

## ***Program***

# **Advances in Lubrication: Linking Molecular, Meso, and Machine Scales**

**January 8 – 13, 2012  
Puntarenas, Costa Rica**

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**Michael Chandross  
Sandia National Laboratories**

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**Sunday, January 9, 2012**

15:00 – 17:00	Registration (Roble 1)
17:00 – 18:00	Opening Reception (on the Pier by the sea)
18:00 – 19:30	Dinner

**NOTES**

- *Technical sessions will be held in Roble 2.*
- *Poster sessions will be held in Roble 1.*
- *All meals, except for the conference banquet, will be in the Calypso Restaurant. The banquet will be on the beach.*
- *The ECI office will be in the Barranca Room and there will be a Hospitality Desk outside the Robles rooms.*
- *Audiotaping, videotaping and photography of presentations are prohibited.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile phones to vibrate or off during technical sessions.*
- *Be sure to make any corrections to your name/contact information on the Master Participant List or confirm (by your initials) that the listing is correct. A corrected copy will be sent to all participants after the conference.*

**Monday, January 9, 2012**

08:00 – 09:00 Breakfast

09:00 – 09:20 Opening Remarks

09:20 – 10:20 **Opening Keynote**  
**MEASUREMENT AND CHARACTERIZATION OF “RESONANCE FRICTION” IN MODEL TRANSMISSION SYSTEMS AT HIGH SPEEDS (RPS) USING A MODIFIED SURFACE FORCES APPARATUS**  
Jacob Israelachvili, University of California Santa Barbara, USA

**Session: Lubrication Properties of Monolayers and Thin Films**

10:20 – 10:40 **FRICTION MEASUREMENTS WITH AFM AND SFA - A COMPARISON**  
Marina Ruths, University of Massachusetts Lowell, USA

10:40 – 11:20 Coffee Break

11:20 – 11:40 **CORRELATING CONTACT MECHANICS AND SOLUTION-PHASE THERMOYDNAMICS IN NANOSCALE MOLECULAR CONTACTS**  
Graham Leggett, University of Sheffield, United Kingdom

11:40 – 12:00 **STUDIES OF FRICTION AND WEAR IN NANOSCOPIC CONTACTS MODIFIED BY MIXED MONOLAYER FILMS**  
James Batteas, Texas A&M University, USA

12:00 – 12:20 **MICRO-SCALE OBSERVATION OF FRICTION CHARACTERISTIC OF ORIENTED ADSORBED ORGANIC MOLECULAR LAYER HAVING DIFFERENT NANO-SCALE MORPHOLOGY**  
Masabumi Masuko, Tokyo Institute of Technology, Japan

12:20 – 13:50 Lunch

13:50 – 14:30 **ENABLING MEMS LUBRICATION THROUGH FUNDAMENTAL UNDERSTANDING OF ENVIRONMENTAL EFFECTS ON ADHESION, FRICTION AND WEAR**  
Seong H. Kim, Pennsylvania State University, USA

14:30 – 14:50 **A MODEL FOR PREDICTING WALL SLIP OF ALKANES CONFINED BETWEEN SMOOTH SURFACES**  
Daniele Savio, Université de Lyon, France

14:50 – 15:30 Coffee Break

**Monday, January 9, 2012 (continued)**

15:30 – 15:50            **CONTROLLING ADHESION AND FRICTION USING NANOSTRUCTURED POLYMER LAYERS: ROLE OF POLYMER CONFORMATION AND IONIZATION**  
Suzanne Giasson, Université de Montréal, Canada

15:50 – 16:10            **BOUNDARY LUBRICATION IN SINGLE ASPERITY CONTACTS**  
Jason Bares, University of Pennsylvania, USA

**Session: Surface Effects**

16:10 – 16:50            **EXPLORING TRIBOLOGICAL PHENOMENA WITH SURFACE GRADIENTS**  
Nicholas Spencer, ETH Zurich, Switzerland

16:50 – 17:10            **SUPERLUBRICITY AT THE MACRO-SCALE: STATE OF THE ART**  
Jean-Michel Martin, Ecole Centrale de Lyon, France

18:00 – 20:00            Dinner

**Tuesday, January 10, 2012**

08:00 – 09:00 Breakfast

**Session: Fundamentals of Capillaries and Confined Fluids**

09:00 – 09:40 **FRICITION OF CONFINED LIQUIDS : A GENTLE PROBE FOR THE MECHANICS OF SOFT INTERFACES**

Elisabeth Charlaix, Universite Joseph Fourier Grenoble, France

09:40 – 10:00 **THE MERCURIAL NATURE OF WATER: A LUBRICANT, OR A FRICTION-INDUCING ADHESIVE?**

Robert Carpick, University of Pennsylvania, USA

10:00 – 10:20 **THE ROLE OF CAPILLARY CONDENSATION ON FRICTION PROPERTIES IN A SLIDING NANOMETER-SIZED CONTACT: AN EXPERIMENTAL APPROACH**

Pierre-Emmanuel Mazeran, UMR CNRS , France

10:20 – 10:40 **ON THE LUBRICATION MECHANISMS OF LAMELLAR FLUIDS**

Juliette Cayer-Barrioz, LTDS- CNRS-Ecole Centrale de Lyon, France

10:40 – 11:20 Coffee Break

11:20 – 12:00 **STRUCTURE MECHANICS AND DYNAMICS OF CONFINED FLUIDS**

Manfred Heuberger, Empa Advanced Fibers, Switzerland

12:00 – 12:20 **WETTING DYNAMICS OF A LUBRICATED TEXTURED CONTACT**

Juliette Cayer-Barrioz, LTDS- CNRS-Ecole Centrale de Lyon, France

12:20 – 13:50 Lunch

**Session: Biological Lubrication**

13:50 – 14:30 **LUBRICATION IN THE BLINK OF AN EYE!**

W. Gregory Sawyer, University of Florida, USA

14:30 – 14:50 **IN-SITU STUDIES OF CARTILAGE MICROTRIBOLOGY AS A NOVEL ROUTE TO STUDY OA**

David Burris, University of Delaware, USA

14:50 – 15:30 Coffee Break

**Tuesday, January 10, 2012 (continued)**

- 15:30 – 15:50      **LUBRICATION AND SQUEAK MECHANISMS OF CERAMIC HIP PROSTHESIS**  
Michele Ciavarella, TUHH, Germany
- 15:50 – 16:10      **SELF-ASSEMBLED LAYERS OF AMPHIPHILIC POLYMERS AND THEIR FRICTION PROPERTIES**  
Rowena Crockett, Empa, Switzerland
- 16:10 – 16:30      **UNDERSTANDING THE ROLE OF GLYCOPROTEINS IN LUBRICATION**  
Rosa Espinosa-Marzal, ETH Zurich, Switzerland
- Session: Friction and Wear of Soft Metals**
- 16:30 – 16:50      **TRIBOLOGICAL PROPERTIES OF THE (111) PREFERRED ORIENTED TIN COATING UNDER SOME WEARING CONDITIONS**  
Yoshio Haruyama, Toyama Prefectural University, Japan
- 16:50 – 17:10      **TOPOGRAPHY EVOLUTION DURING RUNNING-IN OF BINARY BRASSES UNDER BOUNDARY LUBRICATION**  
Martin Dienwiebel, Karlsruhe Institute of Technology, Germany
- 18:00 – 20:00      Dinner



**Wednesday, January 11, 2012**

08:00 – 09:00 Breakfast

**Session: Solid Lubricants: Fullerene-Like Systems**

09:00 – 09:40 **SCALING LAWS OF STRUCTURAL LUBRICITY: LINKING MESOSCOPIC FRICTION WITH ATOMIC PRINCIPLES**  
Udo Schwarz, Yale University, USA

09:40 – 10:00 **TRIBOLOGY OF SPUTTERED SELENIUM-BASED SOLID LUBRICANTS ALLOYED WITH CARBON**  
Fredrik Gustavsson, Uppsala University, Sweden

10:00 – 10:20 **FRICTION AND NANOMECHANICS OF SUPPORTED AND SUSPENDED SINGLE- AND MULTILAYER GRAPHENE**  
Zhao Deng, National Institute of Standards and Technology, USA

10:20 – 10:40 **THE POTENTIAL OF EPITAXIAL GRAPHENE AS SOLID LUBRICANT**  
Diego Marchetto, MicrotribologyCentre, Fraunhofer IWM, Germany

10:40 – 11:20 Coffee Break

11:20 – 11:40 **EFFECT OF SURFACE DEFECTS ON THE TRIBOLOGY OF WSC-CR SELF-LUBRICANT COATINGS**  
Tomas Polcar, Czech Technical University in Prague, Czech Republic

11:40 – 12:00 **FUNDAMENTAL STUDIES OF WEAR: EXPLAINING MACROSCOPIC EVENTS WITH FUNDAMENTAL INTERACTIONS**  
Brandon Krick, University of Florida, USA

12:00 – 13:10 Lunch

13:10 – 19:00 **Excursion – Crocodile Safari**

19:30 – 21:00 Dinner

**Thursday, January 12, 2012**

- 08:00 – 09:00            Breakfast
- Session: Solid Lubricants: From Carbon Films to Nanoparticle Additives**
- 09:00 – 09:40            **DESIGN AND SYNTHESIS OF NANOSTRUCTURED MATERIALS FOR FRICTION AND WEAR MITIGATION**  
Somuri Prasad, Sandia National Laboratories, USA
- 09:40 – 10:00            **EXPERIMENTAL AND COMPUTER MODELING OF LUBRICATION OF NANOCRYSTALLINE DIAMOND BY H/OH-CONTAINING MOLECULES**  
Maria Isabel De Barros Bouchet, Ecole Centrale de Lyon, France
- 10:00 – 10:20            **SURFACE MORPHOLOGY ANALYSIS OF AMORPHOUS CARBON FILMS USING MOLECULAR DYNAMICS**  
Shu Sawai, The University of Tokyo, Japan
- 10:20 – 10:40            **EFFECTS OF SURFACE TOPOGRAPHY ON THE TRIBOLOGICAL PROPERTIES OF NANOPARTICLE FILMS**  
Mustafa Akbulut, Texas A&M University, USA
- 10:40 – 11:20            Coffee Break
- 11:20 – 11:40            **BOUNDARY WEAR INDUCED BY THE FLOW OF CONCENTRATED SUSPENSIONS**  
Parisa Mirbod, The Benjamin Levich Institute, USA
- 11:40 – 12:20            **AB INITIO SIMULATIONS OF TRIBOCHEMICAL REACTIONS AT DIAMOND INTERFACES INTERACTING WITH WATER**  
Clelia Righi, CNR - Istituto Nanoscienze S3, Italy
- 12:20 – 13:50            **Lunch**
- 16:30 – 18:30            **Poster Session and Coffee**
- 19:00 – 19:30            Reception
- 19:30 – 21:00            Conference Banquet

**Friday, January 13, 2012**

08:00 – 09:00 Breakfast

**Session: Fundamentals of Automotive Lubrication**

09:00 – 09:40 **HOW CAN TRIBOCHEMISTRY MITIGATE WEAR: SOME EXAMPLES**  
Clotilde Minfray, Ecole Centrale de Lyon - LTDS, France

09:40 – 10:00 **AN APPROACH TO CONSECUTIVE EVALUATION OF MACRO/MICRO-SCALE FRICTION CHARACTERISTICS OF TRIBOFILMS DERIVED FROM ZNDTPS HAVING DIFFERENT ALKYL CHAIN LENGTH**  
Saiko Aoki, Tokyo Institute of Technology, Japan

10:00 – 10:20 **A REFLECTION X-RAY ABSORPTION NEAR EDGE STRUCTURE STUDY OF LOW FRICTION LUBRICANT FILMS FORMED ON STEEL AND DIAMOND LIKE CARBON (DLC) COATING**  
Ardian Morina, University of Leeds, United Kingdom

10:20 – 10:40 **REACTIVITY OF AN ASHLESS ANTI-WEAR ADDITIVE ON IRON SURFACES: A COMBINED IN SITU (ATR/FT-IR) AND EX SITU (XPS) INVESTIGATION**  
Filippo Mangolini, ETH Zurich, Switzerland

10:40 – 11:20 Coffee Break

11:20 – 12:20 **Closing Keynote**  
**SUSTAINABLE ELECTRICITY GENERATION - OPPORTUNITIES FOR TRIBOLOGISTS?**  
Andrew Jackson, University of Pennsylvania, USA

12:30 – 12:40 **Closing Remarks**

12:40 Lunch

### Poster List

1. **EFFECT OF THE RELATIVE ORIENTATION OF SLIDING AND CONFINING CRYSTALLINE SURFACES ON THE TRIBOLOGICAL BEHAVIOR OF THIN LUBRICATING FILMS**  
Suzanne Giasson, Université de Montréal, Canada
2. **DETERMINATION OF INTERLAYER BINDING ENERGY OF GRAPHITE BY FRICTION FORCE MICROSCOPY**  
Zhao Deng, University of Maryland, USA
3. **IMPROVEMENT OF ANTI-CORROSION PROPERTIES OF MG ALLOY BY OXYGEN-PLASMA TREATMENT AND DLC COATINGS**  
Junho Choi, The University of Tokyo, Japan
4. **THE TRIBOLOGICAL BEHAVIOUR OF HVOF SPRAYED COMPOSITE COATINGS UNDER SLIDING CONDITIONS**  
Monika Madej, Kielce University of Technology, Poland
5. **THE EFFECT OF THE TIN INTERLAYER ON THE TRIBOLOGICAL BEHAVIOUR OF DLC COATINGS**  
Dariusz Ozimina, Kielce University of Technology, Poland
6. **THE TRIBOLOGICAL BEHAVIOUR OF DIAMOND-LIKE CARBON COATINGS UNDER DRY AND WET FRICTION CONDITIONS**  
Monika Madej, Kielce University of Technology, Poland
7. **SPM CIRCULAR MODE: APPLICATIONS FOR FAST AND ACCURATE MEASUREMENTS OF FRICTION, WEAR AND ADHESION**  
Olivier Noel, UMR CNRS 6087, France
8. **EXTENDING HYDRODYNAMIC LUBRICATION AND ESTABLISHING A NEW LOW-FRICTION REGIME BY MEANS OF OIL-COMPATIBLE, SURFACE-GRAFTED POLYMER BRUSHES**  
Robert M. Bielecki, ETH Zürich, Switzerland