Exhibition Hours:
Wednesday, May 18 • 9:30 am-Noon

Session 5A • Bronze 4
Commercial Marketing Forum V
Session Chair: TBD
8 – 8:30 am – Novamont S.P.A.
8:30 – 9 am – Ingevity
9 – 9:30 am – Compass Instruments
9:30 – 10 am – Compass Instruments
10 – 10:30 am – Break
10:30 – 11 am – Kao Chemical GmbH
11 – 11:30 am – Houghton International Inc.
11:30 am – Noon – Functional Products, Inc.

Session 5B • Bronze 3
Lubrication Fundamentals V – Additives
Session Chair: J. Qu, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN
Session Vice Chair: N. Doerr, AC2T Research GmbH, Wiener Neustadt, Austria
8 – 8:30 am
Microencapsulation of Friction Modifiers
F. Zhao, S. Parab, S. Hsu, The George Washington University, Ashburn, VA
8:30 – 9 am  
The Effectiveness of Lubricant Additives in Preventing Soot Induced Wear  
I. Hobday, M. McElwain, Croda, New Castle, DE, J. Eastwood, Croda, Yorkshire, United Kingdom

9 – 9:30 am  
Comparison of Different Types of Friction Modifier Additive  
H. Spikes, J. Guegan, Imperial College London, London, United Kingdom, M. Southby, N. Morgan, Shell Global Solutions UK, London, United Kingdom

9:30 – 10 am  
Tribological Performance of Model Oils Containing Ionic Liquid Additives Influenced by Oxidative Degradation  
N. Doerr, M. Frauscher, C. Gabler, AC2T Research GmbH, Wiener Neustadt, Austria, P. Aswath, University of Texas at Arlington, Arlington, TX

10 – 10:30 am – Break

10:30 – 11 am  
How Oxidative Degradation Can Influence Tribolayer Chemistry of Model Oils Containing Ionic Liquid Additives  
N. Doerr, M. Frauscher, C. Gabler, AC2T Research GmbH, Wiener Neustadt, Austria, P. Aswath, University of Texas at Arlington, Arlington, TX

11 – 11:30 am  
Selection of Pour Point Depressants  
J. Guevremont, K. Garelick, J. Bell, Afton Chemical Corp., Richmond, VA

11:30 am – Noon  
Filtration Effects on Foam Inhibitors and Optically-Detected Oil Cleanliness  
A. Martini, S. Lantz, University of California Merced, Merced, CA; J. Zakarian, Chevron, Richmond, CA
Session 5C • Bronze 2

Engine & Drivetrain V

Session Chair: W. Anderson, Afton Chemical Corp., Richmond, VA
Session Vice Chair: J. Qu, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN

8 – 8:30 am

A Complete 3-D Description of the Elastic Behavior of a Piston Ring and its Influence on the Tribological Behavior of the Piston Ring-Cylinder Liner Interface

L. Mastrandrea, M. Giacopini, E. Bertocchi, A. Strozzi, University of Modena and Reggio Emilia, Modena, Italy, D. Dini, Imperial College London, London, United Kingdom

8:30 – 9 am

Adjustable-Angle Reciprocating Tribometer for Ring-On-Liner Testing

N. Demas, R. Erck, O.O. Ajayi, G.R. Fenske, Argonne National Lab, Lemont, IL

9 – 9:30 am

Theoretical Analysis of Stroke Length Versus Scuffing in Reciprocating Rigs

P. Lee, Southwest Research Institute, San Antonio, TX, T. Kamps, University of Southampton, Southampton, United Kingdom, G. Plint, Phoenix Tribology, Basingstoke, United Kingdom

9:30 – 10 am

Using the Ultra Shear Viscometer and Understanding the Effect of Measurement Method on the Results

P. Lee, Southwest Research Institute, San Antonio, TX
10 – 10:30 am – Break

10:30 – 11 am
A Study of the Friction of Oil Control Rings using the Floating Liner Engine
T. Tian, Z. Westerfield, Y. Liu, D. Kim, Massachusetts Institute of Technology, Cambridge, MA

11 – 11:30 am
Observations of Power Cylinder Component Wear to Advanced Spark Ignited Combustion Technologies
C. Wileman, Southwest Research Institute, San Antonio, TX

11:30 am – Noon
A New Test Rig for Simulation of Piston Ring Friction
M. Söderfjäll, A. Almqvist, R. Larsson, Division of Machine Elements, Luleå, Sweden

Session 5E • Gold

Rolling Element Bearings III
Session Chair: L. Stacke, SKF, Goteborg, Sweden
Session Vice Chair: TBD

8 – 8:30 am
Rolling Bearing Cage Optimization Using Simulations
L. Stacke, SKF, Goteborg, Sweden

8:30 – 9 am
Effect of Housing Support on Bearing Dynamics – Explicit Finite Element Modeling
L. Cao, F. Sadeghi, Purdue University, West Lafayette, IN

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9 – 9:30 am
Dynamic Behaviors of Counter-Rotating Cylindrical Roller Bearing with Different Mounting Configurations
W. Gao, Institut National des Sciences Appliquées de Lyon (INSA), Lyon, France, Z. Liu, Northwestern Polytechnical University, Xi’an, China, S. Zhu, Southwest Jiaotong University, Chengdu, China, D. Nelias, INSA-Lyon, Villeurbanne, France

9:30 – 10 am
Flexible Bearing and Housing Under Radial Load – Calculation Issues
B. Mevel, NTN-SNR, Annecy, France

10 – 10:30 am – Break

10:30 – 11 am
Bearing Thermal Failure Mechanism Analysis
Y. Wang, Beijing Institute of Technology, Beijing, China

11 – 11:30 am
Damage Analysis in High Loaded Oscillating Bearings
E. Houara Komba, Université de Lyon, CNRS, INSA-Lyon, Villeurbanne, France

11:30 am – Noon
Preloaded Bearing Applications in a Helicopter Transmission System: A Performance Evaluation from Strength, Durability and Dynamic Perspectives
A. Gunduz, S. Yilmaz, Z. Saribay, Turkish Aerospace Industries, Ankara, Turkey
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Session 5F  •  Palace 3

Non-Ferrous Metals II – Bio-Based Lubricants
Session Chair: G. Biresaw, USDA, Peoria, IL
Session Vice Chair: W. Jenkins, Houghton International, Hope, AR

8 – 8:30 am
New Base Oils for the Aluminum Industry: Moving Along the Vegetable Road
D. Kupiec, TOTAL, Nanterre, France

8:30 – 9 am
Biobased Lubricant Additives Derived From Limonene
G. Biresaw, G. Bantchev, R. Murray, USDA, Peoria, IL

9 – 9:30 am
Base Oil Lubricants Derived from Yellow and Brown Grease
D. Garbark, H. Benecke, Battelle Memorial Institute, Columbus, OH

9:30 – 10 am
Closing the Loop and Sustainable Cutting Oils
S. Kailas, D. Chakravortty, S. P S, R. S, Indian Institute of Science, Bangalore, India

10 – 10:30 am – Break

10:30 – 11 am
Lubricants from Renewable Group III Synthetic Hydrocarbons Derived from Farnesene
P. Vettel, H. Hahn, J. Wells, Novvi LLC, Emeryville, CA
11 – 11:30 am
Formulating with Microalgal Very High Oleic Oil: Eliminating Chlorinated Paraffins for Non-Ferrous Metalworking
A. McKee, Solazyme, Alameda, CA

11:30 am – Noon
Physical Characteristics of Tetrahydroxy and Acylated Derivatives of Jojoba Liquid Wax
R. Harry-O’Kuru, NCAUR, USDA-ARS, Peoria, IL, J. Xu, G. Biresaw, USDA, Peoria, IL

Session 5G • Palace 4/5

Wind Turbine Technology I
Session Chair: A. Greco, Argonne National Laboratory, Argonne, IL
Session Vice Chair: B. Gould, Department of Mechanical Engineering, University of Delaware, Newark, DE

8:30 – 9 am
Lubricant Effects on White Etching Cracking Failures in Thrust Bearing Rig Tests
T. Haque, J. Carey, S. Korres, P. Jacobs, ExxonMobil, Paulsboro, NJ, J. Franke, W. Holweger, Schaeffler Technologies AG&Co. KG, Herzogenaurach, Germany

9 – 9:30 am
A Study of Microstructure Alterations in White Structure Flaking Failure of Wind Turbine Bearings Through High Pressure Torsion Processes
L. Wilches Pena, L. Wang, B. Mellor, N. Wang, University of Southampton, Southampton, United Kingdom

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9:30 – 10 am
Influence of Heat Treatments on the Microstructure of White Etching Phenomena in Wind Turbine Gearbox Bearings
V. Smelova, University of Southampton, Southampton, United Kingdom

10 – 10:30 am – Break

10:30 – 11 am
Investigation of the Role of Hydrogen in White Structure Flaking (WSF) of Wind Turbine Gearbox Bearings Through Serial Sectioning Analysis
A. Richardson, L. Wang, R. Wood, M. Evans, University of Southampton, Southampton, United Kingdom, M. Ingram, Afton Chemical Ltd., Bracknell, United Kingdom

11 – 11:30 am
Premature Bearing Failures and White Etching Cracks
K. Stadler, SKF GmbH, Schweinfurt, Germany, R. Vegter, I. Nedelcu, SKF B.V., Nieuwegein, Netherlands

11:30 am – Noon
A Study of the Dominant Drivers of White-Etching Crack Formation in a Three Ring on Roller Contact
B. Gould, A. Greco, Argonne National Laboratory, Argonne, IL
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Session 5H • Las Vegas I

Fluid Film Bearings V

Session Chair: A. Fatu, Institut Pprime, Angouleme, France
Session Vice Chair: F. Horvat, Duramax Marine, Hiram, OH

8:30 – 9 am

Design Consideration of Thrust Foil Bearings Operating with Refrigerant Gas

A. Prabhakar, F. Xu, D. Kim, University of Texas at Arlington, Arlington, TX

9 – 9:30 am

Two-Way Coupled Reynolds, Rayleigh-Plesset and Energy Equations for Fully Transient Cavitation Modeling

K. Pierson, M. Braun, T. Snyder, University of Akron, Akron, OH

9:30 – 10 am

Effects of Variable Properties on the Gas Film Hydrodynamics in the High-Speed Micro Gas Thrust Bearings

Q. Chen, X. Zhang, J. Liu, Key Laboratory of Low-Grade Energy Utilization Technologists and Systems of Ministry of Education, College of Power Engineering, Chongqing University, Chongqing, China

10 – 10:30 am – Break

10:30 – 11 am

Analysis of Cavitation, Dynamics, and Solid Deformation of Simple Slider Bearings Using CFD

T. Snyder, M. Braun, University of Akron, Akron, OH

11 – 11:30 am

Numerical Study on the Effect of Oil Removal from Aero-Engine Bearing Chamber and Improvement

Y. Lyu, J. Zhao, Z. Liu, G. Ren, Northwestern Polytechnical University, Xi’an, China
11:30 am – Noon
Analysis of Oil – Gas Interaction in the Aero-Engine Bearing Chamber
J. Zhao, Z. Liu, Y. Lyu, P. Zhu, Northwestern Polytechnical University, Xi’an, China

Session 5I • Las Vegas 2

Environmentally Friendly Fluids I
Session Chair: B. Sharma, University of Illinois at Urbana-Champaign, Champaign, IL
Session Vice Chair: P. Vettel, Novvi LLC, Emeryville, CA

8:30 – 9 am
Oxidation Performance of Various Environmentally Acceptable Lubricants
T. Kuchta, RSC Bio Solutions, Mentor, OH

9 – 9:30 am
Addressing the Thermo-Oxidative Stability of Biobased Lubricants
A. Cholli, Polnox Corp., Lowell, MA

9:30 – 10 am
Frictional Behavior of Ester Base Stocks
M. Hof, Emery Oleochemicals GmbH, Duesseldorf, Germany

10 – 10:30 am – Break
10:30 – 11 am
High Yield Performance of Reusable Positively Charged Zeolite in Skeletal Isomerization Reaction of Oleic Acid
M. Sarker, R. Latona, H. Ngo, Agricultural Research Service, USDA, Wyndmoor, PA

11 – 11:30 am
Fundamental Lubricity Protection of Bio-Hydraulic Fluids Versus Conventional Petroleum Hydraulic Fluids
P. Haines, BioBlend Renewable Resources, LLC, Elk Grove Village, IL

11:30 am – Noon
Water Contamination Control in Hydraulic and Lubrication Systems using a Membrane Dehydrator
S. Majumdar, S. Nemser, Compact Membrane Systems, Newport, DE, K. Benninghoff, MSC Filtration Technologies, Enfield, CT

Session 5K • Las Vegas 4

Wear II: Analysis of Friction and Wear
Session Chair: N. Paulson, Purdue University, West Lafayette, IN
Session Vice Chair: A. Walvekar, Department of Mechanical Engineering, Purdue University, West Lafayette, IN

8 – 8:30 am
Interaction Study Between Raw Materials in a Brake Pad Formulation
F. Vivier, Politecnico di Torino, Turin, Italy

8:30 – 9 am
Tribological Behaviour of Tool Steels Operating at Elevated Temperatures
L. Pelcastre, J. Hardell, B. Prakash, Luleå University of Technology, Luleå, Sweden
9 – 9:30 am
Study of Accelerated Life Model for Harmonic Drive with the Failure Form of Adhesive Wear
J. Li, Chongqing University, Chongqing, China, J. Wang, Z. Wang, Sichuang University, Chengdu, China

9:30 – 10 am
Tribological Compatibilities of Surface-Coated Fuel Claddings for Accident-Tolerant Fuels with Zr-Based Structural Materials
Y. Lee, H. Kim, H. Kim, Y. Koo, Korea Atomic Energy Research Institute, Daejeon, The Republic of Korea

10 – 10:30 am – Break

10:30 – 11 am
Analysis on the Relation Between Wear and Noise of Vehicle Headliner Materials
J. Park, Y. Lee, Sungkyunkwan University, Suwon, The Republic of Korea

11 – 11:30 am
Friction and Wear Mechanism of Polycrystalline Diamond Thrust Bearing under Drilling Fluid Condition
Y. Li, W. Zhenquan, K. Zhang, China University of Petroleum, Beijing, China

11:30 am – Noon
TBD
Session 5L • Las Vegas 5

Tribotesting I

Session Chair: G. Krauss, Harvey Mudd College, Claremont, CA
Session Vice Chair: J. Xiao, Rtec Instruments, San Jose, CA

8 – 8:30 am

Triboemission Imaging to Study Coating Failures
A. Ciniero, T. Reddyhoff, Imperial College London, London, United Kingdom

8:30 – 9 am

Application of Ultrasonic Sensing to Monitoring Lubrication Condition in a Refrigeration Compressor
T. Oyamada, Hitachi, Ltd., Hitachinaka, Japan

9 – 9:30 am

Temperature Rise at the Sliding Interface Between a Carbon Steel and DLC Film
S. Yamamoto, Sankei Giken Kogyo Co., Ltd., Tokyo, Japan

9:30 – 10 am

Accurate Determination of Limiting Friction of Tribo-Pairs through Model Scale Tribotests
K. Pondicherry, G. Krenn, Anton Paar GmbH, Graz, Austria

10 – 10:30 am – Break

10:30 – 11 am

Effect of Soot in the Boundary Friction Regime
F. Wolf, K. Pondicherry, G. Krenn, Anton Paar GmbH, Graz, Austria
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- H1 Food Machinery Lubricants

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11 – 11:30 am

Stick-Slip in Piezoelectric Inertia Drive Motors – Contact Life and Tribological Circuit

F. Dubois, Université de Lyon, LaMCoS, INSA-Lyon, Villeurbanne, France, C. Belly, Cedrat Technologies, Meylan, France, A. Saulot, Y. Berthier, Université de Lyon, LaMCoS, INSA-Lyon, Villeurbanne, France

11:30 am – Noon

High Temperature Wear Evaluation of Materials: Challenges and Industrial Case Studies


Session 5M  • Las Vegas 6/7

Condition Monitoring I

Session Chair: Karl Rogers, Pilot Thomas Logistics, Las Vegas, NV
Session Vice Chair: Carlos Silva, Oilcheck, Ressaca Contagem, Brazil, Greg Livingstone, Fluitec International, Bayonne, NJ

8 – 8:30 am

New Condition Monitoring Method of Oil and Machine Elements by Lubricant Color Analysis

A. Ito, IHI Corp., Yokohama, Japan

8:30 – 9 am

New Scenario for Lubricated Machines, How Big Data Analytics and Industry 4.0 are Changing the Game

J. Alarcon, IK4-TEKNIKER, Eibar, Spain
9 – 9:30 am
Retrospective Approach for Establishing Predictive Wear Signatures for Lubricating Oils
B. Byrne, Dublin Institute of Technology, Carlow, Ireland

9:30 – 10 am
Diagnosing Varnish Problems in Lube Systems with Normal MPC Values
T. Chen, G. Livingstone, Fluitec International, Bayonne, NJ

10 – 10:30 am – Break

10:30 – 11 am
Asset Condition Assessment: A Case-Study from Theory to Reality
M. Yarlott, Veolia North America, Salem, OR

11 – 11:30 am
Quantitative Measurements of Lubricant Contaminants Using a Microsensor Array Based on Back Propagation Artificial Neutral Network
X. Zhu, L. Du, J. Zhe, University of Akron, Akron, OH

11:30 am – Noon
Development of Tribological Diagnostic Technology by the Color of Membrane Patch
E. Kitahara, T. Honda, Y. Ozaki, University of Fukui, Fukui, Japan, Y. Nakamura, Ebara Corp., Ota-ku, Japan

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Session 5N • Pacific 1
Surface Engineering V

8 – 8:30 am
Development of Polymer Brushes for the Lubrication of Silicon Nitride-Steel Contacts
S. Watson, M. Nie, L. Wang, K. Stokes, University of Southampton, Southampton, United Kingdom

8:30 – 9 am
Frictional Behavior of (PEI/GO)x Solid Lubricant Coatings on Steel Substrates in Extreme Environments
P. Saravanan, R. Selyanchyn, S. Fujikawa, J. Sugimura, International Institute for Carbon-Neutral Energy, Fukuoka, Japan

9 – 9:30 am
Investigation on the Atomically Smooth Surface with Step-Terrace Structure of GaN Wafer after Chemical Mechanical Polishing
H. Gong, Research Institute of Tsinghua University in Shenzhen, Shenzhen, China, G. Pan, Tsinghua University, Beijing, China, C. Zou, Guangdong Provincial Key Laboratory of Optomechatronics, Shenzhen, China, Y. Zhou, L. Xu, Tsinghua University, Beijing, China

9:30 – 10 am
The Tribological Performance and Tribofilm Formation on Microwave PECVD Diamond-Like Carbon Films Under Boundary Lubrication Conditions When Lubricated by Gear Oil Formulation
Wednesday Technical Sessions

May 18, 2016 • Las Vegas, Nevada (USA)

H. Zhao, J. Lanigan, C. Wang, T. Liskiewicz, University of Leeds, Leeds, West Yorkshire, United Kingdom, Y. Tamura, Komatsu Ltd., Hiratsuka, Japan, I. Kolev, IHI Hauzer Techno Coating B.V., Venlo, Netherlands, N. Sano, Newcastle University, Newcastle, United Kingdom, A. Neville, University of Leeds, Leeds, West Yorkshire, United Kingdom

10 – 10:30 am – Break

Session 50 • Pacific 2

Materials Tribology V

Session Chair: D. Burris, University of Delaware, Newark, DE
Session Vice Chair: K. Schulze, University of Florida, Gainesville, FL

8 – 8:30 am
Design and Performances of Adaptive Lubricating Composites in a Wide Temperature Ranges
J. Jia, State Key Laboratory of Solid Lubrication, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, Gansu, China

8:30 – 9 am
Tribological Challenges in 3D Printing with Liquid-Like Solids and Complex Fluids
C. O’Bryan, T. Bhattacharjee, W. Sawyer, T. Angelini, University of Florida, Gainesville, FL

9 – 9:30 am
Friction and Yielding in Liquid-Like Solids

9:30 – 10 am
Superlubricity in Soft Matter
A. Pitenis, J. Uruena, A. Cooper, T. Angelini, W. Sawyer, University of Florida, Gainesville, FL

10 – 10:30 am – Break
10:30 – 11 am
Time-Dependence of Hydrogel-Solid Lubrication Investigated by Steady Shear Tribo-Rheology
A. Dunn, J. Kim, University of Illinois at Urbana-Champaign, Urbana, IL

11 – 11:30 am
Tribological Rehydration: Directly Observing the Loss and Recovery of Interstitial Fluid
A. Moore, D. Burris, University of Delaware, Newark, DE

11:30 am – Noon
Slow Rise, Take it Easy: Local Mesh Size Control of Thermal Fluctuation Lubrication

Session 5P · Pacific 3
Nanotribology V: Nanoscale Lubrication Mechanisms
Session Chair: H. Khare, University of Pennsylvania, Philadelphia, PA
Session Vice Chair: C. Wen, T&E/PETH, Kuala Lumpur, Malaysia

8 – 9 am
Molecular Mechanisms of Aqueous Boundary Lubrication by Mucinous Glycoproteins and their Engineered Mimics
S. Zauscher, Duke University, Durham, NC

9 – 9:30 am
Confined Lubricant at a Molecular Scale Under Transient Tribological Conditions
A. Crespo, Ecole Centrale de Lyon, Ecully, France
9:30 – 10 am
Steric Effect of Thickening Agents in Interfacially Confined Liquid Lubricants
K. Tamura, M. Ishikawa, Idemitsu Kosan Co., Ltd., Ichihara, Japan

10 – 10:30 am – Break

10:30 – 11 am
Experimental Study of the Liquid-Mediated Adhesion Between Contacting Rough Surfaces
A. Rostami, J. Streator, Georgia Institute of Technology, Atlanta, GA

11 – 11:30 am
Ionic Liquids Confined in Rough Contacts
R. Espinosa-Marzal, A. Sheehan, L. Jurado, University of Illinois at Urbana-Champaign, Urbana, IL

11:30 am – Noon
Supramolecular Assembly and Nanotribological Properties of Mucic Acid Mediated by Molecular Modulators
H. Shi, Y. Liu, Y. Duan Tsinghua University, Beijing, China, Q. Zeng, Y. Yang, National Center for Nanoscience and Technology, Beijing, China, X. Lu, Tsinghua University, Beijing, China
Session 6A • Bronze 4

Commercial Marketing Forum VI
Session Chair: TBD
1:30 – 2 pm – M RAAB Consulting, LLC
2 – 2:30 pm – Emery Oleochemicals
2:30 – 3 pm – WearCheck Canada
3 – 3:30 pm – Break
3:30 – 4 pm – Sasol North America, Inc.
4 – 4:30 pm – Oil Filtration Systems, A Clark Reliance Company
4:30 – 5 pm – Afton Chemical Corporation

Session 6B • Bronze 3

Lubrication Fundamentals VI – Tribofilms
Session Chair: R. Erck, Argonne National Laboratory, Argonne, IL
Session Vice Chair: B. Miller, Chevron Oronite Co., LLC, Richmond, CA

1:30 – 2 pm
Mechanisms of ZDDP Antiwear Tribofilm Growth Revealed In Situ by Nanoscale Single-Asperity Sliding Contact

2 – 2:30 pm
ZDDP Tribofilm Formation Under Pure Sliding Conditions
Y. Shimizu, H. Spikes, Imperial College London, London, United Kingdom
KH NeoChem
Synthetic Branched Lubricant Raw Materials

Fatty Acids
2-Ethylhexanoic Acid

Isoronanoic Acid

C_{6}H_{12}O_{2}/148.2

C_{8}H_{10}O_{2}/158.2

Functional Alcohols
3,3,5-Trimethylhexanol

Isotridecanol

Mixture of C_{13}H_{28}O / 290.4

C_{13}H_{28}O_{2}/160.3

C_{13}H_{28}O_{2}/162.2

Functional Diols
BEPG (2-Butyl-2-Ethyl-1,3-Propanediol)

OC (2-Ethyl-1,3-Hexanediol)

PD-9 (2,4-Diethyl-1,5-Pentanediol)

C_{9}H_{18}O_{2}/160.3

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2:30 – 3 pm
Correlating Chemical Composition, Mechanical Properties, and Tribological Behavior of Ionic Liquid Tribofilms
J. Qu, Oak Ridge National Laboratory, Oak Ridge, TN

3 – 3:30 pm – Break

3:30 – 4 pm
Understanding Friction Reduction Mechanism of Polyalkylene Glycol Engine Oils

4 – 4:30 pm
Impacts of Oil Contaminants on the Performance of Ionic Liquid and ZDDP
Y. Zhou, J. Qu, Oak Ridge National Laboratory, Oak Ridge, TN

4:30 – 5 pm
Study of Gear Oil Additive Tribofilms Using XANES
M. Costello, BASF, Tarrytown, NY

5 – 5:30 pm
Elucidation of the Action of Functional Groups in the Coexisting Ashless Compounds on the Tribofilm Formation and Friction Characteristic of ZnDTP-Formulated Lubricating Oils
Y. Matsui, JX Nippon Oil & Energy Corp., Yokohama, Japan, S. Aoki, M. Masuko, Tokyo Institute of Technology, Tokyo, Japan
Qualice, LLC is a true pioneer in the domestic MWF additive manufacturing industry, dedicated to the production of very long chain Chlorinated Paraffins vLCCP since 2012.
Session 6C • Bronze 2

Engine & Drivetrain VI

Session Chair: J. Qu, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN
Session Vice Chair: W. Anderson, Afton Chemical Corp., Richmond, VA

1:30 – 2 pm
Tribological Feasibility Study of Oxygen-Diffusion Case-Hardened Titanium Diesel Piston in CJ-4 and PC-11 Engine Oils
J. Qu, A. Shaw, Oak Ridge National Laboratory, Oak Ridge, TN, R. England, C. Wang, Cummins, Inc., Columbus, IN

2 – 2:30 pm
Challenging the Linear Wear Rate Assumption: An In Situ Stylus Profilometer for a Reciprocating Tribometer
T. Kamps, J. Walker, University of Southampton, Southampton, United Kingdom, P. Lee, Southwest Research Institute, San Antonio, TX, R. Wood, University of Southampton, Southampton, United Kingdom, G. Plint, Phoenix Tribology Ltd., Kingsclere, United Kingdom

2:30 – 3 pm
Optimizing Surface Texture to Reduce Friction in Piston-Liner Contacts
T. Reddyhoff, Imperial College, South Kensington, United Kingdom, S. Vladescu, Imperial College London, London, United Kingdom, K. Tufail, I. Pegg, Ford, Laindon, United Kingdom, A. Olver, Imperial College, South Kensington, United Kingdom

3 – 3:30 pm – Break
3:30 – 4:00 pm  
Scuffing of Diesel Engine Cast Iron Liner: Role of Tribochemical Surface Film  
O. Ajayi, M. Lorenzo Martin, Argonne National Laboratory, Argonne, IL

4 – 4:30 pm  
Embeddability Behaviour of Some Pb-Free Engine Bearing Materials  
D. Gebretsadik, N. Rahman, J. Hardell, B. Prakash, Luleå University of Technology, Luleå, Sweden

4:30 – 5 pm  
Hysteresis Phenomenon of Turbocharger Sub-Synchronous Frequency Vibration  
L. Begin, D. Deng, F. Shi, H. Lin, General Motors, Pontiac, MI

Session 6D • Gold

Rolling Element Bearings IV  
Session Chair: N. Weinzapfel, Schaeffler Group USA, Macomb, MI  
Session Vice Chair: TBD

1:30 – 2 pm  
Residual Stress Measurement of M50 Ball Bearings Using the Contour Method  
D. Isaac, University of Florida, Gainesville, FL, M. Prime, Los Alamos National Laboratory, Los Alamos, NM, N. Arakere, University of Florida, Gainesville, FL

2 – 2:30 pm  
Investigation of the Brinell Dent Resistance of Hybrid Rolling Element Bearings with 60NiTi Races and Si3N4 Balls  
S. Howard, NASA Glenn Research Center, Cleveland, OH,  
C. DellaCorte, NASA, Cleveland, OH
2:30 – 3 pm
Spall Propagation Characteristics of Refurbished VIM-VAR AISI M50 Bearings
J. Mason, Air Force Research Laboratories, Wright-Patterson AFB, OH,
H. Trivedi, UES, Dayton, OH, L. Rosado, Air Force Research Laboratory,
Wright Patterson AFB, OH

3 – 3:30 pm – Break

3:30 – 4:00 pm
A New Test Rig for the Investigation of Rolling Bearings in the Centrifugal Field
D. Hochrein, S. Tremmel, S. Wartzack, University of Erlangen, Erlangen, Germany,
O. Graf-Goller, Schaeffler Technologies AG & Co. KG, Herzogenaurach, Germany

4 – 4:30 pm
Tribochemical Investigation of the Micropitting Induced by ZDDP Anti-Wear Additive and Effect of a Potential Additive on Reducing ZDDP-Induced Micopitting
S. Soltanahmadi, A. Morina, A. Neville, IFS, School of Mechnical Engineering, University of Leeds, Leeds, United Kingdom; M. van Eijk, I. Nedelcu, SKF Engineering and Research Center, Nieuwegein, Netherlands

4:30 – 5 pm
Microstructural Changes in Aerospace Bearing Materials Under Accelerated Rolling Contact Fatigue Life Testing
M. Kirsch, AFRL, Wright Patterson AFB, OH, H. Trivedi, UES, Inc., Dayton, OH, D. James, UDRI, Dayton, OH
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- Tight temperature control across samples
- Included in D4684 test method
  - and can run D6821 Driveline method
Session 6F • Palace 3

Non-Ferrous Metals III: Tribology
Session Chair: K. Januszkiewicz, Houghton International, Inverary, ON, Canada
Session Vice Chair: J. Cepec, Allegheny Petroleum, Wilmerding, PA

1:30 – 2 pm
Determination of Boiling Behavior of Rolling Emulsions on Hot Aluminum Slab
K. Januszkiewicz, Houghton International, Inverary, ON, Canada

2 – 2:30 pm
Filtration and Particle Size of an Aluminium Cold Rolling Coolant
P. Deneuville, Constellium C-Tec, Voreppe, France

2:30 – 3 pm
Stain Potential: Aluminum Cold Rolling Applications
R. Blithe, A. Noblit, S. Wheeler, Houghton International, Valley Forge, PA

3 – 3:30 pm – Break

3:30 – 4:00 pm
Water Soluble Ether Carboxylic Acid Amines EP Property on Aluminum Surface Using Rtec TCT Tester
M. Patel, Sasol NA, Lake Charles, LA

4 – 4:30 pm
Investigation of Galling Failure in Cutting and Punching of Aluminum Sheets for Automotive Applications
M. Shafiei, J. Hunter, Novelis Global Research & Technology Center, Kennesaw, GA, D. Young, Ford Motor Co., Dearborn, MI
4:30 – 5 pm
Tribology of Aluminum Sheet Processing for Automotive Applications
M. Shafiei, T. Oleksiak, Novelis Global Research & Technology Center, Kennesaw, GA

5 – 5:30 pm
Evaluation of Wear Response Under Reciprocating Sliding of A390 Alloy When Squeeze Casting Pressure and Stroke Length Vary
T. Harish, Government Engineering College, Bartonhill, Thiruvananthapuram, Kerala, India, V. Rajeev, College of Engineering, Trivandrum (CET), Thiruvananthapuram, India

Session 6G • Palace 4/5

Wind Turbine Technology II
Session Chair: K. Stadler, SKF GmbH, Schweinfurt, Germany
Session Vice Chair: H. Singh, University of Akron, Cuyahoga Falls, OH

1:30 – 2 pm
Integrated Test and Simulation of Large-Size Bearings for Wind Turbines
J. Binderszewsky, Schaeffler Technologies AG & Co. KG, Herzogenaurach, Germany

2 – 2:30 pm
Influence of Contact Conditions and Lubricant Properties on Pitting Failures in Rolling-Sliding Contacts
F. Manieri, P. Rycerz, A. Kadiric, Imperial College London, London, United Kingdom

2:30 – 3 pm
Experimental Results of Different Oil Condition Monitoring Approaches for Wind Turbine Gearboxes in an Oil Sensor Test Bench
D. Coronado, Fraunhofer Institute for Wind Energy and Energy System Technology IWES, Hannover, Germany

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3 – 3:30 pm – Break

3:30 – 4:00 pm
Performance Characterization of Wind Turbine Gear Oils
K. Topolovec Miklozic, Powertrib Limited, Oxford, United Kingdom

4 – 4:30 pm
Maximizing Wind Turbine Gear Oil Life
J. Leather, Castrol Industrial North America, Naperville, IL

4:30 – 5:30 pm – Panel Discussion

5:30 – 6 pm – Wind Turbine Tribology Business Meeting

Session 6H • Las Vegas 1
Fluid Film Bearings VI
Session Chair: J. Bouyer, Department of Mechanical Engineering and Complex Systems, Institut Pprime, Futuroscope Cedex, France
Session Vice Chair: D. Kim, University of Texas at Arlington, Arlington, TX

1:30 – 2 pm
Nonlinear Dynamic Response of an Unbalanced Flexible Rotor Supported by Elastic Bearings Lubricated with Piezo-Viscous Polar Fluids
B. Bou-Said, INSA, Villeurbanne, France, M. Lahmar, Guelma University, Guelma, Algeria

2 – 2:30 pm
Elastogasdynamic Model for Air Foil Journal Bearings: Hysteresis Prediction Including Preloading Effects
M. Mahner, A. Lehn, B. Schweizer, Technical University Darmstadt, Darmstadt, Germany
2:30 – 3 pm
Design Trends for Offset Journal Bearings in Two-Stroke Engines
S. Boedo, D. Anderson, Rochester Institute of Technology, Rochester, NY

3 – 3:30 pm – Break

3:30 – 4:00 pm
Dynamic Coefficients Identification of Water-lubricated Hybrid Journal Bearings Using Non-Contact Excitation
G. Chen, L. Wang, School of Mechanical Engineering, Northwestern Polytechnical University, Xi’an, Shaanxi, China; X. Xiong, Xi’an High Voltage Apparatus Research Institute Co., Ltd, Xi’an, Shaanxi, China; H. Xu, Key Laboratory of Education Ministry for Modern Design and Rotor-Bearing System, Xi’an Jiaotong University, Xi’an, Shaanxi, China

4 – 4:30 pm
Parallel Computing of Multiobjective Optimization of Air Bearing
H. Chen, N. Wang, Chang Gung University, Tao-Yuan, Taiwan

Session 6I • Las Vegas 2

Environmentally Friendly Fluids II
Session Chair: S. Erhan, Elevance Renewable Sciences, Woodridge, IL
Session Vice Chair: M. Sarker, U.S. Department of Agriculture, Agricultural Research Service, Wyndmoor, PA

1:30 – 2 pm
Fast Biodegradable – Always the Optimum Property for Lubricants?
W. Bartz, Technische Akademie Esslingen, Ostfildern, Germany

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Wednesday May 18, 2016
Technical Sessions 6I-6K

2 – 2:30 pm
Application and Performance Comparison of Greases that are Certified as Environmentally Acceptable Lubricants
D. Adams, B. Roell, T. Kuchta, A. Otto, RSC Bio Solutions, Mentor, OH

3 – 3:30 pm – Break

3:30 – 5 pm – Panel Discussion

5 – 6 pm – Environmentally Friendly Fluids Business Meeting

Session 6K • Las Vegas 4

Wear III: Effect of Third Bodies on Wear
Session Chair: A. Ghosh, Department of Mechanical Engineering, Purdue University, West Lafayette, IN
Session Vice Chair: H. Ghaednia, Ford Motor Co., Dearborn, MI

1:30 – 2 pm
High Sensitivity Inductive Pulse Sensor for Metallic Wear Debris Detection Based On Parallel LC Resonance Method
X. Zhu, L. Du, J. Zhe, University of Akron, Akron, OH

2 – 2:30 pm
A Multibody Mesh-Free Method for Third-Body Simulation
G. Mollon, INSA Lyon, Villeurbanne Cedex, France
2:30 – 3 pm
Analysis of Scratches Generated on GaN Substrates During Polishing
C. Zou, G. Pan, H. Gong, Research Institute of Tsinghua University in Shenzhen, Shenzhen, China, L. Xu, Y. Zhou, Tsinghua University, Shenzhen, China

3 – 3:30 pm – Break

3:30 – 4:00 pm
Mechanisms of Chip Formation During Circular Sawing of Supermartensitic Stainless Steel
C. Sanchez, Texas A&M University, College Station, TX, M. Moreira, Universidad Federal de Minas Gerais, Belo Horizonte, Brazil, H. Liang, Texas A&M University, College Station, TX

4 – 4:30 pm
Impact of Third-Body on Wear Mechanisms
M. Renouf, LMGC CNRS UM, Montpellier, France

4:30 – 5 pm
Modeling of the Wear Particles Formation in Mixed Lubricated Sliding Line Contacts
A. Akchurin, Materials Innovation Institute, Delft, Netherlands

5:30 – 6 pm – Wear-Biotribology Business Meeting
Session 6L • Las Vegas 5

**Tribotesting II**

Session Chair: G. Krauss, Harvey Mudd College, Claremont, CA
Session Vice Chair: J. Xiao, Rtec Instruments, San Jose, CA

1:30 – 2 pm

Tribological Modification on the Glass Fabric/Phenolic Laminate Composite under Water Lubricating

F. Yan, Chinese Academy of Sciences, Lanzhou, China

2 – 2:30 pm

Tribological Characterization of a Hybrid Nanoparticles Additive in a Biolubricant Under Boundary Lubrication

J. Abere, T. Slatter, University of Sheffield, Sheffield, United Kingdom

2:30 – 3 pm

Design and Development of Novel Test Instruments to Assess Tribological Effects of Nanofluids

G. Molina, F. Aktaruzzaman, M. Rahman, V. Soloiu, Georgia Southern University, Statesboro, GA

3 – 3:30 pm – Break

3:30 – 4 pm

Some Problems in EHL Film Measurement of Finite Line Contacts under Oscillating

X. Chen, X. Shen, Shanghai University, Shanghai, China

4 – 4:30 pm

Experimental Modeling and Optimization of the Tribocharging Process in a Sliding Contact Between Polymeric Materials

Y. Prawatya, T. Zeghloul, M. Neagoe, L. Dascalescu, Institut P' UPR 3346 CNRS – Université de Poitiers – Ensma, Angoulême, France, Angoulême, France
4:30 – 5 pm
A Novel Device for the Study of Transient Effects in Elastohydrodynamic Contacts
M. Masen, T. Welham, C. Myant, P. Cann, Imperial College London, London, United Kingdom

5 – 5:30 pm
An Experimental Study of the Effects of Lubricants on Piston Ring Friction
T. Tian, Z. Westerfield, D. Kim, Massachusetts Institute of Technology, Cambridge, MA

Session 6M • Las Vegas 6/7

Condition Monitoring II
Session Chair: Karl Rogers, Pilot Thomas Logistics, Las Vegas, NV
Session Vice Chair: TBD

1:30 – 2 pm
One-Man Reliability on a Budget – How One Person Can Make a Difference
C. Haught, Esco Products, Inc., Houston, TX

2 – 2:30 pm
Condition-Based Lubrication
D. Martin, SKF Canada Limited, Port Moody, BC, Canada, J. Yolton, SKF USA, San Diego, CA

2:30 – 3 pm
Using Oil Analysis to Extend Warranty Period on O&M Equipment
C. Silva, Oilcheck, Contagem, Brazil

3 – 3:30 pm – Break
3:30 – 4 pm
Grease Condition Sensor for Rolling Element Bearings: Dielectric Property Measurements of Water Contaminated Grease
N. Dittes, Luleå University of Technology, Sjulsmakr, Sweden

4 – 4:30 pm
A Novel Ultrasonic Sensing Technique to Measure Viscosity In Situ in Journal Bearings
M. Schirru, R. Mills, R. Dwyer-Joyce, The University of Sheffield, Sheffield, United Kingdom, O. Smith, The Lubrizol Corp., Wickliffe, OH

4:30 – 5 pm
A New Approach to Elemental and Wear Debris Analysis
A. Toms, R. Lawrence, R. Hill, GasTOPS Inc., Huntsville, AL

Session 6N • Pacific I
Surface Engineering VI
Session Chair: R. Chinnakurli Suryanarayana, Department of Mechanical Engineering, PES Institute of Technology, Bangalore, India
Session Vice Chair: G. Ramirez, Energy Systems Division, Argonne National Laboratory, Argonne, IL

1:30 – 2 pm
Development and Evaluation of Low Friction and Low Wear TiSiCN and DLC-Based Coatings for Automotive Valvetrain
J. Lin, R. Wei, P. Lee, C. Bitsis, Southwest Research Institute, San Antonio, TX
2 – 2:30 pm
Measurements and Simulations of Full-Field, Sub-Grain Surface Deformation in Tantalum
C. Battaile, J. Carroll, H. Lim, Sandia National Laboratories, Albuquerque, NM

2:30 – 3 pm
Chemical Mechanical Polishing of Sapphire Wafer Using Mixed Silica Nanoparticles
Y. Zhou, G. Pan, State Key Laboratory of Tribology, Tsinghua University, Beijing, China, H. Gong, Research Institute of Tsinghua University in Shenzhen, Shenzhen, China, L. Xu, State Key Laboratory of Tribology, Tsinghua University, Beijing, China, C. Zou, Guangdong Provincial Key Laboratory of Optomechatronics, Shenzhen, China

3 – 3:30 pm – Break

3:30 – 4 pm
A Study on Tribological Performance of Black Oxide Coating for Bearing Applications
V. Brizmer, SKF, Utrecht, Netherlands

4 – 4:30 pm
Surface Amorphization of Si Wafer by UNSM Technique for Solar Cell Applications
A. Amanov, Sun Moon University, Asan, Korea (the Republic of), H. Kwon, Technovalue, Seoul, The Republic of Korea, Y. Pyun, Sun Moon University, Asan, The Republic of Korea

4:30 – 5 pm
Insight into the Mechanisms of High DLC Wear When Lubricated with MoDTC-Containing Lubricants in DLC/Steel Contacts
S. Kosarieh, D. Khaemba, A. Morina, A. Neville, University of Leeds, Leeds, United Kingdom
Session 60 • Pacific 2

Materials Tribology VI

Session Chair: P. Egberts, Department of Mechanical and Manufacturing Engineering, University of Calgary, Calgary, AB, Canada
Session Vice Chair: B. Nation, Sandia National Laboratories, Albuquerque, NM

1:30 – 2 pm
Evaluating Drilling Muds: A Novel Tribometer Designed to Evaluate Geological Sliding Contacts
P. Egberts, N. Simin, J. Czibor, University of Calgary, Calgary, AB, Canada, E. Sonmor, M. DeWitt, SECURE Energy Services, Calgary, AB, Canada, S. Park, University of Calgary, Calgary, AB, Canada

2 – 2:30 pm
Understanding Sliding Wear Behavior Through High Pressure Torsion (HPT) Testing: A Study of the Shear Deformation Behavior of Al-Al₂O₃ by Finite Element Modelling
J. Shockley, INSA-Lyon, Villeurbanne, France, C. Desrayaud, École Nationale Supérieure des Mines de Saint-Étienne, Saint-Étienne, France, R. Chromik, McGill University, Montreal, QC, Canada, S. Descartes, INSA-Lyon, Villeurbanne, France

2:30 – 3 pm
Influence of Sputter Deposited Solid Lubricant Thickness on Plain Journal Bearing Life
B. Nation, M. Dugger, Sandia National Laboratories, Albuquerque, NM

3 – 3:30 pm – Break
Wednesday Technical Sessions

3:30 – 4 pm
Numerical Investigation on Electrical Transmission Ability of a Shearing Powder Layer – Application to Powder Lubricant
C. Zeng, M. Renouf, Université de Montpellier, Montpellier, France, Y. Berthier, Université de Lyon, Villeurbanne, France

4 – 4:30 pm
High Temperature Lubrication in Hot Sheet Metal Forming
J. Hardell, L. Pelcastre, C. Sánchez Santero, C. Wang, B. Prakash, Luleå University of Technology, Luleå, Sweden

4:30 – 5 pm
High Temperature Friction and Wear in Open and Closed Tribo-Systems
S. Hernandez, J. Hardell, B. Prakash, Luleå University of Technology, Luleå, Sweden

5 – 5:30 pm
Corrosion and Wear Behaviour of Zr-Ti-N Thin Films
J. Menghani, K. Babapai, S.V.N.I.T, Surat, India, M. Totlani, Consultant, Mumbai, India
Session 6P • Pacific 3

Nanotribology VI: Nanoscale Lubrication Mechanisms
Session Chair: P. Egberts, Department of Mechanical and Manufacturing Engineering, University of Calgary, Calgary, AB, Canada
Session Vice Chair: Z. Ye, University of California-Merced, Merced, CA

1:30 – 2 pm

Tribological Properties of Nanodiamonds in Aqueous Suspensions: Effect of the Surface Charge
J. Krim, Z. Liu, D. Leininger, A. Kooviland, A. Smirnov, North Carolina State University, Raleigh, NC, O. Shendrova, International Technology Center, Raleigh, NC, D. Brenner, North Carolina State University, Raleigh, NC

2 – 2:30 pm

Effect of Alkyl Chain Length on the Orientational Behavior of Nano LC Lubricating Film
M. Gao, L. Ma, J. Luo, State Key Laboratory of Tribology, Beijing, China

2:30 – 3 pm

Tribochemical Synthesis of Nano-Lubricant Films from Adsorbed Molecules at Sliding Solid Interface: Tribo-Polymers from α-Pinene, Pinane, and n-Decane
X. He, A. Barthel, S. Kim, Penn State University, State College, PA

3 – 3:30 pm – Break
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Session 6Q  • Pacific 3

Materials Tribology/Nanotribology Joint Session I

Session Chair: P. Egberts, Department of Mechanical and Manufacturing Engineering, University of Calgary, Calgary, AB, Canada
Session Vice Chair: H. Khare, University of Pennsylvania, Philadelphia, PA

3:30 – 4:30 pm
Ultralow Wear Fluoropolymer Composites: Putting Together the Mechanistic Pieces

4:30 – 5 pm
Surface Identity, Modification and Evolution in Polymer Tribology
K. Harris, A. Pitenis, J. Uruena, University of Florida, Gainesville, FL, B. Krick, Lehigh University, Bethlehem, PA, W. Sawyer, University of Florida, Gainesville, FL

5 – 5:30 pm
Nano-Rheology of Hydrogels Using Direct Drive Force Modulation Atomic Force Microscopy
P. Nalam, University of Illinois at Urbana-Champaign, Champaign, IL, N. Gosvami, M. Caporizzo, R. Composto, R. Carpick, University of Pennsylvania, Philadelphia, PA

5:30 – 6 pm
Measurement of the Energy Dissipation of Copolymer in Non-Contact Regime Using Atomic Force Microscopy
S. Shi, D. Guo, J. Luo, State Key Laboratory of Tribology, Department of Mechanical Engineering, Tsinghua University, Beijing, China
6 – 6:30 pm
Relationship Between Nano Mechanical Properties and Macro Tribological Properties of Tribo-Films Originated from Friction Modifier
C. Hashimoto, S. Sasaki, C. Tadokoro, Tokyo University of Science, Tokyo, Japan

2016 Annual Meeting Exhibition Hours

Monday, May 16 – Noon-5 pm
Dedicated hour of trade show time from 3-4 pm. No other annual meeting activity during this time.

Tuesday, May 17 – 9:30 am-Noon & 2-5:30 pm
Trade show closes for two hours for the Presidents Luncheon & STLE Business Meeting from noon to 2 pm. Also, there will be a second dedicated hour of trade show time from 3-4 pm. No other annual meeting activity during this time.

Wednesday, May 18 – 9:30 am-Noon