EARLY CAREER POSTERS

Influences of Adsorbed Water on the Interfacial Tribological Phenomena in the Early Stage of Sliding
Z.A. Subhi, Malaysia-Japan International Institute of Technology, Kuala Lumpur, Malaysia

Surfaces are covered by adsorbed water layer due to ambient humidity. In the tribology of micro contacts, frictional and adhesive properties are sensitive to the adsorbed water because surface phenomena become more dominant than volumetric phenomena and therefore the influences of adsorbed water on adhesion become dominant. This study aimed to explore the mechanism of humidity changes to influence the adhesion by the observation of the tribological behaviour during the very early stage of sliding. In this study, a unidirectional ball-on-ball configuration tribo-contact simulator (T-CS) along with atmospheric humidity controller, were used to simulate the micro-sliding between two asperities. Results have suggested that the medium rate of relative humidity can be a critical condition for the tribo-contact due to the effect of liquid assisted adhesion. This critical condition is perhaps caused by the negative Laplace pressure of the meniscus bridge formed between the adsorbed water layer.

Molecular Dynamics Simulation of Drag Reduction by Nanobubble Clusters as Affected by Surface Morphology
Y. Lu, Wuhan University of Technology, Wuhan, China

The investigations of natural superhydrophobic surfaces of plants and animals showed that the wettability property is governed by the nanostructure characteristics of the surface. As a result of the improved surface hydrophobic by morphology, the trapping of gas is promoted on surface cavities to induce friction drag reduction, but gas cushion cannot stably exist. Nanoscopic gas bubbles that exhibit along lifetime and considerable stability may help improve the situation. In this study, molecular dynamics simulations are performed to analyze the formation behavior of nanobubble and the effect of nanobubble flow on the nanochannel with various surface morphologies. Results show that the existence of gaseous nanobubbles can be trapped by the surface cavities, which replace the dense and orderly absorbed liquid layer in non-bubble flow. Therefore, introducing surface morphology can further improve the effect on drag reduction.

Tribological Properties of Additive Manufactured Ti₆Al₄V Against Tungsten Carbide Under Dry Condition
X. Liang, Tsinghua University, Beijing, China

With the development of additive manufacturing (AM technology, titanium alloy manufactured by AM is widely used in aviation manufacturing. Although AM can achieve near net shape, the necessary machining is inevitable. In this paper, the tribological behaviors and wear mechanism of additive manufactured Ti₆Al₄V against tungsten carbide under dry friction condition are studied. The influence of normal load and temperature on friction coefficient were studied. The results show that the effect of load and temperature on friction coefficient is not obvious. We calculated the wear rate and found that the wear rate increased with the increase of load but decreased significantly with the increase of temperature. EDS analysis on the surface of the friction pair shows that tungsten oxide is generated on the friction surface at high temperature. Because tungsten oxide has lubrication properties, it reduces the wear rate at high temperature.

STUDENT POSTERS

Synergistic Effect of Combining TiO₂ and Montmorillonite Clay Nanoparticles as Lubricant Additives for Milling Processes
M.G. Flores, C.S. Rico, G.E. Gonzalez, Universidad de Monterrey, San Pedro Garza García, Mexico

In this work, nanoparticles of TiO₂ and montmorillonite clay were mixed with varying proportions and added to a cutting fluid for milling of an AISI 4340 steel. Due to its semi-spherical shape and small size nano TiO₂ fill surface valleys reducing friction; montmorillonite, being a multilayer flake-like nanomaterial may reduce friction and wear through exfoliation of their weakly-bonded layers. Laboratory experiments were performed in a four-ball tribotester to determine the best proportions of TiO₂ and
montmorillonite clay that provided a synergistic effect. Milling experiments were performed in a CNC equipment with varying feed rate, depth of cut and cutting speed. Plates of AISI 4340 steel were milled with cutting inserts of cemented carbides. A Box Behnken experimental design was performed in order to optimize the milling input parameters and nanoparticle combinations that provided the lowest surface roughness of steel plates, spindle load and wear of cutting inserts.

Wear and Corrosion Performance of Friction Stir Spot Processed 316L Stainless Steel Deposited by High Deposition Rate Cold Spray Additive Manufacturing Process

High Deposition Rate Cold Spray (HDR-CS) is a novel solid-state metal deposition process that uses the additive based principles from additive manufacturing (AM). By rapidly accelerating metal particles to a substrate, components can be prepared where the particles’ intrinsic metallurgical properties are retained thus serving as an advantage over other AM-based technologies. Expanding CS to an industrial perspective, CS deposits act as an easy and effective method to repair various parts. This is especially true in marine-based industries where the combination of cyclic loading and corrosion can greatly diminish the surface material over time. However, the synergism between the wear and corrosion of CS 316L is not well studied. In this work, friction-stir processing (FSP) has been used to enhance the CS coatings’ wear-corrosion resistance. The microstructural evolution and mechanical properties were then analyzed. The mechanisms for the improved wear-corrosion resistance are discussed.

The Effect of Axisymmetric Texture Floor Profile on the Lubricant Film Thickness of Textured Hard-on-Soft Prosthetic Hip Implant Bearings
Q. Allen, B. Raeymaekers, University of Utah, Salt Lake City, UT

Polyethylene wear debris causes osteolysis and premature failure of prosthetic hip implants. We design a pattern of texture features on the femoral head to increase the lubricant film pressure and thickness and reduce the polyethylene wear in hard-on-soft prosthetic hip implants. Specifically, we use a soft elastohydrodynamic lubrication model to study the effect of different axisymmetric texture floor profiles on the lubricant film thickness. We find the optimum texture parameters that maximize the lubricant film thickness for each texture floor profile as a function of bearing operating conditions. We find that flat texture floor profiles create thicker lubricant films than curved and sloped texture floor profiles. We compare the texture feature volumes of the optimum texture design parameters and find a linear relationship between the texture feature volume and the corresponding optimum lubricant film thickness that holds true independent of the axisymmetric texture floor profile.

The Interfacial Gradient and its Role in Ultralow Wear Sliding
I. Alam, D.L. Burris, University of Delaware, Newark, DE, J. Ye, J. Wei, J. Zeng, W. Sun, X. Liu, K. Liu, Hefei University of Technology, Anhui, China

In this paper, we elucidate the effects of interfacial gradients within the native ultralow wear PTFE composite-on-transfer film system using interrupted wear tests and intermittent surface analysis. As anticipated, the transition from high wear to ultralow wear was accompanied by small adherent debris, tribochemical formation of carboxylates, increased surface energy, and increased adhesion. Interestingly, we observed significant differences on either side of the interface during low wear sliding; compared to the running films on the composite surface, the transfer films on the counterface exhibited consistently greater tribochemical degradation, surface energy, and adhesion to a model alumina probe. This interfacial gradient, we propose, is a necessary feature of the ultralow wear system and functions by setting the direction and driving force for transfer wear. In this case, the interfacial gradient stabilizes the transfer film and minimizes the driving force for running film wear.

Molecular Dynamics Investigation of Core-Shell Nanostructures
S.E. Hughes, R. Fleming, Arkansas State University, Jonesboro, AK

Core-shell nanostructures (CSNs) are novel structures that have the potential to exhibit unique mechanical properties. Experimentally, surfaces patterned with Al/a-Si CSNs have been shown to have a low coefficient of friction and high durability. Molecular dynamics (MD) simulations can provide helpful insight into the material behavior of CSNs and help garner a better understanding of the physical mechanisms which enable these unique material properties. In this study, MD simulations are performed to investigate the role of core material and core-shell interface on the dynamics of dislocations nucleated within the core of CSNs during contact loading. Better understanding of the properties of CSNs will further enable their use in tribological applications, such as solid lubrication.
MORE than metal.

Renewable, sustainable, bio-based products manufacturers can count on

acme-hardesty.com | 800.223.7054

INGREDIENTS

Bio-Based PEGs • Castor Products • Emulsifiers • Esters
• Fatty Acids • Fatty Alcohols • Glycerine • Specialty Fatty Acids • Surfactants • Thickeners

Join Us!

STLE Virtual Exhibition
May 2021
## 2020-2021 STLE BOARD OF DIRECTORS

**Paul Hetherington** (President)  
HollyFrontier Lubricants & Specialties  
Mississauga, Ontario, Canada

**Ken Hope** (Vice President)  
Chevron Phillips Chemical Co.  
The Woodlands, TX

**Ryan D. Evans** (Secretary)  
The Timken Co.  
North Canton, OH

**Hong Liang** (Treasurer)  
Texas A&M University  
College Station, TX

**Michael P. Duncan** (Immediate Past President & Presidential Council Chair)  
Daubert Chemical Co.  
Chicago, IL

**Edward P. Salek, CAE** (Executive Director)  
STLE Headquarters  
Park Ridge, IL

**William Anderson**  
Afton Chemical Corp.  
Richmond, VA

**Nicolas Argibay**  
Sandia National Laboratories  
Albuquerque, NM

**Steffen Bots**  
LubeServ  
Brannenburg, Germany

**Michel Fillon**  
Université de Poitiers  
Futuroscope Chasseneuil, Cedex, France

**Aaron Greco**  
Argonne National Laboratory  
Lemont, IL

**Karen Harrington**  
Fuchs Lubricants Co.  
Harvey, IL

**Brian M. Holtkamp**  
Nye Lubricants  
Libertyville, IL

**Brian Hovik**  
Viking Engineering  
Leavenworth, WA

**Robert Jackson**  
Auburn University  
Auburn, AL

**Peter Lee**  
Southwest Research Institute  
San Antonio, TX

**Mandi McElwain**  
Univar Solutions  
Philadelphia, PA

**Kuldeep Mistry**  
The Timken Co.  
North Canton, OH

**Farrukh Qureshi**  
The Lubrizol Corp.  
Wickliffe, OH

**Thomas Scharf**  
University of North Texas  
Denton, TX

**Raj Shah**  
Koehler Instrument Co., Inc.  
Holtville, NY

**David Turner**  
CITGO Petroleum Corp.  
Houston, TX

**Evan Zabawski**  
TestOil  
Calgary, Alberta, Canada

**Min Zou**  
University of Arkansas  
Fayetteville, AK

## COMMITTEES AND INDUSTRY COUNCILS

### Annual Meeting Program Committee

**Min Zou** (Chair)  
University of Arkansas  
Fayetteville, AK

**Robert Jackson** (Vice Chair)  
Auburn University  
Auburn, AL

**Gareth Fish** (Secretary)  
The Lubrizol Corporation  
Wickliffe, OH

**Ashlie Martini**  
University of California, Merced  
Merced, CA

**Azzeddine Dadouche**  
National Research Council Canada  
Ottawa, ON, Canada

**Jun Qu**  
Oak Ridge National Laboratory  
Oak Ridge, TN

**Alison C. Dunn**  
University of Illinois at Urbana-Champaign  
Urbana, IL

### Annual Meeting Education Course Committee

**Scott Howard** (Chair)  
Hy-Pro Filtration  
Virginia Beach, VA

**Anil Agiral**  
The Lubrizol Corporation  
Wickliffe, OH

**Brian Hovik**  
Viking Engineering  
Leavenworth, WA

**Babak Lofti**  
ExxonMobil Chemical Company  
Baytown, TX

**Alex Mannion**  
BASF Corporation  
Florham Park, NJ

**Yvette Trzcinski**  
Holly Frontier  
Waukesha, WI
YOUR PREMIER PARTNER FOR
HIGH PERFORMANCE BASESTOCKS
AND LUBRICANT ADDITIVES

LEADING EDGE
Performance and Service

- SpectraSyn Elite™ mPAO Base Oils Group IV
- SpectraSyn Plus™ Base Oils Group IV
- SpectraSyn™ PAO Group IV
- Esterex™ Esters Group V
- Synesstic™ Alkylated Naphthalene Group V
- Group II and Group III Base Oils
- Novvi™ Renewable Base Oils Group III ++
- Lubricant Additives

J.A.M.
SPECIALTY PRODUCTS
A Brenntag Group Company

7010 Mykawa | Houston, Texas 77033 | 800.228.3848 | www.jamdistributing.com

Esterex, SpectraSyn, SpectraSyn Plus and Synesstic are trademarks of Exxon Mobil Corporation.
COMMITTEES AND INDUSTRY COUNCILS

Awards Committee
Nicolas Argibay (Chair)
Sandia National Laboratories
Albuquerque, NM
Ankur Ashtekar (Vice Chair)
Sentient Science Corporation
Buffalo, NY
John Bomidi
Baker Hughes
The Woodlands, TX
Nicholaos Demas
Argonne National Laboratory
Lemont, IL
Kuldeep Mistry
The Timken Co.
North Canton, OH
Carlos Sanchez
Southwest Research Institute
San Antonio, TX
Qian (Beth) Zou
Oakland University
Rochester, MI

Education Committee
Ramoun Mourhatch (Chair)
Chevron Oronite Co. LLC
Richmond, CA
Scott Howard (Vice Chair)
Hy-Pro Filtration
Virginia Beach, VA
Richard Butler
DuBois Chemicals
Bedford Park, IL
Neil Canter
Chemical Solutions
Willow Grove, PA
Charles Coe
Grease Technology Solutions, LLC
Round Hill, VA
Greg Croce
Chevron Products Co.
Richmond, CA
Karen Harrington
Fuchs Lubricants Company
Harvey, IL

Lawrence Ludwig, Jr.
Schaeffer Manufacturing Company
St. Louis, MO
Frederick J. Passman
BCA, Inc.
Princeton, NJ
Michael Stapels
Kao Chemicals GmbH
Emmerich, Germany

Fellows Committee
Michael T. Dugger (Chair)
Sandia National Laboratories
Albuquerque, NM
Daniel Nelias (Vice Chair)
LaMCoS INSA De Lyon
Villeurbanne, Cedex, France
Gary Doll
University of Akron
Akron, OH
Raj Shah
Koehler Instrument Co., Inc.
Holtville, NY
Min Zou
University of Arkansas
Fayetteville, AK
Jeffrey Streator
Georgia Institute of Technology
Atlanta, GA
Frederick J. Passman
BCA, Inc.
Princeton, NJ

Biotribology Technical Committee
Gagan Srivastava (Chair)
Dow Chemical Company
Freeport, TX
Dipankar Choudhury (Vice Chair)
University of Arkansas
Fayetteville, AR
Kurt Beschorner (Secretary)
University of Pittsburgh
Pittsburgh, PA
Angela Pitenis (PSC)
University of California, Santa Barbara
Santa Barbara, CA
Alison C. Dunn (Vice PSC)
University of Illinois at Urbana-Champaign
Urbana, IL

Alison C. Dunn (PSC for Tribology of Biomaterials: Materials & Biotribology Joint Session)
University of Illinois at Urbana-Champaign
Urbana, IL
Brandon Krick (PSC for Tribology of Biomaterials: Materials & Biotribology Joint Session)
Florida State University, Tallahassee, FL

Condition Monitoring/Predictive Maintenance Technical Committee
Daniel Walsh (Chair)
Spectro Scientific
Chelmsford, MA
Michael Plumley (Vice Chair)
US Coast Guard Academy
New London, CT
Kemberlee Snelling (PSC)
Trico Corporation
Davison, MI
Jatin Mehta (Vice PSC)
Fluitec International
Jersey City, NJ

Contact Mechanics Technical Committee
Kyle D. Schulze (Chair)
Auburn University
Auburn, AL
Ali Beheshti (Vice Chair)
George Mason University
Fairfax, VA
Rohit Voththalur (Secretary)
The Timken Company
North Canton, OH
Hamid Ghaednia (PSC)
Harvard University
Massachusetts General Hospital
Boston, MA
Morgan R. Jones (Vice PSC)
Sandia National Laboratories
Albuquerque, NM
Matthew Brake (Award Chair)
Rice University
Houston, TX
Designing and manufacturing world leading tribology test equipment for over 30 years.

2500+ Instruments
10+ Industries
100+ Countries
500+ Technical papers

PCS Instruments is proud to sponsor the STLE 2021 annual meeting and exhibition.

Come and chat with us at our virtual booth at the online conference.

pcs-instruments.com  info@pcs-instruments.com  +44 (0)20 8600 9920
<table>
<thead>
<tr>
<th>Technical Committee</th>
<th>Chair</th>
<th>Company</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine and Drivetrain Technical Committee</td>
<td>William Anderson (Chair)</td>
<td>Afton Chemical Corporation</td>
<td>Richmond, VA</td>
</tr>
<tr>
<td></td>
<td>Raj Chandramohan (Vice Chair)</td>
<td>Borg Warner</td>
<td>Arden, NC</td>
</tr>
<tr>
<td></td>
<td>Cole Hudson (Secretary)</td>
<td>Southwest Research Institute</td>
<td>San Antonio, TX</td>
</tr>
<tr>
<td></td>
<td>Carlos Sanchez (PSC)</td>
<td>Southwest Research Institute</td>
<td>San Antonio, TX</td>
</tr>
<tr>
<td></td>
<td>Hamed Ghaednia (PSC)</td>
<td>Gehring</td>
<td>Livonia, MI</td>
</tr>
<tr>
<td></td>
<td>Environmentally Friendly Fluids Technical Committee</td>
<td>Selim M. Erhan (Chair)</td>
<td>Oil Process Industries</td>
</tr>
<tr>
<td></td>
<td>Brajendra K. Sharma (Vice Chair)</td>
<td>Illinois Sustainable Technology Center, University of Illinois at Urbana-Champaign</td>
<td>Champaign, IL</td>
</tr>
<tr>
<td></td>
<td>Daniel B. Garbark (Secretary)</td>
<td>Battelle</td>
<td>Columbus, OH</td>
</tr>
<tr>
<td></td>
<td>Helen L. Ngo (PSC)</td>
<td>Eastern Regional Research Center</td>
<td>Agricultural Research Service, USDA</td>
</tr>
<tr>
<td></td>
<td>Fluid Film Bearings Technical Committee</td>
<td>Troy Snyder (Chair)</td>
<td>The University of Akron</td>
</tr>
<tr>
<td></td>
<td>Balint Pap (Vice Chair &amp; Secretary)</td>
<td>Safran Transmission Systems</td>
<td>Colombes, France</td>
</tr>
<tr>
<td></td>
<td>Bruce Fabijonas (PSC)</td>
<td>Kingsbury Inc.</td>
<td>Philadelphia, PA</td>
</tr>
<tr>
<td></td>
<td>Xuan Ma (Vice PSC)</td>
<td>Harbin Engineering University</td>
<td>Harbin, Heilongjian Province China</td>
</tr>
<tr>
<td></td>
<td>Gears and Gear Lubrication Technical Committee</td>
<td>Jeffrey Ewin (Chair)</td>
<td>Naval Air Systems Command</td>
</tr>
<tr>
<td></td>
<td>Weixue Tian (Vice Chair)</td>
<td>ExxonMobil Research and Engineering</td>
<td>Annandale, NJ</td>
</tr>
<tr>
<td></td>
<td>Nikhil Murthy (PSC)</td>
<td>US Army Research Laboratory</td>
<td>Aberdeen Proving Ground, MD</td>
</tr>
<tr>
<td></td>
<td>Grease Technical Committee</td>
<td>Wenying Zhang (Chair)</td>
<td>Tesla, Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cindy Liu (Vice Chair)</td>
<td>Klüber Lubrication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H. Scott Crawford (PSC)</td>
<td>Primrose Oil Company</td>
</tr>
<tr>
<td></td>
<td>Lubrication Fundamentals Technical Committee</td>
<td>Mihir Patel (Chair)</td>
<td>Chevron Lubricants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jodie Nelson (Vice Chair)</td>
<td>American Refining Group, Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nicole Döerr (PSC)</td>
<td>AC2T research GmbH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brendan Miller (Vice PSC)</td>
<td>Chevron Oronite Company, LLC</td>
</tr>
<tr>
<td></td>
<td>Materials Tribology Technical Committee</td>
<td>Brandon Krick (Chair)</td>
<td>Florida State University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tevis Jacobs (Vice Chair)</td>
<td>University of Pittsburgh</td>
</tr>
<tr>
<td></td>
<td>John F. Curry (PSC for Materials Tribology)</td>
<td>Sandia National Laboratories</td>
<td>Albuquerque, NM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mark A. Sidebottom (PSC for Tribiochemistry – Materials &amp; Nanotribology Joint Session)</td>
<td>Miami University</td>
</tr>
<tr>
<td></td>
<td>Mary Makowiec (PSC for 2D Materials – Materials &amp; Nanotribology Joint Session)</td>
<td>Pratt &amp; Whitney</td>
<td>East Hartford, CT</td>
</tr>
<tr>
<td></td>
<td>Alison C. Dunn (PSC for Tribology of Biomaterials – Materials &amp; Biotribology Joint Session)</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>Urbana, IL</td>
</tr>
<tr>
<td></td>
<td>Brandon Krick (PSC for Tribology of Biomaterials – Materials &amp; Biotribology Joint Session)</td>
<td>Florida State University</td>
<td>Tallahassee, FL</td>
</tr>
<tr>
<td></td>
<td>Metalworking Technical Committee</td>
<td>E. Jon Schnellbacher (Chair)</td>
<td>Formulas &amp; Solutions, LLC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bridget Dubbert (Vice Chair)</td>
<td>Engineered Lubricants</td>
</tr>
<tr>
<td></td>
<td>Jill Myers (PSC)</td>
<td>The Timken Company</td>
<td>North Canton, OH</td>
</tr>
<tr>
<td></td>
<td>Nanotribology Technical Committee</td>
<td>Zhijiang (Justin) Ye (Chair)</td>
<td>Miami University</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prathima C. Nalam (Vice Chair)</td>
<td>University of Buffalo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mohammad Vazirisereshk (PSC)</td>
<td>University of California, Merced</td>
</tr>
<tr>
<td></td>
<td>Nikolay Garabedian (Vice PSC)</td>
<td>Karlsruhe Institute of Technology</td>
<td>Karlsruhe, Germany</td>
</tr>
</tbody>
</table>
Your Expert in Physical Property Testing

Viscosity
Rheology
Density
Polymer
Petroleum
Transportation
Pharmaceuticals
Food & Beverage
Petrochemicals

Visit us today at cannoninstrument.com
2021 STLE Virtual Annual Meeting & Exhibition

COMMITTEES AND COUNCILS

Mehmet Z. Baykara (Vice PSC)
University of California, Merced
Merced, CA

Nonferrous Industry Council
Joseph Cepec (Chair)
Allegheny Petroleum Products Company
Wilmerding, PA

Andrea Lynn Knopp
(Secretary/Treasurer)
Lightstone Generation – Gavin Plant
Cheshire, OH

Tom Oleksiaik (PSC)
Quaker Houghton
Conshohocken, PA

Power Generation Industry Council
Jatin Mehta (Chair)
Fluigtec International
Jersey City, NJ

Peter Dufresne (Co-Chair)
WLU
Calgary, Alberta, Canada

Matthew Hobbs (Vice Chair & PSC)
EPT
Calgary, Alberta, Canada

Salvatore Rea (PSC)
LANXESS Corporation
Perkasie, PA

Rolling Element Bearings Technical Committee
Trevor Slack (Chair)
American Roller Bearing Company
Morganton, NC

Nikhil Londhe (Vice Chair)
The Timken Company
North Canton, OH

Daniel Merk (Secretary)
Schaeffler Technologies
Bavaria, Germany

Bryan Allison (PSC)
SKF Aeroengineering
Clymer, NY

Isaac Daulton (Vice PSC)
AFRL Turbine Engine Division
Engine Mechanical Systems Branch
AFRL/RQTM
WPAFB, OH

Hannes Grillenberger (REB Discussion Roundtable)
Schaeffler Technologies AG & Co. KG
Herzogenaurach, Germany

Seals Technical Committee
Khalid Malik (Chair)
Ontario Power Generation
Pickering, Ontario, Canada

Hongmei Zhao (Vice Chair)
The Lubrizol Corporation
Wickliffe, OH

Bo Tan (Secretary & PSC)
University of Kentucky
Lexington, KY

Surface Engineering Technical Committee
Harpal Singh (Chair)
Sentient Science Corporation
West Lafayette, IN

Suvrat Bhargava (Vice Chair)
TE Connectivity
Middletown, PA

Kora Farokhzadeh (PSC)
Bruker Nano Surfaces
San Jose, CA

Nikhil Murthy (Vice PSC)
U.S. Army Research Lab
Aberdeen Proving Ground, MD

Auezhan Amanov (Vice PSC)
Sun Moon University
Sunmoong-ro, Asan, South Korea

Synthetic Lubricants and Hydraulics Technical Committee
Robert Davidson (Chair)
Afton Chemical Corporation
Richmond, VA

Lauren Huffman (Vice Chair)
The Dow Chemical Company
Midland, MI

Ryan Fenton (PSC)
BASF Corporation
Tarrytown, NY

Patti Cusatis (Vice PSC)
BASF Corporation
Tarrytown, NY

Tribotesting Technical Committee
Gordon G. Krauss (Chair)
Harvey Mudd College
Claremont, CA

Jun Xiao (Vice Chair)
Rtec Instruments, Inc.
San Jose, CA

Oluwaseyi Ogunsona (PSC)
Shell Technology Center
Houston, TX

Pradeep Menezes (Vice PSC)
University of Nevada, Reno
Reno, NV

Wear Technical Committee
Arnab Ghosh (Chair)
EtaGen
Idaho Fall, ID

Chinpei Wang (Vice Chair)
Cummins, Inc.
Columbus, IN

Mathieu Renouf (Secretary)
CNRS
Université De Montpellier
Montpellier, France

Yan Zhou (PSC)
Houghton International
Oak Ridge, TN

Ali Beheshti (Vice PSC)
George Mason University
Fairfax, VA

Wind Energy Technical Committee
Manish Patel (Chair)
NanoTech Industrial Solutions
Lake Charles, LA

Ramesh Navaratnam (Vice Chair)
Patech Fine Chemicals
Taipei City, Taiwan

David Pack (PSC)
Pack Consulting Services
Katy, TX

Student Posters
Azhar Vellore (Chair)
University of California, Merced
Merced, CA