**3 – 3:30 pm | Break**

### 3:30 pm – 4:00 pm | Static Friction Phase Diagram for Hydrogels

**Rosa Espinosa-Marzal, Tooba Shoaib, University of Illinois at Urbana-Champaign, Urbana, IL**

Investigating the mechanisms underlying soft-matter lubrication is pivotal in understanding the functionalities and complexities of bio-lubrication. Hydrogels are key components in biological tribosystems, including the articular and ocular lubrication systems. We present studies of the static friction by colloidal probe microscopy under a wide range of hold times, loads, compositions, sliding velocities and temperatures. The results of this experimental study let us construct a static friction phase diagram that should be universal for gel-like materials, including the components of biological tribosystems.

### 4 – 4:30 pm | Effect of Shoe Outsole Backing on the Coefficient of Friction

**Arian Iraqi, Kurt Beschorner, University of Pittsburgh, Pittsburgh, PA**

Footwear with high coefficient of friction (COF) against lubricated floor may mitigate slipping accidents. COF varies considerably across and within shoes brands. This variation may be due to the supporting midsole that affects contact area. This study investigated the effect of this support system on the COF. Eleven pairs of shoes with outsole tread were tested on a ceramic and laminate tile with canola oil using a robotic shoe tribometer. The contact area of the tread was used as a metric to identify between outsole backings that either fully or partially brought treads into the contact region. The outsole designs were similar between shoes with good and poor support system. The shoes with the good support system had 15.5% and 26.7% higher COF on ceramic and laminate tile, respectively, compared to shoes with poor support. The suboptimal design of shoe outsole backing negatively impacts COF by reducing the contact area.

Session 8C • Music Row 5

## Power Generation II

**Session Chair:**
Matthew Hobbs, EPT, Calgary, Alberta, Canada

**Session Vice Chair:**
Salvatore Rea, LANXESS Corp., Perkasie, PA

### 1:30 – 2 pm | Fluorescence Spectroscopy for Online Condition Monitoring of Machinery Lubricants

**Pooja Suresh, Oleg Sosnovski, GasTOPS Ltd., Ottawa, Ontario, Canada**

Lubricating oils contain antioxidant additives in order to protect the base oil from thermal oxidation, thereby preventing loss of lubricity and formation of oxidation products and deposits such as sludge and varnish. Monitoring the antioxidant levels provides early indication of oxidative degradation of the lubricant, allowing for condition-based maintenance ahead of potential damage to the equipment. This translates to lower cost of maintenance and improved equipment availability, which are key drivers for the power generation industry. Current techniques for measuring antioxidant additive content require expensive laboratory-grade equipment, sample preparation, consumables and operation by trained personnel, making them unsuitable for online monitoring. This presentation discusses the application of an alternative technique using fluorescence spectroscopy technology that allows for real-time, online monitoring of antioxidant additive levels.

### 2 – 2:30 pm | Consequences of Incorrect EHC Fluid Maintenance and Opportunities for Improvement

**Peter Dufresne, EPT, Calgary, Alberta, Canada**

EHC systems are one of the most critical hydraulic applications in power plants operating steam turbines. Despite their importance, common fluid maintenance practices often fail to keep the EHC fluid in acceptable condition. With a number of recent catastrophic failures, OEMs and insurance companies have become increasingly interested in oil quality to confirm that sites are operating within established industry specifications. Site managers, therefore, need to appreciate the implications of poor fluid condition and the importance of effective EHC fluid maintenance. Only then can they ensure that effective maintenance programs are in place with sufficient budgets established. This paper will review common issues observed and review opportunities that leverage technology to improve fluid quality in EHC applications.

### 2:30 – 3 pm | Understanding EHC Fluid Condition Monitoring

**Ken Brown, Canoil, Mississauga, Ontario, Canada, Matthew Hobbs, EPT, Calgary, Alberta, Canada**

Triaryl phosphate esters have been used as fire-resistant hydraulic fluids in the control systems of steam turbines for over 50 years. These fluids significantly reduce the risk of fire but their maintenance has been problematic at some stations. This is a combination of many factors ranging from system design to failure to keep up to date with current operating procedures and best maintenance practices. Some turbine manufacturers have also been slow to revise fluid condition monitoring requirements including recommended tests and their limits. This presentation will cover a number of root causes of fluid degradation in addition to more recent test methods and fluid conditioning/remediation options.

**3 – 3:30 pm | Break**

### 3:30 – 4 pm | Evaluation of Turbine Oil Performance

**Jatin Mehta, Fluitec International, Bayonne, NJ**

Significant advancements have been made in the last two decades in turbine oil formulations, utilizing superior base stocks and antioxidant chemistries. The result is that turbine oils used in even the most thermally stressful gas turbines can provide long-life and good performance provided they are maintained properly. Turbine oils are evaluated using various oxidations test under oxidative, thermal, hydrolytic and catalytic conditions. The test methods used in the industry are D943, D4310, and D7873 in additional to OEM specific tests. The Turbine Oil Performance Prediction test helps to determine the long-term performance of the turbine oil in steam and gas turbines. This paper will assess the oxidation resisitance, antioxidants stability, varnish potential/sludge formation and various performacne properties of the turbine oils. This paper will describe the performance of commercially available oils using Turbine Performance Prediction Tests.

**4 – 4:30 pm | Power Generation Business Meeting**

Program Guide and Schedule


# 74th STLE Annual Meeting and Exhibition

MAY 19-23, 2019

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