



6th European Conference on TRIBology ECOTRIB 2017

7–9 June 2017, Ljubljana, *Slovenia*

CONFERENCE PROGRAMME



Photo: D. Wedam, Turizem Ljubljana



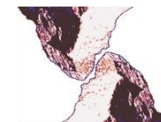
Slovenian Society for Tribology



Austrian Tribology Society



Italian Tribology Association



Swiss Tribology

Wednesday, 7th June 2017

08:00 – 09:40	Registration				
09:40 – 09:50	Opening ceremony				
09:50 – 10:40	[KS01] Wear performance design by integrated computational materials modelling (Keynote lecture) Kenneth Holmberg , Anssi Laukkanen, VTT Technical Research Centre of Finland, Finland				
10:40 – 11:10	Coffee break				
11:10 – 12:00	[KS02] Stress-promoted thermal activation - from rheology to tribochemistry (Keynote lecture) Hugh Spikes , Imperial College London, UK				
12:00 – 13:30	Lunch + Poster exhibition				
Session Title	Lubrication & Lubricants	Coatings & Surfaces	Interface nano phenomena	Wear	Engineering components
13:30 – 14:00	[IT01-01] Tribochemistry and tribocorrosion in micropitting contacts; using advanced microscopy to understand localised reactions (Invited talk) A. Neville University of Leeds, UK	[IT02-01] Coatings solutions for high temperature sliding applications (Invited talk) A. Cavaleiro ^{1,2} , F. Fernandes ^{1,2} , T. Danek ^{3,4} , T. Polcar ^{3,4,5} ¹ University of Coimbra Portugal; ² LED&Mat – Instituto Pedro Nunes, Portugal; ³ Czech Technical University, Czech Republic; ⁴ AdvaMat s.r.o. Company, Czech Republic; ⁵ University of Southampton, UK	[IT03-01] Towards a better understanding of the lubrication mechanisms of metal disulfides nanoparticles (Invited talk) F. Dassenoy , I. Jenei École Centrale de Lyon, France	[IT04-01] High temperature erosion behavior of SiC-WC composites (Invited talk) S. K. Sharma ¹ , B. V. M. Kumar ¹ , Young-Wook Kim ² ¹ Indian Institute of Technology Roorkee, India ² University of Seoul, Republic of Korea	[IT05-01] Evaluation method for cold and hot metal forming (Invited talk) K. Dohda Northwestern University, USA
14:00 – 14:20	[O01.01] Study of antiwear mechanisms of dialkyl phosphonoacetic acids in biodegradable oils by isotope labelling methods T. Oshio ¹ , K. Yagishita ¹ , N. Kitani ² , T. Wakabayashi ² ¹ JX Nippon Oil and Energy Corporation, Japan; ² Kagawa University, Japan	[O02.01] Submicron scale experimental analyses of the real contact area for different topographic and material properties B. Brodnik Žugelj , M. Kalin University of Ljubljana, Slovenia	[O03.01] Epoxy resin based on the fullerenes and nanotubes during friction in severe contact conditions V. Perfiljev ¹ , H. Doduk ² , S. Kenig ² , I. lapsker ¹ , L. Rapoport ¹ ¹ Holon Institute of Technology, Israel ² Shenkar College of Engineering and Design, Israel	[O04.01] Study on the combined effects of soot and temperature on tribological properties of steel and ceramic contacts using Taguchi analysis Yadvendra Kaushik, P. Ramkumar Indian Institute of Technology Madras, India	[O05.01] Set-up of a novel test plant for high power turbomachinery tilting pad journal bearings E. Ciulli ¹ , P. Forte ¹ , F. Maestrale ² , M. Nuti ² , M. Libraschi ³ ¹ University of Pisa, Italy; ² AM Testing srl, Pisa, Italy; ³ GE Oil & Gas, Firenze, Italy
14:20 – 14:40	[O01.02] Sliding evolution of the chemical and mechanical properties of the tribofilms formed from fully formulated oils on steel, H-DLC and Si-DLC S. Akbari , E. Oblak, M. Kalin University of Ljubljana, Slovenia	[O02.02] Ag-ZrCN coatings as a solution for improving the electrochemical and tribological performance of biomaterials S. Calderon V ^{1,2} , J. C. Sánchez López ³ , A. Cavaleiro ² , S. Carvalho ^{1,2} ¹ University of Minho, Portugal ² University of Coimbra, Portugal ³ Instituto de Ciencia de Materiales de Sevilla, Spain	[O03.02] Tribological behaviour of goethite (α-FeOOH) based nanolubricants V. Zin ¹ , F. Agresti ¹ , S. Barison ¹ , S. Rossi ² , M. Fabrizio ¹ ¹ Institute of Condensed Matter Chemistry and Technologies for Energy, National Research Council of Italy, Italy ² Institute of Construction Technologies, National Research Council of Italy, Italy	[O04.02] Investigation on the friction and wear behaviour of thermoplastic polyurethanes by controlling the adhesion and deformation part of friction A. Hausberger ¹ , Z. Major ² , G. Theiler ³ , T. Gradt ³ , T. Schwarz ⁴ ¹ Polymer Competence Center Leoben GmbH, Austria; ² Institute of Polymer Product Engineering, Johannes Kepler University Linz, Austria; ³ Bundesanstalt für Materialforschung und prüfung (BAM), Germany; ⁴ SKF Sealing Solutions Austria GmbH, Austria	[O05.02] Flattening mechanisms through roller burnishing by active rotary tool M. Okada ¹ , M. Shinke ¹ , M. Otsu ¹ , T. Miura ¹ , K. Dohda ² ¹ University of Fukui, Japan; ² Northwestern University, USA
14:40 – 15:00	[O01.03] A study on tribofilm growth and the friction coefficient microscopy R. Lu , H. Tani, N. Tagawa, S. Koganezawa Kansai University, Japan	[O02.03] Surface roughness control of CVD diamond coatings by high density plasma polishing T. Aizawa , E. E. Yunata Shibaura Institute of Technology, Japan	[O03.03] Graphene as lubrication additive for steel and DLC-coated surfaces J. Kogovšek , M. Kalin University of Ljubljana, Slovenia	[O04.03] High performance hybrid PPS polymer composites for tribological applications N. Emami , A. Jain Luleå University of Technology, Sweden	[O05.03] Tribology of new thin compression ring of fired engine under realistic speeds – A combined experimental and numerical study A. Zavos , P. Nikolakopoulos University of Patras, Greece
15:00 – 15:30	Coffee break				

Session Title	Lubrication & Lubricants	Coatings & Surfaces	Interface nano phenomena	Wear	Engineering components
15:30 – 15:50	[O01.04] The experimental study on the relationship between grease film thickness and grease flows K. Sakai ^{1,2} , D. Kostal ¹ , Y. Shitara ² , M. Kaneta ¹ , I. Krupka ¹ , M. Hartl ¹ ¹ Brno University of Technology, Czech Republic ² JX Nippon Oil & Energy Corporation, Japan	[IT02.02] Tribological considerations in the development of endovascular catheters (Invited talk) S. E. Franklin Philips Research, The Netherlands	[O03.04] Friction mechanisms in MOS₂ thin films produced by PVD-magnetron sputtering technique E. Serpini ^{1,2} , A. Rota ¹ , A. Ballestrazzi ¹ , T. Polcar ^{4,5} , S. Valeri ^{1,2} ¹ Università di Modena e Reggio Emilia, Italy ² Istituto CNR-NANO S3, Modena, Italy ³ University of Southampton, UK ⁴ Czech Technical University in Prague, Czech Republic	[O04.04] Crack evolution of thermally worn AISI H13 steel in die casting environment H. A. Abdulhadi ^{1,2} , S. N. Aqida ¹ , I. Ismail ¹ , M. Ishak ¹ , G.R. Mohammed ² ¹ University Malaysia Pahang, Malaysia ² Baghdad-Institute, Foundation of Technical Education, Iraq	Panel Discussion on Micromachining Panellists: K. Dohda ¹ M. Yamamoto ² M. Okada ³ M. A. Ahmad ⁴ J. Valentinčič ⁵ ¹ Northwestern University, USA ² Manufacturing Engineering Center, NSK Ltd, Japan ³ University of Fukui, Japan ⁴ Universiti Teknologi MARA, Malaysia ⁵ University of Ljubljana, Slovenia
15:50 – 16:10	[O01.05] Characterization of environmentally acceptable lubricants (eal’s) for marine applications F. X. Borrás , M. B. de Rooij, D. J. Schipper University of Twente, The Netherlands		[O03.05] In-situ generation of transition metal dichalcogenide tribofilms M. Rodríguez Ripoll , A. Tomala, V. Totolin AC ² T research GmbH, Austria	[O04.05] Tribo-electrically induced modifications of copper surfaces in sliding contact against copper-graphite M. Grandin , U. Wiklund Uppsala University, Sweden	
16:10 – 16:30	[O01.06] Physio-tribological properties of lithium based Grease developed from coconut oil (Cocos nucifera) and analysis on crystal formation in grease J. Babu, K. P. Nair, M. L. Joy National Institute of Technology Calicut, India	[O02.04] Fibre laser surface texturing on bearing steel (AISI 52100) for tribological applications H. Vijaikumar , S. Soundarapandian, L. Vijayaraghavan Indian Institute of Technology Madras, India	[O03.06] Challenging the status quo: accurate nanoindentation of soft matter in liquid R. Simič , C. H. Mathis, N. D. Spencer ETH Zürich, Switzerland	[O04.06] Tribological behavior of sinter-forged Fe-2Cu-0.7C-xMo alloys S. S. Rathore ¹ , V. Verma ² , B. V. M. Kumar ² , V. V. Dabhade ² ¹ Govt. Engineering College Bikaner, India ² Indian Institute of Technology Roorkee, India	
16:30 – 16:50	[O01.07] Effects of solid lubricants (Graphite, MoS₂ and Sb₂S₃) of Cu/SiC hybrid composite brake materials on tribological properties for medium duty automotive applications R. Petchiappan , P. Ramkumar Indian Institute of Technology Madras, India	[O02.05] Combination of laser surface texturing and DLC coating of PEEK for enhanced tribological properties J. Dufils ¹ , F. Faverjon ² , C. Heau ² , C. Donnet ³ , S. Benayoun ¹ , S. Valette ¹ ¹ École Centrale de Lyon, France ² IREIS, HEF group, France ³ Université Jean Monnet, France	[O03.07] Fundamental and tribological properties of thick CPB K. Sato ¹ , H. Okubo ¹ , Y. Hirata ¹ , C. Tadokoro ² , T. Fujimori ³ , K. Nakano ⁴ , Y. Tsujii ³ , B. Prakash ⁵ , S. Sasaki ¹ ¹ Tokyo University of Science, Japan; ² Saitama University, Japan; ³ Kyoto University Institute for Chemical Research, Japan; ⁴ Yokohama National University, Japan; ⁵ Luleå University of Technology, Sweden	[O04.07] Wear effects on PTFE/DLC in reciprocating sliding contact M. Adler , S. Spiller, E. Badisch AC ² T research GmbH, Austria	
18:15 – 19:45	1.5 hour guided city tour				
20:00 –	Welcome reception at the Ljubljana Castle				

Thursday, 8th June 2017

09:00 – 09:50	[KS03] Extracting diamondlike carbon tribofilms from lubricating oils by catalytically active composite coatings (Keynote lecture) A. Erdemir , G. Ramirez, O. Eryilmaz; Argonne National Laboratory, USA				
09:50 – 10:40	[KS04] Past studies and recent developments on hydrodynamic journal and thrust bearings (Keynote lecture) M. Fillon ; Pprime Institute, CNRS - Université de Poitiers - ISAE-ENSMA, France				
10:40 – 11:10	Coffee break				
11:10 – 12:00	[KS05] Friction and lubrication inside disk drives: Is nanotribology useful? (Keynote lecture) C. M. Mate ; formerly with Western Digital Company, USA				
12:00 – 13:30	Lunch + Poster Exhibition				
Session Title	Lubrication & Lubricants	Coatings & Surfaces	Modelling & Simulations	Wear	Engineering components
13:30 – 14:00	[IT01-02] In-situ analysis and evaluation of adsorbed additive layer for boundary lubrication (Invited talk) T. Hirayama ^{1,2} ¹ Doshisha University, Japan ² JST Presto, Japan	[IT02-03] Running-in control for creation of nanointerface giving super-low friction (Invited talk) K. Adachi Tohoku University, Japan	[IT03-02] Ab-initio investigation of tribochemistry phenomena in solid and boundary lubricants (Invited talk) M. C. Righi ^{1,2} ¹ University of Modena and Reggio Emilia, ² CNR - Institute of Nanoscience, Italy	[IT04-02] Lifetime test of carbon fibre water hydraulic cylinder (Invited talk) F. Majdič University of Ljubljana, Slovenia	[IT05-02] Rolling bearing modelling and current trends (Invited talk) G. E. Morales-Espejel ^{1,2} ¹ SKF Engineering and Research Centre, The Netherlands ² Université de Lyon, INSA-Lyon, CNRS LaMCos, France
14:00 – 14:20	[O01.08] In situ Raman observation of structural transformation of diamond-like carbon films lubricated with MoDTC solution: mechanism of wear acceleration of DLC films lubricated with MoDTC solution H. Okubo ¹ , C. Tadokoro ² , Y. Hirata ¹ , S. Sasaki ¹ ¹ Tokyo University of Science, Japan; ² Sitama University, Japan	[O02.06] Characterization of the DLC films tribological responses related to the test environments G. Fiaschi ¹ , E. Vezzalini ¹ , A. Ballestrazzi ¹ , D. Marchetto ^{1,2} , S. Valeri ^{1,2} ¹ University of Modena and Reggio Emilia, Italy ² CNR - Institute of Nanoscience, Italy	[O03.08] Influence of friction on metal flow in forming process T. Funazuka ¹ , N. Takatsuji ² , K. Dohda ¹ , T. Aizawa ³ ¹ Northwestern University, USA ² Toyama University, Japan ³ Shibaura Institute of Technology, Japan	[O04.08] Microstructural design of multifunctional laser hardfacings for high temperature sliding applications H. Torres ¹ , M. Rodriguez Ripoll ¹ , B. Prakash ² ¹ AC ² T research GmbH, Austria ² Luleå University of Technology, Sweden	[O05.08] Benchtop screening of wet clutch materials S. J. Shaffer ¹ , T. B. Freshly ² , S. E. Papanicolaou ¹ ¹ Bruker: Tribology, Stylus and Optical Metrology, USA ² LuK USA, LLC: Wet Friction Development, USA
14:20 – 14:40	[O01.09] Tribological investigation of greases in static and boundary regimes K. S. Pondicherry ¹ , F. Rummel ² ¹ Anton Paar GmbH, Austria ² Anton Paar Germany GmbH, Germany	[O02.07] Self-lubricating protective coatings: CrVN sputtering deposition and oxidation A. Drnovšek , P. Panjan, J. Kovač, M. Panjan and M. Čekada Jožef Stefan Institute, Slovenia	[O03.09] Simulation of the roundness effects in the active magnetic bearings behavior L. Giasiranis , P. G. Nikolakopoulos, C. A. Papadopoulos ¹ University of Patras, Greece	[O04.09] Role of alloying elements on the strain hardening behaviour of iron-based alloys in abrasive contacts H. Rojacz , M. Varga, M. Rodríguez Ripoll AC ² T research GmbH, Austria	[O05.09] Influence of structural flexibility on the contact characteristics of a thin-walled roller bearing Y. Mao , L. Wang, C. Zhang ¹ Harbin Institute of Technology, China
14:40 – 15:00	[O01.10] Atomic force microscopy for in-situ tribology R. Bingley , C. Wang, A. Morina, A. Neville University of Leeds, UK	[O02.08] Combined effect of the AW and the AM package additives on the coefficient of friction in the boundary lubrication regime K. Simonović , M. Kalin University of Ljubljana, Slovenia	[O03.10] Abrasive Wear Simulation of an ASTM G65 Standard Test D. Bianchi, P. Bedolla, G. Vorlauffer, E. Badisch AC ² T research GmbH, Austria	[O04.10] Rail head damage and accumulation of welded deposits on the breaking pads of railway vehicles V. Pejaković , F. Heindl, U. Cihak-Bayr, F. Franek AC ² T research GmbH, Austria	[O05.10] An integrated bearing selection methodology based on total cost of ownership S. Vandenberghe , F. Al-Bender University of Leuven, Belgium
15:00 – 15:30	Coffee break				

Session Title	Lubrication & Lubricants	Coatings & Surfaces	Modelling & Simulations	Wear	Engineering components
15:30 – 15:50	[001.11] Oxidation mechanisms of ester oils identified by isotope labelling and mass spectrometry M. Frauscher¹, C. Besser¹, B. Ronai^{1,2}, N. Dörr¹, G. Allmaier² ¹AC²T research GmbH, Austria; ²Vienna University of Technology, Institute of Chemical Technologies and Analytics, Austria	[002.09] Plasma electrolytic oxidation coating application for engine blocks R. Bayón, V. Sáenz de Viteri, X. Fernández, A. Igartua IK4-Tekniker, Spain	[003.11] Numerical and experimental methodologies based on femtosecond laser micro-texturing for enhanced surface tribology C. Putignano^{1,2}, G. S. Joshi², A. Ancona¹, G. Carbone^{1,2} ¹CNR-IFN U.O.S. Bari, Italy ²Politecnico di Bari, Italy	[004.11] The influence of contact configuration on tribological properties of polyamide (PA6) A. Kupec¹, A. Pogačnik², M. Kalin¹ ¹University of Ljubljana, Slovenia ²KISSsoft AG, Bubikon, Switzerland	[005.11] Dynamic behavior of a rectangular grooved air pad F. Colombo, D. Ghodsiyeh, Terenziano Raparelli, A. Trivella, V. Viktorov Polytechnic University of Turin, Italy
15:50 – 16:10	[001.12] Correlation between limiting shear stress and lubricant properties under elastohydrodynamic lubrication S. N. Ndiaye, L. Martinie, D. Philippon, P. Vergne University of Lyon, INSA Lyon, CNRS, LaMCoS, France	[002.10] The correlated selection of the substrate, thin coating and lubricating oil to increase the resistance of heavy loaded parts to various forms of wear M. Szczerek¹, R. Michalczewski¹, W. Piekoszewski¹, W. Tuszyński¹, J. Wulczynski¹, A. Wieczorek² ¹Institute for Sustainable Technologies, Poland; ²Silesian University of Technology, Poland	[003.12] Wearing-in of journal bearings under non-stationary conditions F. König, G. Jacobs G. Burghardt RWTH Aachen University, Germany	[004.12] Influence of temperature on the corrosion and tribocorrosion behaviour of high strength low-alloy steels used in offshore applications A. López-Ortega¹, R. Bayón¹, J. L. Arana², E. Rodríguez³, A. Igartua¹ ¹IK4-Tekniker, Eibar, Spain, ²University of the Basque Country, Spain ³Vicinay Marine Innovación, Bilbao, Spain	[005.12] Novel lead free bearing overlay solutions with low friction performance ¹F. Summer, ¹F. Grün, ²M. Offenbecher, ³E. Laine, ³S. Taylor ¹Montanuniversität Leoben, Austria ²Miba Bearing Group, Austria ³Infineum UK Limited, UK
16:10 – 16:30	[001.13] Viscosity index improvers response in thin and very thin lubrication regimes P. Cusseau¹, P. Vergne¹, D. Philippon¹, L. Martinie¹, N. Bouscharain¹, F. Briand² ¹University of Lyon, INSA Lyon, CNRS, LaMCoS, France ²TOTAL, France	[002.11] The mechanism of lifetime enhancement by phosphate conversion coatings D. Ernens^{1,2}, G. Langedijk^{2,3}, M. B. de Rooij¹, H. R. Pasaribu², D.J. Schipper¹ ¹University of Twente, The Netherlands ²Shell Global Solutions International BV, The Netherlands; ³The Hague University of Applied Sciences, The Netherlands	[003.13] Multiscale contact simulations for elastomers A. Miniberger, M. C. Miron, J. Holzweber, U. Cakmak, Z. Major University of Linz, Institute for Polymer Product Engineering, Austria	[004.13] Fabrication and reciprocating wear of TiCN based cermets S. K. Sharma¹, D. Singh¹, B. V. Manoj Kumar¹, Blaž Brodnik Žugelj², Mitjan Kalin² ¹Indian Institute of Technology Roorkee, India ²University of Ljubljana, Slovenia	[005.13] The role of adhesion in transition from stick to slip at the interface of two contacting bodies M. Bazr Afshan Fadafan^{1,2}, M.B. de Rooij², D. J. Schipper² ¹Material Innovation Institute (M2i), The Netherlands ²University of Twente, The Netherlands
16:30 – 16:50	[001.14] Effect of surface topography parameters on friction coefficient and load distribution in rolling/sliding point contacts operating under mixed lubrication regime using load-sharing concept D. K. Prajapati, M. Tiwari ¹Indian Institute of Technology Patna, India	[002.12] Low friction mechanism of chlorine-containing amorphous carbon films against aluminium alloy Y. Tokuta^{1,4}, T. Itoh², T. Shiozaki², M. Kawaguchi¹, S. Sasaki³ ¹Tokyo Metropolitan Industrial Technology Research Institute, Japan ²FUJIMETAL Co. Ltd., Japan ³Tokyo University of Science, Japan	[003.14] Material point method simulation of ploughing behaviour in coated systems T. Mishra¹, G. Ganzenmüller², M. B. de Rooij¹, D.J. Schipper¹ ¹University of Twente, The Netherlands ; ²Fraunhofer Ernst-Mach-Institut, Germany	[004.14] Formation and functional mechanisms of transfer films between polymeric composites and steel counterpart under dry sliding contact B. C. Jim¹, G. Zhang², W. Österle³, I. Häusler³, A. I. Dmitriev⁴, B. Wetzel¹ ¹Institute for Composite Materials, Germany; ²Lanzhou Institute for Chemical Physics, China; ³Federal Institute for Materials Research, Germany;⁴Institute of Strength Physics and Materials Science, Russia	[005.14] Adhesion growth behavior in metal forming M. Yamamoto¹, Kuniaki Dohda², Houichi Kitano³, Mitjan Kalin⁴, Kornel F. Ehmann² ¹Manufacturing Engineering Center, NSK Ltd, Japan; ²Northwestern University, USA; ³Research Center for Structural Materials, National Institute for Materials Science, Japan; ⁴University of Ljubljana, Slovenia
16:50 – 17:10	[001.15] Experimental and quantum chemical investigations on oxidative stability of sesame oil with ecofriendly synthetic antioxidant additives for high-temperature lubricants S. Sankarannair, K. P. Nair, R. P. Krishnan National Institute of Technology Calicut, India	[002.13] Tribology of fibrous tows D. M. Mulvihill¹, O. Smerdova², M. P. F. Sutcliffe³ ¹University of Glasgow, UK; ²Institut Pprime, CNRS - Université de Poitiers - ISAE-ENSMA, France; ³University of Cambridge, Cambridge, UK	[003.15] The role of the preload on the behavior of gas lubricated offset half bearings M. T. C. Faria RWTH Aachen University, Germany	[004.15] Subsurface material analysis and wear of cylinder liner materials T. Wopelka, C. Lenauer, U. Cihak-Bayr, M. Jech AC²T research GmbH, Austria	[005.15] Novel gear test methodology to evaluate efficiency and durability F. Grün, B. Maier, I. Gódor, F. Steinwender Montanuniversität Leoben, Austria
20:00 –	Gala dinner at the National Gallery of Slovenia				

Friday, 9th June 2017

09:00 – 09:50	[KS06] Thermal and shear-induced effects in boundary film formation (Keynote lecture) W. T. Tysoe ; University of Wisconsin Milwaukee, USA				
09:50 – 10:40	[KS07] Biolubrication: beyond tribology (Keynote lecture) J. Klein ; Weizmann Institute, Israel				
10:40 – 11:10	Coffee break				
11:10 – 12:00	[KS08] Low friction and emission cylinder liner surfaces and the influence of surface topography and scale (Keynote lecture) C. Anderberg ¹ , Z. Dimkovski ² , B. G. Rosén ² ; ¹ Chalmers University of Technology, Sweden, ² Halmstad University, Sweden				
12:00 – 13:30	Lunch + Poster exhibition				
Session Title	Lubrication & Lubricants	Coatings & Surfaces	Interface nano phenomena	Wear	Engineering components
13:30 – 14:00	[IT01-03] Ionic liquids and carbon nanophases in lubrication (Invited talk) F. J. Carrión-Vilches ^{1,2} , M.D. Avilés ¹ , J. Sanes ¹ , R. Pamies ¹ , M.D. Bermúdez ¹ , K.Nakano ² ¹ Universidad Politécnica de Cartagena, Spain ² Yokohama National University, Japan	[IT02-04] Structural and mechanical modifications of hard carbon coatings under low friction (Invited talk) M. I. De Barros Bouchet University of Lyon, École Centrale de Lyon, France	[IT03-03] Facilitating effective hydrodynamic lubrication for zero-entrainment-velocity contacts based on boundary slip mechanism (Invited talk) P. L. Wong ¹ , Y. Zhao ^{1,2} , J. Mao ² ¹ City University of Hong Kong, China ² Xi'an Jiaotong University, China	[IT04-03] Effect of hydrothermal ageing on wear mechanism and friction behaviour of PTFE composites (Invited talk) N. Emami , M.R. Homayoun Luleå University of Technology, Sweden	[IT05-03] Tribotronics – part of a pathway to sustainable engineering? (Invited talk) I. Sherrington Jost Institute for Tribotechnology, University of Central Lancashire, UK
14:00 – 14:20	[O01.16] Grafting heteroelement-rich groups on graphene oxide: Tuning polarity and molecular interaction with bio-ionic liquid towards advanced lubrication L. Mu, ^{1,2} Y. Shi ² , J. Zhu ¹ ¹ The University of Akron, USA ² Luleå University of Technology, Sweden	[O02.14] Crack density and tribological performance of hard chrome coatings B. Podgornik ¹ , O. Massler ² , F. Kafexhiu ¹ , M. Sedlaček ¹ ¹ Institute of Metals and Technology, Slovenia ² De Martin AG, Switzerland	[O03.16] The effect of different additives on interfacial properties and EHD friction of steel/steel contact at 25 °C and 100 °C M. Polajnar ¹ , M. Kalin ¹ , F. Jarnias ² , B. Thiebaud ² ¹ University of Ljubljana, Slovenia ² TOTAL, France	[O04.16] Improved tribological behaviors of graphene/polytetrafluoroethylene composites X. Wang , J. Wu, L. Zhou, X. Wei Shanghai University, China	[O05.16] Synergetic effects inside a simplified friction material: A PCA approach F. Vivier ^{1,2} , D. Pellerej ¹ ¹ ITT Italia Srl, Italy; ² University of Turin, Italy
14:20 – 14:40	[O01.17] The role of the interfacial layer formed in the presence of ionic liquids in preventing surface damage A. Arcifa ¹ , A. Rossi ^{1,2} , N.D. Spencer ¹ ¹ ETH Zürich, Switzerland ² Università di Cagliari, Italy	[O02.15] The application of fine grained solid lubricants in high performance dry machining processes L. Sterle , F. Pušavec, M. Kalin University of Ljubljana, Slovenia	[O03.17] The thermocapillary migration on shot blasted surfaces Q. Dai ¹ , W. Huang ¹ , X. Wang ^{1,2} ¹ Nanjing University of Aeronautics & Astronautics, China ² Jiangsu Key Laboratory of Precision and Micro-Manufacturing Technology, China	[O04.17] Friction and wear of PTFE composites with various filler materials in high purity hydrogen gas Y. Sawae ^{1,2} , K. Takeda ³ , T. Morita ^{1,2} , H. Watanabe ¹ , S. Onitsuka ² , T. Yamaguchi ^{1,2} , J. Kaneuchi ³ , J. Sugimura ^{1,2,4} ¹ Kyushu University, Japan; ² International Institute for Carbon-Neutral Energy Research, Japan; ³ STARLITE Co., Ltd., Japan; ⁴ Research Center for Hydrogen Industrial Use and Storage, Japan	[O05.17] Energy efficiency potential of hydrostatic bearings S. Vandenberghé ¹ , W. Driesen ² , S. Devos ² , F. Al-Bender ¹ ¹ University of Leuven, Belgium ² Flanders Make, Belgium
14:40 – 15:00	[O01.18] Lubricating property of cyano-based ionic liquids against tetrahedral amorphous carbon film S. Kawada , S. Watanabe, Y. Hirata, S. Sasaki Tokyo University of Science, Japan	[O02.16] Effect of the contact geometry and thermal spray coatings on abrasion resistance of rotary feeder blades V. Pejaković , U. Cihak-Bayr AC ² T research GmbH, Austria	[O03.18] Wear mechanisms in metals studied with Smooth Particle Hydrodynamics (SPH) S. Leroch, S. J. Eder, M. Rodríguez-Ripoll AC ² T research GmbH, Austria	[O04.18] Experimental and analytical Investigations on wear characteristics of polymers against metal counterfaces using disc-on-disc system S. Panda, A. Maurya [*] , M. Sarangi, S. K. Roy Chowdhury Indian Institute of Technology Kharagpur, India	[O05.18] Double-Hertz extension for mild ellipticity ratio contact between elastic cylinders N. H. Mohd Zini ^{1,2} , M. B. de Rooij ¹ , M. Bazrafshan ¹ , N. Ismail ^{1,2} , D. J. Schipper ¹ ¹ University of Twente, The Netherlands ² Universiti Teknikal Malaysia Melaka, Malaysia
15:00 – 15:30	Coffee break				

Session Title	Wear	Biotribology	Interface nano phenomena	Wear	Engineering components
15:30 – 15:50	[O01.19] Fretting behavior of PP grease lubricated PPS and pa composites <u>J. Lind</u>, P. Söderbäck, Å. Kassman Rudolphi Uppsala University, Sweden	[O02.17] Relationship between friction and wear of dental implant materials F. Alemanno¹, S. Spriano² <u>D. Halenahally Veeregowda</u>¹ ¹Ducom Instruments Europe B.V, The Netherlands ²Polytechnic University of Turin, Italy	[O03.19] Dynamic friction during oblique impact of golf ball <u>K. Arakawa</u> Research Institute for Applied Mechanics, Kyushu University, Japan	[O04.19] A bibliometric framework to identify and delineate subfields of research on tribological wear - Part two: research fronts of bibliographically coupled publications <u>E. Schiebel</u>¹, D. Bianchi², A. Vernes², F. Franek² ¹AIT Austrian Institute of Technology, Austria ²AC²T research GmbH, Austria	[O05.19] Influence of reaction layer composition on surface damage in bearing application <u>I. Nedelcu</u>¹, E. Vegter¹, K. Stadler² ¹SKF B.V., The Netherlands; ²SKF GmbH, Germany
15:50 – 16:10	[O01.20] Real time hydrogenation method for white etching crack replication using pin-on-disc tribometer on bearing steel <u>S. Kodoor</u>, P. Ramkumar Indian Institute of Technology Madras, India	[O02.18] A finite element simulation of MOM hip implant <u>S. Chaturvedi</u>¹, P. K. Bharti², ³S. Kumar Yadav ¹Integral University, India ²Integral University, India ³Graphic Era University, India	[O03.20] Tribological characterization of carbon materials <u>E. Casamassa</u>^{1,2}, G. Gautier¹, A. Sin³, M. G. Faga¹ ¹IMAMOTER, National Council of Research, Torino, Italy ²University of Parma, Italy ³ITT Italia srl, Italy	[O04.20] Properties of the nitrocarburised and oxidised steel surfaces and the correlation with their tribological behaviour under unlubricated sliding conditions <u>I. Velkavrh</u>¹, F. Ausserer¹, S. Klien¹, J. Voyer¹, K. Lingenhöle², F. Kafexhiu³, D. Mandrino³, B. Podgornik³, A. Diem¹ ¹V-Research GmbH, Austria; ²Lingenhöle Technologie GmbH, Austria; ³Institute of Metals and Technology, Slovenia	[O05.20] Lifetime estimation of lubricant used in dragline gearbox <u>P. Kewat</u>, A. K. Mukhopadhyay, S.K. Ghosh ¹Indian Institute of Technology (Indian School of Mines) Dhanbad, India
16:10 – 16:30	[O01.21] A comparative study on the micro-abrasive wear behavior of tribological systems submitted to conditions of “constant normal force” and “constant pressure” <u>R. C. Cozza</u> University Center FEI – Educational Foundation of Ignatius “Padre Sabóia de Medeiros”, Brazil	[O02.19] Tribological approach to food oral processing <u>F. Rummel</u>¹, K. S. Pondicherry² ¹Anton Paar Gernmay GmbH, Germany ²Anton Paar GmbH, Austria	[O03.21] Measuring friction in fibre-on-fibre contact <u>N. Ismail</u>^{1,2}, M. B. de Rooij¹, E.G. de Vries¹, D. J. Schipper¹ ¹University of Twente, The Netherlands; ²Universiti Teknikal Malaysia Melaka, Malaysia	[O04.21] A wear test of conventional WC-CO and alternative binder rock drill materials tested against granite and sandstone <u>C. J. Hassila</u>¹, A. Holmberg¹, M. Lilja², S. Norgren² ¹Uppsala University, Sweden ²Sandvik Mining Rock Tools, Sweden	[O05.21] A study on highly-loaded contacts under dry lubrication for gear applications <u>M. Yilmaz</u>, D. Kratzer, T. Lohner, K. Michaelis, K. Stahl Gear Research Centre (FZG), Technical University of Munich (TUM), Germany
16:30	Closing				

List of poster presentations

1	Nominal contact area calculations for bushing shaft assembly K. Bērziņš , J. Rudzītis Riga Technical University, Institute of Mechanical Engineering, Latvia
2	Couple stress effects on the performances of thermo-hydrodynamic slider bearing S. Boubendir ¹ , M. Malki ² ¹ University of Sciences and Technology Houari Boumedien, Algeria; ² LGMD-Ecole Nationale Polytechnique, Algeria
3	Sensitivity of wear coefficient to dimensional tolerance in shoulder implants L. Mattei ¹ , F. Di Puccio ¹ , T. J. Joyce ² , E. Ciulli ¹ ¹ University of Pisa, Italy; ² Newcastle University, UK
4	Relationship between micro-abrasive wear modes and contact stresses: Experimental tests and CAE simulations for ISO P20 cemented carbide (WC-Co) R. C. Cozza , G. H. B. Donato University Center FEI – Educational Foundation of Ignatius “Padre Sabóia de Medeiros”, Brazil
5	Influence of the contact size on friction and wear during fretting of a AISI 4337 surfaces using a plane/plane configuration A. Dreano , G. Guillonneau, S. Fouvry Ecole Centrale de Lyon, France
6	Tribological performance and thermal characteristics of UHMWPE multifunctional hybrid composites N. Emami , H. Vadivel, A. Golchin Luleå University of Technology, Sweden
7	Tribological tests of abrasion wear resistance of carbide cutting tools with deposited wear resistant coating W. Grzegorzek Silesian University of Technology, Poland
8	Predicting fuel economy using ball-on-disk with European urban driving cycles A. Tortora, D. Halenahally Veeregowda Ducom Instruments Europe B.V, The Netherlands
9	A wear test of conventional WC-CO and alternative binder rock drill materials tested against granite and sandstone C. J. Hassila ¹ , A. Holmberg ¹ , M. Lilja ² , S. Norgren ² ¹ Uppsala University, Sweden; ² Sandvik Mining Rock Tools, Sweden
10	Trimeric surfactant as boundary lubricants N. Kampf ¹ , C. Wu ² , Y. Wang ² , J. Klein ¹ ¹ Weizmann Institute of Science, Israel; ² Institute of Chemistry, Chinese Academy of Sciences, China
11	Erosion wear behaviour of SiC ceramics M. H. Karigerasi ¹ , S. Vaidya ¹ , P. Mohanty ¹ , P. Varshney ¹ , S. K. Sharma ¹ , A. Selokar ¹ , Yashpal ¹ , B. V. Manoj Kumar ¹ , Young-Wook Kim ² ¹ Indian Institute of Technology Roorkee, India; ² University of Seoul, Republic of Korea
12	Wear debris size distribution analysis in used engine oil A. Kumar , P. S. Chauhan, S. Kumar Ghosh Indian Institute of Technology (Indian School of Mines) Dhanbad, India
13	The effect off temperature on wear behaviour of polymer (POM) gears A. Kupec , M. Kalin University of Ljubljana, Slovenia
14	Tribological properties of polyacetal (POM): the influence of contact configuration A. Kupec ¹ , A. Pogačnik ² , M. Kalin ¹ ¹ University of Ljubljana, Slovenia; ² KISSsoft AG, Bubikon, Switzerland
15	Static and dynamic wetting of PAO on various steel surfaces M. Kus , M. Kalin University of Ljubljana, Slovenia
16	Experimental tests on nonconventional lip seals for pneumatic cylinders T. Raparelli, L. Mazza , A. Trivella Polytechnic University of Turin, Italy

17	Mechanical and tribotechnical properties of nitride coatings obtained by means of sputtering unit-cast multielement alloys by vacuum-arc deposition method P. A. Srebniuk, U. S. Nyemchenko , V. V. Kruglova, V.M. Beresnev V. N. Karazin Kharkiv National University, Ukraine
18	Sliding contact analysis between a spherical particle embedded in a rubber seal and multilayered TiN/Ti coated steel surface T. J. Park , M. G. Kim Gyeongsang National University, Republic of Korea
19	Passivation-repassivation phenomena of Ti6Al4V alloy exposed to different contact conditions in marine environment V. Pejaković , M. Rodriguez Ripoll AC ² T research GmbH, Austria
20	Tribological behavior of carbon nano tubes as lubricant additive in boundary lubrication P. Ramkumar , G. S. Vankayalapati Indian Institute of Technology Madras, India
21	A CFD study of a pin-on-disc tribometer setup focusing on airborne particle sampling efficiency G. Riva ¹ , J. Wahlström ² , M. Alemani ¹ , U. Olofsson ² ¹ Brembo S.p.A., Stezzano (BG), Italy; ² KTH Royal Institute of Technology, Sweden
22	Fundamental abrasive wear behaviour of different iron aluminides H. Rojacz ¹ , M. Varga ¹ , A. Sikora ^{2,3} , M. Rodriguez Ripoll ¹ ¹ AC ² T research GmbH, Wiener Neustadt, Austria; ² Vienna University of Technology, Vienna, Austria; ³ CEST GmbH, Austria
23	Hydration lubrication at a hydrophobic surface I. Rosenhek-Goldian , N. Kampf, J. Klein Weizmann Institute of Science, Israel
24	Metal transfer and surface roughness in ceramic femoral heads: recent investigations and future research trends A. Ruggiero ¹ , M. Merola ¹ , S. Affatato ² ¹ University of Salerno, Italia; ² Istituto Ortopedico Rizzoli, Italia
25	Ceramic coatings by ionized magnetron sputtering techniques for harsh environments S. M. Deambrosis, M. Fabrizio, E. Miorin , F. Montagner, V. Zin Institute of Condensed Matter Chemistry and Technologies for Energy – National Research Council of Italy, Padova, Italy
26	Investigations of mechanical properties and structural analysis of chlorine-containing amorphous carbon films Y. Tokuta ^{1,4} , T. Itoh ² , T. Shiozaki ² , M. Kawaguchi ¹ , S. Sasaki ³ ¹ Tokyo Metropolitan Industrial Technology Research Institute, Japan; ² FUJIMETAL Co. Ltd., Japan; ³ Tokyo University of Science, Japan
27	Texture recognition of wear particles based on gray level gradient co-occurrence matrix J. Wang , Guoliang Wang, and Xiaolei Wang Nanjing University of Aeronautics & Astronautics, China
28	A Multi-objective optimization approach on the shape of surface texture for mechanical seals Xiuying Wang ¹ , L. Shi ^{1,2} , W.Huang ¹ , Xiaolei Wang ¹ ¹ Nanjing University of Aeronautics and Astronautics, China; ² Anhui University of Technology, China
29	Effect of flat ends of gears on lubricant films P. L. Wong ¹ , L. Guo ¹ , W. Wang ² , Z. M. Zhang ² ¹ City University of Hong Kong, China; ² Shanghai University, China
30	A dynamic and tribological simulation in a monolayer graphene sheet for a graphene-graphene tribo contact pair A. Palaiologos , K. Grigoriadis, A. Zavos, P. G. Nikolakopoulos University of Patras, Greece
31	Erosion-corrosion mapping of steel in crude oil. Effects of slurry composition I. Zekos , M. Stack University of Strathclyde, UK

SPONSORS

