 am</strong></td>
<td>Wear of Thermal Oil &amp; Degradation and Onsite Reconditioning</td>
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<tr>
<td>F. Tremblay, A. Mohamed, Groupe LTI, Asbestos, QC, Canada</td>
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<tr>
<td><strong>10 am – 10:30 am</strong></td>
<td>Break</td>
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<tr>
<td><strong>10:30 am – 11 am</strong></td>
<td>Tribology of Metal-on-Metal Bearings at High Inclination Angles</td>
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<tr>
<td>R. Lee, A. Wang, A. Essner, J. Longaray, Stryker Orthopaedics, Mahwah, NJ</td>
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<tr>
<td><strong>11 am – 11:30 am</strong></td>
<td>Liposomes as Potential Biolubricant Additives for Wear Reduction in Human Synovial Joints</td>
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<tr>
<td>I. Etsion, G. Verbeke, Technion, Haifa, Israel, A. Schroeder, Hebrew University, Jerusalem, Israel, Y. Merkher, G. Halperin, A. Maroudas, Technion, Haifa, Israel, Y. Barenholz, Hebrew University, Jerusalem, Israel</td>
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<tr>
<th>Session 5C</th>
<th>Coronado C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONDITION MONITORING III</strong></td>
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<tr>
<td>Session Chair: TBD</td>
<td>Session Vice-Chair: C. Chichester, Dow Corning Corp., Midland, MI</td>
</tr>
<tr>
<td><strong>8 am – 8:30 am</strong></td>
<td>Application of EDXRF for Lubricant Analysis</td>
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<td>R. Phillips, Thermo/GasTops, Pensacola, FL</td>
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<tr>
<td><strong>8:30 am – 10 am</strong></td>
<td>The Use of XRF Analysis in Machinery Condition Assessment</td>
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<tr>
<td>R. Phillips, Thermo/Gastops, Pensacola, FL</td>
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</tbody>
</table>
**Session 5C ** continued

10:30 am – 12 pm
X-ray Fluorescence Spectroscopy for Filter Debris Analysis
A. Toms, GasTOPS Inc, Pensacola, FL

12 pm – 12:30 pm ** Business Meeting

**Session 5D ** Coronado D
SEALS I

Session Chair: R. Salant, Georgia Institute of Technology, Atlanta, GA

8 am – 8:30 am
Comparison of Leakage Performance in Three Types of Gas Annular Seals Operating at a High Temperature
Z. Ashton, L. San Andrés, A. Delgado, Texas A&M University, College Station, TX

8:30 am – 9 am
FEA of Lip Seals – Adjusting the Contact Area for Perfect Working Conditions
F. Bauer, W. Haas, Universitaet Stuttgart, Stuttgart, Germany

9 am – 9:30 am
Dynamic Analysis of Rubber Lip Seal Using Finite Element Method
W. Li, L. Stephens, University of Kentucky, Lexington, KY

9:30 am – 10 am
Radial Lip Seal System Modeling and Monte Carlo Simulation
K. Warren, S. Stephens, University of Kentucky, Lexington, KY

10 am – 10:30 am ** Break

10:30 am – 11 am
Optimizing Microfeatures to Improve Performance in Radial Lip Seals
W. Leachman, S. Stephens, University of Kentucky, Lexington, KY

11 am – 11:30 am
Simulation of a Hydraulic Rod Seal with a Micro-Patterned Sealing Surface
B. Yang, R. Salant, Georgia Institute of Technology, Atlanta, GA

**Session 5E ** Coronado E
TRIBOTESTING I

Session Chair: N. Gitis, CETR, Campbell, CA
Session Vice-Chair: G. Krauss, Energizer Consumer Group, Milford, CT

8 am – 8:30 am
Human Corneal Epithelial Cell Responses to Tribological Damage
D. Dickrell, W. Sawyber, B. Keselowsky, University of Florida, Gainesville, FL

8:30 am – 9 am
Quantification of Fabric Sensory Tactility and Correlation with Surface Properties
C. Schwartz, M. Darden, Texas A&M University, College Station, TX

9 am – 9:30 am
Porous UHMWPE Scaffolds Impregnated with Bio-Derived Materials: A New Class of Orthopedic Material
C. Schwartz, K. Plumlee, Texas A&M University, College Station, TX

9:30 am – 10 am
A New Setup for Temperature Dependent Measurement of Starting Torque, Running Torque and Roll-Out Time of Rolling Element Bearing Grease
J. Laeuger, P. Heyer, Anton Paar Germany, Ostfildern, Germany

10 am – 10:30 am ** Break

10:30 am – 11 am
A Novel Method for Quantitative Determination of Ultra-Low Wear Rates: Application to Multiphase Al-Si Alloys
D. Shakhvorostov, L. Coatsworth, W. Lennard, P. Norton, University of Western Ontario, London, ON, Canada

11 am – 11:30 am
The Effects of CO2 Pressure in the Tribological Behavior of Interfaces Used in Air Conditioning Compressors
E. Escobar Nunez, A. Polycarpou, University of Illinois, Urbana, IL

**Session 5F ** Coronado F/G
LUBRICATION FUNDAMENTALS V

Session Chair: TBD

8 am – 8:30 am
Development of A Three-Dimensional Plastico-Elasto-Hydrodynamic Lubrication (PEHL) Model for Point Contact Mixed Lubrication
N. Ren, Northwestern University, Evanston, IL, D. Zhu, Tri-Tech Solutions, Inc., Mt Prospect, IL, W. Chen, Q. Wang, Northwestern University, Evanston, IL

8:30 am – 9 am
On Mechanism of Sucking Force Under Vertical and Tangential Pulling Conditions
T. Washio, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan, K. Mizuhara, Tokyo Denki University, Chiyoda-ku, Japan

**Program Guide and Registration**

Wednesday, May 20, 2009
Session 5F  * continued

9 am – 9:30 am
Design-of-Experiments Study of Lubricant Additive Effects on the Oxidation Stability of LORD Magnetorheological Fluids
D. Barber, LORD Corp., Cary, NC

9:30 am – 10 am
Studies on Some Electro-Physical Properties of Lubricating Oils
F. Novotny-Farkas, OMV Refining & Marketing, Schwechat, Austria

10 am – 10:30 am  * Break

10:30 am – 11 am
A Simple Numerical Method for the Solution of Thermal Elastohydrodynamic Lubrication Problem of Infinite Line Contacts
P. Sinha, H. Khan, A. Saxena, I.I.T. Kanpur, Kanpur, India

11 am – 11:30 am
Numerical Simulation of Thermal and Roughness Effects on the Performance of Finite Tilted Pad Slider Bearings
P. Sinha, G. Adamu, I.I.T. Kanpur, KANPUR, India

11:30 am – 12 pm
Progressive Mesh Densification (PMD) Method for Full Numerical Solution of EHL Problems
D. Zhu, Tsinghua University, Beijing, China

Session 5G  * Fiesta 3/4
METALWORKING III

Session Chair: T. McClure, Tribsys LLC, Valparaiso, IN
Session Vice-Chair: W. Roetting, Chemtool, Inc., Crystal Lake, IL

8:30 am – 9 am
The Problems with Relying on Biocide-Free Fluids to Control Microbial Growth in Metalworking Fluids
J. Pohlman, The Dow Chemical Co., Buffalo Grove, IL

9 am – 9:30 am
The Effect of Solvent Type and Drying Time on Rust Preventive Performance
W. Kingston, King Industries, Norwalk, CT

9:30 am – 10 am
Advantageous Characteristics of Graphite Free Forging Lubricants to Environmentally Friendly Work Space
Y. Yoneda, K. Goto, KYODOYUSHI, Fujisawa-shi, Japan

10 am – 10:30 am  * Break

10:30 am – 11 am
Numerical Study of the Process Fluid Flow Before the Abrasive Contact
S. Milic, S. Cioc, I. Marinescu, University of Toledo, Toledo, OH, M. Weismiller, Master Chemical Corp., Perrysburg, OH

11 am – 11:30 am
Experimental Design: A Tool for Metalworking Fluid Performance Optimization
C. Nash, A. Jones, B. Pyzowski, P. Novy, ANGUS Chemical, Buffalo Grove, IL, J. Pohlman, Dow Biocides, Buffalo Grove, IL, P. Brutto, ANGUS Chemical, Buffalo Grove, IL

Session 5H  * Fiesta 5
COMMERCIAL MARKETING FORUM V

Session Chair: TBD

8 am
TBD

8:30 am
TBD

9 am
PCC-Chemax, Inc.

9:30 am
Chemidex LLC

10 am – 10:30 am  * Break

10:30 am
Ciba Corp.

11 am
NCeed Enterprises Inc.

11:30 am
TBD

Session 5I  * Yucatan 1
ROLLING ELEMENT BEARINGS I

Session Chair: D. Nelias, INSA-LaMCoS, Villeurbanne, France

8 am – 8:30 am
An Investigation of Residual Stresses Within Hertzian Contact of Lubricated Rolling Bearing Elements
Z. Khan, M. Hadfield, Bournemouth University, Poole, United Kingdom

8:30 am – 9 am
Modification of Contact Performance Using Coatings
W. Borchers, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany, V. Bakolas, Schaeffler KG, Herzogenaurach, Germany

9 am – 9:30 am
CAGEDYN: A Contribution to Roller Bearing Dynamic Calculations
L. Houpert, TIMKEN Europe, Colmar, France
9:30 am – 10 am
Thermal Analysis of Rolling Element Bearings
F. Pouly, TURBOMECA groupe SAFRAN, Pau, France, C. Changenet, Université de Lyon, Lyon, France, F. Ville, P. Velex, Université de Lyon, Villeurbanne, France, B. Damiens, TURBOMECA groupe SAFRAN, Pau, France

10 am – 10:30 am  ✷ Break

10:30 am – 11 am
Bearing Optimization Using a 3D-Dynamic Simulation Tool
V. Vesselinov, V. Bakolas, Schaeffler KG, Herzogenaurach, Germany

11 am – 11:30 am
A New Approach for Fatigue Modeling of Dented Surfaces Under EHL Line Contact
A. Warhadpande, F. Sadeghi, Purdue University, West Lafayette, IN

11:30 am – 12 pm
A Combined Analytical-Numerical Model for Subsurface Crack Initiation and Propagation Under Rolling Contact Loading
J. Lai, SKF Engineering & Research Centre, Nieuwegein, Netherlands, S. Ioannides, SKF Group Technology Development, Nieuwegein, Netherlands, H. Kuijpers, SKF Engineering & Research Centre, Nieuwegein, Netherlands

10:30 am – 11 am
Change of a Hot Rolling Emulsion by Balance Additions of a New Formulation – A Case Study
G. Kudermann, Hydro Aluminium Deutschland GmbH, Bonn, Germany, T. Wirtz, Hydro Aluminium Deutschland GmbH, Hamburg, Germany

11 am – 11:30 am
Filtration Technology for the Aluminum and Nonferrous Metalworking Industry
B. Terrell, Mann+Hummel, Louisville, KY, J. Haus, Houghton International, Valley Forge, PA

11:30 am – 12 pm
Bearings at the Heart of an Environmental Clean-Up in the Steel Industry
C. Bender, NSK Corp. Ann Arbor, MI

9:30 am – 10 am
Use of Ether Carboxylates as Additives to Increase Coolant Life in Non-Ferrous Applications
A. Michael, Clariant Corp., Mt. Holly, NC

10 am – 10:30 am  ✷ Break

9 am – 9:30 am
NASA PS324: A New High Temperature Solid Lubricant Coating for High Temperature Wear Applications
C. DellaCorte, NASA, Cleveland, OH

8:30 am – 9 am
Microstructure and Tribological Performance of MoS2-Based Composite Films
J. Hu, R. Wheeler, J. Zabinski, C. Muratore, B. Phillips, A. Voevodin, Air Force Research Laboratory, Dayton, OH

9:30 am – 10 am
A New Strategy of Synthesis of Hard and Tough Coatings with Excellent Adhesion
Y. Chung, A. Ranade, L. Krishna, Northwestern University, Evanston, IL

10 am – 10:30 am  ✷ Break

Session Chair: T. Oleksiak, BP Castrol, Naperville, IL
Session Vice-Chair: R. Pruhs, D. A. Stuart Co., Warrenville, IL

Session 5I  ✷ continued

Session 5J ✷ Yucatan 2
NONFERROUS I

Sustainability in the Nonferrous Industry
Session Chair: T. Oleksiak, BP Castrol, Naperville, IL
Session Vice-Chair: R. Pruhs, D. A. Stuart Co., Warrenville, IL

8 am – 8:30 am
Aluminum Industry – At the Crossroads of Sustainability
T. Brackmann, Nichols Aluminum, Davenport, IA

8:30 am – 9 am
The Aluminum Industry’s Sustainability Efforts
J. Wang, The Aluminum Association, Arlington, VA

9 am – 9:30 am
Sustainable Processes, Green Chemistry, Nano Particles and Other Myths Involved in Non Ferrous and Ferrous Metal Manufacturing Processes
J. Burke, Houghton International, Valley Forge, PA

9:30 am – 10 am
Use of Ether Carboxylates as Additives to Increase Coolant Life in Non-Ferrous Applications
A. Michael, Clariant Corp., Mt. Holly, NC

10 am – 10:30 am  ✷ Break
Wednesday, May 20, 2009

Session 5K  Continued

10:30 am – 11 am  
Effects of Structure, Doping & Environment on the Tribochemistry of DLC  
J. Harrison, G. Gao, M. Knippenberg, P. Piotrowski, J. Schall, US Naval Academy, Annapolis, MD

11 am – 11:30 am  
Development of Diamond-Like Carbon Films for Application from Deep Ocean to Orbit Space  
L. Santos, V. Airoldi, L. Bonetti, R. Statuti, P. Radi, INPE, Sao Jose dos Campos, Brazil

11:30 am – 12 pm  
Spectromicroscopy of Tribochemical Wear of Ultrananocrystalline Diamond Films  

Session 5L  Coronado D  
SAFETY, HEALTH & REGULATORY AFFAIRS

Session Chair: E. White, Milacron, Inc., Cincinnati, OH

8 am – 8:30 am  
Best Practices for Microbial Control and Biocide Treatment of Metalworking Fluids  
T. Williams, D. Reynolds, Rohm and Haas Co., Spring House, PA

8:30 am – 9 am  
Formaldehyde Release Biocides: A Comparison of Airborne Formaldehyde Measurements to Predicted Values in a Machining Environment  
P. Miller, Lubrizol Corp., Spartanburg, SC

9 am – 9:30 am  
“Endotoxin and the Respiratory Health of Machinists: A Search for Understanding”  
E. White, Milacron, Cincinnati, OH

9:30 am – 10 am  
H1 Lubricants for Food Machinery  
D. Selby, ExxonMobil Lubricants & Specialties, Fairfax, VA

10 am – 10:30 am  
Break

Session 6A  Coronado A  
CERAMICS/COMPOSITES

Session Chair: A. Rocha, Texas A&M University, Bryan, TX

1:30 pm – 2 pm  
Friction and Wear of PEEK Reinforced with Carbon Fibers in Nitrogen at Normal and Cryogenic Temperature  
T. Oyamada, M. Ono, Y. Mural, Mechanical Engineering Research Laboratory, Hitachi, Ltd., Hitachinaka, Japan, H. Miura, T. Kuwano, Hitachi Plant Technologies, Ltd., Tsuchiura, Japan

2 pm – 2:30 pm  
PTFE Fiber Reinforced PEEK Composites  
J. Vail, University of Florida, Gainesville, FL, D. Burris, University of Delaware, Newark, DE, W. Sawyer, University of Florida, Gainesville, FL

2:30 pm – 3 pm  
The Effect of pH Levels and Exposure Times on Polyurethane Scratch Resistance  
C. Korach, O. Sha, W. Zhao, SUNY-Stony Brook, Stony Brook, NY

3 pm – 3:30 pm  
Break

3:30 pm – 4 pm  
Ex Situ Observation of Tantalum Oxides After ECMP  
K. Wang, F. Gao, H. Liang, Texas A&M University, College Station, TX

4 pm – 4:30 pm  
Friction of Integrated Circuits for Chemical Mechanical Polishing with Varying Slurries  
C. Korach, Stony Brook University, Stony Brook, NY, J. Levert, R. Fedele, B. Toman, SUNY Maritime College, Bronx, NY

4:30 pm – 5 pm  
Nano- and Micro-scale Abrasivity and Hardness of Lunar Regolith Simulant  
K. Miyoshi, K. Ishibashi, Nippon Institute of Technology, Miyashiro-machi, Japan, P. Abel, NASA, Cleveland, OH

5 pm – 5:30 pm  
Business Meeting
Wednesday, May 20, 2009

Session 6B  ✷ Coronado B
WEAR IV
Session Chair: TBD

1:30 pm – 2 pm
Temperature Field of a Rotating Cylindrical Workplace in Laser Quenching and Related Parametric Study
H. Xu, Y. Huang, Printing Engineer, Xi’an University of Technology, Xi’an, Shaanxi, China, W. Cheng, Q. (Jane) Wang, Northwestern University, Evanston, IL

2 pm – 2:30 pm
Nanoscale Wear of Silicon- and Carbon-based Atomic Force Microscope Probes

2:30 pm – 3 pm
A Parametric Investigation of a Lab-Scale Electromagnetic Launcher Using Finite-Element Analysis
E. Kimn, I. Green, R. Cowan, Georgia Institute of Technology, Atlanta, GA

3 pm – 3:30 pm ✷ Business Meeting

Session 6C  ✷ Coronado C
CONDITIONING MONITORING IV
TBA

Session 6D  ✷ Coronado D
SEALS II – FACE SEAL MATERIALS
Panel Discussion: Fundamental Review and Technology Outlook
Session Chair: J. Derby, John Crane, Inc., Morton Grove, IL

1:30 pm – 5:30 pm
Panel Discussion: Face Seal Materials – Fundamental Review and Technology Outlook
Jeff Anderson, ESK Ceramics, Saline, MI – Silicon Nitride, Liquid Phase Sintered SiC

Joseph Boylan, Morgan AM&T, St. Marys, PA – Carbon, Graphite Loaded Self Sintered SiC
Ali Erdimer, PhD, Argonne National Laboratory, Argonne, IL – Surface Treatment
Paul Faker, Saint Gobain, Niagara Falls, NY – Self Sintered SiC, Controlled Porosity SiC
Dr. Stephen Hsu, George Washington University, Germantown, MD – Boundary Film
Kevin McNerney, CoorsTek – Ceramic, Reaction Bonded SiC

5:30 pm – 6 pm ✷ Business Meeting

Session 6E  ✷ Coronado E
TRIBOTESTING II
Session Chair: G. Krauss, Energizer Consumer Group, Milford, CT
Session Vice-Chair: N. Gitis, CETR, Campbell, CA

1:30 pm – 2 pm
A Novel and More Accurate Method for Quantifying and Mapping the Sliding Friction Without Wear
E. Poiré, EP Laboratories, Inc., Irvine, CA

2 pm – 2:30 pm
Friction and Wear Measurements of Hard-Carbon and Nitride Coatings Sliding Against S2100 Steel in Commercial Gear Oils at Elevated Temperatures
R. Erck, C. Lorenzo-Martin, O. Ajayi, Argonne National Laboratory, Argonne, IL

2:30 pm – 3 pm
An Instrumented Crank-Slider Mechanism for Wear Testing
N. Mauntler, S. Mukras, N. Kim, T. Schmitz, W. Sawyer, University of Florida, Gainesville, FL

3 pm – 3:30 pm ✷ Break

3:30 pm – 4 pm
Low Earth Orbit Space Tribometer
B. Krick, University of Florida, Gainesville, FL, J. Jones, Air Force Research Laboratory, Wright-Patterson AFB, OH, W. Sawyer, University of Florida, Gainesville, FL

Session 6F  ✷ Coronado F/G
GEARS & GEAR LUBRICATION
Session Chair: C. Ved, Ford Motor Co., Livonia, MI
Session Chair: H. Gao, ConocoPhillips, Ponca City, OK
Session Vice-Chair: C. Phillips, ConocoPhillips, Troy, MI

1:30 pm – 2 pm
Bright Stock Alternatives in Formulating Gear Oils and Greases
J. Vinci, R. Profilet, Lubrizol Corp., Wickliffe, OH

2 pm – 2:30 pm
Influence of Base Oil and Additives of Gear Oils on Friction Power Losses of Passenger Cars
W. Bartz, Technische Akademie Esslingen, Ostfildern, Germany
Wednesday, May 20, 2009

Session 6F  * continued

2:30 pm – 3 pm
The Effect of Chemical Boundary Films on Tribological Behavior of Mild Carbon Steel
M. Lorenzo Martin, O. Ajayi, R. Erck, G. Fenske, Argonne National Laboratory, Argonne, IL

3 pm – 3:30 pm  * Break

3:30 pm – 4 pm
Fluid Design Impacts on Worm Gear Efficiency Performance
J. Carey, A. Galiano-Roth, N. Leon, ExxonMobil Research and Engineering, Paulsboro, NJ

4 pm – 4:30 pm
Investigations on the Power Losses and Thermal Effects in Gear Transmissions
G. Koffel, C. Changenet, F. Ville, P. Velex, Université de Lyon, VILLEURBANNE, France

4:30 pm – 5 pm  * Business Meeting

Session 6G  * Fiesta 3/4

METALWORKING IV

Session Chair: T. McClure, Tribsys LLC, Valparaiso, IN
Session Vice-Chair: W. Roetling, Chemtool, Inc., Crystal Lake, IL

1:30 pm – 2 pm
Tool Performance When Drilling Sintered Nickel-Base (RR1000) Alloy with Uncoated Carbide Tool
E. Ezugwu, J. Bonney, E. Ugwoha, London South Bank University, London, United Kingdom

2 pm – 2:30 pm
Investigating Tribological Properties of MoS2 Nanoparticles Based Machining Fluids for Minimum Quantity Lubrication (MQL) Grinding
P. Kalita, A. Malshe, University of Arkansas, Fayetteville, AR; A. Shih, University of Michigan, Ann Arbor, MI

5:30 pm – 6 pm  * Business Meeting

Session 6H  * Fiesta 5

COMMERCIAL MARKETING FORUM VI

Session Chair: TBD

1:30 pm
The Lubrizol Corp.

2 pm
TBD

2:30 pm
TBD

3 pm – 3:30 pm  * Break

4 pm
TBD

4:30 pm
TBD

Session 6I  * Yucatan 1

ROLLING ELEMENT BEARINGS II

Session Chair: TBD

1:30 pm – 2 pm
A Voronoi Finite Element/Damage Model for Life Scatter in Rolling Contact Fatigue
B. Jalalahmadi, F. Sadeghi, Purdue University, West Lafayette, IN

2 pm – 2:30 pm
Free Surface Thin Layer Flow Modeling of Contact Pressure Induced Lubricant Migration in Rolling Element Bearings
M. van Zoelen, C. Venner, University of Twente, Enschede, Netherlands; P. Lugt, SKF ERC, Nieuwegein, Netherlands

2:30 pm – 3 pm
Interference Fit Life Factors for Ball Bearings
F. Oswald, E. Zaretsky, NASA Glenn Research Center, Cleveland, OH; J. Poplawski, J.V. Poplawski & Associates, Bethlehem, PA

3 pm – 3:30 pm  * Break
Session 6J  Yucatan 2
NONFERROUS II – BIOBASED APPLICATIONS IN THE NONFERROUS INDUSTRY

3:30 pm – 4 pm
Determination of Fatigue Loads of Complex Systems
A. Degtiarev, S. Lenssen, V. Vesselinov, V. Bakolas, Schaeffler KG, Herzogenaurach, Germany

4 pm – 4:30 pm
Finite Element Analysis of Debris Denting by Spherical Ductile Particles
D. Nélias, INSA Lyon, Villeurbanne, France

4:30 pm – 5 pm
Rolling Contact Fatigue Cracks in the Presence of a Lubricant
R. Balcombe, M. Fowell, A. Olver, D. Dini, Imperial College London, London, United Kingdom

5 pm – 5:30 pm
A Discrete Element Approach for Modeling the Dynamics of Deep Groove and Angular Contact Ball Bearing with Flexible Cages
N. Weinzapfel, F. Sadeghi, Purdue University, West Lafayette, IN

5:30 pm – 6 pm
Synthesis and Characterization of New Sulfide Derivatives of Vegetable Oils
G. Bantchev, J. Kenar, G. Biresaw, USDA-NCAUR, Peoria, IL

4 pm – 4:30 pm
The History of Quenching – The Original Biobased Metalworking Process
D. MacKenzie, Houghton International, Valley Forge, PA

4:30 pm – 5 pm
Particle Size Analysis Of Non-Ferrous Rolling Oil Emulsions Using Light Scattering Techniques
P. Krippax, A. Virden, D. Higgs, Malvern Instruments Limited, Malvern, United Kingdom

5 pm – 5:30 pm
Fatty Alcohols in Oils and Emulsions. Various Methods to Identify and Quantify Them
P. Mortreuil, Alcan-Centre de Recherches de Voreppe, Voreppe, France

5:30 pm – 6 pm  Business Meeting

Session 6K  Yucatan 3
JOINT SESSION: SURFACE ENGINEERING/SOLID LUBRICANTS II
Special Session: Tribological Coatings

3:30 pm – 4 pm
Effect of Soybean Oil and EP Additives on Surface Wear Under Boundary Lubrication Conditions
T. McClure, TribSys LLC, Valparaiso, IN, S. Asadauskas, Institute of Chemistry, Vilnius, Lithuania, J. Baltrus, Dept of Energy, Valparaiso, PA, J. Mieczkowski, Fuchs Lubricants, Harvey, IL

3 pm – 3:30 pm  Break

3:30 pm – 4 pm
Synthesis and Characterization of New Sulfide Derivatives of Vegetable Oils
G. Bantchev, J. Kenar, G. Biressaw, USDA-NCAUR, Peoria, IL

1:30 pm – 2 pm
Tribological Studies of Temperature-Adaptive Nanocrystalline Lubricant Coating for Machining Applications
W. Jiang, J. Wu, NanoMech, LLC, Fayetteville, AR, A. Malshe, University of Arkansas, Fayetteville, AR

2 pm – 2:30 pm
Intrafilm Shear Accommodation in Nanolaminate Lubricous Oxide Coatings
T. Scharf, B. Mensah, H. Mohseni, M. Romanes, The University of North Texas, Denton, TX
### Wednesday, May 20, 2009

**Session 6K  continued**

**2:30 pm – 3 pm**
Effect of Substrate Material on the Tribological Performance of PTFE-Based Polymeric Coatings in a CO2 Environment  
D. Dascalescu, K. Polychronopoulou, A. Polycarpou, University of Illinois at Urbana-Champaign, Urbana, IL

**3 pm – 3:30 pm  ✷ Break**

**3:30 pm – 4 pm**
Mechanical Properties and Scratch Resistance of CdSe/PMMA Nanocomposite Coatings  
A. Arguelles, H. Wang, C. Gan, M. Zou, University of Arkansas, Fayetteville, AR, Y. Wang. Ocean NanoTech, LLC., Fayetteville, AR

**4 pm – 4:30 pm**
A Novel Low Friction and Low Wear Polymer Coating for Metal Substrates  
A. Polycarpou, J. Zhang, J. Economy, University of Illinois at Urbana-Champaign, Urbana, IL

**4:30 pm – 5 pm**
Low Friction Surface Coatings Obtained Using Nano-Filled Polymer and Laser Radiation  
S. Tesker, S. Veldhuis, G. Foux-Rabinovich, McMaster University, Hamilton, ON, Canada, E. Tesker, Volgograd State Technical University, Volgograd, Russian Federation

**5 pm – 5:30 pm  ✷ Surface Engineering Business Meeting**

### Thursday, May 21, 2009

**Session 7A  ✷ Coronado A**

**GREASE**

Session Chair: P. Shiller, SKF, Canton, OH  
Session Vice-Chair: C. Coe, ExxonMobil Lubricants and Specialties, Manassas, VA

**8 am – 8:30 am**
The Use of Controlled Stress Rheology to Evaluate the Low Temperature Performance of Lubricating Greases  
M. Sivik, The Lubrizol Corp., Wickliffe, OH, S. Nolan, Lubrizol Limited, Hazelwood, United Kingdom

**8:30 am – 9 am**
Study of Additive Response in Prevention of Fretting Wear in Bearing Greases  
J. Kaperick, Afton Chemical Corp., Richmond, VA

**9 am – 9:30 am**
“Shouldn’t Grease Upper Operating Temperature Claims Have a Technical Basis?”  
C. Coe, ExxonMobil, Manassas, VA

**9:30 am – 10 am**
Seizure Life of Angular Contact Ball Bearing  
T. Azuma, O. Saita, Y. Oonuki, Kyodo Yushi Co., Ltd., Fujisawa, Japan

**10 am – 10:30 am  ✷ Break**

**10:30 am – 11 am**
Rheological Investigation of Carbon Nanotube Grease  
H. Hong, South Dakota School of Mines and Technology, Rapid City, SD

**11 am – 11:30 am**
Evaluation of the Effectiveness of Grease Sampling Techniques for Motor Operated Valves  
R. Wurzbach, L. Williams, York Laboratories, LLC, York, PA

**11:30 am – 12 pm  Business Meeting**

**Session 7B  ✷ Coronado B**

**SURFACE ENGINEERING III**

Session Chair: M. Zou, University of Arkansas, Fayetteville, AR  
Session Vice-Chair: I. Etsion, Technion, Haifa, Israel

**8 am – 8:30 am**
A Review of Engineered Surfaces for Valvetrain Friction Reduction and Wear  
A. Gangopadhyay, D. McWatt, R. Zdrodowski, Ford Research and Advanced Engineering, Dearborn, MI

**8:30 am – 9 am**
Modeling Start-up Friction in Hydraulic Components  
J. Garcia, M. Ashlie, J. Lumkes, Purdue University, West Lafayette, IN

**9 am – 9:30 am**
Analysis of Tribological Behaviour of Cast Iron Textured Surfaces for Cylinder Liners Application  
V. Fridrici, J. Keller – Espinouse, P. Kapsa, Ecole Centrale de Lyon, Ecuy, France, J. Huard, F2A, Fumel, France
2009 STLE 64th ANNUAL MEETING & EXHIBITION

Thursday, May 21, 2009

Session 7B  * continued

9:30 am – 10 am
Micro Textures in Concentrated Conformal-Contact Lubrication: Effect of the Original Machined Surface Roughness
N. Ren, Northwestern University, Evanston, IL, T. Nanbu, Y. Yasuda, Nissan Motors, Kanagawa, Japan, D. Zhu, Tri-Tech Solutions, Mt Prospect, IL, Q. Wang, Northwestern University, Evanston, IL

10 am – 10:30 am  * Break

10:30 am – 11 am
Micro Textures in Concentrated Conformal-Contact Lubrication: Effect of Bottom Shape Imperfections
T. Nanbu, Nissan Motors, Kanagawa, Japan, N. Ren, Northwestern University, Evanston, IL, Y. Yasuda, Nissan Motors, Kanagawa, Japan, D. Zhu, Tri-Tech Solutions, Mt. Prospect, IL, Q. Wang, Northwestern University, Evanston, IL

11 am – 11:30 am
Numerical Study of Effect of Initial Clearance Between Lubricated Laser – Textured Parallel Surfaces on Friction
F. Meng, R. Zhou, T. Davis, Q. Wang, J. Cao, Northwestern University, Evanston, IL, D. Hua, J. Liu, Caterpillar Inc., Peoria, IL

Session 7D  * Coronado D

SEALS III

Session Chair: A. Lebeck, Mechanical Seal Technology Inc., Albuquerque, NM

8 am – 8:30 am
Operating Experience with Mechanical Seals in Reactor Shutdown Cooling Pumps
G. Staniewski, Ontario Power Generation, Pickering, ON, Canada

8:30 am – 9 am
Numerical Study of the Dysfunctions Observed on Hydrostatic Mechanical Face Seals
N. Brunetiere, University of Poitiers – CNRS, Futuroscope Chasseneuil, France, E. Galenne, EDF R&D, Clamart, France

9 am – 9:30 am
Phase Change in Water Lubricated Mechanical Face Seals
F. Migout, N. Brunetière, B. Tournerie, University of Poitiers, Futuroscope, France

9:30 am – 10 am
A Pump Seal Selection Guideline Complementing API 682/ISO 21049
M. Goodrich, Total Raffinage Marketing, Harfleur, France

10 am – 10:30 am  * Break

10:30 am – 11 am
Exploring Operation Mechanisms of the Flexible Metal to Metal Face Seal: Part I – Numerical Modeling and Validations
Y. Wang, Y. Li, T. Tian, Massachusetts Institute of Technology, Cambridge, MA

11 am – 11:30 am
Exploring Operation Mechanisms of the Flexible Metal to Metal Face Seal: Part II – Scoring and Leakage Analysis
Y. Wang, T. Tian, Massachusetts Institute of Technology, Cambridge, MA

11:30 am – 12 pm
Face Seals for High Viscosity Oil Sealing
T. Lai, John Crane, Morton Grove, IL

Session 7E  * Coronado E

TRIBOTESTING III

Session Chair: G. Krauss, Energizer Consumer Group, Milford, CT
Session Vice-Chair: N. Gitis, CETR, Campbell, CA

8 am – 8:30 am
Friction and Wear of Polypropylene – AISI P20 Mold Steel Tribosystem
N. Restrepo-Zapata, EAFIT University, Medellín, Colombia, J. Vélez R., Universidad Nacional de Colombia, Medellín, Colombia

8:30 am – 9 am
Rolling-Element Fatigue Testing- A Tutorial
B. Vlcek, Georgia Southern University, Statesboro, GA, E. Zaretsky, NASA-Glenn Research Center, Cleveland, OH

9 am – 9:30 am
Diesel Soot Abrasiveness
B. Papke, Shell Global Solutions (US), Houston, TX

9:30 am – 10 am
Boundary Lubrication of Glass – Rubber Sliding Contacts
E. van der Heide, C. Lossie, S. Reinders, K. van Bommel, H. Lenting, TNO Science and Technology, Eindhoven, Netherlands

10 am – 10:30 am  * Break
Session 7E  ✷ continued

10:30 am – 11 am
Rolling Contact Fatigue Test in a Modified 4-Ball Test Machine
S. Saenz de Santa Maria, Bournemouth University, Poole, United Kingdom,
R. Gonzalez, Universidad de Oviedo, Gijon, Spain, M. Hadfield, Z. Khan, Bournemouth University, Poole, United Kingdom,
R. Vijande, Universidad de Oviedo, Gijon, Spain

11 am – 11:30 am
Tribological Evaluation of Piston Skirt/Cylinder Liner Contact Interfaces Under Boundary Lubrication Conditions
N. Demas, R. Erck, G. Fenske, Argonne National Laboratory, Argonne, IL

11:30 am – 12 pm
Electrical Contact Resistance of Nominally Flat Rough Surfaces: Modeling and Experiments
D. Bansal, J. Streator, Georgia Institute of Technology, Atlanta, GA

Session 7F  ✷ Coronado F/G

POWER GENERATION I

Session Chair: A. Sasaki, Kleentek Corp., Yokohama, Japan
Session Chair: T. Olmsted, Forysthe Lubrication Associates Ltd., Hamilton, Ont., Canada

8:30 am – 9 am
Oxidation and Varnish Formation in Turbine Oils Formulated with Antioxidant Systems Containing Phenyl-Alpha-Naphthylamine (PANA) or Alkylated Phenyl-Alpha-Naphthylamine (APANA)
V. Gatto, W. Moehle, T. Burris, Albemarle Corp., Baton Rouge, LA

9 am – 9:30 am
Color Characterization of Membrane Patches for the Oil Degradation Analysis
T. Honda, K. Kodo, H. Aoyama, Y. Iwai, University of Fukui, Fukui, Japan, A. Sasaki, Kleentek Corp., Tokyo, Japan

9:30 am – 10 am
Varnish Control in Turbine Lubrication System Through the Use of Electrostatic Charge Dissipating Filtration
K. Faroq, Pall Corp., Port Washington, NY

10 am – 10:30 am  ✷ Break

10:30 am – 11 am
A Study of Single and Complex Antioxidant Systems: Effects on a Group II Base Oil’s Varnish Potential, Sludge Formation and Oxidative Resistance
G. Wagenseller, J. Kuca, Analysts Inc., Stafford, TX

11 am – 11:30 am
Advanced Maintenance Practices for Fluid Treatment in Modern Power Generation Industry
A. Schmidt, J. Duchowski, HYDAC Technology Corp., Sulzbach, Germany

Session 7K  ✷ Yucatan 2

NONFERROUS III – HOT AND COLD NONFERROUS FORMING

Session Chair: P. Deneuville, ALCAN Centre de Recherche De Voreppe, Voreppe, France
Session Vice-Chair: P. Bartosh, Houghton International, Inc., Parkersburg, WV

8 am – 8:30 am
Can We Still Use Liquid Crystals as Lubricants for Rolling of Aluminum?
P. Deneuville, Alcan Centre de recherche de Voreppe, Voreppe, France

8:30 am – 9 am
A Comparison Between Normal Paraffins, and Severely Hydro-Treated Aliphatic Solvents Used as Aluminum Cold Rolling Coolant Bases
E. Lorence, University of Pittsburgh, Pittsburgh, PA

9 am – 9:30 am
Experimental Study of Aluminum Cold Rolling Fluids
A. Riss, T. Kouvtanovitch, F. Eydoux, TOTAL Lubrifiants, Paris La Défense, France

9:30 am – 10 am
The Effect of Lubricant Oleic Acid Content on Aluminum Transfer During Hot Rolling
R. Hunt, P. Deneuville, Alcan CRV, Voreppe, France

10 am – 10:30 am  ✷ Break

10:30 am – 11 am
Characterisation of the Tribofilm on a WC-DLC coating under Sliding-Rolling Contact Conditions
K. Mistry, A. Neville, A. Morina, University of Leeds, Leeds, United Kingdom

11 am – 12 pm
Thermodynamics: A Bridge that Links Chemistry and Mechanics in Surface Frictional Contact, and its Application for Blank Preparation in Coining Industry
Session 8B  ✷ Coronado B
SURFACE ENGINEERING IV

Session Chair: R. Evans, The Timken Co., Canton, OH
Session Vice-Chair: T. Scharf, University of North Texas, Denton, TX

1:30 pm – 2 pm
Improving Tribological Performance of Elastomer Seals by Surface Texturing
I. Etsion, A. Shinkarenko, Y. Kligerman, Technion, Haifa, Israel

2 pm – 2:30 pm
Fabrication and Tribological Study of Nano-/Micro-Textured Surfaces on Stainless Steel Substrate
M. Zou, H. Wang, University of Arkansas, Fayetteville, AR

2:30 pm – 3 pm
Adhesion and Friction Forces on Silicon Wafers with Dual Surface Modifications at Nano-Scale
E. Yoon, A. Singh, D. Pham, K. Na, S. Yang, Korea Institute of Science and Technology, Seoul, South Korea

3 pm – 3:30 pm ✷ Break

3:30 pm – 4 pm
Characterization and Properties of Yeast Spore Walls by Scanning Probe Microscopy
C. Korach, J. Choi, SUNY-Stony Brook, Stony Brook, NY

Session 8E  ✷ Coronado E
TRIBOTESTING IV

Session Chair: N. Gitis, CETR, Campbell, CA
Session Vice-Chair: G. Krauss, Energizer Consumer Group, Milford, CT

1:30 pm – 2 pm
Friction Coefficient Comparison of the DLC Films in Ocean Water, Air and Vacuum
R. Statuti, P. Radi, V. Trava-Airoldi, L. Santos, Instituto Nacional de Pesquisas Espaciais – INPE, São José dos Campos, Brazil

2 pm – 2:30 pm
Test Method for Lubrication in Sheet Metal Forming
K. Helmetag, Henkel Corp., Madison Heights, MI, B. Swank, Autoform Engineering USA, Troy, MI

2:30 pm – 3 pm
Challenges of Investigating Running-In
A. Karpinska, D. Proprentner, A. Olver, D. Ewins, Imperial College, London, United Kingdom

3 pm – 3:30 pm ✷ Break

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Show hours:

- Monday, May 18 – noon – 5pm
- Tuesday, May 19 – 9:30 am – noon & 2-5:30 pm
- Wednesday, May 20 – 9:30 am – noon

Session 8F  ✷ Coronado F/G
POWER GENERATION II

Session Chair: G. Khemchandani, Dow Chemical Co., Freeport, TX

1:30 pm – 2 pm
The Value of Tribology (Part 1), A Macroeconomic View
A. Sasaki, Maintek Consultant, Yokohama, Japan, G. Sakhrani, Ferrocare Machines Private Ltd., Pune, India

2 pm – 2:30 pm
The Value of Tribology (Part 2), The Economic Value of State-of-the-Art Oil Management
G. Sakhrani, Ferrocare Machines Private Ltd., Pune, India, A. Sasaki, Maintek Consultant, Yokohama, Japan

2:30 pm – 3 pm
Review of Varnish Problems of Turbine Oils
A. Sasaki, Maintek Consultant, Yokohama, Japan

3 pm – 3:30 pm ✷ Break

3:30 pm – 4 pm
Counting Particles Under One Micron in Size Has Precluded Many Tribological Studies – Until Now
G. Munson, D. McCormick, Fluid Assets, LLC, Madison, CT

4 pm – 4:30 pm
Greener Wind Turbine Gears
O. El-Saeed, REM Chemicals, Inc., Southington, CT

4:30 pm – 5 pm ✷ Business Meeting