



# 6<sup>th</sup> European Conference on TRIBology ECOTRIB 2017

7–9 June 2017, Ljubljana, *Slovenia*

## CONFERENCE PROGRAMME



Photo: D. Wedam, Turizem Ljubljana



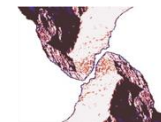
Slovenian Society for Tribology



Austrian Tribology Society



Italian Tribology Association



Swiss Tribology

# Wednesday, 7<sup>th</sup> June 2017

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|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 08:00 – 09:40 | Registration                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                        |
| 09:40 – 09:50 | Opening ceremony                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                        |
| 09:50 – 10:40 | <b>[KS01] Wear performance design by integrated computational materials modelling (Keynote lecture)</b><br><b>Kenneth Holmberg</b> , Anssi Laukkanen, VTT Technical Research Centre of Finland, Finland                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                        |
| 10:40 – 11:10 | Coffee break                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                        |
| 11:10 – 12:00 | <b>[KS02] Stress-promoted thermal activation - from rheology to tribochemistry (Keynote lecture)</b><br><b>Hugh Spikes</b> , 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 | <b>[IT01-01] Tribochemistry and tribocorrosion in micropitting contacts; using advanced microscopy to understand localised reactions (Invited talk)</b><br><br><b>A. Neville</b><br><br>University of Leeds, UK                                                                                                                                                | <b>[IT02-01] Coatings solutions for high temperature sliding applications (Invited talk)</b><br><br><b>A. Cavaleiro</b> <sup>1,2</sup> , F. Fernandes <sup>1,2</sup> , T. Daneš <sup>3,4</sup> , T. Polcar <sup>3,4,5</sup><br><br><sup>1</sup> University of Coimbra Portugal;<br><sup>2</sup> LED&Mat – Instituto Pedro Nunes, Portugal; <sup>3</sup> Czech Technical University, Czech Republic; <sup>4</sup> AdvaMat s.r.o. Company, Czech Republic; <sup>5</sup> University of Southampton, UK | <b>[IT03-01] Towards a better understanding of the lubrication mechanisms of metal disulfides nanoparticles (Invited talk)</b><br><br><b>F. Dassenoy</b> , I. Jenei<br><br>École Centrale de Lyon, France                                                                                                                                                                                                                                                       | <b>[IT04-01] High temperature erosion behavior of SiC-WC composites (Invited talk)</b><br><br>S. K. Sharma <sup>1</sup> , <b>B. V. M. Kumar</b> <sup>1</sup> , Young-Wook Kim <sup>2</sup><br><br><sup>1</sup> Indian Institute of Technology Roorkee, India<br><sup>2</sup> University of Seoul, Republic of Korea                                                                                                                                                                                                                                                                                              | <b>[IT05-01] Evaluation method for cold and hot metal forming (Invited talk)</b><br><br><b>K. Dohda</b><br><br>Northwestern University, USA                                                                                                                                                                                                                                            |
| 14:00 – 14:20 | <b>[O01.01] Study of antiwear mechanisms of dialkyl phosphonoacetic acids in biodegradable oils by isotope labelling methods</b><br><br><b>T. Oshio</b> <sup>1</sup> , K. Yagishita <sup>1</sup> , N. Kitani <sup>2</sup> , T. Wakabayashi <sup>2</sup><br><br><sup>1</sup> JX Nippon Oil and Energy Corporation, Japan; <sup>2</sup> Kagawa University, Japan | <b>[O02.01] Submicron scale experimental analyses of the real contact area for different topographic and material properties</b><br><br><b>B. Brodnik Žugelj</b> , M. Kalin<br><br>University of Ljubljana, Slovenia                                                                                                                                                                                                                                                                                | <b>[O03.01] Epoxy resin based on the fullerenes and nanotubes during friction in severe contact conditions</b><br><br><b>V. Perfiljev</b> <sup>1</sup> , H. Doduk <sup>2</sup> , S. Kenig <sup>2</sup> , I. lapsker <sup>1</sup> , L. Rapoport <sup>1</sup><br><br><sup>1</sup> Holon Institute of Technology, Israel<br><sup>2</sup> Shenkar College of Engineering and Design, Israel                                                                         | <b>[O04.01] Study on the combined effects of soot and temperature on tribological properties of steel and ceramic contacts using Taguchi analysis</b><br><br>Yadvendra Kaushik, <b>P. Ramkumar</b><br><br>Indian Institute of Technology Madras, India                                                                                                                                                                                                                                                                                                                                                           | <b>[O05.01] Set-up of a novel test plant for high power turbomachinery tilting pad journal bearings</b><br><br><b>E. Ciulli</b> <sup>1</sup> , P. Forte <sup>1</sup> , F. Maestrale <sup>2</sup> , M. Nuti <sup>2</sup> , M. Libraschi <sup>3</sup><br><br><sup>1</sup> University of Pisa, Italy; <sup>2</sup> AM Testing srl, Pisa, Italy; <sup>3</sup> GE Oil & Gas, Firenze, Italy |
| 14:20 – 14:40 | <b>[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</b><br><br><b>S. Akbari</b> , E. Oblak, M. Kalin<br><br>University of Ljubljana, Slovenia                                                                                                               | <b>[O02.02] Ag-ZrCN coatings as a solution for improving the electrochemical and tribological performance of biomaterials</b><br><br>S. Calderon V <sup>1,2</sup> , J. C. Sánchez López <sup>3</sup> , A. Cavaleiro <sup>2</sup> , <b>S. Carvalho</b> <sup>1,2</sup><br><br><sup>1</sup> University of Minho, Portugal<br><sup>2</sup> University of Coimbra, Portugal<br><sup>3</sup> Instituto de Ciencia de Materiales de Sevilla, Spain                                                         | <b>[O03.02] Tribological behaviour of goethite (α-FeOOH) based nanolubricants</b><br><br><b>V. Zin</b> <sup>1</sup> , F. Agresti <sup>1</sup> , S. Barison <sup>1</sup> , S. Rossi <sup>2</sup> , M. Fabrizio <sup>1</sup><br><br><sup>1</sup> Institute of Condensed Matter Chemistry and Technologies for Energy, National Research Council of Italy, Italy<br><sup>2</sup> Institute of Construction Technologies, National Research Council of Italy, Italy | <b>[O04.02] Investigation on the friction and wear behaviour of thermoplastic polyurethanes by controlling the adhesion and deformation part of friction</b><br><b>A. Hausberger</b> <sup>1</sup> , Z. Major <sup>2</sup> , G. Theiler <sup>3</sup> , T. Gradt <sup>3</sup> , T. Schwarz <sup>4</sup><br><br><sup>1</sup> Polymer Competence Center Leoben GmbH, Austria; <sup>2</sup> Institute of Polymer Product Engineering, Johannes Kepler University Linz, Austria; <sup>3</sup> Bundesanstalt für Materialforschung und prüfung (BAM), Germany; <sup>4</sup> SKF Sealing Solutions Austria GmbH, Austria | <b>[O05.02] Flattening mechanisms through roller burnishing by active rotary tool</b><br><br><b>M. Okada</b> <sup>1</sup> , M. Shinke <sup>1</sup> , M. Otsu <sup>1</sup> , T. Miura <sup>1</sup> , K. Dohda <sup>2</sup><br><br><sup>1</sup> University of Fukui, Japan;<br><sup>2</sup> Northwestern University, USA                                                                 |
| 14:40 – 15:00 | <b>[O01.03] A study on tribofilm growth and the friction coefficient microscopy</b><br><b>R. Lu</b> , H. Tani, N. Tagawa, S. Koganezawa<br><br>Kansai University, Japan                                                                                                                                                                                        | <b>[O02.03] Surface roughness control of CVD diamond coatings by high density plasma polishing</b><br><br><b>T. Aizawa</b> , E. E. Yunata<br><br>Shibaura Institute of Technology, Japan                                                                                                                                                                                                                                                                                                            | <b>[O03.03] Graphene as lubrication additive for steel and DLC-coated surfaces</b><br><br><b>J. Kogovšek</b> , M. Kalin<br><br>University of Ljubljana, Slovenia                                                                                                                                                                                                                                                                                                | <b>[O04.03] High performance hybrid PPS polymer composites for tribological applications</b><br><br><b>N. Emami</b> , A. Jain<br><br>Luleå University of Technology, Sweden                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>[O05.03] Tribology of new thin compression ring of fired engine under realistic speeds – A combined experimental and numerical study</b><br><br><b>A. Zavos</b> , P. Nikolakopoulos<br><br>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 | <p><b>[O01.04] The experimental study on the relationship between grease film thickness and grease flows</b></p> <p><b>K. Sakai</b><sup>1,2</sup>, D. Kostal<sup>1</sup>, Y. Shitara<sup>2</sup>, M. Kaneta<sup>1</sup>, I. Krupka<sup>1</sup>, M. Hartl<sup>1</sup></p> <p><sup>1</sup>Brno University of Technology, Czech Republic<br/><sup>2</sup>JX Nippon Oil &amp; Energy Corporation, Japan</p> | <p><b>[IT02.02] Tribological considerations in the development of endovascular catheters</b><br/><b>(Invited talk)</b></p> <p><b>S. E. Franklin</b></p> <p>Philips Research, The Netherlands</p>                                                                                                                                                                                                                               | <p><b>[O03.04] Friction mechanisms in MOS<sub>2</sub> thin films produced by PVD-magnetron sputtering technique</b></p> <p>E. Serpini<sup>1,2</sup>, <b>A. Rota</b><sup>1</sup>, A. Ballestrazzi<sup>1</sup>, T. Polcar<sup>4,5</sup>, S. Valeri<sup>1,2</sup></p> <p><sup>1</sup>Università di Modena e Reggio Emilia, Italy<br/><sup>2</sup>Istituto CNR-NANO S3, Modena, Italy<br/><sup>3</sup>University of Southampton, UK<br/><sup>4</sup>Czech Technical University in Prague, Czech Republic</p>                                                                         | <p><b>[O04.04] Crack evolution of thermally worn AISI H13 steel in die casting environment</b></p> <p>H. A. Abdulhadi<sup>1,2</sup>, <b>S. N. Aqida</b><sup>1</sup>, I. Ismail<sup>1</sup>, M. Ishak<sup>1</sup>, G.R. Mohammed<sup>2</sup></p> <p><sup>1</sup>University Malaysia Pahang, Malaysia<br/><sup>2</sup>Baghdad-Institute, Foundation of Technical Education, Iraq</p> | <b>Panel Discussion on Micromachining</b> |  |
| 15:50 – 16:10 | <p><b>[O01.05] Characterization of environmentally acceptable lubricants (eal’s) for marine applications</b></p> <p><b>F. X. Borrás</b>, M. B. de Rooij, D. J. Schipper</p> <p>University of Twente, The Netherlands</p>                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>[O03.05] In-situ generation of transition metal dichalcogenide tribofilms</b></p> <p><b>M. Rodríguez Ripoll</b>, A. Tomala, V. Totolin</p> <p>AC<sup>2</sup>T research GmbH, Austria</p>                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>[O04.05] Tribo-electrically induced modifications of copper surfaces in sliding contact against copper-graphite</b></p> <p><b>M. Grandin</b>, U. Wiklund</p> <p>Uppsala University, Sweden</p>                                                                                                                                                                               |                                           |  |
| 16:10 – 16:30 | <p><b>[O01.06] Physio-tribological properties of lithium based Grease developed from coconut oil (Cocos nucifera) and analysis on crystal formation in grease</b></p> <p>J. Babu, K. P. Nair, <b>M. L. Joy</b></p> <p>National Institute of Technology Calicut, India</p>                                                                                                                               | <p><b>[O02.04] Fibre laser surface texturing on bearing steel (AISI 52100) for tribological applications</b></p> <p><b>H. Vijaikumar</b>, S. Soundarapandian, L. Vijayaraghavan</p> <p>Indian Institute of Technology Madras, India</p>                                                                                                                                                                                        | <p><b>[O03.06] Challenging the status quo: accurate nanoindentation of soft matter in liquid</b></p> <p><b>R. Simič</b>, C. H. Mathis, N. D. Spencer</p> <p>ETH Zürich, Switzerland</p>                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>[O04.06] Tribological behavior of sinter-forged Fe-2Cu-0.7C-xMo alloys</b></p> <p><b>S. S. Rathore</b><sup>1</sup>, V. Verma<sup>2</sup>, B. V. M. Kumar<sup>2</sup>, V. V. Dabhade<sup>2</sup></p> <p><sup>1</sup>Govt. Engineering College Bikaner, India<br/><sup>2</sup>Indian Institute of Technology Roorkee, India</p>                                                |                                           |  |
| 16:30 – 16:50 | <p><b>[O01.07] Effects of solid lubricants (Graphite, MoS<sub>2</sub> and Sb<sub>2</sub>S<sub>3</sub>) of Cu/SiC hybrid composite brake materials on tribological properties for medium duty automotive applications</b></p> <p><b>R. Petchiappan</b>, P. Ramkumar</p> <p>Indian Institute of Technology Madras, India</p>                                                                              | <p><b>[O02.05] Combination of laser surface texturing and DLC coating of PEEK for enhanced tribological properties</b></p> <p><b>J. Dufils</b><sup>1</sup>, F. Faverjon<sup>2</sup>, C. Heau<sup>2</sup>, C. Donnet<sup>3</sup>, S. Benayoun<sup>1</sup>, S. Valette<sup>1</sup></p> <p><sup>1</sup>École Centrale de Lyon, France<br/><sup>2</sup>IREIS, HEF group, France<br/><sup>3</sup>Université Jean Monnet, France</p> | <p><b>[O03.07] Fundamental and tribological properties of thick CPB</b></p> <p><b>K. Sato</b><sup>1</sup>, H. Okubo<sup>1</sup>, Y. Hirata<sup>1</sup>, C. Tadokoro<sup>2</sup>, T. Fujimori<sup>3</sup>, K. Nakano<sup>4</sup>, Y. Tsujii<sup>3</sup>, B. Prakash<sup>5</sup>, S. Sasaki<sup>1</sup></p> <p><sup>1</sup>Tokyo University of Science, Japan; <sup>2</sup>Saitama University, Japan; <sup>3</sup>Kyoto University Institute for Chemical Research, Japan; <sup>4</sup>Yokohama National University, Japan; <sup>5</sup>Luleå University of Technology, Sweden</p> | <p><b>[O04.07] Wear effects on PTFE/DLC in reciprocating sliding contact</b></p> <p><b>M. Adler</b>, S. Spiller, E. Badisch</p> <p>AC<sup>2</sup>T research GmbH, Austria</p>                                                                                                                                                                                                      |                                           |  |
| 18:15 – 19:45 | 1.5 hour guided city tour                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                    |                                           |  |
| 20:00 –       | Welcome reception at the Ljubljana Castle                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                    |                                           |  |

## Thursday, 8<sup>th</sup> June 2017

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|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09:00 – 09:50 | <b>[KS03] Extracting diamondlike carbon tribofilms from lubricating oils by catalytically active composite coatings (Keynote lecture)</b><br><b>A. Erdemir</b> , G. Ramirez, O. Eryilmaz; Argonne National Laboratory, USA                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                 |
| 09:50 – 10:40 | <b>[KS04] Past studies and recent developments on hydrodynamic journal and thrust bearings (Keynote lecture)</b><br><b>M. Fillon</b> ; Pprime Institute, CNRS - Université de Poitiers - ISAE-ENSMA, France                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                 |
| 10:40 – 11:10 | Coffee break                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                 |
| 11:10 – 12:00 | <b>[KS05] Friction and lubrication inside disk drives: Is nanotribology useful? (Keynote lecture)</b><br><b>C. M. Mate</b> ; 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 | <b>[IT01-02] In-situ analysis and evaluation of adsorbed additive layer for boundary lubrication (Invited talk)</b><br><b>T. Hirayama</b> <sup>1,2</sup><br><sup>1</sup> Doshisha University, Japan<br><sup>2</sup> JST Presto, Japan                                                                                                                                                                                    | <b>[IT02-03] Running-in control for creation of nanointerface giving super-low friction (Invited talk)</b><br><b>K. Adachi</b><br>Tohoku University, Japan                                                                                                                                                                                                                          | <b>[IT03-02] Ab-initio investigation of tribochemistry phenomena in solid and boundary lubricants (Invited talk)</b><br><b>M. C. Righi</b> <sup>1,2</sup><br><sup>1</sup> University of Modena and Reggio Emilia,<br><sup>2</sup> CNR - Institute of Nanoscience, Italy                                                              | <b>[IT04-02] Lifetime test of carbon fibre water hydraulic cylinder (Invited talk)</b><br><b>F. Majdič</b><br>University of Ljubljana, Slovenia                                                                                                                                                                                     | <b>[IT05-02] Rolling bearing modelling and current trends (Invited talk)</b><br><b>G. E. Morales-Espejel</b> <sup>1,2</sup><br><sup>1</sup> SKF Engineering and Research Centre, The Netherlands<br><sup>2</sup> Université de Lyon, INSA-Lyon, CNRS LaMCos, France                             |
| 14:00 – 14:20 | <b>[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</b><br><b>H. Okubo</b> <sup>1</sup> , C. Tadokoro <sup>2</sup> , Y. Hirata <sup>1</sup> , S. Sasaki <sup>1</sup><br><sup>1</sup> Tokyo University of Science, Japan;<br><sup>2</sup> Sitama University, Japan | <b>[O02.06] Characterization of the DLC films tribological responses related to the test environments</b><br><b>G. Fiaschi</b> <sup>1</sup> , E. Vezzadini <sup>1</sup> , A. Ballestrazzi <sup>1</sup> , D. Marchetto <sup>1,2</sup> , S. Valeri <sup>1,2</sup><br><sup>1</sup> University of Modena and Reggio Emilia, Italy<br><sup>2</sup> CNR - Institute of Nanoscience, Italy | <b>[O03.08] Influence of friction on metal flow in forming process</b><br><b>T. Funazuka</b> <sup>1</sup> , N. Takatsuji <sup>2</sup> , K. Dohda <sup>1</sup> , T. Aizawa <sup>3</sup><br><sup>1</sup> Northwestern University, USA<br><sup>2</sup> Toyama University, Japan<br><sup>3</sup> Shibaura Institute of Technology, Japan | <b>[O04.08] Microstructural design of multifunctional laser hardfacings for high temperature sliding applications</b><br>H. Torres <sup>1</sup> , <b>M. Rodriguez Ripoll</b> <sup>1</sup> , B. Prakash <sup>2</sup><br><sup>1</sup> AC <sup>2</sup> T research GmbH, Austria<br><sup>2</sup> Luleå University of Technology, Sweden | <b>[O05.08] Benchtop screening of wet clutch materials</b><br><b>S. J. Shaffer</b> <sup>1</sup> , T. B. Freshly <sup>2</sup> , S. E. Papanicolaou <sup>1</sup><br><sup>1</sup> Bruker: Tribology, Stylus and Optical Metrology, USA<br><sup>2</sup> LuK USA, LLC: Wet Friction Development, USA |
| 14:20 – 14:40 | <b>[O01.09] Tribological investigation of greases in static and boundary regimes</b><br><b>K. S. Pondicherry</b> <sup>1</sup> , F. Rummel <sup>2</sup><br><sup>1</sup> Anton Paar GmbH, Austria<br><sup>2</sup> Anton Paar Germany GmbH, Germany                                                                                                                                                                         | <b>[O02.07] Self-lubricating protective coatings: CrVN sputtering deposition and oxidation</b><br><b>A. Drnovšek</b> , P. Panjan, J. Kovač, M. Panjan and M. Čekada<br>Jožef Stefan Institute, Slovenia                                                                                                                                                                             | <b>[O03.09] Simulation of the roundness effects in the active magnetic bearings behavior</b><br><b>L. Giasiranis</b> , P. G. Nikolakopoulos, C. A. Papadopoulos<br><sup>1</sup> University of Patras, Greece                                                                                                                         | <b>[O04.09] Role of alloying elements on the strain hardening behaviour of iron-based alloys in abrasive contacts</b><br><b>H. Rojacz</b> , M. Varga, M. Rodríguez Ripoll<br>AC <sup>2</sup> T research GmbH, Austria                                                                                                               | <b>[O05.09] Influence of structural flexibility on the contact characteristics of a thin-walled roller bearing</b><br><b>Y. Mao</b> , L. Wang, C. Zhang<br><sup>1</sup> Harbin Institute of Technology, China                                                                                   |
| 14:40 – 15:00 | <b>[O01.10] Atomic force microscopy for in-situ tribology</b><br><b>R. Bingley</b> , C. Wang, A. Morina, A. Neville<br>University of Leeds, UK                                                                                                                                                                                                                                                                           | <b>[O02.08] Ceramic coatings by ionized magnetron sputtering techniques for harsh environments</b><br>S. M. Deambrosio, M. Fabrizio, <b>E. Miorin</b> , F. Montagner, V. Zin<br>Institute of Condensed Matter Chemistry and Technologies for Energy – National Research Council of Italy, Padova, Italy                                                                             | <b>[O03.10] Abrasive Wear Simulation of an ASTM G65 Standard Test</b><br>D. Bianchi, P. Bedolla, G. Vorlauffer, <b>E. Badisch</b><br>AC <sup>2</sup> T research GmbH, Austria                                                                                                                                                        | <b>[O04.10] Rail head damage and accumulation of welded deposits on the breaking pads of railway vehicles</b><br><b>V. Pejaković</b> , F. Heindl, U. Cihak-Bayr, F. Franek<br>AC <sup>2</sup> T research GmbH, Austria                                                                                                              | <b>[O05.10] An integrated bearing selection methodology based on total cost of ownership</b><br><b>S. Vandenbergh</b> , 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15:30 – 15:50 | <p><b>[001.11] Oxidation mechanisms of ester oils identified by isotope labelling and mass spectrometry</b></p> <p><b>M. Frauscher</b><sup>1</sup>, C. Besser<sup>1</sup>, B. Ronai<sup>1,2</sup>, N. Dörr<sup>1</sup>, G. Allmaier<sup>2</sup></p> <p><sup>1</sup>AC<sup>2</sup>T research GmbH, Austria; <sup>2</sup>Vienna University of Technology, Institute of Chemical Technologies and Analytics, Austria</p> | <p><b>[002.09] Plasma electrolytic oxidation coating application for engine blocks</b></p> <p><b>R. Bayón, V. Sáenz de Viteri</b>, X. Fernández, A. Igartua</p> <p>IK4-Tekniker, Spain</p>                                                                                                                                                                                                                                                                                            | <p><b>[003.11] Numerical and experimental methodologies based on femtosecond laser micro-texturing for enhanced surface tribology</b></p> <p><b>C. Putignano</b><sup>1,2</sup>, G. S. Joshi<sup>2</sup>, A. Ancona<sup>1</sup>, G. Carbone<sup>1,2</sup></p> <p><sup>1</sup>CNR-IFN U.O.S. Bari, Italy<br/><sup>2</sup>Politecnico di Bari, Italy</p> | <p><b>[004.11] The influence of contact configuration on tribological properties of polyamide (PA6)</b></p> <p><b>A. Kupec</b>, M. Kalin</p> <p>University of Ljubljana, Slovenia</p>                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>[005.11] Dynamic behavior of a rectangular grooved air pad</b></p> <p>F. Colombo, D. Ghodsiyeh, Terenziano Raparelli, <b>A. Trivella</b>, V. Viktorov</p> <p>Polytechnic University of Turin, Italy</p>                                                                                                                                                                                                                                                                             |
| 15:50 – 16:10 | <p><b>[001.12] Correlation between limiting shear stress and lubricant properties under elastohydrodynamic lubrication</b></p> <p><b>S. N. Ndiaye</b>, L. Martinie, D. Philippon, P. Vergne</p> <p>University of Lyon, INSA Lyon, CNRS, LaMCoS, France</p>                                                                                                                                                            | <p><b>[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</b></p> <p><b>M. Szczerek</b><sup>1</sup>, R. Michalczewski<sup>1</sup>, W. Piekoszewski<sup>1</sup>, W. Tuszyński<sup>1</sup>, J. Wulczynski<sup>1</sup>, A. Wieczorek<sup>2</sup></p> <p><sup>1</sup>Institute for Sustainable Technologies, Poland; <sup>2</sup>Silesian University of Technology, Poland</p> | <p><b>[003.12] Wearing-in of journal bearings under non-stationary conditions</b></p> <p><b>F. König</b>, G. Jacobs G. Burghardt</p> <p>RWTH Aachen University, Germany</p>                                                                                                                                                                           | <p><b>[004.12] Influence of temperature on the corrosion and tribocorrosion behaviour of high strength low-alloy steels used in offshore applications</b></p> <p><b>A. López-Ortega</b><sup>1</sup>, R. Bayón<sup>1</sup>, J. L. Arana<sup>2</sup>, E. Rodríguez<sup>3</sup>, A. Igartua<sup>1</sup></p> <p><sup>1</sup>IK4-Tekniker, Eibar, Spain,<br/><sup>2</sup>University of the Basque Country, Spain<br/><sup>3</sup>Vicinay Marine Innovación, Bilbao, Spain</p>                                                                                                                    | <p><b>[005.12] Novel lead free bearing overlay solutions with low friction performance</b></p> <p><b><sup>1</sup>F. Summer</b>, <sup>1</sup>F. Grün, <sup>2</sup>M. Offenbecher, <sup>3</sup>E. Laine, <sup>3</sup>S. Taylor</p> <p><sup>1</sup>Montanuniversität Leoben, Austria<br/><sup>2</sup>Miba Bearing Group, Austria<br/><sup>3</sup>Infineum UK Limited, UK</p>                                                                                                                 |
| 16:10 – 16:30 | <p><b>[001.13] Viscosity index improvers response in thin and very thin lubrication regimes</b></p> <p><b>P. Cusseau</b><sup>1</sup>, P. Vergne<sup>1</sup>, D. Philippon<sup>1</sup>, L. Martinie<sup>1</sup>, N. Bouscharain<sup>1</sup>, F. Briand<sup>2</sup></p> <p><sup>1</sup>University of Lyon, INSA Lyon, CNRS, LaMCoS, France<br/><sup>2</sup>TOTAL, France</p>                                            | <p><b>[002.11] The mechanism of lifetime enhancement by phosphate conversion coatings</b></p> <p><b>D. Ernens</b><sup>1,2</sup>, G. Langedijk<sup>2,3</sup>, M. B. de Rooij<sup>1</sup>, H. R. Pasaribu<sup>2</sup>, D.J. Schipper<sup>1</sup></p> <p><sup>1</sup>University of Twente, The Netherlands<br/><sup>2</sup>Shell Global Solutions International BV, The Netherlands; <sup>3</sup>The Hague University of Applied Sciences, The Netherlands</p>                           | <p><b>[003.13] Multiscale contact simulations for elastomers</b></p> <p><b>A. Miniberger</b>, M. C. Miron, J. Holzweber, U. Cakmak, Z. Major</p> <p>University of Linz, Institute for Polymer Product Engineering, Austria</p>                                                                                                                        | <p><b>[004.13] Fabrication and reciprocating wear of TiCN based cermets</b></p> <p>S. K. Sharma<sup>1</sup>, D. Singh<sup>1</sup>, <b>B. V. Manoj Kumar</b><sup>1</sup>, Blaž Brodnik Žugelj<sup>2</sup>, Mitjan Kalin<sup>2</sup></p> <p><sup>1</sup>Indian Institute of Technology Roorkee, India<br/><sup>2</sup>University of Ljubljana, Slovenia</p>                                                                                                                                                                                                                                   | <p><b>[005.13] The role of adhesion in transition from stick to slip at the interface of two contacting bodies</b></p> <p><b>M. Bazr Afshan Fadafan</b><sup>1,2</sup>, M.B. de Rooij<sup>2</sup>, D. J. Schipper<sup>2</sup></p> <p><sup>1</sup>Material Innovation Institute (M2i), The Netherlands<br/><sup>2</sup>University of Twente, The Netherlands</p>                                                                                                                            |
| 16:30 – 16:50 | <p><b>[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</b></p> <p><b>D. K. Prajapati</b>, M. Tiwari</p> <p><sup>1</sup>Indian Institute of Technology Patna, India</p>                                                                                            | <p><b>[002.12] Low friction mechanism of chlorine-containing amorphous carbon films against aluminium alloy</b></p> <p><b>Y. Tokuta</b><sup>1,4</sup>, T. Itoh<sup>2</sup>, T. Shiozaki<sup>2</sup>, M. Kawaguchi<sup>1</sup>, S. Sasaki<sup>3</sup></p> <p><sup>1</sup>Tokyo Metropolitan Industrial Technology Research Institute, Japan<br/><sup>2</sup>FUJIMETAL Co. Ltd., Japan<br/><sup>3</sup>Tokyo University of Science, Japan</p>                                           | <p><b>[003.14] Material point method simulation of ploughing behaviour in coated systems</b></p> <p><b>T. Mishra</b><sup>1</sup>, G. Ganzenmüller<sup>2</sup>, M. B. de Rooij<sup>1</sup>, D.J. Schipper<sup>1</sup></p> <p><sup>1</sup>University of Twente, The Netherlands ; <sup>2</sup>Fraunhofer Ernst-Mach-Institut, Germany</p>               | <p><b>[004.14] Formation and functional mechanisms of transfer films between polymeric composites and steel counterpart under dry sliding contact</b></p> <p><b>B. C. Jim</b><sup>1</sup>, G. Zhang<sup>2</sup>, W. Österle<sup>3</sup>, I. Häusler<sup>3</sup>, A. I. Dmitriev<sup>4</sup>, B. Wetzell<sup>1</sup></p> <p><sup>1</sup>Institute for Composite Materials, Germany;<br/><sup>2</sup>Lanzhou Institute for Chemical Physics, China; <sup>3</sup>Federal Institute for Materials Research, Germany;<sup>4</sup>Institute of Strength Physics and Materials Science, Russia</p> | <p><b>[005.14] Adhesion growth behavior in metal forming</b></p> <p><b>M. Yamamoto</b><sup>1</sup>, Kuniaki Dohda<sup>2</sup>, Houichi Kitano<sup>3</sup>, Mitjan Kalin<sup>4</sup>, Kornel F. Ehmann<sup>2</sup></p> <p><sup>1</sup>Manufacturing Engineering Center, NSK Ltd, Japan; <sup>2</sup>Northwestern University, USA; <sup>3</sup>Research Center for Structural Materials, National Institute for Materials Science, Japan; <sup>4</sup>University of Ljubljana, Slovenia</p> |
| 16:50 – 17:10 | <p><b>[001.15] Experimental and quantum chemical investigations on oxidative stability of sesame oil with ecofriendly synthetic antioxidant additives for high-temperature lubricants</b></p> <p>S. Sankarannair, <b>K. P. Nair</b>, R. P. Krishnan</p> <p>National Institute of Technology Calicut, India</p>                                                                                                        | <p><b>[002.13] Tribology of fibrous tows</b></p> <p><b>D. M. Mulvihill</b><sup>1</sup>, O. Smerdova<sup>2</sup>, M. P. F. Sutcliffe<sup>3</sup></p> <p><sup>1</sup>University of Glasgow, UK; <sup>2</sup>Institut Pprime, CNRS - Université de Poitiers - ISAE-ENSMA, France; <sup>3</sup>University of Cambridge, Cambridge, UK</p>                                                                                                                                                 | <p><b>[003.15] The role of the preload on the behavior of gas lubricated offset half bearings</b></p> <p><b>M. T. C. Faria</b></p> <p>RWTH Aachen University, Germany</p>                                                                                                                                                                             | <p><b>[004.15] Subsurface material analysis and wear of cylinder liner materials</b></p> <p>T. Wopelka, <b>C. Lenauer</b>, U. Cihak-Bayr, M. Jech</p> <p>AC<sup>2</sup>T research GmbH, Austria</p>                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>[005.15] Novel gear test methodology to evaluate efficiency and durability</b></p> <p><b>F. Grün</b>, B. Maier, I. Gódor, F. Steinwender</p> <p>Montanuniversität Leoben, Austria</p>                                                                                                                                                                                                                                                                                               |
| 20:00 –       | Gala dinner at the National Gallery of Slovenia                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Friday, 9<sup>th</sup> June 2017

| 09:00 – 09:50 | <b>[KS06] Thermal and shear-induced effects in boundary film formation (Keynote lecture)</b><br><b>W. T. Tysoe</b> ; University of Wisconsin Milwaukee, USA                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09:50 – 10:40 | <b>[KS07] Biolubrication: beyond tribology (Keynote lecture)</b><br><b>J. Klein</b> ; Weizmann Institute, Israel                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                          |
| 10:40 – 11:10 | Coffee break                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                          |
| 11:10 – 12:00 | <b>[KS08] Low friction and emission cylinder liner surfaces and the influence of surface topography and scale (Keynote lecture)</b><br>C. Anderberg <sup>1</sup> , Z. Dimkovski <sup>2</sup> , <b>B. G. Rosén</b> <sup>2</sup> ; <sup>1</sup> Chalmers University of Technology, Sweden, <sup>2</sup> 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 | <b>[IT01-03] Ionic liquids and carbon nanophases in lubrication (Invited talk)</b><br><b>F. J. Carrión-Vilches</b> <sup>1,2</sup> , M.D. Avilés <sup>1</sup> , J. Sanes <sup>1</sup> , R. Pamies <sup>1</sup> , M.D. Bermúdez <sup>1</sup> , K.Nakano <sup>2</sup><br><br><sup>1</sup> Universidad Politécnica de Cartagena, Spain<br><sup>2</sup> Yokohama National University, Japan | <b>[IT02-04] Structural and mechanical modifications of hard carbon coatings under low friction (Invited talk)</b><br><b>M. I. De Barros Bouchet</b><br><br>University of Lyon,<br>École Centrale de Lyon, France                                                                                                 | <b>[IT03-03] Facilitating effective hydrodynamic lubrication for zero-entrainment-velocity contacts based on boundary slip mechanism (Invited talk)</b><br><br><b>P. L. Wong</b> <sup>1</sup> , Y. Zhao <sup>1,2</sup> , J. Mao <sup>2</sup><br><br><sup>1</sup> City University of Hong Kong, China<br><sup>2</sup> Xi'an Jiaotong University, China | <b>[IT04-03] Effect of hydrothermal ageing on wear mechanism and friction behaviour of PTFE composites (Invited talk)</b><br><br><b>N. Emami</b> , M.R. Homayoun<br><br>Luleå University of Technology, Sweden                                                                                                                                                                                                                                                                                                                                                                                           | <b>[IT05-03] Tribotronics – part of a pathway to sustainable engineering? (Invited talk)</b><br><br><b>I. Sherrington</b><br><br>Jost Institute for Tribotechnology,<br>University of Central Lancashire, UK                                                                                                                                                                             |
| 14:00 – 14:20 | <b>[O01.16] Grafting heteroelement-rich groups on graphene oxide: Tuning polarity and molecular interaction with bio-ionic liquid towards advanced lubrication</b><br><br>L. Mu, <sup>1,2</sup> <b>Y. Shi</b> <sup>2</sup> , J. Zhu <sup>1</sup><br><br><sup>1</sup> The University of Akron, USA<br><sup>2</sup> Luleå University of Technology, Sweden                               | <b>[O02.14] Crack density and tribological performance of hard chrome coatings</b><br><b>B. Podgornik</b> <sup>1</sup> , O. Massler <sup>2</sup> , F. Kafexhiu <sup>1</sup> , M. Sedlaček <sup>1</sup><br><br><sup>1</sup> Institute of Metals and Technology, Slovenia<br><sup>2</sup> De Martin AG, Switzerland | <b>[O03.16] The effect of different additives on interfacial properties and EHD friction of steel/steel contact at 25 °C and 100 °C</b><br><br><b>M. Polajnar</b> <sup>1</sup> , M. Kalin <sup>1</sup> , F. Jarnias <sup>2</sup> , B. Thiebaud <sup>2</sup><br><br><sup>1</sup> University of Ljubljana, Slovenia<br><sup>2</sup> TOTAL, France       | <b>[O04.16] Improved tribological behaviors of graphene/polytetrafluoroethylene composites</b><br><br><b>X. Wang</b> , J. Wu, L. Zhou, X. Wei<br><br>Shanghai University, China                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>[O05.16] Synergetic effects inside a simplified friction material: A PCA approach</b><br><br><b>F. Vivier</b> <sup>1,2</sup> , D. Pellerej <sup>1</sup><br><br><sup>1</sup> ITT Italia Srl, Italy;<br><sup>2</sup> University of Turin, Italy                                                                                                                                         |
| 14:20 – 14:40 | <b>[O01.17] The role of the interfacial layer formed in the presence of ionic liquids in preventing surface damage</b><br><b>A. Arcifa</b> <sup>1</sup> , A. Rossi <sup>1,2</sup> , N.D. Spencer <sup>1</sup><br><br><sup>1</sup> ETH Zürich, Switzerland<br><sup>2</sup> Università di Cagliari, Italy                                                                                | <b>[O02.15] The application of fine grained solid lubricants in high performance dry machining processes</b><br><b>L. Sterle</b> , F. Pušavec, M. Kalin<br><br>University of Ljubljana, Slovenia                                                                                                                  | <b>[O03.17] The thermocapillary migration on shot blasted surfaces</b><br>Q. Dai <sup>1</sup> , W. Huang <sup>1</sup> , <b>X. Wang</b> <sup>1,2</sup><br><br><sup>1</sup> Nanjing University of Aeronautics & Astronautics, China<br><sup>2</sup> Jiangsu Key Laboratory of Precision and Micro-Manufacturing Technology, China                       | <b>[O04.17] Friction and wear of PTFE composites with various filler materials in high purity hydrogen gas</b><br><br><b>Y. Sawae</b> <sup>1,2</sup> , K. Takeda <sup>3</sup> , T. Morita <sup>1,2</sup> , H. Watanabe <sup>1</sup> , S. Onitsuka <sup>2</sup> , T. Yamaguchi <sup>1,2</sup> , J. Kaneuchi <sup>3</sup> , J. Sugimura <sup>1,2,4</sup><br><br><sup>1</sup> Kyushu University, Japan; <sup>2</sup> International Institute for Carbon-Neutral Energy Research, Japan; <sup>3</sup> STARLITE Co., Ltd., Japan; <sup>4</sup> Research Center for Hydrogen Industrial Use and Storage, Japan | <b>[O05.17] Energy efficiency potential of hydrostatic bearings</b><br><b>S. Vandenberghé</b> <sup>1</sup> , W. Driesen <sup>2</sup> , S. Devos <sup>2</sup> , F. Al-Bender <sup>1</sup><br><br><sup>1</sup> University of Leuven, Belgium<br><sup>2</sup> Flanders Make, Belgium                                                                                                        |
| 14:40 – 15:00 | <b>[O01.18] Lubricating property of cyano-based ionic liquids against tetrahedral amorphous carbon film</b><br><b>S. Kawada</b> , S. Watanabe, Y. Hirata, S. Sasaki<br><br>Tokyo University of Science, Japan                                                                                                                                                                          | <b>[O02.16] Effect of the contact geometry and thermal spray coatings on abrasion resistance of rotary feeder blades</b><br><b>V. Pejaković</b> , U. Cihak-Bayr<br><br>AC <sup>2</sup> T research GmbH, Austria                                                                                                   | <b>[O03.18] Wear mechanisms in metals studied with Smooth Particle Hydrodynamics (SPH)</b><br><b>S. Leroch</b> , S. J. Eder, M. Rodríguez-Ripoll<br><br>AC <sup>2</sup> T research GmbH, Austria                                                                                                                                                      | <b>[O04.18] Experimental and analytical Investigations on wear characteristics of polymers against metal counterfaces using disc-on-disc system</b><br><br>S. Panda, <b>A. Maurya</b> <sup>*</sup> , M. Sarangi, S. K. Roy Chowdhury<br><br>Indian Institute of Technology Kharagpur, India                                                                                                                                                                                                                                                                                                              | <b>[O05.18] Double-Hertz extension for mild ellipticity ratio contact between elastic cylinders</b><br><b>N. H. Mohd Zini</b> <sup>1,2</sup> , M. B. de Rooij <sup>1</sup> , M. Bazrafshan <sup>1</sup> , N. Ismail <sup>1,2</sup> , D. J. Schipper <sup>1</sup><br><br><sup>1</sup> University of Twente, The Netherlands<br><sup>2</sup> 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 | <p><b>[O01.19] Fretting behavior of PP grease lubricated PPS and pa composites</b></p> <p><u>J. Lind</u>, P. Söderbäck, Å. Kassman Rudolphi<br/>Uppsala University, Sweden</p>                                                                                                                                   | <p><b>[O02.17] Relationship between friction and wear of dental implant materials</b></p> <p>F. Alemanno<sup>1</sup>, S. Spriano<sup>2</sup> <u>D. Halenahally Veeregowda</u><sup>1</sup></p> <p><sup>1</sup>Ducom Instruments Europe B.V, The Netherlands<br/><sup>2</sup>Polytechnic University of Turin, Italy</p> | <p><b>[O03.19] Dynamic friction during oblique impact of golf ball</b></p> <p><u>K. Arakawa</u></p> <p>Research Institute for Applied Mechanics, Kyushu University, Japan</p>                                                                                                                                                                   | <p><b>[O04.19] A bibliometric framework to identify and delineate subfields of research on tribological wear - Part two: research fronts of bibliographically coupled publications</b></p> <p><u>E. Schiebel</u><sup>1</sup>, D. Bianchi<sup>2</sup>, A. Vernes<sup>2</sup>, F. Franek<sup>2</sup></p> <p><sup>1</sup>AIT Austrian Institute of Technology, Austria<br/><sup>2</sup>AC<sup>2</sup>T research GmbH, Austria</p>                                                                                                                                                  | <p><b>[O05.19] Influence of reaction layer composition on surface damage in bearing application</b></p> <p><u>I. Nedelcu</u><sup>1</sup>, E. Vegter<sup>1</sup>, K. Stadler<sup>2</sup></p> <p><sup>1</sup>SKF B.V., The Netherlands; <sup>2</sup>SKF GmbH, Germany</p> |
| 15:50 – 16:10 | <p><b>[O01.20] Real time hydrogenation method for white etching crack replication using pin-on-disc tribometer on bearing steel</b></p> <p><u>S. Kodoor</u>, P. Ramkumar</p> <p>Indian Institute of Technology Madras, India</p>                                                                                 | <p><b>[O02.18] A finite element simulation of MOM hip implant</b></p> <p><u>S. Chaturvedi</u><sup>1</sup>, P. K. Bharti<sup>2</sup>, <sup>3</sup>S. Kumar Yadav</p> <p><sup>1</sup>Integral University, India<br/><sup>2</sup>Integral University, India<br/><sup>3</sup>Graphic Era University, India</p>            | <p><b>[O03.20] Tribological characterization of carbon materials</b></p> <p><u>E. Casamassa</u><sup>1,2</sup>, G. Gautier<sup>1</sup>, A. Sin<sup>3</sup>, M. G. Faga<sup>1</sup></p> <p><sup>1</sup>IMAMOTER, National Council of Research, Torino, Italy<br/><sup>2</sup>University of Parma, Italy<br/><sup>3</sup>ITT Italia srl, Italy</p> | <p><b>[O04.20] Properties of the nitrocarburised and oxidised steel surfaces and the correlation with their tribological behaviour under unlubricated sliding conditions</b></p> <p><u>I. Velkavrh</u><sup>1</sup>, F. Ausserer<sup>1</sup>, S. Klien<sup>1</sup>, J. Voyer<sup>1</sup>, K. Lingenhöle<sup>2</sup>, F. Kafexhiu<sup>3</sup>, D. Mandrino<sup>3</sup>, B. Podgornik<sup>3</sup>, A. Diem<sup>1</sup></p> <p><sup>1</sup>V-Research GmbH, Austria; <sup>2</sup>Lingenhöle Technologie GmbH, Austria; <sup>3</sup>Institute of Metals and Technology, Slovenia</p> | <p><b>[O05.20] Lifetime estimation of lubricant used in dragline gearbox</b></p> <p><u>P. Kewat</u>, A. K. Mukhopadhyay, S.K. Ghosh</p> <p><sup>1</sup>Indian Institute of Technology (Indian School of Mines) Dhanbad, India</p>                                       |
| 16:10 – 16:30 | <p><b>[O01.21] A comparative study on the micro-abrasive wear behavior of tribological systems submitted to conditions of “constant normal force” and “constant pressure”</b></p> <p><u>R. C. Cozza</u></p> <p>University Center FEI – Educational Foundation of Ignatius “Padre Sabóia de Medeiros”, Brazil</p> | <p><b>[O02.19] Tribological approach to food oral processing</b></p> <p><u>F. Rummel</u><sup>1</sup>, K. S. Pondicherry<sup>2</sup></p> <p><sup>1</sup>Anton Paar Gernmay GmbH, Germany<br/><sup>2</sup>Anton Paar GmbH, Austria</p>                                                                                  | <p><b>[O03.21] Measuring friction in fibre-on-fibre contact</b></p> <p><u>N. Ismail</u><sup>1,2</sup>, M. B. de Rooij<sup>1</sup>, E.G. de Vries<sup>1</sup>, D. J. Schipper<sup>1</sup></p> <p><sup>1</sup>University of Twente, The Netherlands;<br/><sup>2</sup>Universiti Teknikal Malaysia Melaka, Malaysia</p>                            | <p><b>[O04.21] A wear test of conventional WC-CO and alternative binder rock drill materials tested against granite and sandstone</b></p> <p><u>C. J. Hassila</u><sup>1</sup>, A. Holmberg<sup>1</sup>, M. Lilja<sup>2</sup>, S. Norgren<sup>2</sup></p> <p><sup>1</sup>Uppsala University, Sweden<br/><sup>2</sup>Sandvik Mining Rock Tools, Sweden</p>                                                                                                                                                                                                                        | <p><b>[O05.21] A study on highly-loaded contacts under dry lubrication for gear applications</b></p> <p><u>M. Yilmaz</u>, D. Kratzer, T. Lohner, K. Michaelis, K. Stahl</p> <p>Gear Research Centre (FZG), Technical University of Munich (TUM), Germany</p>            |
| 16:30         | Closing                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                         |

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| 1  | <b>Nominal contact area calculations for bushing shaft assembly</b><br><b>K. Bērziņš</b> , J. Rudzītis<br>Riga Technical University, Institute of Mechanical Engineering, Latvia                                                                                                                                                                                                                                                   |
| 2  | <b>Couple stress effects on the performances of thermo-hydrodynamic slider bearing</b><br><b>S. Boubendir</b> <sup>1</sup> , M. Malki <sup>2</sup><br><sup>1</sup> University of Sciences and Technology Houari Boumedien, Algeria; <sup>2</sup> LGMD-Ecole Nationale Polytechnique, Algeria                                                                                                                                       |
| 3  | <b>Sensitivity of wear coefficient to dimensional tolerance in shoulder implants</b><br>L. Mattei <sup>1</sup> , F. Di Puccio <sup>1</sup> , T. J. Joyce <sup>2</sup> , <b>E. Ciulli</b> <sup>1</sup><br><sup>1</sup> University of Pisa, Italy; <sup>2</sup> Newcastle University, UK                                                                                                                                             |
| 4  | <b>Relationship between micro-abrasive wear modes and contact stresses: Experimental tests and CAE simulations for ISO P20 cemented carbide (WC-Co)</b><br><b>R. C. Cozza</b> , G. H. B. Donato<br>University Center FEI – Educational Foundation of Ignatius “Padre Sabóia de Medeiros”, Brazil                                                                                                                                   |
| 5  | <b>Influence of the contact size on friction and wear during fretting of a AISI 4337 surfaces using a plane/plane configuration</b><br><b>A. Dreano</b> , G. Guillonneau, S. Fouvry<br>Ecole Centrale de Lyon, France                                                                                                                                                                                                              |
| 6  | <b>Tribological performance and thermal characteristics of UHMWPE multifunctional hybrid composites</b><br><b>N. Emami</b> , H. Vadel, A. Golchin<br>Luleå University of Technology, Sweden                                                                                                                                                                                                                                        |
| 7  | <b>Influence of steel microstructure and tool wear characteristics of coated tools on surface topography in turning</b><br><b>M. Fallqvist</b> <sup>1</sup> , A. van Bellinghen <sup>2</sup> , F. Cabanettes <sup>2</sup> , C. Courbon <sup>2</sup> , R. M'Saoubi <sup>2</sup><br><sup>1</sup> Seco Tools AB, Sweden; <sup>2</sup> LTDS, Ecole Nationale d'Ingénieurs de Saint-Etienne, France                                     |
| 8  | <b>Tribological tests of abrasion wear resistance of carbide cutting tools with deposited wear resistant coating</b><br><b>W. Grzegorzek</b><br>Silesian University of Technology, Poland                                                                                                                                                                                                                                          |
| 9  | <b>Predicting fuel economy using ball-on-disk with European urban driving cycles</b><br>A. Tortora, <b>D. Halenahally Veeregowda</b><br>Ducom Instruments Europe B.V, The Netherlands                                                                                                                                                                                                                                              |
| 10 | <b>A wear test of conventional WC-CO and alternative binder rock drill materials tested against granite and sandstone</b><br><b>C. J. Hassila</b> <sup>1</sup> , <b>A. Holmberg</b> <sup>1</sup> , M. Lilja <sup>2</sup> , S. Norgren <sup>2</sup><br><sup>1</sup> Uppsala University, Sweden; <sup>2</sup> Sandvik Mining Rock Tools, Sweden                                                                                      |
| 11 | <b>Trimeric surfactant as boundary lubricants</b><br><b>N. Kampf</b> <sup>1</sup> , C. Wu <sup>2</sup> , Y. Wang <sup>2</sup> , J. Klein <sup>1</sup><br><sup>1</sup> Weizmann Institute of Science, Israel; <sup>2</sup> Institute of Chemistry, Chinese Academy of Sciences, China                                                                                                                                               |
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