TECHNICAL SESSION

Tuesday, September 10TH

TU1-ET2 Tribology for Energy Conservation II

Room 1 8:30 – 10:30

Chair: Zygmunt Rymuza, *Warsaw University of Technology, Poland*

649 – *Keynote*: MEMS/NEMS and BioMEMS/BioNEMS Materials and Devices and Biomimetics

Bharat Bhushan, *The Ohio State University, Columbus, OH, United States*

1111: Influence of Ethanol on Piston Assembly Lubricant Composition and Friction in an Automotive Gasoline Engine

Martin Priest, Prashan R. De Silva, Richard C. Coy, *University of Leeds, Leeds, United Kingdom*, Robert I Taylor, *Shell Research Ltd, Chester, United Kingdom*

127: Global Impact of Friction on Energy Consumption, Environment and Economy

Kenneth Holmberg, Peter Andersson, Roope Siilasto, *VTT Technical Research Centre of Finland, Espoo, Finland*, Ali Erdemir, *Argonne National Laboratory, Argonne, IL, United States*

245: CAE Simulation of IC Engine Friction

Ming-Tang Ma, Jianhong Li, Fuqiang Xu, *AVL List Technical Center Co. LTD, Shanghai, China*

348: Controllable Superlubricity of Glycerol Solution via Environment Humidity

Zhe Chen, Liran Ma, Jinjin Li, Dan Guo, Yuhong Liu, Jianbin Luo, *Tsinghua University, Beijing, China*

137: Atomic-Scale Friction and Energy Dissipation in Multilayer Graphene

Hui Wang, Liang Xu, Yuan-zhong Hu, *Tsinghua University, Beijing, China*

TU2-ET3 Environmentally Friendly Tribology

Room 1 11:00 – 13:00

Chair: Wilfried Bartz, *Tribology and Lubrication Engineering, Denkerdorf, Germany*

160: Tribochemistry of Stearic Acid and its Lubricating Behavior Sensitivity to Base Oil

Christine Matta, Sophie Loehle, Clotilde Minfray, Thierry Le Mogne, Jean-Michel Martin, *École Centrale de Lyon, Écully, France*, Raphaele Iovine, Carine Pizard, *TOTAL, Solaize Research Center, Solaize, France*, Akira Miyamoto, *Tohoku University, Sendai, Japan*

991: Low Friction System Using Carbon Fiber Reinforced Plastics

Wataru Sato, Takanori Takeno, Koshi Adachi, *Tohoku University, Sendai, Japan*

1096: Nanointerface for Superior Tribological Properties of Silicon Carbide in Water

Koshi Adachi, *Tohoku University, Sendai, Japan*

995: Surface Texture to Improve Friction Properties by Forming Smoother Surface on Silicon-based Ceramics in Water

Yuta Nishikawa, Koji Noguchi, Takanori Takeno, Koshi Adachi, *Tohoku University, Sendai, Japan*

162: Friction Based Renewable Fuel Technology

Evgeny Deulin, *Bauman Moscow State Technical University, Moscow, Russian Federation*

201: Hydration Lubrication at Solid Surfaces

Liran Ma, *Tsinghua University, Beijing, China*, Anastasia Gaisinskaya, Nir Kampf, Jacob Klein, *Weizmann Institute, Rehovot, Israel*

TU4-BT5 Artificial Joints: Surfaces, Structure and Coatings

Room 2 16:30 – 18:50

Chair: Teruo Murakami, *Kyushu University, Fukuoka, Japan*

607: The Effects of DLC Coatings on Reciprocating Sliding Conditions and Wear of CoCrMo Alloy

Konttinen T. Yrjö, Tiainen Velli-Matti, *ORTON Research Institute, Helsinki, Finland*, Eva Zdravecká, Miroslav Ondáč, *Technical University in Košice, Košice, Slovakia*, Marian Marton, Marian Vojs, Marian Veselý, *Slovak University of Technology, Bratislava, Slovakia*

1235: Surface Texturing in Artificial Hip Joints for Friction and Wear Control I: Experiments

Patrick S.M. Dougherty, Gagan Srivastava, Recep Onler, Burak Ozdoganlar, C. Fred Higgs, *Carnegie Mellon University, Pittsburgh, PA, United States*

1237: Surface Texturing in Artificial Hip Joints for Friction and Wear Control II: Modeling

Gagan Srivastava, Patrick S.M. Dougherty, C. Fred Higgs, *Carnegie Mellon University, Pittsburgh, PA, United States*

303: Tribological and Bio-compatible Properties of Combined Micro and Nano Hierarchical Texturing Co-Cr-Mo Surface

Liguo Qin, Bin Liu, Ping Lin, Hui Zhang, Guangneng Dong, *Xi'an Jiaotong University, Xi'an, China*

439: To Increase the Hydrophobicity, Non-stickiness and Wear Resistance of DLC Surface by Surface Texturing Using Laser Ablation Process

P.W. Shum, Z.F. Zhou, K.Y. Li, *City University of Hong Kong, Hong Kong*

447: Moved to FR2-FW16

309: Behavior of Adsorbed Albumin Film on CoCrMo Alloy under In-situ Observation

Kazuhiro Nakashima, Yoshinori Sawae, Teruo Murakami, *Kyushu University, Fukuoka, Japan*, Stefano Mischler, *École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

TU1-ST3 Coatings 2

Room 3 8:30 – 10:30

Chair: Jose D. Biasoli de Mello, *Universidade Federal de Uberlândia, MG, Brazil*

144: Effect of Intercalated Compounds into MoS2 Matrices on Mechanical and Tribological Properties

Nathalie M. Renevier, *University of Central Lancashire, Preston, United Kingdom*, Xiaoling Li, *University of Birmingham, Birmingham, United Kingdom*, Xiaoling Zhen-Teer, *Miba, Droitwich, United Kingdom*

149: Static Friction of Thin Film Coatings and Solid Lubricants

Lauri Kilpi, Peter Andersson, Timo J. Hakala, Helena Ronkainen, *VTT Technical Research Centre of Finland, Espoo, Finland*, Sanna Tervakangas, *DIARC-Technology Inc., Espoo, Finland*, Jussi Oksanen, Jari Koskinen, *Aalto University, Espoo, Finland*

190: Friction Characteristics between CVD Diamond Film and Stainless Steel under Un-lubricated Vacuum Condition

Kenta Nakamura, Kenji Tamaoki, *Tokyo Metropolitan Industrial Technology Research Institute, Tokyo, Japan*, Kazutaka Kanda, *Fukui University of Technology, Fukui, Japan*

195: High Temperature Tribological Behavior of ta-C and a-C:H Coatings

Xingrui Deng, Hiroyuki Kousaka, Takayuki Tokoroyama, Noritsugu Umehara, *Nagoya University, Nagoya, Japan*

382: Assessment of the Thermo-Oxidative Stability of Silicon Oxide-Doped Diamond-Like Carbon by In Situ Environmental X-ray Photoelectron Spectroscopy

Filippo Mangolini, James Hilbert, Jennifer R. Lukes, Robert W. Carpick, *University of Pennsylvania, Philadelphia, PA, United States*

718: Zirconium Carbonitrides for Tribological Applications

Javier Barriga, Unai R. de Gopegui, Cristina Zubizzareta, *IK4-Tekniker, Eibar, Spain*

TU1-ST4 Contact Mechanics 2

Room 4 8:30 – 10:30

Chair: Mike Khonsari, *Louisiana State University, Baton Rouge, LA, USA*

136: Deterministic Analysis of Contacts - From Roughness to Inhomogeneity

Yuan-zhong Hu, *Tsinghua University, Beijing, China*

23: Method of Reduction of Dimensionality. Foundations and Case Studies: Rolling Noise, Friction of Elastomers and Ultrasonic Actuators

Valentin L. Popov, Mikhail Popov, Qiang Li, *Berlin University of Technology, Berlin, Germany*, Andrey Dimaki, *Russian Academy of Sciences, Tomsk, Russian Federation*, Ha X. Nguyen, *University of Oldenburg, Oldemburg, Germany*, Elena Teidelt, *Berlin University of Technology, Berlin, Germany*

821: The Multifractal Analysis of the Fatigue Fracture under the Process of Friction

Arif M. Pashayev, Ahad Kh. Janahmadov, Natig G. Javadov, M.Y. Javadov, *Azerbaijan Engineering Academy, Baku, Azerbaijan*

909: A Numerical and Experimental Model for the Tribological Design of a Variable Displacement Oil Pump

Andrea Barbetti, Maurizio Moriglia, Matteo Gasperini, Nicola Novi, Raffaele Squarcini, *Pierburg Pump Technology SpA, Livorno, Italy*

943: Modeling of Friction in Contact of Viscoelastic Bodies with Textured Surfaces

Irina Goryacheva, *Russian Academy of Sciences, Moscow, Russian Federation*

TU1-LF2 Boundary and Thin Film Lubrication

Room 7 8:30 – 10:30

Chair: Philippa Cann, *Imperial College London, United Kingdom*

1242: NEMD Simulations of Confined Liquids under Pressure and Shear

Chiara Gattinoni, *Imperial College London, London, United Kingdom*, Chris Lorenz, *King's College London, London, United Kingdom*, David M. Heyes, Daniele Dini, *Imperial College London, London, United Kingdom*

1065: De-mystifying the Load-independent Derjaguin-offset in Various Boundary-Lubricated Nanosystems

Stefan Eder, András Vernes, Georg Vorlaufer, *AC²T Research GmbH, Wiener Neustadt, Austria*, Gerhard Betz, *Vienna University of Technology, Vienna, Austria*

644: Lubricant Flow-reflow on the Air Bearing Surface in a Hard Disk Drive

Alejandro Rodriguez Mendez, David B. Bogy, *University of California Berkeley, Berkeley, CA, United States*

630: Probing the Molecularly-thin Lubricated Disk Surface Using Thermal Fly-height Control Sliders to Study Recording Head Wear

Yung-Kan Chen, *University of California Berkeley, Berkeley, CA, United States*, Aravind N. Murthy, Remmelt Pit, *HGST a Western Digital Company, San Jose, CA, United States*, David B. Bogy, *University of California Berkeley, Berkeley, CA, United States*

965: A Novel Approach to Evaluate a Solid-liquid Interfacial Slip in Lubricated Contacts of DLC

Marko Polajnar, Mitjan Kalin, *University of Ljubljana, Ljubljana, Slovenia*

1214: In Situ Raman Micro Spectrometry Investigation of Boundary Dynamic Tribologic Contacts

Audrey Molza, A. Sauldubois, P. Bilas, Yves Bercion, J.L. Mansot, *Université des Antilles et de la Guyane, Pointe à Pitre, France*

TU2-LF3 Starved and cavitated lubrication

Room 7 11:00 – 13:00

Chair: Ashlie Martini, *University of California, Merced, CA, USA*

733: A Model Considering non-fully Filled Gaps for Systems under Starved Lubrication

Michael Müller, Georg-Peter Ostermeyer, Florian Bubser, *Braunschweig University of Technology, Braunschweig, Germany*

768: Occurrence of Starvation: Stationary and Transient Approaches

Florian Brémond, Denis Mazuyer, Juliette Cayer-Barrioz, *École Centrale de Lyon, Écully, France*

972: An Analysis of Starved EHL Point Contacts with Reflow

Takashi Nogi, *Japan Aerospace Exploration Agency, Chofu, Japan*

129: CFD Modelling of Cavitation Phenomenon in Piston Ring/Cylinder Liner Conjunction

Hamed Shahmohamadi, Ramin Rahmani, Homer Rahnejat, Colin Garner, *Loughborough University, Loughborough, United Kingdom*

831: Preliminary Investigation of the Impact Pressure from a Single Cavitation Water Bubble on a Solid Boundary Wall, Using Experimental, Analytical and Numerical Methods

Iakovos Tzanakis, *Bournemouth University, Bournemouth, United Kingdom*, Anastasios Georgoulas, Dimitrios Fytanidis, *Democritus University of Thrace, Xanthi, Greece*, Mark Hadfield, *Bournemouth University, Bournemouth, United Kingdom*, Nikolaos Kotsovinos, *Democritus University of Thrace, Xanthi, Greece*

1212: Surface Roughness Effects in Starved EHL Contacts

David Kostal, Petr Sperka, Ivan Krupka, Martin Hartl, *Brno University of Technology, Brno, Czech Republic*

TU3-VI4 Nano-Particles as Lubricant Additive

Room 8 14:00 – 16:00

Chair: Wilfried Bartz, *Tribology and Lubrication Engineering, Denkerdorf, Germany*

328: Nanomaterials in Lubricants: Myths and Facts

Boris Zhmud, *Applied Nano Surfaces Sweden AB, Uppsala, Sweden*, Bogdan Pasalskiy, *Kyiv National University of Trade and Economics, Kyiv, Ukraine*

1039: Investigation on Tribological Properties of Nanolubricants with Carbon Nano-horns as Additives at Different Temperatures

Valentina Zin, Filippo Agresti, Simona Barison, Laura Colla, Cesare Pagura, Monica Fabrizio, *National Research Council of Italy, Padova, Italy*

112: Use of Carbon Nano Fiber (CNF) as a Potential Additive for Enhanced Tribological Properties

Paul Mathew, Mohandas Nayak, *John F. Welch Technology Centre, Bangalore, India*, Mallikarjun Karadge, *GE Global Research Centre, Niskayuna, NY, United States*, K. Anand, *John F. Welch Technology Centre, Bangalore, India*

46: Withdrawn

294: Investigation of Fullerence C60 Influence on Tribotechnical and Dynamical Mechanical Properties of Composite Materials Based on Phenilon

Alexander I. Burya, *Ukrainian Technological Academy, Dnepropetrovsk, Ukraine*, O.Yu. Kuznetsova, A.D. Derkach, *Dnepropetrovsk State Agrarian University, Dnepropetrovsk, Ukraine*, V.P. Sergiyenko, S.N. Bukharov, *National Academy of Science of Belarus, Gomel, Belarus*

1069: Improvement of Tribological Properties of a Lubricant Engine Oil by Addition of Cu, TiO2 Nanoparticles and Carbon Nano-horns

Valentina Zin, Filippo Agresti, Simona Barison, Laura Colla, E. Mercadelli, Monica Fabrizio, *National Research Council, Padova, Italy*

694: Friction Characteristic of Palm Olein as Lubricant in Plane Strain Extrusion Process

Samion Syahrullail, *Universiti Teknologi Malaysia, Skudai, Malaysia*, Shunpei Kamitani, Kenji Nakanishi, *Kagoshima University, Kagoshima, Japan*

TU1-BE2 Rolling Bearings 1

Room 9 8:30 – 10:30

Chair: Spiridon Creţu, *Technical University "Gheorghe Asachi", Iaşi, Romania*

592: Fatigue Life Extension of Rolling Element Bearings by Residual Stresses Induced Through Surface Machining

Timo Neubauer, Gerhard Poll, Berend Denkena, Oliver Maiß, *Leibniz Universität Hannover, Hannover, Germany*

625: CFD Analysis of Drag Loss in High Speed Bearings

Jun Wang, *SKF Engineering & Research Centre, Nieuwegein, Netherlands*

548: Inner Secrets of the Tapered Roller Bearing

Henrik Strand, *Volvo Construction Equipment AB, Eskilstuna, Sweden*

1151: A Fully-coupled Finite Volume Solver for Elasto-hydrodynamic Lubrication Problems with Particular Application to Rolling Element Bearings

Alireza Hajishafiee, Daniele Dini, Amir Kadiric, Stathis Ioannides, *Imperial College London, London, United Kingdom*

265: Influence of Grease Bleed Oil on Ball-on-disc Lubrication

Tiago Cousseau, *Universidade do Porto, Porto, Portugal*, Markus Björling, *Luleå University of Technology, Luleå, Sweden*, Beatriz Graça, *Universidade do Porto, Porto, Portugal*, Armando Campos, *Instituto Superior de Engenharia do Porto, Porto, Portugal*, Jorge Seabra, *Universidade do Porto, Porto, Portugal*, Roland Larsson, *Luleå University of Technology, Luleå, Sweden*

448: Analysis of Sliding Friction Moment in Ball-Cage Contact of Instrument Mini-ball Bearing Undergoing Oscillatory Motion

Shaona Jiang, Xiaoyang Chen, *Shanghai University, Shanghai, China*, Jiaming Gu, *Shanghai Tian An Bearing Co. Ltd, Shanghai, China*

TU3-EC4 Transmissions 3

Room 10 14:00 – 16:00

Chair: Johann Stemplinger, *Technische Universität München, Germany*

788: Improvement of Lubrication Life of Strain Wave Gearing for Space Applications by Surface Carburizing

Kazuaki Maniwa, Shingo Obara, *Japan Aerospace Exploration Agency, Tsukuba, Japan*, Jun'ichi Kurogi, Satoru Kanai, Keiji Ueura, *Harmonic Drive Systems Inc., Azumino, Japan*

1059: Influence of Dry Friction on the Irreversibility of Cycloidal Speed Reducer

Andrea Tonoli, Nicola Amati, Fabrizio Impinna, Joaquim Girardello Detoni, Sanjarbek Ruzimov, Enrico Gasparin, Kamaliddin Abdivakhidov, *Politecnico di Torino, Torino, Italy*

1169: Diagnostics and Prognostics Algorithms for an Aircraft Accessory Gearbox

Aida Rezaei, *Queen's University, Kingston, Canada*, Azzedine Dadouche, *National Research Council Canada, Ottawa, Canada*

1246: Modelling Lubrication in Gear Pairs

Marco Barbieri, Francesco Pellicano, *Università di Modena e Reggio Emilia, Modena, Italy*

1289: Load Independent Power Losses of Ordinary Gears: Numerical and Experimental Analysis

Franco Concli, Carlo Gorla, *Politecnico di Milano, Milano, Italy*, Karsten Stahl, Bernd-Robert Höhn, Klaus Michaelis, Hansjörg Schultheiß, Johann-Paul Stemplinger, *FZG Gear Research Center, Garching bei München, Germany*

525: Experimental Test of Dynamic Characteristics of Tilting Pad Thrust Bearing

Qing Ge, *Shanghai Electric Power Generation Equipment Co., Shanghai, China*, Bing Wu, Chunyang Zang, Jian Jin, Xiaojing Wang, *Shanghai University, Shanghai, China*

Wednesday, September 11TH

WE2-FW7 Mechanisms of Wear 1

Room 5 11:00 – 13:00

Chair: Waldemar Tuszynski, *Institute for Sustainable Technologies, Radom, Poland*

1307: New Analytical Limiting Friction Laws and Universal Tribological Constants of Dry Static and Kinetic Friction

Vladimir I. Pozhbelko, *South-Ural State University, Chelyabinsk, Russian Federation*

30: Effects of Slip and Twinning Deformation Systems upon Friction and Wear at Single Crystal Faces of Calcite(CaCO3)

Hitoshi Shindo, Mai Kobayashi, *Chuo University, Tokyo, Japan*, Kaori Niki, *Chiba University, Chiba, Japan*

44: Is There a Third Abrasive Wear Mode?

Ronaldo Câmara Cozza, Cláudio Geraldo Schön, *Universidade de São Paulo – Escola Politécnica, São Paulo, SP, Brazil*

62: Effect of Sliding Speed and Humidity on the Nanowear of Si/SiO2 Pair

Linmao Qian, *Southwest Jiaotong University, Chengdu, China*, Seong H. Kim, *Pennsylvania State University, University Park, PA, United States*, Lei Chen, Xiaodong Wang, Binjun Yu, Zhongrong Zhou, *Southwest Jiaotong University, Chengdu, China*

65: Generation of Ammonia During Wear Processes in Adhesive Wear

Hiroshi Mishina, Kentaro Chiba, *Chiba University, Chiba, Japan*, Alan Hase, *Saitama Institute of Technology, Fukaya, Japan*

81: Evaluation and Prediction of the Effect of Load Frequency on the Wear Properties of pre-cracked Nylon 66

Ahmed Abdelbary, Mohamed N. Abouelwafa, Ibraheem M. El Ffahham, Alaa H. Hamdy, *Alexandria University, Alexandria, Egypt*

WE4-JM1 Passive and Active Frictional Joints

Room 8 16:10 – 17:30

Chair: Muzio Gola, *Politecnico di Torino, Italy*

1165: Withdrawn

34: Measurement and Modelling of Interface Stiffness in Frictional Contacts

David Nowell, Daniel Mulvihill, *University of Oxford, Oxford, United Kingdom*, Henry Brunskill, *University of Sheffield, Sheffield, United Kingdom*, Mehmet Kartal, *University of Oxford, Oxford, United Kingdom*, Rob Dwyer-Joyce, *University of Sheffield, Sheffield, United Kingdom*

669: Assessment on Control Strategies of Friction Dampers

Marcelo Braga dos Santos, Francisco P. Lepore Neto, *Federal University of Uberlândia, Uberlândia, Brazil*

3: Semi-active Control of Structures Assembled by Bolted Joints
Lothar Gaul, *University of Stuttgart, Stuttgart, Germany*, Jens Becker, *Moog GmbH, Böblingen, Germany*

253: Development of a Coupling Metric to Assess the Shakedown Limits for a Contact Interface
Matthew R. Brake, *Sandia National Laboratories, Albuquerque, NM, United States*, Robert R. Flicek, David A. Hills, Anothai Thaitirarot, *University of Oxford, Oxford, United Kingdom*

Thursday, September 12TH

TH2-BT10 Tactile Tribology II

Room 2 11:00 – 13:00
Chair: Yu Yan, *University of Science and Technology Beijing, China*

410: On the Probability of Skin Damage due to Frictional Heating in Real Asperity Contacts
Emile van der Heide, Marc Masen, Sheng Zhang, Julien van Kuilenburg, *University of Twente, Enschede, Netherlands*, Edwin Gelinck, *TNO, Netherlands*

826: Friction of Various Polymer Textures against Skin-like Materials
Matthew A. Darden, Christian J. Schwartz, *Iowa State University, Ames, IA, United States*

1167: Dynamic Modelling of Finger-surface Contacts
Ramona Fagiani, *Università degli studi di Parma, Parma, Italy*, Marco Barbieri, *Università di Modena e Reggio Emilia, Modena, Italy*

582: Tribology, Texture and Touch
Lisa Skedung, Mark W. Rutland, *SP Technical Research Institute of Sweden, Stockholm, Sweden*, Martin Arvidsson, Birgitta Berglund, *Stockholm University, Stockholm, Sweden*, Jun Chung Young, Christopher M. Stafford, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

1238: Tribological Approach of the Contact Human Skin Synthetic Fabric
Jérômre Cavoret, Benyebka Bou-Saïd, Fabrice Ville, *INSA-Lyon, Villeurbanne, France*

333: Conformation and Formation Mechanism of Durable Self-assembled HDPA Bilayers on Titanium Alloy Substrate
Caixia Zhang, Yuhong Liu, Pengxiao Liu, *State Key Laboratory of Tribology, Beijing, China*, Shizhu Wen, *State Key Laboratory of Tribology, Beijing, China*

TH2-ST20 Coatings 7

Room 3 11:00 – 13:00
Chair: Filippo Mangolini, *University of Pennsylvania, Philadelphia, PA, USA*

165: Mechanical and Tribological Behaviour of Thin Ceramic Coatings Deposited on PET and PEN Substrates
Abdul Shah, Nathalie Renevier, Ian Sherrington, *University of Central Lancashire, Preston, United Kingdom*, David Wickens, *Manchester Metropolitan University, Manchester, United Kingdom*, Peter Kelly, *Manchester Metropolitan University, Manchester, United Kingdom*

1295: Comparative Analysis of the Tribological Bbehaviour of HVOF- and HVAF-sprayed Cermet Coatings

Lutz-Michael Berger, *Fraunhofer-Institut für Werkstoff- und Strahltechnik (IWS), Dresden, Germany*, Giovanni Bolelli, Tim Börner, *Università degli Studi di Modena e Reggio Emilia, Modena, Italy*, Heli Koivuluoto, *Tampere University of Technology, Tampere, Finland*, Luca Lusvarghi, *Università degli Studi di Modena e Reggio Emilia, Modena, Italy*, Christophe Lyphout, Nicolaie Markocsan, Per Nylén, *University West, Trollhättan, Sweden*, Petri Vuoristo, *Tampere University of Technology, Tampere, Finland*, S. Zimmermann, *H.C. Starck GmbH, Laufenburg, Germany*

547: Tribology Behavior under Different Working Conditions and Friction Heat Effect on Abradability of Abradable Seal Coating

Shu Li, Deli Duan, Siyang Gao, *Chinese Academy of Sciences, Shenyang, China*

981: Effectiveness of Hard Coatings for Vacuum Lubrication by Space Liquid Lubricants

Masanori Iwaki, *Japan Aerospace Exploration Agency, Tsukuba, Japan*, Takanori Takeno, Hiroyuki Miki, Toshiyuki Takagi, *Tohoku University, Sendai, Japan*

1207: Tribological Behaviour of Ferrous-based APS Coatings under Dry Sliding Conditions

Aleksandar Vencl, *University of Belgrade, Belgrade, Serbia*

499: Study on the Residual Stress of Si Doped CNx Films

Tianmin Shao, Shiyu Hu, Xiao Huang, Hui Wang, *Tsinghua University, Beijing, China*

TH3-ST22 Coatings 8

Room 3 14:00 – 16:00

Chair: Josef Brenner, *AC²T Research GmbH, Wiener Neustadt, Austria*

56: On the Weakening Effect in a Spherical Contact with Thin Hard Coatings

R. Goltsberg, I. Etsion, *Technion, Haifa, Israel*

666: Effect of Substrate Surface Finish/Coating Architecture on the Sliding Wear of Multi-layered/Gradient NCrAlSi Coatings

Silviu Victor, Carlos A.S. de Oliveira, *Universidade Federal de Santa Catarina, Florianópolis, Brazil*, Mario M. de Oliveira, Jose D. Biasoli de Mello, *Universidade Federal de Uberlândia, Uberlândia, Brazil*

885: Smart Coatings and Green Tribology

Emilia Assenova, *Society of Bulgarian Tribologists, Sofia, Bulgaria*, Gottlieb Polzer, *Tribology Unit, Schönfels, Germany*, Dr. Tsermaa, *University of Ulan Bator, Ulan Bator, Mongolia*, Mara Kandeva, *Technical University - Sofia, Sofia, Bulgaria*

1029: Study on Anti-Micropitting Protective Mechanisms of Black Oxide Coating

Victor Brizmer, Andriy Rychahivskyy, Bo Han, *SKF Engineering & Research Centre, Nieuwegein, Netherlands*

1080: PVD Refractory Metal Based Coatings for Tribological Applications

Silvia M. Deambrosis, Enrico Miorin, Francesco Montagner, Valentina Zin, *CNR-Institute for Energetics and Interphases, Padova*, Italy, Marco Sebastiani, *University "Roma Tre", Roma, Italy*, D. Dellasega, M. Passoni, *Politecnico di Milano, Milano, Italy*, Edoardo Bemporad, *University "Roma Tre", Roma, Italy*, Monica Fabrizio, *CNR-Institute for Energetics and Interphases, Padova, Italy*

1200: The Effect of Applied Aoad on Tribological Behaviour of PVD-CrN Coatings

Candida Petrogalli, Lorenzo Montesano, Marcello Gelfi, Giovina M. La Vecchia, *University of Brescia, Brescia, Italy*, Paolo Colombi, *CSMT Gestione S.c.a.r.l., Brescia, Italy*

TH3-ST23 Texturing 3

Room 4 14:00 – 16:00

Chair: Giuseppe Carbone, *Politecnico di Bari, Italy*

191: Investigation on the Load Carrying Capacity of Textured Surface Based on Interferometry Measurements

Enyang Zhang, Bo Zhang, Wei Huang, Xiaolei Wang, *Nanjing University of Aeronautics & Astronautics, Nanjing, China*

258: Numerical Analysis of Global and Local Effects of Textures on the Hydrodynamic Performance of a Mechanical Seal

Mohand Adjemout, Noël Brunetière, Jean Bouyer, *CNRS-Université de Poitiers, Chasseneuil, France*

638: CFD Investigation of Influence of Surface Texturing on the Wedge Effect

Yasutsugu Oshima, Akira Nakano, Ryo Tsuboi, Shinya Sasaki, *Tokyo University of Science, Tokyo, Japan*

810: Improving Piston-liner Performance thru Surface Texturation: Coupling Measurement and Theoretical Study to Optimize Friction and Oil Consumption

Pierre Charles, Gabriel Cavallaro, *PSA Peugeot Citroën, La Garenne-Colombes, France*

873: Investigation of Tribological Properties and Vortex Structures in the Texture by using Computational Fluid Dynamics

Ryo Tsuboi, Yasutsugu Oshima, Akira Nakano, Shinya Sasaki, *Tokyo University of Science, Tokyo, Japan*

1159: A Numerical and Experimental Approach in Understanding the Performance of Textured Surfaces in Sliding Contacts

Nicholas J. Morris, Miguel De La Cruz, Ramin Rahmani, Michael Leighton, Homer Rahnejat, Paul King, *Loughborough University, Loughborough, United Kingdom*

TH2-BE11 Gas Bearings 2

Room 9 11:00 – 13:00

Chair: Jianjun Du, *Harbin Institute of Technology, Shenzhen, China*

931: Impact Characteristics of Optimized Hydrodynamic Thrust Air Bearing

Masayuki Ochiai, Yuta Sunami, Hayato Sasaki, Hiromu Hashimoto, *Tokai University, Hiratsuka, Japan*

1016: Theoretical and Experimental Analysis of the Pneumatic Hammer Instability in an Aerostatic Bearing

Mihai Arghir, Franck Balducchi, Amine Hassini, *Université de Poitiers, Futuroscope Chasseneuil, France*, Sébastien Guingo, *SNECMA - Division Moteurs Spatiaux, Vernon, France, Emelyne Renard, CNES, Paris, France*

1110: Static Study of the Arc Effect on Annular-Thrust Aerostatic Porous Bearings

Pyung Hwang, *Yeungnam University, Gyeongsan, Republic of Korea*, Polina Khan, *Kamchatka State Technical University, Petropavlovsk-Kamchatski, Russian Federation*

523: Modeling Method of Aeroengine Bearing Chamber Oil/Air Two-phase Flow

Hengchao Sun, Guoding Chen, Tao Wang, *Northwestern Polytechnical University, Xi'an, China*

TH2-MF3 Metal forming

Room 7 11:00 – 13:00

Chair: Jose Daniel Biasoli de Mello, *Universidade Federal de Uberlândia, MG, Brazil*

29: A Study of Shear Friction Factor in FSP/FSW for Developing a Finite Element Model and Its Importance in the Context of Formation of Defect Free and Defective Weld

Malik Vinayak, K. M. Midhun, Satish V. Kailas, *Indian Institute of Science, Bangalore, Bangalore, India*

39: A Novel Sensor for Lubrication and Contact Measurement in Metal Rolling

Rob S. Dwyer-Joyce, Andy K. Hunter, *University of Sheffield, Sheffield, United Kingdom*

509: Friction Modeling for Sheet Metal Forming Processes under Loading and Reloading Contact Conditions

Dinesh K. Karupannasamy, *Materials innovation institute (M2i), Delft, Netherlands*, Matthijn B. de Rooij, Dirk J. Schipper, *University of Twente, Enschede, Netherlands*

694: Moved to TU3-VI4

727: New Approaches for Lubrication in Steel Cold Rolling

Tilo Reichardt, *VDEh-Betriebsforschungsinstitut GmbH, Düsseldorf, Germany*, Martin Raulf, *ThyssenKrupp Steel AG, Duisburg, Germany*, Michael Herrmann, *Chemische Werke Kluthe GmbH, Heidelberg, Germany*, Cornelia Mömming, *Hydro Aluminium Rolled products GmbH, Bonn, Germany*, Rolf Luther, *Fuchs Europe Schmierstoffe GmbH, Mannheim, Germany*

1210: Wear Debris Generation During Cold Rolling Process

Willian Labiapari, Cláudio M. de Alcântara, *Aperam South America, Timóteo, MG, Brazil*, Henara L. Costa, Jose Daniel Biasoli De Mello, *Universidade Federal de Uberlândia, Uberlândia, MG, Brazil*

TH4-JM2 Tribology and Wear within Frictional Joints

Room 8 16:30 – 18:50

Chair: Matthew R. Brake, *Sandia National Laboratories, Albuquerque, NM, USA*

911: Research on the Tribological Reliability of the Piezoelectric Contact

Juozas Padgurskas, Raimundas Rukuiža, *Aleksandras Stulginskis University, Kaunas, Lithuania*, Ramutis Bansevičius, *Kaunas University of Technology, Kaunas, Lithuania*, Audrius Žunda, *Aleksandras Stulginskis University, Kaunas, Lithuania*, Valentin Mihailov, *Institute of Applied Physics, Chisinau, Moldova*

436: High Temperature Comparative Tribological Study of CoCrTaAlY Coatings Reinforced with Different Percentages of Alumina

Daniele Botto, Mario Lavella, Muzio Gola, Paolo Zanon, *Politecnico di Torino, Torino, Italy*

433: Utilization of Abbott-Firestone Curves to Characterize the Wear Behavior of Low Wear Rate Coating Layers

Daniele Botto, Mario Lavella, Muzio Gola, *Politecnico di Torino, Torino, Italy*

598: Characterization of Contact Parameters and Fretting Wear Behavior of T-800 Coating on Inconel 718

Mario Lavella, Daniele Botto, Muzio M. Gola, *Politecnico di Torino, Torino, Italy*

1327: Impact of Synergic Interactions between Sliding Frequency and a Cyclic Variation of Normal Force on Ti-6Al-4V/ Ti-6Al-4V Gross Slip Fretting Wear Response

Siegfried Fouvry, Benjamin Van-Peteghem, Mariana Mendes, Patricia Neubauer, *École Centrale de Lyon, Écully, France*

999: Simulation of Starved Lubrication in Spherical Joints

Holger Fuchs, Henning Haensel, *Ruhr-University Bochum, Bochum, Germany*, Oliver Habel, *Daimler AG, Sindelfingen, Germany*, Jan Scholten, *Ruhr-University Bochum, Bochum, Germany*

253: Moved to WE4-JM1

Friday, September 13TH

BM - Biomimetics

FR1-BM2 Superhydrophobic, Self-cleaning, Low Friction Surfaces

Room 4 8:30 – 10:30

Chair: Giuseppe Carbone, *Politecnico di Bari, Italy*

77 – *Keynote*: Lotus Effect: Surfaces with Roughness-Induced Superhydrophobicity, Self Cleaning and Low Adhesion

Bharat Bhushan, *Ohio State University, Columbus, OH, United States*

314: Simulation Analysis on Drag Reduction Performance of Shell Surfaces with Antifouling Ability

Xiuqin Bai, Xuan Zhang, Chengqing Yuan, Chengwang Lei, Xinping Yan, *Wuhan University of Technology, Wuhan, China*

889: Tuning Roughness to Design Robust Superhydrophobic Surfaces

Francesco Bottiglione, Luciano Afferrante, *Politecnico di Bari, Bari, Italy*, Elena Pierro, *Università degli Studi della Basilicata, Potenza, Italy*, Giuseppe Carbone, *Politecnico di Bari, Bari, Italy*

705: Controllable Partial Wetting on Microwrinkle Surfaces

Takuya Ohzono, *Nanosystem Research Institute, AIST, Tsukuba, Japan*

325: Aqueous Lubrication of Sliding Contacts of Polymeric Surfaces by means of Polymer Brushes

Troels Røn, Irakli Javakhishvili, Søren Hvilsted, Seunghwan Lee, *Technical University of Denmark, Kgs. Lyngby, Denmark*

623: Withdrawn

FR1-ST26 Texturing 4

Room 3 8:30 – 10:30

Chair: Noel Brunetiere, *Université de Poitiers, Futuroscope Chasseneuil, France*

458: Wear Resistant Property of Stainless Steel Modified by Friction Reforming

Han Chen, Masayuki Shima, Takashi Sugawara, Tatsuhiro Jibiki, *Tokyo University of Marine Science and Technology, Tokyo, Japan*

1013: Study of the Film Forming Technology to the Cylindrical Materials Using Friction

Hideki Akita, *Hitachi Construction Machinery Co.,Ltd, Tsuchiura, Japan*, Masayuki Shima, Takashi Sugawara, Tatsuhiro Jibiki, Yasuhiro Konda, *Tokyo University of Marine Science and Technology, Tokyo, Japan*

713: Effects of Surface Texture on the Tribological Properties of Ti-6Al-4V Sliding against Si3N4 Balls in Water Lubrication

Fei Zhou, Yuejun Peng, Zhenfu Zhang, Xianliang Wang, Jianning Cheng, Naizhang Yun, *Nanjing University of Aeronautics and Astronautics, Nanjing, China*

254: Dry Friction between Laser-patterned Surfaces

Andreas Rosenkranz, Carsten Gachot, *Saarland University, Saarbrücken, Germany*, Nikolay Prodanov, Martin H. Müser, *Jülich Supercomputing Centre, Jülich, Germany*, Frank Mücklich, *Saarland University, Saarbrücken, Germany*

1097: Effects of Periodic Structure on EHL Film Formation under Pure Sliding Condition

Hiroshi Shiomi, Kazuaki Maniwa, Takashi Nogi, Shingo Obara, *Japan Aerospace Exploration Agency, Tsukuba, Japan*

1087: Study of Run-in Behaviour of Laser-patterned Surfaces under Dry Sliding Conditions

Björn Lechthaler, Carsten Gachot, Frank Mücklich, *Saarland University, Saarbrücken, Germany*

FR2-FW16 Surface Tribology – Coatings

Room 2 11:00 – 13:00

Chair: Remigiusz Michalczewski, *Institute for Sustainable Technologies, Radom, Poland*

974: Tribological Properties of CVD Graphene Sheets on Polymer Substrates

Kwang-Seop Kim, Kyungmin Jo, Bongkyun Jang, Jae-Hyun Kim, Hak-Joo Lee, *Korea Institute of Machinery & Materials, Daejong, Republic of Korea*

818: The Wear Behaviors of Basalt Base Glass-ceramic Coatings by Plasma Spray Coating Technique

Gunhan Bayrak, Senol Yilmaz, Ugur Sen, Ediz Ercenk, *Sakarya University, Sakarya, Turkey*

880: Sliding Wear Behavior of Chromium Boride Coated AISI 52100 Steel

Ugur Sen, Fatih Aydın, İsmail H. Kara, Saduman Sen, *Sakarya University, Sakarya, Turkey*

447: Tribological Properties of UHMWPE Grafted with PMPC Brushes at High Contact Stress

Dangsheng Xiong, Yaling Deng, Yuanyuan Yang, *Nanjing University of Science and Technology, Nanjing, China*

204: Withdrawn

FR1-LA14 Lubricants

Room 6 8:30 – 10:30

Chair: Fabrice Dassenoy, *École Centrale de Lyon, Écully, France*

1021: In situ Analysis of Viscosity Modifiers at EHL Contact Using a FT-IR Spectroscopy

Yasushi Hoshi, Hidetaka Nanao, Shigeyuki Mori, *Iwate University, Morioka, Japan*

736: Microencapsulation for Next Generation Lubricants

Karen Mitchell, Olivier J. Cayre, Ardian Morina, Anne Neville, *University of Leeds, Leeds, United*

Kingdom, Gary Walker, Mike Sutton, *Lubrizol Limited, Derby, United Kingdom*

785: Oiliness Additive Adsorption onto Metal Surface Analyzed by Infrared Reflection Absorption Spectroscopy

Ryota Kawamura, Masato Nakashima, Takashi Matsuoka, Tomoko Hirayama, *Doshisha University, Kyotanabe, Japan*

1056: The Development of in Situ Chemical Sensors for Engine Oil Acidity Monitoring

Mostafa Soleimani, Ling Wang, John K. Atkinson, *University of Southampton, Southampton, United Kingdom*, Robert I. Taylor, *Shell Research Ltd, Chester, United Kingdom*, Robert J K Wood, *University of Southampton, Southampton, United Kingdom*

775: Flammability of Emulsions on Hot Surfaces

Lorena Deleanu, Constantin Georgescu, Sorin Ciortan, Liviu Şolea, *"Dunarea de Jos" University of Galati, Galati, Romania*

474: Withdrawn

FR1-BE14 Rolling Bearings 6

Room 7 8:30 – 10:30

Chair: Paolo Pennacchi, *Politecnico di Milano, Italy*

336: False Brinelling - Influence of the Pivoting Angle on the Contact Mechanics and the Wear Mechanisms in the Contact between Roller and Raceway

Markus Grebe, Paul Feinle, *Mannheim University of Applied Sciences, Mannheim, Germany*, Pavol Blaškovitš, *Slovak University of Technology in Bratislava, Trnava, Slovakia*

224: Comparison of the EHL Characteristics for Different Roller Axial Profiles

Tae-Jo Park, *Gyeongsang National University, Jinju, Republic Of Korea*

192: Radial Stiffness of an Angular Contact Ball Bearing under Cryogenic Temperature

Tomoya Nakamura, Satoshi Takada, Masataka Kikuchi, Takayuki Sudou, *Japan Aerospace Exploration Agency, Kakuda, Japan*, Tomoyuki Takano, *Japan Aerospace Technology Foundation, Kakuda, Japa*n

296: Cage Instability of High Speed Ball Bearing in Starting Process

Zhenhuan Ye, Liqin Wang, *Harbin Institute of technology, Harbin, China*

984: Refrigerant-Lubricated Gas Foil Bearings - A Thermo-Hydrodynamic Study

Mathieu Garcia, *Liebherr Aerospace Toulouse SAS, Toulouse, France*, Benyebka Bou-Saïd, *INSA-Lyon, Lyon, France*, Jérôme Rocchi, Gregory Grau, *Liebherr Aerospace Toulouse SAS, Toulouse, France*

448: Moved to TU1-BE2

FR1-BE15 Fluid-Film Bearings 5

Room 9 8:30 – 10:30

Chair: Stanisław Strzelecki, *Institute of Textile Machinery "Polmatex-Cenaro", Łódź, Poland*

926: Experimental Study on a Hydrodynamic Centered Pivot Tilting-pad Thrust Bearing

Jean Bouyer, *Université de Poitiers, Futuroscope Chasseneuil, France*, Yuuta Nakano, Mari Nagata, *Daido Metal Co. Ltd, Inuyama, Japa*n, Michel Fillon, *Université de Poitiers, Futuroscope Chasseneuil, France*

928: Experimental Identification of a Squeeze Film Damper Rotordynamic Coefficients

Ezequiel Trejo, Gustavo Rodríguez, Sergio Diaz, *Universidad Simón Bolívar, Caracas, Venezuela*

1047: Development and Validation of Low Friction Guide Shoe Bearing for Large Two-stroke Marine Diesel Engines

Anders Vølund, *MAN Diesel & Turbo SE, Copenhagen, Denmark*

1313: Experimental Investigation of Innovative Low Viscosity Synthetic Oils for Journal Bearings in Turbomachinery Applications

Luigi Barbato, Francesca Tognini, *GE Oil & Gas, Firenze, Italy*, Claudio Barzaghi, Manuela Toscanini, *Eni S.p.A., San Donato Milanese (MI), Italy*

525: Moved to TH2-B11

761: Comparative Performance Study of Hybrid Bearings with Different Structures

Lin Wang, Shiyuan Pei, Hua Xu, *Xi'an Jiaotong University, Xi'an, China*

FR1-MT10 Surfaces

Room 1 8:30 – 10:30

Chair: Daniele Ugues, *Politecnico di Torino, Italy*

1058: Comprehensive Study of ZDDP-tribofilms Formed under Soft Contact Conditions

Kartik S. Pondicherry, *Materials Center Leoben GmbH, Leoben, Austria*, Florian Grün, Florian Summer, István Gódor, *Montanuniversität Leoben, Leoben, Austria*, Emmanuel Lainé, *Infineum UK Limited, Milton Hill, United Kingdom*, Martin Offenbecher, *Miba Bearing Group, Laakirchen, Austria*

1217: Study of Micro Hardness, Roughness, Wear and Corrosion behaviour of Ni/CNT and Ni/GNP Composite Coatings Produced by Electrodeposition

Muhammad R. Abdul Karim, Matteo Pavese, Daniele Ugues, Azhar Hussain, Andrea G. Pisa, *Politecnico di Torino, Torino, Italy*, Elisa P. Ambrosio, *Italian Institute of Technology, Torino, Italy*, Sara Biamino, Paolo Fino, Claudio F. Badini, *Politecnico di Torino, Torino, Italy*

1259: Wear Prediction from Energy Considerations in Alumina with Different Grain Sizes

Álvaro Rico, Felipe Orgaz, *Instituto de Cerámica y Vidrio, Madrid, Spain*, Jesús Rodríguez, *Universidad Rey Juan Carlos, Móstoles, Spain*

1077: Wear of Different Material Pairings for the Piston Ring – Cylinder Liner Contact

Thomas Wopelka, Claudia Lenauer, Johannes Sequard-Base, Karoline Steinschütz, Lukas Spiller, Andreas Pauschitz, Martin Jech, *AC^2T Research GmbH, Wiener Neustadt, Austria*

896: Ultra-Low Wear Nanocomposites

Angela A. Pitenis, Brandon A. Krick, Jeffrey J. Ewin, W. Gregory Sawyer, *University of Florida, Gainesville, FL, United States*

859: Reduction of Graphite Lamella Size in Grey Cast Iron: Impact on the Friction and Damage Mechanisms Activated During Braking

Anne-Lise Cristol, Mathilde Collignon, David Balloy, *Université Lille Nord de France, Lille, France*, Gilles Regheere, *Centre Technique des Industries de la Fonderie, Sèvres, France*, Yannick Desplanques, *Université Lille Nord de France, Lille, France*