



2020 STLE Tribology Frontier Virtual Conference
Co-sponsored by ASME Tribology Division

Virtual event hosted online
at www.stle.org

2020 Preliminary Technical Program
Updated as of Sept. 9, 2020

2020 STLE Virtual Tribology Frontiers Conference
November 9-13, 2020

Preliminary Program-at-a-Glance
As of 9-9-20 – Subject to Change

Monday, November 9, 2020

Networking – 8:30 – 9:00am

Welcome and Introductions – 9:00 – 9:15 am

Keynote Session –9:15 – 9:55 am

Keynote Presentation:

Ali Erdimir, Texas A&M University: *Frontiers of Catalyst-driven Tribochemistry: Implications for Friction and Wear*

Technical Sessions – 10 – 11 am

1A – Energy, Environment and Manufacturing I
1B – Fluid Lubrication I
1C – Surfaces & Interfaces I

Meet the Experts – 11 – 11:30 am

Technical Sessions – 11:30 am – 12:30 pm

1A – Energy, Environment and Manufacturing I
1B – Fluid Lubrication I
1C – Surfaces & Interfaces I

STLE Connect-(Exhibits & Posters) – 12:30 – 1 pm

Keynote Session –1 – 1:55 pm

Keynote Presentation:

Carmel Majidi, Carnegie Mellon University: *Challenges at the Interface in Soft, Stretchable Electronics*

Technical Sessions – 2 – 3:20 pm

2A – Energy, Environment and Manufacturing II
2B – Fluid Lubrication II
2C – Surfaces & Interfaces II

Meet the Experts – 3:20 – 4 pm

Tuesday, November 10, 2020

Networking – 8:30 – 9:00am

Keynote Session –9:00 – 9:55 am

Keynote Presentation:

Rosa Espinosa-Marzal, University of Illinois at Urbana-Champaign: *Modulating Slip, Adhesion and Friction of Graphene Via Substrate-Induced Doping*

Technical Sessions – 10 – 11:00 am

3A – Tribochemistry I
3B – Surfaces & Interfaces III
3C – Lubricants I

Meet the Experts – 11 – 11:30 am

Technical Sessions – 11:30 am – 12:30 pm

3A – Tribochemistry I
3B – Surfaces & Interfaces III
3C – Lubricants I

STLE Connect-(Exhibits & Posters) – 12:30 – 1 pm

Keynote Session –1 – 1:55 pm

Keynote Presentation:

Jean-Francois Molinari, EPFL, Switzerland: *Revisiting Archard's Wear Model: A Dialog Between Scales*

Technical Sessions – 2 – 3:20 pm

4A - Tribochemistry II
4B – Surfaces & Interfaces IV
4C – Lubricants II

Meet the Experts – 3:20 – 4 pm

Wednesday, November 11, 2020

Networking – 8:30 – 9:00am

**ASME Workshop – 8:00 am – 12 pm
(Separate Registration Required)**

Technical Sessions - 8:00 – 10 am

5A – Materials Tribology I
5B – Surfaces & Interfaces V
5C – Tribochemistry III

Break – 10 – 10:20am

Technical Sessions – 10:20 am – 12 pm

5A – Materials Tribology I
5B – Surfaces & Interfaces V

STLE Connect-(Exhibits & Posters) – 12:00 – 1 pm

6A - Special Plenary Symposium – Beyond the Cutting Edge: Highlights from Tribology Letters – 1 pm – 4:00 pm

Thursday, November 12, 2020

Networking – 8:30 – 9:00am

Keynote Session –9:00 – 9:55 am

Keynote Presentation:

Patricia Iglesias Victoria, Rochester Institute of Technology, New York: *Protic Ionic Liquids: Economical and Low-Toxicity Lubricants and Additives*

Technical Sessions – 10 – 11 am

7A – Materials Tribology II

7B – Lubricants III

7C – Machine Elements & Systems I

Meet the Experts – 11 – 11:30 am

Technical Sessions – 11:30 am – 12:30 pm

7A – Materials Tribology II

7B – Lubricants III

7C – Machine Elements & Systems I

STLE Connect-(Exhibits & Posters) – 12:30 – 1 pm

Keynote Session –1 – 1:55 pm

Keynote Presentation:

David Burris, PhD, University of Delaware: *Cartilage Tribology and the Biomechanics of Joint Health*

Technical Sessions – 2 – 3:20 pm

8A – Materials Tribology III

8B – Lubricants IV

8C – Machine Elements & Systems II

Meet the Experts – 3:20 – 4 pm

Friday, November 13, 2020

Networking – 8:30 – 9:00am

Keynote Session –9:00 – 9:55 am

Keynote Presentation:

Izabela Szlufarska, PhD, University of Wisconsin-Madison: *Microstructural and Chemical Evolution of Frictional Contacts*

Technical Sessions – 10 – 11 am

9A – Biotribology I

9B – Lubricants V

Meet the Experts – 11 – 11:30 am

Technical Sessions – 11:30 am – 12:30 pm

9A – Biotribology I

9B – Lubricants V

STLE Connect-(Exhibits & Posters) – 12:30 – 12:45 pm

Closing Comments: 12:45 – 1:00 pm

Keynote Session –1 – 2:00 pm

Keynote Presentation:

John A. Rogers, Northwestern University: *Electronic and Microfluids Systems That Softly Interface to the Skin*

Closing Celebration – 2 - 2:20 pm

Monday, November 9, 2020

9 – 9:15 am - Welcome and Introductions

9:15 – 9:55 am - Keynote Session

Ali Erdimir, Texas A&M University

Frontiers of Catalyst-Driven Tribochemistry: Implications for Friction and Wear

1A

Virtual Breakout Room 1

Energy, Environment and Manufacturing I

Session Chair: TBD

10 - 10:20 am

3435803: Ultrasonic Measurement of Lubrication and Contact Conditions in Metal Forming

Andrew Hunter, Rob Dwyer-Joyce, University of Sheffield, Sheffield, United Kingdom, Henry Brunskill, Peak to Peak Measurement Solutions, Sheffield, United Kingdom

10:20 - 10:40 am

3436061: Design of SiO₂ Nanoparticle Deposited 3D Connected Porous Aluminum Alloy Electrode Surfaces for Rechargeable Batteries

Swarn Jha, Siddhi Mehta, Yan Chen, Alaa Elwany, Hong Liang, Texas A&M University, College Station, TX

10:40 - 11 am

3418647: The Tribological Failure of O-Rings in Electrical Transmission Equipment

Simon Hutt, Alastair Clarke, Mark Eaton, Cardiff University, Cardiff, United Kingdom

11 - 11:30 am - Meet the Experts

11:30 - 11:50 am

3439422: Thermal Management in Battery Electric Vehicle (BEV)

Harsha Nanjundaswamy, Dean Tomazic, Joel Deussen, Madhura Medikeri, Chen Duan, Andreas Mayer, FEV North America Inc., Auburn Hills, MI

11:50 am - 12:10 pm

3439455: Influence of Fluids on the Operational Efficiency of Transmissions and Drivetrain Components

Kiran Govindswamy, Dean Tomazic, Tom D'Anna, Thomas Wellmann, FEV North America Inc., Auburn Hills, MI

12:10 - 12:30 pm

3413729: Latest in Biosynthetic Base Oils – Evaluating Estolide Performance Characteristics in Expanding Viscosity Ranges

Mark Miller, Debby Neubauer, Biosynthetic Technologies, Indianapolis, IN

Fluid Lubrication I

Session Chair: TBD

10 - 10:20 am

3420426: Elasto-Hydrodynamic Lubrication with Mixture in Point Contact

Fan Zhang, Université de Lyon, INSA Lyon, CNRS, LaMCoS , Lyon, France

10:20 - 10:40 am

3432447: Piston Ring on Liner Lubrication Monitoring in a Marine Diesel Engine Using Ultrasound

Jack Rooke, Xiangwei Li, Rob Dwyer-Joyce, University of Sheffield, Sheffield, South Yorkshire, United Kingdom, Henry Brunskill, Peak to Peak, Sheffield, United Kingdom, Mattias Stark, Winterthur Gas & Diesel Ltd, Winterthur, Switzerland

10:40 - 11 am

3436112: Using a Range of Measurement Technologies and a New Hydrodynamic Test Platform to Characterize the Fluid Film Behavior of EALs for the Marine Stern Tube Journal Bearing Application

Henry Brunskill, Andy Hunter, Peak to Peak Measurement Solutions/University of Sheffield, Sheffield , United Kingdom, Rob Dwyer-Joyce, Sheffield University, Sheffield, South Yorkshire, United Kingdom

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3439445: Numerical and Experimental Investigation of Aerostatic Bearing with Applications to High-Frequency Rotation (More Than 100 kHz)

Rajdeep Deb, Beat Meier, Solid State Nuclear Magnetic Resonance, ETH Zurich, Zurich, Switzerland, Dirk Wilhelm, Institute of Applied Mathematics and Physics, ZHAW, Winterthur, Switzerland, Patrick Jenny, Institute of Fluid Dynamics, ETH Zurich, Zurich, Switzerland

11:50 am - 12:10 pm

3410408: Visualization of Micro Cavity Flow of Surface Textured Mechanical Seal by Particle Tracking Velocimetry

Iwa Ou, Shogo Fukuda, Eagle Industry Co., Ltd., Sakado-shi, Saitama-Ken, Japan

12:10 - 12:30 pm

3402992: Performance of Porous Conical Bearing with Viscosity Variation of Non-Newtonian Lubricant with Squeeze Film Lubrication: Rabinowitsch Fluid Model

Amit Rahul, Indian Institute of Technology, Dhanbad, Jharkhand, India

Surfaces & Interfaces I

Session Chair: TBD

10 - 10:20 am

3419267: A Multi-Scale Strategy for Wear Modeling of Diamond Tools

Adriana Quacquarelli, INSA Lyon, Villeurbanne, France

10:20 - 10:40 am

3419310: Third-Body Flow Regime Influence on the Surface Response to Tribological Loading

Olivier Bouillanne, Guilhem Mollon, Aurélien Saulot, Sylvie Descartes, INSA de Lyon, Villeurbanne, France, Nathalie Serres, Guillaume Chassaing, Karim Demmou, Safran Aircraft Engines, Moissy-Cramayel, France

10:40 - 11:00 am

3420027: Improving the Frictional Performance of Elasto-Hydrodynamic Lubricated Contacts by Applying Fast Laser Surface Texturing of Spherical Samples

Guido Boidi, AC2T Research, Wiener Neustadt, Austria, Philipp Grützmacher, Carsten Gachot, TU Wien, Vienna, Austria, Amir Kadiric, Daniele Dini, Imperial College London, London, United Kingdom, Izabel Machado, Polytechnic School, University of São Paulo – USP, São Paulo, Brazil

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3420032: Friction Level Control of Pneumatic Rod Seals by Multi-Scale Surface Texturing

Markus Brase, Matthias Wangenheim, Leibniz University Hannover, Garbsen, Germany

11:50 am - 12:10 pm

3428051: Wear-Corrosion Modeling of Lubricated Nano Coatings in Sliding Contact

Zulfiqar Khan, Adil Saeed, Bournemouth University, Bournemouth, United Kingdom, Hammad Mian, University of South Wales, Pontypridd, Wales, United Kingdom

12:10 - 12:30 pm

3420313: Molecular Dynamics Simulations of Dislocation Confinement Effects in Core-Shell Nanostructures

Robert Fleming, Arkansas State University, Jonesboro, AR

12:30 – 1 pm - STLE Connect-(Exhibits & Posters)

1 – 1:55pm - Keynote Session

Carmel Majidi, Carnegie Mellon University

Challenges at the Interface in Soft, Stretchable Electronics

Energy, Environment & Manufacturing II

Session Chair: TBD

2 - 2:40 pm**3439417: "SPOTLIGHT" - Study of Vibration Wear in Plug-In Hybrid Vehicle Engine**

Weizi Li, Shell (Shanghai) Technology Limited., Shanghai, China, Yunfei Wang, Qin hao Fan, Zhi Wang, Tsinghua University, Beijing, China, Taylor Robert, Shell Global Solutions UK, London, United Kingdom

2:40 - 3 pm**3452741: Optimization of Tribological Parameters of 4340 Steel Machining Processes with the Use of Laser Surface Texturing**

Demófilo Cortés, Mónica Herrera-Maldonado, Gabriela Trouselles, Rodrigo Montalvo, Universidad de Monterrey, San Pedro Garza Garcia, NL, Mexico, Laura Pena-Paras, Martha Rodríguez, University of Monterrey, San Pedro, Nuevo Leon, Mexico

3 - 3:20 pm - Open Slot**3:20 – 4 pm - Meet the Experts****Fluid Lubrication II**

Session Chair: TBD

2:00 pm - 2:20 pm**3409433: Lubricity and Viscosity of N-Butanol and Its Mixtures in Ultra-Low-Sulfur Diesel**

Gustavo Molina, John Morrison, Cesar Carapia, Valentin Soloiu, Georgia Southern University, Statesboro, GA

2:20 - 2:40 pm**3446762: Molecular Dynamics Simulation of Lubricant Flow in Porous Polyimide Retainers of Bearing**

Wenbin Chen, Wenzhong Wang, Pengzhe Zhu, Beijing Institute of Technology, Beijing, China

2:40 - 3 pm**3439323: Correlating Adsorption Behavior and Tribological Performance of Organic Friction Modifiers**

Sendhil Poornachary, Febin Cyriac, Pui Shan Chow, A*STAR Institute of Chemical and Engineering Sciences, Singapore, Singapore, Naoki Yamashita, Tomoko Hirayama, Kyoto University, Kyoto, Japan

3 - 3:20 pm

3439424: Investigation of the Lubricant Oil Flow Pattern around Rolling Point Contacts

Hongbai Chen, Wenzhong Wang, He Liang, Beijing Institute of Technology, Beijing, China

3:20 pm - 4 pm - Meet The Experts

2C

Virtual Breakout Room 3

Surfaces & Interfaces II

Session Chair: TBD

2 - 2:20 pm

3418264: The Generalized Reference Lever: A Simple, Reliable and Traceable Calibration Method for Arbitrary Normal and Friction Forces

Arnab Bhattacharjee, David Burris, University of Delaware, Newark, DE

2:20 - 2:40 pm

3435077: Investigating the Effect of Nanoscale Roughness on Macroscale Adhesion in Hard Contacts: Experimental Measurements of Ruby on Polycrystal Diamond

Luke Thimons, Abhijeet Gujrati, Tevis Jacobs, University of Pittsburgh, Pittsburgh, PA, Antoine Sanner, Lars Pastewka, University of Freiburg, Freiburg, Germany

2:40 - 3 pm

3435749: Capturing Fretting Fatigue with FEA Framework

Iyabo Lawal, Matthew Brake, Rice University, Houston, TX

3 - 3:20 pm

3435833: Environmental Effects on Friction of Graphene Step Edges

Zhe Chen, Seong Kim, Pennsylvania State University, University Park, PA

3:20 pm - 4 pm - Meet The Experts

Tuesday, November 10, 2020

9 – 9:55 am - Keynote Presentation

Rosa Espinosa-Marzal, University of Illinois at Urbana-Champaign

Modulating Slip, Adhesion and Friction of Graphene Via Substrate-Induced Doping

3A

Virtual Breakout Room 1

Tribochemistry I

Session Chair: TBD

10 - 10:20 am

3423181: Influence of Rubbing Material on ZDDP Tribofilm Formation

Mao Ueda, Amir Kadiric, Hugh Spikes, Imperial College London, London, United Kingdom

10:20 - 10:40 am

3432117: The Effects of Addition of Zinc Carboxylate in Grease on the Tribological Properties of PA66-GF Composite in Contact with Carbon Steel

Takeshi Kunishima, Jules Galipaud, Gaëtan Bouvard, Jean-Christophe Abry, Clotilde Minfray, Vincent Fridrici, Philippe Kapsa, Laboratoire de Tribologie et Dynamique des Systèmes, Lyon, France

10:40 - 11 am

3439423: Adsorption on Metal Oxides: An in Silico Design of Lubricants

Sarah Blanck, Sophie Loehle, Centre de Recherche Total de Solaize, Solaize, France, Carles Marti, Carine Michel, Stephan Steinmann, Laboratoire de Chimie ENS de Lyon, Lyon, France

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3432543: Understanding the Effect of Forces on Tribochemical Reactions

Wilfred Tysoe, Alejandro Boscoboinik, UW Milwaukee, Milwaukee, WI

11:50 am - 12:10 pm

3432627: Formation of Metastable Phases in Tribochemical Reactions

Wilfred Tysoe, Resham Rana, UW Milwaukee, Milwaukee, WI

12:10 - 12:30 pm

3436574: Stress-Dependent Adhesion in Nanoscale Contacts

Tevis Jacobs, Sai Vishnubhotla, Andrew Baker, University of Pittsburgh, Pittsburgh, PA, Rimei Chen, Ashlie Martini, University of California, Merced, Merced, CA

Surface & Interfaces III

Session Chair: TBD

10 - 10:20 am

3435945: Embedded Micro-Ultrasonic Arrays for the Measurement of Tribological Interfaces.

Andrew Hunter, Henry Brunskill, Peak to Peak Measurement Solutions, Sheffield, United Kingdom, Rob Dwyer-Joyce, University of Sheffield, Sheffield, United Kingdom

10:20 - 10:40 am

3439269: The Necessary Condition for a Hard Coating to Strengthen a Coated Sphere

Zhou Chen, Technion, Haifa, Israel

10:40 - 11 am

3439437: Insights into the Formation of Protective Tribo-Layer on Ti6Al4V in the Simulated Body Fluid Environment

Jiahui Qi, Mark Rainforth, University of Sheffield, Sheffield, United Kingdom

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3435997: Development of a ReaxFF Reactive Force Field for the Study of Iron Phosphates with Molecular Dynamics

Talia Sebastian, Department of Defense, Warren, MI, Diana van Duin, Adri van Duin, RxFF Consulting, LLC, State College, PA

11:50 am - 12:30 pm

3439430: "SPOTLIGHT" - Chemical and Physical Origins of Friction on Two-Dimensionally Flat Surface with Atomic Steps

Seong Kim, Pennsylvania State University, State College, PA

Lubricants I

Session Chair: TBD

10 - 10:20 am

3439432: Base Oil, Ionic Liquid, Anti-Wear Additive, and Friction Modifier: Which One is at the Solid/lubricant Interface?

Seong Kim, Pennsylvania State University, State College, PA

10:20 - 11 am

3435312: "SPOTLIGHT" - Mechanochemical Decomposition of Organic Friction Modifiers in DLC-DLC Contacts with Varying sp^2/sp^3 Ratios

Jagjeevan Bhamra, James Ewen, Daniele Dini, Imperial College London, London, United Kingdom, Marc Bird, John Bomidi, Baker Hughes, Houston, TX

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3413733: Oxidative Stability of Estolides

Mark Miller, Debby Neubauer, Biosynthetic Technologies, Indianapolis, IN

11:50 am - 12:10 pm

3439426: Designing a Simple Test to Measure Lubricant Efficiency

Marc Ingram, Ingram Tribology Ltd, Carmarthen, United Kingdom, Izzy Roots, Clive Hamer, PCS Instruments, London, United Kingdom

12:10 - 12:30 pm

3439428: Development of a Fired-Engine Test Cycle to Evaluate the Effect of Engine Oil Formulation on Emulsion Formation

Dan Engstrom, Southwest Research Institute, San Antonio, TX

12:30 – 1 pm - STLE Connect- (Exhibits & Posters)

1 – 1:55 pm - Keynote Presentation

Jean-Francois Molinari, EPFL, Switzerland

Revisiting Archard's Wear Model: A Dialog Between Scales

4A

Virtual Breakout Room 1

Tribochemistry II

Session Chair: TBD

2 - 2:40 pm

3438144: "SPOTLIGHT" - Understanding the In-Situ Formation and Evolution of Phosphorus Antiwear Tribofilms with FFM and NanoIR-AFM

Kerry Cogen, Infineum USA L.P., Linden, NJ, Alison Pawlicki, Matthias Lorenz, Nickolay Borodinov, Olga Ovchinnikova, Oak Ridge National Laboratory, Oak Ridge, TN

2:40 pm - 3 pm

3439973: Mechanochemical Wear of Silicate Glass: Beyond the Conventional Materials Removal

Hongtu He, Southwest University of Science and Technology, Mianyang, Sichuan, China, Seung Hahn, Seong Kim, Pennsylvania State University, State College, PA

3 - 3:20 pm - Open Slot

3:20 – 4 pm - Meet The Experts

4B

Virtual Breakout Room 2

Surfaces & Interfaces IV

Session Chair: TBD

2 - 2:20 pm

3468267: Metrology and Numerical Characterization of Random Rough Surfaces - Data Reduction via an Effective Filtering Solution

Itzhak Green, GA Tech, Atlanta, GA

2:20 - 2:40 pm

3436700: Nanoparticle α -ZrP Enhanced Super Hydrophobicity

Yan Chen, Xuezhen Wang, Abraham Clearfield, Hong Liang, Texas A&M University, College Station, TX

2:40 - 3 pm

3440136: Tribology of Surfaces with 3D Textures Fabricated via Two Photon Lithography: A Multi-Scale In-Situ Study

Mahyar Afshar Mohajer, Min Zou, University of Arkansas, Fayetteville, AR

3 - 3:20 pm

3454134: Direct Imaging of Atomic-Scale Ripples on MoS₂ and Their Effect on Friction Anisotropy

Mehmet Baykara, Ogulcan Acikgoz, University of California Merced, Merced, CA, Omur Dagdeviren, Peter Grütter, McGill University, Montreal, Quebec, Canada

3:20 - 4 pm - Meet The Experts

4C

Virtual Breakout Room 3

Lubricants II

Session Chair: TBD

2 - 2:20 pm

3428676: Observation of Polymer Orientation in Oil under High Shear

Tatsuya Kusumoto, Idemitsu Kosan Co.,Ltd, Ichihara-Shi, Japan

2:20 - 2:40 pm

3390912: Effects of Lubricant Additives on Hydrogen Permeation under Rolling Fatigue

Yoji Sunagawa, Idemitsu Kosan Co.,Ltd, Ichihara, Chiba, Japan

2:40 - 3 pm

3415767: Tribological Performances of 3-(Trimethylsilyl)-1-Propanephosphate Anion Based Ionic Liquids as Lubricant Additives

Shouhei Kawada, Shinya Sasaki, Masaaki Miyatake, Tokyo University of Science, Tokyo, Japan, Gen Masuda, Nisshinbo Holdings, Inc., Chiba, Japan

3 - 3:20 pm

3419906: Tribological Performance of Piston Compression Ring in Artificial Intelligence Based Design Green Lubricant during Cold Start-Up

Imran Shahid, HITEC University, Taxila, Punjab, Pakistan

3:20 pm - 4 pm - Meet The Experts

Wednesday, November 11, 2020

8 am – 12 pm - ASME Workshop
(Separate Registration Required)

5A

Virtual Breakout Room 1

Materials Tribology I

Session Chair: TBD

8 - 8:20 am

3414131: Deformation Mechanisms and Friction of High-Purity Copper during Sliding
Christian Haug, Friederike Ruebeling, Ankush Kashiwar, Peter Gumbsch, Christian Kübel, Christian Greiner, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany

8:20 - 8:40 am

3431532: Effect of Temperature and Filler on the Tribological Responses of Sintered Polyimides
Kian Kun Yap, Marc Masen, Imperial College London, London, South Kensington, United Kingdom

8:40 - 9 am

3435338: Nanoindentation Analysis of Evolved Bearing Steel under Rolling Contact Fatigue (RCF)

Muhammad Abdullah, Zulfiqar Khan, Bournemouth University, Bournemouth, United Kingdom, Wolfram Kruhoeffer, Schaeffler Technologies AG & Co. KG, Herzogenaurach, Germany

9 - 9:20 am

3416413: Maximizing the Impact of Nanofillers on PTFE Wear Resistance

Istiaque Alam, David Burris, University of Delaware, Newark, DE

9:20 - 9:40 am - Break

9:40 - 10 am

3407025: Wear Effects from Binary and Ternary Mixtures of Methyl-Esters in Mineral Oil
Gustavo Molina, John Morrison, Emeka Oniejizu, Valentin Soloiu, Georgia Southern University, Statesboro, GA

10 - 10:20 am

3422696: On Measuring the Friction Component of Oils

Kenneth Budinski, Bud Labs, Rochester, NY

10:20 - 10:40 am

3436076: A New Test Method for Direct Measurement of Friction in Biomass Material
Maria Cinta Lorenzo Martin, Oyelayo Ajayi, George Fenske, Argonne National Laboratory, Argonne, IL, Jordan Klinger, Yidong Xia, INL, Idaho Falls, ID, Troy A. Semelsberger, NREL,

Golden, CO

10:40 - 11 am

3436081: Tribological Performance of PDA+PTFE Coating in Oil-Lubricated Condition

Sujan Ghosh, Min Zou, University of Arkansas, Fayetteville, AR

11 - 11:20 am - Open Slot

5B

Virtual Breakout Room 2

Surfaces & Interfaces V

Session Chair: TBD

8 - 8:20 am

3439434: Hydrodynamic Slip and Frictional Characteristics of the Graphene-Liquid Interface

Rosa Espinosa-Marzal, Gus Greenwood, University of Illinois at Urbana-Champaign, Urbana, IL

8:20 - 9 am

3439419: "SPOTLIGHT" - In Situ Study of the Lubrication Mechanism of Phosphonium Phosphate Ionic Liquid in Nanoscale Single-Asperity Sliding Contacts

Filippo Mangolini, Zixuan Li, Oscar Morales-Collazo, Hugo Celio, Andrei Dolocan, Robert Chrostowski, Joan Brennecke, The University of Texas at Austin, Austin, TX, Jerzy Sadowski, Brookhaven National Laboratory, Upton, NY

9 - 9:20 am - Open Slot

10 - 10:20 am – Break

5C

Virtual Breakout Room 3

Tribochemistry III

Session Chair: TBD

8 - 8:20 am

3439443: In-Situ Reactive Formation of MoS₂ Tribofilms: Interaction with ZDDP and Dispersants

Manel Rodriguez Ripoll, Bernhard Kohlhauser, Sara Spiller, AC2T Research GmbH, Wiener Neustadt, Austria, Carmen Vladu, CEST Centre for Electrochemistry and Surface Technology GmbH, Wiener Neustadt, Austria

8:20 - 8:40 am

3438174: Comparing the Composition and Evolution of Macro- and Nano-Scale Phosphorus Antiwear Tribofilms with ToF-SIMS

Kerry Cogen, Infineum USA L.P., Linden, NJ, Matthias Lorenz, Alison Pawlicki, Nickolay Borodinov, Olga Ovchinnikova, Oak Ridge National Laboratory, Oak Ridge, TN

8:40 - 9 am

3439431: Fundamentals of Tribochemistry: Model Study with Tribopolymerization of Adsorbate Molecules

Seong Kim, Pennsylvania State University, State College, PA

9 - 9:20 am - Open Slot

10 - 10:20 am - Break

6A

Virtual Ballroom

Cutting Edge Symposium

Session Chair: TBD

1 - 2 pm

3420392: Prediction of Nanoscale Friction for Two-Dimensional Materials Using a Machine Learning Approach

Prathima Nalam, Behnoosh Sattari Baboukani, Kristofer Reyes, SUNY University at Buffalo, Buffalo, NY, Zhijiang Ye, Miami University, Oxford, OH

2 - 3 pm

3429904: The Influence of Material and Electrical Current on the Formation of Premature Bearing Failures

Benjamin Gould, Nick Demas, Robert Erck, Maria Cinta Lorenzo Martin, Aaron Greco, Argonne National Laboratory, Chicago, IL

3 - 4 pm

3435050: Walking Your Way to Thick Slippery Cartilage

David Burris, University of Delaware, Newark, DE

4 - 5 pm

3436427: Graft Copolymers and Bottlebrushes at Surfaces for Tuning Physicochemical and Tribological Properties of Materials

Edmondo M. Benetti, ETH Zürich, Zürich, Switzerland

Thursday, November 12, 2020

9 – 9:55 am - Keynote Presentation

Patricia Iglesias Victoria, Rochester Institute of Technology, New York

Protic Ionic Liquids: Economical and Low-Toxicity Lubricants and Additives

7A

Virtual Breakout Room 1

Materials Tribology II

Session Chair: TBD

10 - 10:40 am

3435645: "SPOTLIGHT" - Linking Energy Loss in Soft Adhesion to Surface Roughness

Tevis Jacobs, Abhijeet Gujrati, Subarna Khanal, University of Pittsburgh, Pittsburgh, PA, Siddhesh Dalvi, Ali Dhinojwala, University of Akron, Akron, OH, Lars Pastewka, University of Freiburg, Freiburg, Germany

10:40 - 11 am

3439418: Tribological Performance of Bearing Bushes Made of Lightweight Mg Matrix Composites

Juanjuan Zhu, Rob Dwyer-Joyce, The University of Sheffield, Sheffield, United Kingdom

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3435911: Investigation of Formation Mechanisms of Dark Etching Regions and White Etching Bands in SAE 52100 Steel Bearings

Mostafa El Laithy, Ling Wang, Terry Harvey, University of Southampton, Southampton, Hampshire, United Kingdom, Bernd Vierneusel, Schaeffler AG & Co., Schweinfurt, Germany

11:50 am - 12:10 pm

3435695: Direct Measurement of Adhesion for Noble-Metal Nanoparticles Using In Situ Transmission Electron Microscopy

Andrew Baker, Sai Vishnubhotla, Sanjana Karpe, Yahui Yang, Goetz Vesper, Tevis Jacobs, University of Pittsburgh, Pittsburgh, PA

12:10 - 12:30 pm

3435705: Use of Digital Tribology to Evaluate the Combined Effect of Surface Texture and DLC Coatings during Ball-On-Disk Reciprocating Tests

Roberto Souza, Izabel Machado, Newton Fukumasu, University of São Paulo, Sao Paulo, Brazil, Vanessa Seriacopi, Instituto Mauá de Tecnologia, Sao Paulo / SP, Brazil, Erika Prados, Luis Ambrosi, Federal University of ABC, Santo André, São Paulo/SP, Brazil

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Lubricants III

Session Chair: TBD

10 - 10:20 am

3436109: Concentration and Stability Profiles of Copper-Infused Wire Drawing Fluids

Floriane Charpentier, Patrycja Adamska, Pascal Bru, Formulaction, Worthington, OH

10:20 - 10:40 am

3436118: Mimicking of Internal Engine Oil Viscosity at Real Temperature and Shear by Way of a Microfluidic Rheometer

Patrycja Adamska, Floriane Charpentier, Pascal Bru, Formulaction, Worthington, OH

10:40 - 11 am

3429117: A Novel Approach in the Oil and Gas Industry to Use Tribology Science for the Engineering Design and Evaluation of a Solid Lubricant to Improve Lubricity in Extended Reach Horizontal Wells

Mario Ramirez, Chevron Phillips Chemical Co, The Woodlands, TX

11 - 11:30 am - Meet The Experts

11:30 am - 12:10 pm

3436105: "SPOTLIGHT" - Optimization of Bio-Derived Basefluid Properties to Improve Efficiency in Hydraulic Systems

Maria Cinta Lorenzo Martin, Oyelayo Ajayi, George Fenske, Argonne National Laboratory, Argonne, IL, Girma Biresaw, Grigor Bantchev, Roger HarryKuru, USDA, Peoria, IL

12:10 - 12:30 pm

3435799: A Molecular Dynamics Approach to Predict Pour Points of Fluids

Jannat Ahmed, Jie Lu, Q. Wang, Northwestern University, Evanston, IL, Junqin Shi, Northwestern Polytechnical University, Xian, China, Ning Ren, Fran Lockwood, Valvoline Inc, Lexington, KY

Machine Elements & Systems I

Session Chair: TBD

10 - 10:20 am

3418681: The Influence of Oil Film Thickness and Surface Roughness on the Acoustic Emission from Mixed Lubrication Contacts

Simon Hutt, Alastair Clarke, Rhys Pullin, Pwt Evans, Cardiff University, Cardiff, United Kingdom

10:20 - 10:40 am

3423687: Numerical Modeling of Three-Dimensional Crack Propagation under Rolling Contact Fatigue

Florian Meray, LaMCoS - Airbus Helicopters, Villeurbanne, France, Daniel Nélias, Anthony Gravouil, Thibaut Chaise, LaMCoS, Villeurbanne, France, Bruno Descharrieres, Airbus Helicopters, Marignane, France

10:40 - 11 am

3405390: Wear Effects of Alumina-Nanofluids on Aluminum, Copper and Stainless-Steel Surfaces

Gustavo Molina, Fnu Aktaruzzaman, Hayden Ohmer, Valentin Soloiu, Mosfequr Rahman, Georgia Southern University, Statesboro, GA

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3436088: Recent Developments in Embedded Non-Invasive Ultrasonic Sensors for Measurement and Monitoring in Automotive Tribology

Henry Brunskill, Andy Hunter, Peak to Peak Measurement Solutions / University of Sheffield, Sheffield, United Kingdom, Rob Dwyer-Joyce, The University of Sheffield, Sheffield, United Kingdom

11:50 am - 12:30 pm

3473456: "SPOTLIGHT" - Use of Tribology in Rolling Bearing Design for Use in Advanced Machinery

Michael Kotzalas, The Timken Company, North Canton, OH

12:30 – 1 pm - STLE Connect- (Exhibits & Posters)

1 – 1:55 pm - Keynote Presentation:

David Burris, PhD, University of Delaware

Cartilage Tribology and the Biomechanics of Joint Health

8A

Virtual Breakout Room 1

Materials Tribology III

Session Chair: TBD

2 - 2:20 pm

3435936: In-Situ Observation of Friction and Wear Characteristics of Aluminum Alloys

Kazuyuki Yagi, Yuya Abe, Joichi Sugimura, Kyushu University, Fukuoka, Japan

2:20 - 2:40 pm

3435792: Carbon Nanotube Forest as a Protective Coating for Tribological Application

Chanaka Kumara, Michael Lance, Jun Qu, Oak Ridge National Laboratory, Oak Ridge, TN

2:40 - 3 pm

3436191: PDA/PTFE + Graphite Particles Coating on 60NiTi: Effect of Coating Thickness and Substrate Roughness

Dipankar Choudhury, Min Zou, University of Arkansas, Fayetteville, AR

3 - 3:20 pm

3436002: The Effects of Incorporating Cu-SiO₂ Nanoparticles in PTFE Top Layer of PDA/PTFE Thin Films

Firuze Soltani, Deborah Okyere, Jingyi Chen, Charles Miller, Sujan Ghosh, Mahyar Afshar Mohajer, Nathan Harris, Min Zou, University of Arkansas, Fayetteville, AR

3:20 - 4 pm - Meet The Experts

8B

Virtual Breakout Room 2

Lubricants IV

Session Chair: TBD

2 - 2:20 pm

3439722: Tribological Investigation of Nano-Talc as Additive in Oil Nanolubricants

Vinay Saini, Jayashree Bijwe, Indian Institute of Technology, Delhi, Hauz Khas, Delhi, India

2:20 - 2:40 pm

3440344: Interfacial Structure of Adsorption Layer Formed by Polymer-Type Friction Modifier under Temperature Change and Its Nanotribological Property

Naoki Yamashita, Tomoko Hirayama, Kyoto University, Kyoto, Japan, Honami Watanabe, Ko Onodera, Takehisa Sato, EMG Lubricants Godo Kaisha, Kawasaki, Kanagawa, Japan

2:40 - 3 pm

3440430: Structural Analysis of Viscosity Index Improvers in Lubricating Oil by X-ray and Neutron Small-Angle Scatterings

Tomoko Hirayama, Nobuhiro Sato, Masaaki Sugiyama, Kyoto University, Kyoto, Japan, Ryohei Takahashi, Doshisha University, Kyotanabe, Japan, Yoriyuki Takashima, Kazushi Tamura, Idemitsu Kosan Co., Ltd., Ichihara, Japan, Shinichi Takata, Japan Atomic Energy Agency, Tokai, Japan

3 - 3:20 pm

3441831: Emission and Vehicle Performance Evaluation of Aged Gasoline Particle Filter via Accelerated Ash and Soot Loading

Weizi Li, Shell (Shanghai) Technology Limited, Shanghai, China, Yansong Lin, Jinchong Pan, Suzhou Automotive Research Institute, Tsinghua University, Suzhou, China, Chen Yang, Haijun Yang, Geely Powertrain Research Institute, Ningbo, China

3:20 - 4 pm - Meet The Experts

Machine Elements & Systems II

Session Chair: TBD

2 - 2:20 pm

3437098: Three-Dimensional Multiphase Physics-Based Model to Study Engine Cylinder-Kit Assembly Tribology

Sadiyah Sabah Chowdhury, Michigan State University, East Lansing, MI

2:20 - 2:40 pm

3439449: Tribological Aspects of Utilizing Wet Friction Materials in Wet Clutch Systems Like Torque Converter Clutches

Vladimir Klotchikhine, Greening Inc., Detroit, MI

2:40 - 3 pm

3440619: Loss Analysis of Radial Magnetic Bearing Using Genetic Algorithm and Gradient Based Method

Santosh Shelke, Sir Visvesvaraya Institute of Technology Nashik, Nashik, Maharashtra, India

3 - 3:20 pm - Open Slot

3:20 - 4 pm - Meet The Experts

Friday, November 13, 2020

9 – 9:55 am - Keynote Presentation:

Izabela Szlufarska, PhD, University of Wisconsin-Madison

Microstructural and Chemical Evolution of Frictional Contacts

9A

Virtual Breakout Room 1

Biotribology I

Session Chair: TBD

10 - 10:20 am

3393437: Innovations in High Performance, Environmentally Acceptable Lubricants (EALs); A Special Focus on Oxidative Stability and Hydrolytic Stability

Mark Miller, Debby Neubauer, Biosynthetic Technologies, Indianapolis, IN

10:20 - 11 am

3438863: "SPOTLIGHT" - Tribological and Bactericidal Effect of Nanodiamonds as Potential Lubricants for Artificial Joints

Diana Berman, University of North Texas, Denton, TX

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3432768: Shoe Tread can Reduce Slip Risk on Surface Contaminated with Slurry Contaminants

Mahiyar Nasarwanji, Kurt Beschorner, University of Pittsburgh, Pittsburgh, PA, Jonisha Pollard, CDC/NIOSH, Pittsburgh, PA

11:50 am - 12:10 pm

3436194: Biotribological Investigation of Cartilage Inspired Textured Ti-6Al-4V and PEEK Interface

Dipankar Choudhury, Min Zou, University of Arkansas, Fayetteville, AR

12:10 - 12:30 pm

3460061: Mechanical and Tribological Behavior of SU-8 Composite Filled with UHMWPE and Gum Acacia Filler

Jaswant Hirwani, Sujeet Sinha, IIT Delhi, Delhi, India

Lubricants V

Session Chair: TBD

10 - 10:20 am

3439436: Piston Deposit Control: A Fundamental Mechanistic Study

Anil Agiral, Lubrizol Corporation, Wickliffe, OH

10:20 - 10:40 am

3439453: Effects of Filtration on Foaming Performance of Anti-Foam Laden Lubricants

Vinny Suja, Gerald Fuller, Stanford University, Stanford, CA, Abhishek Kar, Shell Global Solutions US Inc., Houston, TX, Stanford University, Stanford, CA

10:40 - 11 am

3440498: Synergistic Effect of Combining TiO₂ and Montmorillonite Clay Nanoparticles as Lubricant Additives for Milling Processes

Laura Pena-Paras, Martha Rodríguez, University of Monterrey, San Pedro, Nuevo Leon, Mexico, Demófilo Cortés, Gerardo Elizondo, Claudia Elizondo, Marcela Guajardo, Universidad de Monterrey, San Pedro Garza Garc, NL, Mexico

11 - 11:30 am - Meet The Experts

11:30 - 11:50 am

3468065: Lubrication Failures in Critical Equipment in Ammonia Plants

Sanya Mathura, Strategic Reliability Solutions Ltd, Chatham, Trinidad and Tobago

11:50 am - 12:10 pm

3471418: Grease Behavior in Rolling/Sliding Contacts – On the Neglected Thickener Effects

Balasubramaniam Vengudusamy, Reiner Spallek, Klüber Lubrication München SE & Co. KG, Munich, Germany

12:30 – 12:45 pm - STLE Connect- (Exhibits & Posters)

12:45 – 2:00pm - Closing Keynote Presentation:

John A. Rogers, Northwestern University

Electronic and Microfluids Systems That Softly Interface to the Skin

2 – 2:20 pm - 2020 STLE Tribology Frontiers Week Closing Celebration

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