6th European COnference on TRIBology
ECOTRIB 2017

*7–9 June 2017, Ljubljana, Slovenia*

# CONFERENCE PROGRAMME

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Slovenian Society for Tribology | Austrian Tribology Society | Italian Tribology Association | Swiss Tribology

## Wednesday, 7th June 2017

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| **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)<br>**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)<br>**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)<br>**A. Neville**<br>University of Leeds, UK | **[IT02-01] Coatings solutions for high temperature sliding applications** (Invited talk)<br>**A. Cavaleiro**[1,2], F. Fernandes[1,2], T. Danek[3,4], T. Polcar[3,4,5]<br>[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 Republik; [5]University of Southampton, UK | **[IT03-01] Towards a better understanding of the lubrication mechanisms of metal disulfides nanoparticles** (Invited talk)<br>**F. Dassenoy**, I. Jenei<br>École Centrale de Lyon, France | **[IT04-01] High temperature erosion behavior of SiC-WC composites** (Invited talk)<br>S. K. Sharma[1], **B. V. M. Kumar**[1], Young-Wook Kim[2]<br>[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)<br>**K. Dohda**<br>Northwestern University, USA |
| **14:00 – 14:20** | **[O01.01] Study of antiwear mechanisms of dialkyl phosphonoacetic acids in biodegradable oils by isotope labelling methods**<br>**T. Oshio**[1] , K. Yagishita[1], N. Kitani[2], T.Wakabayashi[2]<br>[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**<br>**B. Brodnik Žugelj**, M. Kalin<br>University of Ljubljana, Slovenia | **[O03.01] Epoxy resin based on the fullerenes and nanotubes during friction in severe contact conditions**<br>**V. Perfilyev**[1], H. Doduk[2], S. Kenig[2], I. lapsker[1], L. Rapoport[1]<br>[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**<br>Yadvendra Kaushik, **P. Ramkumar**<br>Indian Institute of Technology Madras, India | **[O05.01] Set-up of a novel test plant for high power turbomachinery tilting pad journal bearings**<br>**E. Ciulli**[1], P. Forte[1], F. Maestrale[2], M. Nuti[2], M. Libraschi[3]<br>[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**<br>**S. Akbari**, E. Oblak, M. Kalin<br>University of Ljubljana, Slovenia | **[O02.02] Ag-ZrCN coatings as a solution for improving the electrochemical and tribological performance of biomaterials**<br>S. Calderon V[1,2], J. C. Sánchez López[3], A. Cavaleiro[2], **S. Carvalho**[1,2]<br>[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**<br>**V. Zin**[1], F. Agresti[1], S. Barison[1], S. Rossi[2], M. Fabrizio[1]<br>[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**<br>**A. Hausberger**[1], Z. Major[2], G. Theiler[3], T. Gradt[3], T. Schwarz[4]<br>[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**<br>**M. Okada**[1], M. Shinke[1], M. Otsu[1], T. Miura[1], K. Dohda[2]<br>[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**<br>**R. Lu**, H. Tani, N. Tagawa, S. Koganezawa<br>Kansai University, Japan | **[O02.03] Surface roughness control of CVD diamond coatings by high density plasma polishing**<br>**T. Aizawa**, E. E. Yunata<br>Shibaura Institute of Technology, Japan | **[O03.03] Graphene as lubrication additive for steel and DLC-coated surfaces**<br>**J. Kogovšek**, M. Kalin<br>University of Ljubljana, Slovenia | **[O04.03] High performance hybrid PPS polymer composites for tribological applications**<br>**N. Emami**, A. Jain<br>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**<br>**A. Zavos**, P. Nikolakopoulos<br>University of Patras, Greece |
| **15:00 – 15:30** | Coffee break | | | | |

| Session Title | Lubrication & Lubricants | Coatings & Surfaces | Interface nano phenomena | Wear | Engineering components |
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| 15:30 – 15:50 | **[O01.04] The experimental study on the relationship between grease film thickness and grease flows**<br><br>**K. Sakai**[1,2], D. Kostal[1], Y. Shitara[2], M. Kaneta[1], I. Krupka[1], M. Hartl[1]<br><br>[1]Brno University of Technology, Czech Republic<br>[2]JX Nippon Oil & Energy Corporation, Japan | **[IT02.02] Tribological considerations in the development of endovascular catheters**<br>(Invited talk)<br><br>**S. E. Franklin**<br><br>Philips Research, The Netherlands | **[O03.04] Friction mechanisms in $MOS_2$ thin films produced by PVD-magnetron sputtering technique**<br><br>E. Serpini[1,2], **A. Rota**[1], A. Ballestrazzi[1], T. Polcar[4,5], S. Valeri[1,2]<br><br>[1]Università di Modena e Reggio Emilia, Italy<br>[2]Instituto CNR-NANO S3, Modena, Italy<br>[3]University of Southampton, UK<br>[4]Czech Technical University in Prague, Czech Republic | **[O04.04] Crack evolution of thermally worn AISI H13 steel in die casting environment**<br><br>H. A. Abdulhadi[1,2], **S. N. Aqida**[1], I. Ismail[1], M. Ishak[1], G.R. Mohammed[2]<br><br>[1]University Malaysia Pahang, Malaysia<br>[2]Baghdad-Institute, Foundation of Technical Education, Iraq | **Panel Discussion on Micromachining**<br><br>**Panellists:**<br><br>**K. Dohda**[1]<br>**M. Yamamoto**[2]<br>**M. Okada**[3]<br>**M. A. Ahmad**[4]<br>**J. Valentinčič**[5]<br><br>[1]Northwestern University, USA<br>[2]Manufacturing Engineering Center, NSK Ltd, Japan<br>[3]University of Fukui, Japan<br>[4]Universiti Teknologi MARA, Malaysia<br>[5]University of Ljubljana, Slovenia |
| 15:50 – 16:10 | **[O01.05] Characterization of environmentally acceptable lubricants (eal's) for marine applications**<br><br>**F. X. Borras**, M. B. de Rooij, D. J. Schipper<br><br>University of Twente, The Netherlands | | **[O03.05] In-situ generation of transition metal dichalcogenide tribofilms**<br><br>**M. Rodríguez Ripoll**, A. Tomala, V. Totolin<br><br>AC[2]T research GmbH, Austria | **[O04.05] Tribo-electrically induced modifications of copper surfaces in sliding contact against copper-graphite**<br><br>**M. Grandin**, U. Wiklund<br><br>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**<br><br>J. Babu, K. P. Nair, **M. L. Joy**<br><br>National Institute of Technology Calicut, India | **[O02.04] Fibre laser surface texturing on bearing steel (AISI 52100) for tribological applications**<br><br>**H. Vijaikumar**, S. Soundarapandian, L. Vijayaraghavan<br><br>Indian Institute of Technology Madras, India | **[O03.06] Challenging the status quo: accurate nanoindentation of soft matter in liquid**<br><br>**R. Simič**, C. H. Mathis, N. D. Spencer<br><br>ETH Zürich, Switzerland | **[O04.06] Tribological behavior of sinter-forged Fe-2Cu-0.7C-xMo alloys**<br><br>**S. S. Rathore**[1], V. Verma[2], B. V. M. Kumar[2], V. V. Dabhade[2]<br><br>[1]Govt. Engineering College Bikaner, India<br>[2]Indian Institute of Technology Roorkee, India | |
| 16:30 – 16:50 | **[O01.07] Effects of solid lubricants (Graphite, $MoS_2$ and $Sb_2S_3$) of Cu/SiC hybrid composite brake materials on tribological properties for medium duty automotive applications**<br><br>**R. Petchiappan**, P. Ramkumar<br><br>Indian Institute of Technology Madras, India | **[O02.05] Combination of laser surface texturing and DLC coating of PEEK for enhanced tribological properties**<br><br>**J. Dufils**[1], F. Faverjon[2], C. Heau[2], C. Donnet[3], S. Benayoun[1], S. Valette[1]<br><br>[1]École Centrale de Lyon, France<br>[2]IREIS, HEF group, France<br>[3]Université Jean Monnet, France | **[O03.07] Fundamental and tribological properties of thick CPB**<br><br>**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]<br><br>[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**<br><br>**M. Adler**, S. Spiller, E. Badisch<br><br>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 | | | | | |
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| **09:00 – 09:50** | **[KS03] Extracting diamondlike carbon tribofilms from lubricating oils by catalytically active composite coatings** (Keynote lecture)<br>**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)<br>**M. Fillon**; Pprime Institute, CNRS - Université de Poitiers - ISAE-ENSMA, France | | | | |
| **10:40 – 11:10** | Coffee break | | | | |
| **11:10 – 12:00** | **[KS05] Friciton and lubrication inside disk drives: Is nanotribology useful?** (Keynote lecture)<br>**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)<br>**T. Hirayama**[1,2]<br>[1]Doshisha University, Japan<br>[2]JST Presto, Japan | **[IT02-03] Running-in control for creation of nanointerface giving super-low friction** (Invited talk)<br>**K. Adachi**<br>Tohoku University, Japan | **[IT03-02] Ab-initio investigation of tribochemistry phenomena in solid and boundary lubricants** (Invited talk)<br>**M. C. Righi**[1,2]<br>[1]University of Modena and Reggio Emilia,<br>[2]CNR - Institute of Nanoscience, Italy | **[IT04-02] Lifetime test of carbon fibre water hydraulic cylinder** (Invited talk)<br>**F. Majdič**<br>University of Ljubljana, Slovenia | **[IT05-02] Rolling bearing modelling and current trends** (Invited talk)<br>**G. E. Morales-Espejel**[1,2]<br>[1]SKF Engineering and Research Centre, The Netherlands<br>[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**<br>**H. Okubo**[1], C. Tadokoro[2], Y. Hirata[1], S. Sasaki[1]<br>[1]Tokyo University of Science, Japan;<br>[2]Sitama University, Japan | **[O02.06] Characterization of the DLC films tribological responses related to the test environments**<br>**G. Fiaschi**[1], E. Vezzalini[1], A. Ballestrazzi[1], D. Marchetto[1,2], S. Valeri[1,2]<br>[1]University of Modena and Reggio Emilia, Italy<br>[2]CNR - Institute of Nanoscience, Italy | **[O03.08] Influence of friction on metal flow in forming process**<br>**T. Funazuka**[1], N. Takatsuji[2], K. Dohda[1], T. Aizawa[3]<br>[1]Northwestern University, USA<br>[2]Toyama University, Japan<br>[3]Shibaura Institute of Technology, Japan | **[O04.08] Microstructural design of multifunctional laser hardfacings for high temperature sliding applications**<br>H. Torres[1], **M. Rodriguez Ripoll**[1], B. Prakash[2]<br>[1]AC[2]T research GmbH, Austria<br>[2]Luleå University of Technology, Sweden | **[O05.08] Benchtop screening of wet clutch materials**<br>**S. J. Shaffer**[1], T. B. Freshly[2], S. E. Papanicolaou[1]<br>[1]Bruker: Tribology, Stylus and Optical Metrology, USA<br>[2]LuK USA, LLC: Wet Friction Development, USA |
| **14:20 – 14:40** | **[O01.09] Tribological investigation of greases in static and boundary regimes**<br>**K. S. Pondicherry**[1], F. Rummel[2]<br>[1]Anton Paar GmbH, Austria<br>[2]Anton Paar Germany GmbH, Germany | **[O02.07] Self-lubricating protective coatings: CrVN sputtering deposition and oxidation**<br>**A. Drnovšek**, P. Panjan, J. Kovač, M. Panjan and M. Čekada<br>Jožef Stefan Institute, Slovenia | **[O03.09] Simulation of the roundness effects in the active magnetic bearings behavior**<br>**L. Giasiranis**, P .G. Nikolakopoulos, C. A. Papadopoulos<br>[1]University of Patras, Greece | **[O04.09] Role of alloying elements on the strain hardening behaviour of iron-based alloys in abrasive contacts**<br>**H. Rojacz**, M. Varga, M. Rodríguez Ripoll<br>AC[2]T research GmbH, Austria | **[O05.09] Influence of structural flexibility on the contact characteristics of a thin-walled roller bearing**<br>**Y. Mao**, L. Wang , C. Zhang<br>[1]Harbin Institute of Technology, China |
| **14:40 – 15:00** | **[O01.10] Atomic force microscopy for in-situ tribology**<br>**R. Bingley**, C. Wang, A. Morina, A. Neville<br>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**<br>**K. Simonović**, M. Kalin<br>University of Ljubljana, Slovenia | **[O03.10] Abrasive Wear Simulation of an ASTM G65 Standard Test**<br>D. Bianchi, P. Bedolla, G. Vorlaufer, **E. Badisch**<br>AC[2]T research GmbH, Austria | **[O04.10] Rail head damage and accumulation of welded deposits on the breaking pads of railway vehicles**<br>**V. Pejaković**, F. Heindl, U. Cihak-Bayr, F. Franek<br>AC[2]T research GmbH, Austria | **[O05.10] An integrated bearing selection methodology based on total cost of ownership**<br>**S. Vandenberghe**, F. Al-Bender<br>University of Leuven, Belgium |
| **15:00 – 15:30** | Coffee break | | | | |

| Session Title | Lubrication & Lubricants | Coatings & Surfaces | Modelling & Simulations | Wear | Engineering components |
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| 15:30 – 15:50 | **[O01.11] Oxidation mechanisms of ester oils identified by isotope labelling and mass spectrometry**<br>**M. Frauscher**[1], C. Besser[1], B. Ronai[1,2], N. Dörr[1], G. Allmaier[2]<br>[1]AC[2]T research GmbH, Austria; [2]Vienna University of Technology, Institute of Chemical Technologies and Analytics, Austria | **[O02.09] Plasma electrolytic oxidation coating application for engine blocks**<br>**R. Bayón**, **V. Sáenz de Viteri**, X. Fernández, A. Igartua<br>IK4-Tekniker, Spain | **[O03.11] Numerical and experimental methodologies based on femtosecond laser micro-texturing for enhanced surface tribology**<br>C. Putignano[1,2], **G. S. Joshi**[2], A. Ancona[1], G. Carbone[1,2]<br>[1]CNR-IFN U.O.S. Bari, Italy<br>[2]Politecnico di Bari, Italy | **[O04.11] The influence of contact configuration on tribological properties of polyamide (PA6)**<br>**A. Kupec**[1], A. Pogačnik[2], M. Kalin[1]<br>[1]University of Ljubljana, Slovenia<br>[2]KISSsoft AG, Bubikon, Switzerland | **[O05.11] Dynamic behavior of a rectangular grooved air pad**<br>F. Colombo, D. Ghodsiyeh, Terenziano Raparelli, **A. Trivella**, V. Viktorov<br>Polytechnic University of Turin, Italy |
| 15:50 – 16:10 | **[O01.12] Correlation between limiting shear stress and lubricant properties under elastohydrodynamic lubrication**<br>**S. N. Ndiaye**, L. Martinie, D. Philippon, P. Vergne<br>University of Lyon, INSA Lyon, CNRS, LaMCoS, France | **[O02.10] The correlated selection of the substrate, thin coating and lubricating oil to increase the resistance of heavy loaded parts to various forms of wear**<br>**M. Szczerek**[1], R. Michalczewski[1], W. Piekoszewski[1], W. Tuszynski[1], J. Wulczynski[1], A. Wieczorek[2]<br>[1]Institute for Sustainable Technologies, Poland; [2]Silesian University of Technology, Poland | **[O03.12] Wearing-in of journal bearings under non-stationary conditions**<br>**F. König**, G. Jacobs G. Burghardt<br>RWTH Aachen University, Germany | **[O04.12] Influence of temperature on the corrosion and tribocorrosion behaviour of high strength low-alloy steels used in offshore applications**<br>**A. López-Ortega**[1], R. Bayón[1], J. L. Arana[2], E. Rodríguez[3], A. Igartua[1]<br>[1]IK4-Tekniker, Eibar, Spain,<br>[2]University of the Basque Country, Spain<br>[3]Vicinay Marine Innovación, Bilbao, Spain | **[O05.12] Novel lead free bearing overlay solutions with low friction performance**<br>**[1]F. Summer**, [1]F. Grün, [2]M. Offenbecher, [3]E. Laine, [3]S. Taylor<br>[1]Montanuniversität Leoben, Austria<br>[2]Miba Bearing Group, Austria<br>[3]Infineum UK Limited, UK |
| 16:10 – 16:30 | **[O01.13] Viscosity index improvers response in thin and very thin lubrication regimes**<br>**P. Cusseau**[1], P. Vergne[1], D. Philippon[1], L. Martinie[1], N. Bouscharain[1], F. Briand[2]<br>[1]University of Lyon, INSA Lyon, CNRS, LaMCoS, France<br>[2]TOTAL, France | **[O02.11] The mechanism of lifetime enhancement by phosphate conversion coatings**<br>**D. Ernens**[1,2], G. Langedijk[2,3], M. B. de Rooij[1], H. R. Pasaribu[2], D.J. Schipper[1]<br>[1]University of Twente, The Netherlands<br>[2]Shell Global Solutions International BV, The Netherlands; [3]The Hague University of Applied Sciences, The Netherlands | **[O03.13] Multiscale contact simulations for elastomers**<br>**A. Miniberger**, M. C. Miron, J. Holzweber, U. Cakmak, Z. Major<br>University of Linz, Institute for Polymer Product Engineering, Austria | **[O04.13] Fabrication and reciprocating wear of TiCN based cermets**<br>S. K. Sharma[1], D. Singh[1], **B. V. Manoj Kumar**[1], Blaž Brodnik Žugelj[2], Mitjan Kalin[2]<br>[1]Indian Institute of Technology Roorkee, India<br>[2]University of Ljubljana, Slovenia | **[O05.13] The role of adhesion in transition from stick to slip at the interface of two contacting bodies**<br>**M. Bazr Afshan Fadafan** [1,2], M.B. de Rooij[2], D. J. Schipper[2]<br>[1]Material Innovation Institute (M2i), The Netherlands<br>[2]University of Twente, The Netherlands |
| 16:30 – 16:50 | **[O01.14] 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**<br>**D. K. Prajapati**, M. Tiwari<br>[1]Indian Institute of Technology Patna, India | **[O02.12] Low friction mechanism of chlorine-containing amorphous carbon films against aluminium alloy**<br>**Y. Tokuta**[1,4], T. Itoh[2], T. Shiozaki[2], M. Kawaguchi[1], S. Sasaki[3]<br>[1]Tokyo Metropolitan Industrial Technology Research Institute, Japan<br>[2]FUJIMETAL Co. Ltd., Japan<br>[3]Tokyo University of Science, Japan | **[O03.14] Material point method simulation of ploughing behaviour in coated systems**<br>**T. Mishra**[1], G. Ganzenmüller[2], M. B. de Rooij[1], D.J. Schipper[1]<br>[1]University of Twente, The Netherlands ; [2]Fraunhofer Ernst-Mach-Institut, Germany | **[O04.14] Formation and functional mechanisms of transfer films between polymeric composites and steel counterpart under dry sliding contact**<br>**B. C. Jim**[1], G. Zhang[2], W. Österle[3], I. Häusler[3], A. I. Dmitriev[4], B. Wetzel[1]<br>[1]Institute for Composite Materials, Germany; [2]Lanzhou Institute for Chemical Physics, China; [3]Federal Institute for Materials Research, Germany;[4]Institute of Strength Physics and Materials Science, Russia | **[O05.14] Adhesion growth behavior in metal forming**<br>**M. Yamamoto**[1], Kuniaki Dohda[2], Houichi Kitano[3], Mitjan Kalin[4], Kornel F. Ehmann[2]<br>[1]Manufacturing Engineering Center, NSK Ltd, Japan; [2]Northwestern University, USA; [3]Research Center for Structural Materials, National Institute for Materials Science, Japan; [4]University of Ljubljana, Slovenia |
| 16:50 – 17:10 | **[O01.15] Experimental and quantum chemical investigations on oxidative stability of sesame oil with ecofriendly synthetic antioxidant additives for high-temperature lubricants**<br>S. Sankarannair, **K. P. Nair**, R. P. Krishnan<br>National Institute of Technology Calicut, India | **[O02.13] Tribology of fibrous tows**<br>**D. M. Mulvihill**[1], O. Smerdova[2], M. P. F. Sutcliffe[3]<br>[1]University of Glasgow, UK; [2]Institut Pprime, CNRS - Université de Poitiers - ISAE-ENSMA, France; [3]University of Cambridge, Cambridge, UK | **[O03.15] The role of the preload on the behavior of gas lubricated offset half bearings**<br>**M. T. C. Faria**<br>RWTH Aachen University, Germany | **[O04.15] Subsurface material analysis and wear of cylinder liner materials**<br>T. Wopelka, **C. Lenauer**, U. Cihak-Bayr, M. Jech<br>AC[2]T research GmbH, Austria | **[O05.15] Novel gear test methodology to evaluate efficiency and durability**<br>**F. Grün**, B. Maier, I. Gódor, F. Steinwender<br>Montanuniversität Leoben, Austria |
| 20:00 – | **Gala dinner at the National Gallery of Slovenia** | | | | |

| Friday, 9th June 2017 | | | | | |
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| **09:00 – 09:50** | **[KS06] Thermal and shear-induced effects in boundary film formation** (Keynote lecture)<br>**W. T. Tysoe**; University of Wisconsin Milwaukee, USA | | | | |
| **09:50 – 10:40** | **[KS07] Biolubrication: beyond tribology** (Keynote lecture)<br>**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)<br>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)<br>**F. J. Carrión-Vilches**[1,2], M.D. Avilés[1], J. Sanes[1], R. Pamies[1], M.D. Bermúdez[1], K.Nakano[2]<br>[1]Universidad Politécnica de Cartagena, Spain<br>[2]Yokohama National University, Japan | **[IT02-04] Structural and mechanical modifications of hard carbon coatings under low friction** (Invited talk)<br>**M. I. De Barros Bouchet**<br>University of Lyon,<br>École Centrale de Lyon, France | **[IT03-03] Facilitating effectve hydrodynamic lurbication for zero-entrainment-velocity contacts based on boundary slip mechanism** (Invited talk)<br>**P. L. Wong**[1], Y. Zhao[1,2], J. Mao[2]<br>[1]City University of Hong Kong, China<br>[2]Xi'an Jiaotong University, China | **[IT04-03] Effect of hydrothermal ageing on wear mechanism and friction behaviour of PTFE composites** (Invited talk)<br>**N. Emami, M.R. Homayoun**<br>Luleå University of Technology, Sweden | **[IT05-03] Tribotronics – part of a pathway to sustainable engineering?** (Invited talk)<br>**I. Sherrington**<br>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**<br>L. Mu,[1,2] **Y. Shi**[2], J. Zhu[1]<br>[1]The University of Akron, USA<br>[2]Luleå University of Technology, Sweden | **[O02.14] Crack density and tribological performance of hard chrome coatings**<br>**B. Podgornik**[1], O. Massler[2], F. Kafexhiu[1], M. Sedlaček[1]<br>[1]Institute of Metals and Technology, Slovenia<br>[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**<br>**M. Polajnar**[1], M. Kalin[1], F. Jarnias[2], B. Thiebaut[2]<br>[1]University of Ljubljana, Slovenia<br>[2]TOTAL, France | **[O04.16] Improved tribological behaviors of graphene/polytetrafluoroethylene composites**<br>**X. Wang,** J. Wu, L. Zhou, X. Wei<br>Shanghai University, China | **[O05.16] Synergetic effects inside a simplified friction material: A PCA approach**<br>**F. Vivier**[1,2], D. Pellerej[1]<br>[1]ITT Italia Srl, Italy;<br>[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**<br>**A. Arcifa**[1], A. Rossi[1,2], N.D. Spencer[1]<br>[1]ETH Zürich, Switzerland<br>[2]Università di Cagliari, Italy | **[O02.15] The application of fine grained solid lubricants in high performance dry machining processes**<br>**L. Sterle**, F. Pušavec, M. Kalin<br>University of Ljubljana, Slovenia | **[O03.17] The thermocapillary migration on shot blasted surfaces**<br>Q. Dai[1], W. Huang[1], **X. Wang**[1,2]<br>[1]Nanjing University of Aeronautics & Astronautics, China<br>[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**<br>**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]<br>[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**<br>**S. Vandenberghe**[1], W. Driesen[2], S. Devos[2], F. Al-Bender[1]<br>[1]University of Leuven, Belgium<br>[2]Flanders Make, Belgium |
| **14:40 – 15:00** | **[O01.18] Lubricating property of cyano-based ionic liquids against tetrahedral amorphous carbon film**<br>**S. Kawada**, S. Watanabe, Y. Hirata, S. Sasaki<br>Tokyo University of Science, Japan | **[O02.16] Effect of the contact geometry and thermal spray coatings on abrasion resistance of rotary feeder blades**<br>**V. Pejaković**, U. Cihak-Bayr<br>AC²T research GmbH, Austria | **[O03.18] Wear mechanisms in metals studied with Smooth Particle Hydrodynamics (SPH)**<br>S. Leroch, S. J. Eder, **M. Rodríguez-Ripoll**<br>AC²T research GmbH, Austria | **[O04.18] Experimental and analytical Investigations on wear characteristics of polymers against metal counterfaces using disc-on-disc system**<br>S. Panda, **A. Maurya***, M. Sarangi, S. K. Roy Chowdhury<br>Indian Institute of Technology Kharagpur, India | **[O05.18] Double-Hertz extension for mild ellipticity ratio contact between elastic cylinders**<br>**N. H. Mohd Zini**[1,2], M. B. de Rooij[1], M. Bazrafshan[1] , N. Ismail[1,2], D. J. Schipper[1]<br>[1]University of Twente, The Netherlands<br>[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**<br>**J. Lind**, P. Söderbäck, Å. Kassman Rudolphi<br>Uppsala University, Sweden | **[O02.17] Relationship between friction and wear of dental implant materials**<br>F. Alemanno[1], S. Spriano[2] **D. Halenahally Veeregowda**[1]<br>[1]Ducom Instruments Europe B.V, The Netherlands<br>[2] Polytechnic University of Turin, Italy | **[O03.19] Dynamic friction during oblique impact of golf ball**<br>**K. Arakawa**<br>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**<br>**E. Schiebel**[1], D. Bianchi[2], A. Vernes[2], F. Franek[2]<br>[1]AIT Austrian Institute of Technology, Austria<br>[2]AC[2]T research GmbH, Austria | **[O05.19] Influence of reaction layer composition on surface damage in bearing application**<br>**I. Nedelcu[1],** E. Vegter[1], K. Stadler[2]<br>[1]SKF B.V., The Netherlands; [2]SKF 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**<br>**S. Kodoor**, P. Ramkumar<br>Indian Institute of Technology Madras, India | **[O02.18] A finite element simulation of MOM hip implant**<br>**S. Chaturvedi**[1], P. K. Bharti[2], [3]S. Kumar Yadav<br>[1]Integral University, India<br>[2] Integral University, India<br>[3]Graphic Era University, India | **[O03.20] Tribological characterization of carbon materials**<br>**E. Casamassa**[1,2], G. Gautier[1], A. Sin[3], M. G. Faga[1]<br>[1]IMAMOTER, National Council of Research, Torino, Italy<br>[2]University of Parma, Italy<br>[3]ITT Italia srl, Italy | **[O04.20] Properties of the nitrocarburised and oxidised steel surfaces and the correlation with their tribological behaviour under unlubricated sliding conditions**<br>**I. Velkavrh**[1], F. Ausserer[1], S. Klien[1], J. Voyer[1], K. Lingenhöle[2], F. Kafexhiu[3], D. Mandrino[3], B. Podgornik[3], A. Diem[1]<br>[1]V-Research GmbH, Austria; [2]Lingenhöle Technologie GmbH, Austria; [3]Institute of Metals and Technology, Slovenia | **[O05.20] Lifetime estimation of lubricant used in dragline gearbox**<br>**P. Kewat**, A. K. Mukhopadhyay, S.K. Ghosh<br>[1]Indian 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"**<br>**R. C. Cozza**<br>University Center FEI – Educational Foundation of Ignatius "Padre Sabóia de Medeiros", Brazil | **[O02.19] Tribological approach to food oral processing**<br>**F. Rummel**[1], K. S. Pondicherry[2]<br>[1]Anton Paar Germay GmbH, Germany<br>[2]Anton Paar GmbH, Austria | **[O03.21] Measuring friction in fibre-on-fibre contact**<br>**N. Ismail**[1,2], M. B. de Rooij[1] , E.G. de Vries[1], D. J. Schipper[1]<br>[1]University of Twente, The Netherlands; [2]Universiti Teknikal Malaysia Melaka, Malaysia | **[O04.21] A wear test of conventional WC-CO and alternative binder rock drill materials tested against granite and sandstone**<br>**C. J. Hassila**[1], A. Holmberg[1], M. Lilja[2], S. Norgren[2]<br>[1]Uppsala University, Sweden<br>[2]Sandvik Mining Rock Tools, Sweden | **[O05.21] A study on highly-loaded contacts under dry lubrication for gear applications**<br>**M. Yilmaz**, D. Kratzer, T. Lohner, K. Michaelis, K. Stahl<br>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**<br>**K. Bērziņš**, J. Rudzītis<br>Riga Technical University, Institute of Mechanical Engineering, Latvia |
| 2 | **Couple stress effects on the performances of thermo-hydrodynamic slider bearing**<br>**S. Boubendir**[1], M. Malki[2]<br>[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**<br>L. Mattei[1], F. Di Puccio[1], T. J. Joyce[2], **E. Ciulli**[1]<br>[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)**<br>**R. C. Cozza**, G. H. B. Donato<br>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**<br>**A. Dreano**, G. Guillonneau, S. Fouvry<br>Ecole Centrale de Lyon, France |
| 6 | **Tribological performance and thermal characteristics of UHMWPE multifunctional hybrid composites**<br>**N. Emami**, H. Vadivel, A. Golchin<br>Luleå University of Technology, Sweden |
| 7 | **Tribological tests of abrasion wear resistance of carbide cutting tools with deposited wear resistant coating**<br>**W. Grzegorzek**<br>Silesian University of Technology, Poland |
| 8 | **Predicting fuel economy using ball-on-disk with European urban driving cycles**<br>A. Tortora, **D. Halenahally Veeregowda**<br>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**<br>**C. J. Hassila**[1], **A. Holmberg**[1], M. Lilja[2], S. Norgren[2]<br>[1]Uppsala University, Sweden; [2]Sandvik Mining Rock Tools, Sweden |
| 10 | **Trimeric surfactant as boundary lubricants**<br>**N. Kampf**[1], C. Wu[2], Y. Wang[2], J. Klein[1]<br>[1]Weizmann Institute of Science, Israel; [2]Institute of Chemistry, Chinese Academy of Sciences, China |
| 11 | **Erosion wear behaviour of SiC ceramics**<br>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]<br>[1]Indian Institute of Technology Roorkee, India; [2]University of Seoul, Republic of Korea |
| 12 | **Wear debris size distribution analysis in used engine oil**<br>**A. Kumar**, P. S. Chauhan, S. Kumar Ghosh<br>Indian Institute of Technology (Indian School of Mines) Dhanbad, India |
| 13 | **The effect off temperature on wear behaviour of polymer (POM) gears**<br>**A. Kupec**, M. Kalin<br>University of Ljubljana, Slovenia |
| 14 | **Tribological properties of polyacetal (POM): the influence of contact configuration**<br>**A. Kupec**[1], A. Pogačnik[2], M. Kalin[1]<br>[1]University of Ljubljana, Slovenia; [2]KISSsoft AG, Bubikon, Switzerland |
| 15 | **Static and dynamic wetting of PAO on various steel surfaces**<br>**M. Kus**, M. Kalin<br>University of Ljubljana, Slovenia |
| 16 | **Experimental tests on nonconventional lip seals for pneumatic cylinders**<br>T. Raparelli, **L. Mazza**, A. Trivella<br>Polytechnic University of Turin, Italy |

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| **17** | **Mechanical and tribotechnical properties of nitride coatings obtained by means of sputtering unit-cast multielement alloys by vacuum-arc deposition method**<br>P. A. Srebniuk, **U. S. Nyemchenko**, V. V. Kruglova, V.M. Beresnev<br>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**<br>**T. J. Park**, M. G. Kim<br>Gyeongsang National University, Republic of Korea |
| **19** | **Passivation-repassivation phenomena of Ti6Al4V alloy exposed to different contact conditions in marine environment**<br>**V. Pejaković**, M. Rodriguez Ripoll<br>AC$^2$T research GmbH, Austria |
| **20** | **Tribological behavior of carbon nano tubes as lubricant additive in boundary lubrication**<br>**P. Ramkumar**, G. S. Vankayalapati<br>Indian Institute of Technology Madras, India |
| **21** | **A CFD study of a pin-on-disc tribometer setup focusing on airborne particle sampling efficiency**<br>**G. Riva**[1], J. Wahlström[2], M. Alemani[1], U. Olofsson[2]<br>[1]Brembo S.p.A., Stezzano (BG), Italy; [2]KTH Royal Institute of Technology, Sweden |
| **22** | **Fundamental abrasive wear behaviour of different iron aluminides**<br>**H. Rojacz**[1], M. Varga[1], A. Sikora[2,3], M. Rodriguez Ripoll[1]<br>[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**<br>**I. Rosenhek-Goldian**, N. Kampf, J. Klein<br>Weizmann Institute of Science, Israel |
| **24** | **Metal transfer and surface roughness in ceramic femoral heads: recent investigations and future research trends**<br>**A. Ruggiero**[1], M. Merola[1], S. Affatato[2]<br>[1]University of Salerno, Italia; [2]Istituto Ortopedico Rizzoli, Italia |
| **25** | **Ceramic coatings by ionized magnetron sputtering techniques for harsh environments**<br>S. M. Deambrosis, M. Fabrizio, **E. Miorin**, F. Montagner, V. Zin<br>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**<br>**Y. Tokuta**[1,4], T. Itoh[2], T. Shiozaki[2], M. Kawaguchi[1], S. Sasaki[3]<br>[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**<br>**J. Wang**, Guoliang Wang, and Xiaolei Wang<br>Nanjing University of Aeronautics & Astronautics, China |
| **28** | **A Multi-objective optimization approach on the shape of surface texture for mechanical seals**<br>Xiuying Wang[1], L. Shi[1,2], W.Huang[1], **Xiaolei Wang**[1]<br>[1]Nanjing University of Aeronautics and Astronautics, China; [2]Anhui University of Technology, China |
| **29** | **Effect of flat ends of gears on lubricant films**<br>**P. L. Wong**[1], L. Guo[1], W. Wang[2], Z. M. Zhang[2]<br>[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**<br>**A. Palaiologos**, K. Grigoriadis, A. Zavos, P. G. Nikolakopoulos<br>University of Patras, Greece |
| **31** | **Erosion-corrosion mapping of steel in crude oil. Effects of slurry composition**<br>**I. Zekos**, M. Stack<br>University of Strathclyde, UK |

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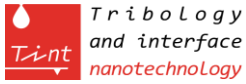
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