

WOM 2009 ORAL PROGRAMME**Sunday April 19, 2009**

- 12:00 **Tutorial Registration**
Tutorial Session
- 13:30 **Introduction**
IM Hutchings, Editor-in-Chief of WEAR and University of Cambridge, United Kingdom
- 13:45 **Fundamentals of sliding wear**
P Shipway, University of Nottingham, United Kingdom
- 14:30 **Fundamentals of wear by hard particles**
IM Hutchings, Editor-in-Chief of WEAR and University of Cambridge, United Kingdom
- 15:15 **Refreshments**
- 15:30 **Design and selection of wear tests**
M Gee, National Physical Laboratory, United Kingdom
- 16:15 **Lubricated wear testing**
G Plint, Phoenix Tribology Ltd, United Kingdom
- 17:00 **Panel discussion**
- 17:30 **End of Tutorial**
- 16:00-18:30 **Conference Registration**
- 18:30-19:30 **Welcome Drinks Reception**

Monday April 20, 2009**Session 1 - Plenary**

- 08:30 01A.1 **Wear mechanisms and mitigation strategies in microsystems**
MT Dugger*; Sandia National Laboratories, United States
- Session 2A – Wear Polymers and Polymer Composites**
- 09:40 02A.1 **Friction and wear behaviour of acetal and nylon gears**
K Mao^{*1}, W Li²; ¹Warwick University, United Kingdom, ²Trelleborg Sealing Solutions, United Kingdom
- 10:00 02A.2 **A Route to wear resistant PTFE via trace loadings of functionalized nanofillers**
DL Burris^{*1}, S Zhao³, R Duncan³, J Lowitz², SS Perry², LS Schadler³, et al; ¹University of Delaware, United States, ²University of Florida, United States, ³Rensselaer Polytechnic Institute, United States
- 10:20 02A.3 **Tribological behaviour of multilayered textile composites: The effect of reciprocating sliding frequency**
MT Mathew¹, NV Padaki², R Alagirusamy², R Fanguero¹, LA Rocha¹, JR Gomes^{*1}, et al; ¹University of Minho, Portugal, ²Indian Institute of Technology-Delhi, India

Session 2B – Applied Tribology: Rail Wear

- 09:40 02B.1 **Monitoring of rail corrugation growth due to irregular wear on a railway metro curve**

PT Torstensson*, JCO Nielsen; Chalmers University of Technology, Sweden

10:00 02B.2 **Wheel-rail wear index prediction considering multiple contact patches**
J Santamaria*, EG Vadillo, O Oyarzabal; University of the Basque Country, Spain

10:20 02B.3 **Study on relationship between oblique fatigue crack and rail wear in curve track and prevention**
WJ Wang, J Guo, QY Liu*, ZR Zhou; Southwest Jiaotong University, China

Session 2C – Sliding Wear of Metals and Alloys

09:40 02C.1 **Investigation into wear of Ti-6Al-4V under reciprocating sliding conditions**
RS Magaziner¹, VK Jain¹, S Mall²; ¹University of Dayton, United States, ²Air Force Institute of Technology, United States

10:00 02C.2 **Sliding friction and wear of Cu-graphite against 2024, AZ91D and Ti6Al4V at different speeds**
W Ma^{1,2}, J Lu¹; ¹Lanzhou Institute of Chemical Physics CAS, China, ²Graduate School of the Chinese Academy of Sciences, China

10:20 02C.3 **Effect of molybdenum and chromium contents in sliding wear of high-chromium white cast iron: the relationship between microstructure and wear**
C Scandian¹, C Boher², JDB De Mello³, F Rezai-Aria²; ¹University of Espirito Santo, Brazil, ²Ecole Mines Albi, France, ³University of Uberlândia, Brazil

Session 2D - Erosive Wear and Erosion/Corrosion

09:40 02D.1 **Erosion-corrosion resistance of engineering materials in various test conditions**
SS Rajahram*, TJ Harvey, RJK Wood; University of Southampton, United Kingdom

10:00 02D.2 **Solid particle erosion caused by rice grains**
JR Laguna-Camacho, R Lewis*, RS Dwyer-Joyce; The University of Sheffield, United Kingdom

10:20 02D.3 **Electrochemical controlled wear transitions in the tribocorrosion of ruthenium**
J Stojadinovic¹, L Mendia¹, D Bouvet², M Declercq², S Mischler¹; ¹EPFL-STI-LMCH, Switzerland, ²EPFL-STI-LEG¹, Switzerland

10:40 **Refreshments**

Session 3A - Wear Polymers and Polymer Composites

11:00 03A.1 **Multifunctionality of single-walled carbon nanotube-polytetrafluoroethylene nanocomposites**
J Vail¹, D Burris², WG Sawyer¹; ¹University of Florida, United States, ²University of Delaware, United States

11:20 03A.2 **The wear and friction of polyamide 46 and polyamide 46 / aramid-fibre composites in sliding-rolling contact**
DH Gordon, SN Kukureka*; University of Birmingham, United Kingdom

11:40 03A.3 **Influence of orientation of long fibers in carbon fiber-polyetherimide composites on mechanical and tribological properties**
M Sharma*, IM Rao, J Bijwe; Indian Institute of Technology Delhi, India

Session 3B – Applied Tribology: Wear of Clutch and Brake

11:00 03B.1 **A comprehensive microscopic study of third body formation at the interface between a brake pad and brake disc during the final stage of a pin-on-disc test**
A-L Cristol-Bulthe¹, G Degallaix¹, Y Desplanques¹, W Österle², C Prietzel², H Rooch²; ¹Ecole Central de Lille, France, ²Bundesanstalt für Materialforschung und -prüfung, Germany

11:20 03B.2 **A comparative study on the tribological behaviour of hexagonal boron nitride (h-BN) as lubricating micro-particles - an additive in porous sliding bearings for a car clutch**

Z Pawlak¹, T Kaldonski², R Pai³, E Bayraktar*⁴, A Oloyede⁵; ¹Tribochemistry Consulting, United States, ²Military University of Technology, Poland, ³Manipal University, India, ⁴Supemeca (EA²³³6)/LISMMA, France, ⁵Queensland University of Technology, Australia

- 11:40 03B.3 **Microstructural alterations within thermal spray coatings during highly loaded diesel engine tests**
M Hahn*, R Theissmann, B Gleising, A Fischer; ¹University of Duisburg-Essen, Germany

Session 3C – Sliding Wear of Metals and Alloys

- 11:00 03C.1 **Effect of boron on the sliding wear of directionally-solidified high-chromium white irons**
R Correa*¹, A Bedolla-Jacuinde¹, J Zuno-Silva², E Cardoso³, I Mejía¹; ¹Universidad Michoacana de San Nicolas de Hidalgo, Mexico, ²The University of Sheffield, United Kingdom, ³Universidad Autonoma del Estado de Hidalgo, Mexico
- 11:20 03C.2 **Sliding wear of superelastic TiNi alloy**
C Zhang, Z Farhat*; Dalhousie University, Canada
- 11:40 03C.3 **Tribological characteristics of aluminum alloys against steel lubricated by ammonium and imidazolium ionic liquids**
J Qu*¹, S Dai¹, H Luo¹, JJ Truhan², PJ Blau¹; ¹Oak Ridge National Laboratory, United States, ²Caterpillar Inc, United States

Session 3D - Erosive Wear and Erosion/Corrosion

- 11:00 03D.1 **Variations in microstructure of high chromium cast irons and resultant changes in resistance to wear, corrosion and corrosive wear**
X Tang*¹, D Li¹, B Hinckley², K Dolman²; ¹University of Alberta, Canada, ²Weir Minerals Australia Ltd, Australia
- 11:20 03D.2 **Erosive wear properties of high V-Cr-Ni stainless spheroidal carbides cast iron at high temperature**
K Shimizu*¹, Y Xinba¹, K Kimura², K Minami², H Matsumoto³; ¹Muroran Institute of Technology, Japan, ²Nichias Corporation, Japan, ³Sankyo Co Ltd, Japan
- 11:40 03D.3 **An experimental study of the erosion-corrosion behavior of plasma transferred arc MMCs**
JF Flores*, A Neville, N Kapur, A Gnanavelu; University of Leeds, United Kingdom
- 12:00 **Lunch Break**

Session 4A – Wear of Thin Films and Coatings, Surface Engineering for Wear Control

- 13:30 04A.1 **Effect of La₂O₃ addition on the microstructure, hardness and abrasive wear behavior of flame sprayed Ni based coatings**
SP Sharma, DK Dwivedi*, PK Jain; IIT Roorkee, India
- 13:50 04A.2 **Friction and sliding wear behaviour of electrodeposited cobalt and cobalt-tungsten alloy coatings for replacement of electrodeposited chromium**
DP Weston, PH Shipway*, SJ Harris, MK Cheng; University of Nottingham, United Kingdom
- 14:10 04A.3 **The influence of laser hardening on wear in the valve and valve seat contact**
T Slatter*¹, H Taylor², R Lewis¹, P King²; ¹The University of Sheffield, United Kingdom, ²Loughborough University, United Kingdom
- 14:30 04A.4 **Wear life and adhesion of solid lubricant films on laser textured steel surfaces**
L Rapoport*¹, A Moshkovich¹, V Perfilyev¹, I Lapsker¹, G Galperin², I Etsion², et al; ¹Holon Institute of Technology, Israel, ²Technion, Israel, ³Bar-Ilan University, Israel
- 13:30 04B.1 **Potential exploration of novel green resins as binders for NAO friction composites in severe operating conditions**
PV Gurunath, J Bijwe*; Indian Institute of Technology Delhi, India

Session 4B – Applied Tribology: Wear of Clutch and Brake

- 13:50 04B.2 **Oxygen-diffused titanium as a candidate brake rotor material**
J Qu*, PJ Blau, BC Jolly; Oak Ridge National Laboratory, United States
- 14:10 04B.3 **Influence of silicon carbide filters in cast iron composite brake blocks on brake performance and development of a production process**
TM Miyauchi¹, TT Tsujimura¹, KH Handa¹, JN Nakayama¹, KS Shimizu¹; ¹Railway Technical Research Institute, Japan, ²Hokkaido Railway Company, Japan, ³Muroran Institute of Technology, Japan
- 14:30 04B.4 **Wear mechanism in automotive brake materials, wear debris and its potential environmental impact**
J Kukutschova¹, V Roubicek¹, P Filip²; ¹VSB - Technical University Ostrava, Czech Republic, ²Southern Illinois University Carbondale, United States

Session 4C – Sliding Wear of Metals and Alloys

- 13:30 04C.1 **Hot friction and wear behaviour of high speed steel and high chromium iron for rolls**
M Pellizzari*, D Cescato, MG De Flora; University of Trento, Italy
- 13:50 04C.2 **Wear mechanisms experienced by a work roll grade high speed steel under different environmental conditions**
N Garza-Montes-deOca, WM Rainforth*; The University of Sheffield, United Kingdom
- 14:10 04C.3 **Micromechanisms of low load wear in an Al-18.5% Si alloy**
SK Dey¹, TA Perry², AT Alpas¹; ¹University of Windsor, Canada, ²General Motors Research and Development Centre, United States
- 14:30 04C.4 **Influence of hardness of the harder body on wear regime transition in a sliding pair of steels**
CC Viáfara¹, A Sinatora^{1,2}; ¹University of São Paulo, Brazil, ²Aços Villares S/A, Brazil

Session 4D – Erosive Wear and Erosion/Corrosion

- 13:30 04D.1 **Development of predictive model for fly-ash erosion phenomena in coal-burning boilers**
R Nagarajan¹, B Ambedkar¹, S Gowrisankar², S Somasundaram²; ¹IIT Madras, India, ²BHEL Trichy, India
- 13:50 04D.2 **Surface nanocrystallization of Al-plated steel for application in the exhaust system of vehicles**
C Chen^{1,2}, CJ Shang², DY Li¹; ¹University of Alberta, Canada, ²University of Science and Technology Beijing, China
- 14:10 04D.3 **Sliding wear-corrosion of ceramics**
AJ Gant, MG Gee*; National Physical Laboratory, United Kingdom
- 14:30 04D.4 **Tribocorrosion behaviour of DLC-coated 316L stainless steel**
M Azzi¹, M Paquette², J Szpunar¹, J Sapieha², L Martinu²; ¹McGill University, Canada, ²Ecole Polytechnique, Canada
- 14:50 **Refreshments**

Session 5A – Wear of Thin Films and Coatings, Surface Engineering for Wear Control

- 15:10 05A.1 **Dry and wet sliding wear of ITO coated PET components used in flexible optoelectronic applications**
KA Sierras¹, DR Cairns^{1,2}, SN Kukureka²; ¹West Virginia University, United States, ²University of Birmingham, United Kingdom
- 15:30 05A.2 **Wear behaviour of nanostructured alumina-titania coatings deposited by atmospheric plasma spray**

A Rico^{*1}, J Rodriguez¹, E Otero¹, WM Rainforth²; ¹Rey Juan Carlos University, Spain, ²University of Sheffield, United Kingdom

- 15:50 05A.3 **Sliding tribological behaviors of PVD CrN and AlCrN coatings against Si3N4 ceramic and pure titanium**
M Zhu*, J Mo; Southwest Jiaotong University, China
- 16:10 05A.4 **Tribology of water and oil repellent sol-gel coatings for optical applications**
AJ Kessman^{*1}, DKP Huckaby¹, NJ Morris¹, DR Cairns^{1,2}, SN Kukureka²; ¹West Virginia University, United States, ²University of Birmingham, United Kingdom

Session 5B – Applied Tribology: Wear of Tool Materials

- 15:10 05B.1 **Wear mechanisms of WC-Co cutting tools from high-speed tribological tests**
T Kagnaya^{*1,2}, C Boher¹, L Lambert², M Lazard², T Cutard¹; ¹Ecole Mines Albi, France, ²GIP-INSIC, France
- 15:30 05B.2 **Wear mechanisms and tool life management of WC-Co drills during dry high speed drilling of woven carbon fiber composites**
S Rawat¹, H Attia^{*1,2}; ¹McGill University, Canada, ²National Research Council Canada, Canada
- 15:50 05B.3 **The microstructure of the affected zone of a worn PCBN cutting tool characterised with SEM and TEM**
J Angseryd^{*1,2}, M Elfving¹, E Coronel¹, E Olsson², H-O Andrén²; ¹Sandvik Tooling, Sweden, ²Chalmers University of Technology, Sweden

Session 5C – Sliding Wear of Metals and Alloys

- 15:10 05C.1 **Investigations on the mechanism of quasi-mild wear for carbon steel in dry sliding contact under variable loading, and endurance of the worn surfaces**
H Goto*, Y Amamoto, C Suci; Fukuoka Institute of Technology, Japan
- 15:30 05C.2 **Crystallographic textures and texture transitions induced by sliding wear in bronze and nickel**
W Cai^{*1}, P Bellon¹, JB Singh²; ¹University of Illinois at Urbana-Champaign, United States, ²Bombay Atomic Research Center, India
- 15:50 05C.3 **High current density copper-on-copper sliding electrical contacts at low sliding velocities**
JA Bares*, N Argibay, N Mauntler, GR Bourne, WG Sawyer; University of Florida, United States
- 16:10 05C.4 **Effects of titanium addition on microstructure and wear resistance of hypereutectic high chromium cast iron Fe-25wt.%Cr-4wt.%C**
RJ Chung^{*1}, X Tang¹, DY Li¹, K Dolman², B Hinckley²; ¹University of Alberta, Canada, ²Weir Minerals Australia Ltd, Australia

Session 5D – Erosive Wear and Erosion/Corrosion

- 15:10 05D.1 **Slurry and cavitation erosion resistance of thermal spray coatings**
JF Santa*, LA Espitia, JA Blanco, SA Romo, A Toro; National University of Colombia, Colombia
- 15:30 05D.2 **Mesoscale plasticity anisotropy at the earliest stages of cavitation-erosion damage of a high nitrogen austenitic stainless steel**
DH Mesa^{*2,1}, CM Garzon³, AP Tschiptschin¹; ¹University of São Paulo, Brazil, ²Pereira University of Technology, Colombia, ³National University of Colombia, Colombia
- 15:50 05D.3 **Erosion resistance of TiB2-ZrB2 composites**
JS Peters*, BA Cook, JL Harringa, AM Russell; Iowa State University, United States
- 16:10 05D.4 **Impact-angle dependence and estimation of erosion damage to ceramic materials caused by solid particle impact**
YI Oka*, S Mihara, T Yoshida; Hiroshima University, Japan

Session 6 – Plenary

16:45 06A.1 **Effect of material wear of hydro turbine performance**
W Bruninga*; Hoover Dam Facility Manager, United States

17:45 **End of Sessions**

Tuesday April 21, 2009

Session 7A – Wear of Thin Films and Coatings, Surface Engineering for Wear Control

- 08:30 07A.1 **Effect of the actual environment present in hermetic compressors on the tribological behaviour of a Si rich multifunctional DLC coating**
JDB De Mello¹, R Binder², NG Demas³, AA Polycarpou³; ¹Federal University of Uberlândia, Brazil, ²Whirlpool - EMBRACO, Brazil, ³University of Illinois at Urbana-Champaign, United States
- 08:50 07A.2 **Energy dissipation in depth-sensing indentation as a characteristic of the nanoscratch behavior of coatings**
AAC Recco¹, CC Viáfara¹, AP Tschiptschin¹, A Sinatora^{1,2}; ¹University of São Paulo, Brazil, ²Aços Villares S/A, Brazil
- 09:10 07A.3 **Micro-abrasion wear behaviour of TiAlCrSiN nanostructured coatings**
RP Martinho¹, MFC Andrade², FJG Silva^{2,4}, RJD Alexandre³, APM Baptista⁴; ¹ESEIG-IPP, Portugal, ²ISEP-IPP, Portugal, ³TEandM, Portugal, ⁴FEUP-INEGI, Portugal
- 09:30 07A.4 **HVOF-sprayed WC-CoCr coatings on Al alloy: effect of the coating thickness on the tribological properties**
G Bolleli¹, L Lusvarghi¹, M Barletta²; ¹University of Modena and Reggio Emilia, Italy, ²University of Roma "Tor Vergata", Italy
- 09:50 07A.5 **Assessment of gradient and nanogradient PVD coatings behaviour under erosive, abrasive and impact wear conditions**
M Antonov, I Hussainova, P Kulu, F Sergejev*, A Gregor; Tallinn university of Technology, Estonia

Session 7B – Biotribology, Wear of Skin and Restorative Materials
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- 08:30 07B.1 **Friction and deformation behaviour of human skin**
M Kwiatkowska^{1,2}, SE Franklin², CP Hendriks²; ¹Szczecin University of Technology, Poland, ²Philips Applied Technologies, Netherlands
- 80:50 07B.2 **The effect of normal force and roughness on friction in human finger contact**
SE Tomlinson*, R Lewis, MJ Carré; The University of Sheffield, United Kingdom
- 09:10 07B.3 **Micro-structural alterations within different areas of articulating surfaces of a metal-on-metal hip resurfacing system**
R Pourzal*, A Fischer; University of Duisburg-Essen, Germany
- 09:30 07B.4 **Improved wear resistance of orthopaedic UHMWPE by reinforcement with zirconium particles**
KG Plumlee, CJ Schwartz*; Texas A&M University, United States

Session 7C – Sliding Wear of Metals and Alloys

- 08:30 07C.1 **Correlation of microstructure with wear behaviour of deep cryogenically treated AISI D2 steel**
D Das¹, AK Dutta¹, KK Ray²; ¹Bengal Engineering and Science University, India, ²Indian Institute of Technology - Kharagpur, India
- 08:50 07C.2 **Tribological properties of CrSiN-coated 301 stainless steel under wet and dry conditions**
M Azzi¹, M Benkahoul², P Robin², J Szpunar¹, J Sapieha², L Martinu²; ¹McGill University, Canada, ²Ecole Polytechnique, Canada
- 09:10 07C.3 **Microstructural characterization and sliding wear behavior of ultra high carbon steels processed by mechanical alloying**

J Victoria^{*1}, M Vite², D Hernández¹; ¹ESIQIE IPN, Mexico, ²ESIME IPN, Mexico

09:30 07C.4 **Influence of temperature of sub-zero treatments on the wear behaviour of die steel**

D Das¹, KK Ray², AK Dutta^{*1}; ¹Bengal Engineering and Science University, India, ²Indian Institute of Technology – Kharagpur, India

09:50 07C.5 **Influence of the spring stiffness on friction and wear behaviors of stainless steel /copper-impregnated metallized carbon couple with electrical current**

T Ding, GX Chen*, ZR Zhou; Southwest Jiaotong University, China

Session 7D - Erosive Wear and Erosion/Corrosion

08:30 07D.1 **Reduction of erosion rate by particle size distribution (PSD) modification of hematite as weighting agent for oil based drilling fluids**

G Quercia*, R Belisario, R Rengifo; PDVSA Intevep SA, Venezuela

08:50 07D.2 **Particle size effects on the slurry erosion of aluminium alloy (AA 6063)**

GR Desale, BK Gandhi*, SC Jain; IIT Roorkee, India

09:10 07D.3 **Hydro-abrasive erosion of high performance fiber-reinforced concrete**

EK Horszczaruk*; West Pomeranian University of Technology, Poland

09:30 07D.4 **Influence of microstructure on slurry erosive wear characteristics of laser surface alloyed 13Cr-4Ni steel**

RC Shivamurthy^{*1}, M Kamaraj¹, R Nagarajan¹, SM Shariff², G Padmanabham²; ¹Indian Institute of Technology Madras, India, ²International Advanced Research Centre for Powder Metallurgy and Newer Materials, India

09:50 07D.5 **Erosion wear behavior of laser clad surfaces of low carbon austenitic steel**

G Desale^{*1}, BK Gandhi², SC Jain²; ¹Design Drawing and Workshop Engineering, India, ²IIT Roorkee, India

10:10 **Refreshments**

Session 8A – Wear of Thin Films and Coatings, Surface Engineering for Wear Control

10:30 08A.1 **Tribological effects of plasma immersion ion implantation heating treatments on Ti-6Al-4V alloy**

CB Mello^{*1,2}, M Ueda¹, MM Silva³, H Reuther⁴; ¹Laboratório Associado de Plasma – INPE, Brazil, ²Laboratório Associado de Sensores e Materiais – INPE, Brazil, ³Divisão de Engenharia Mecânica/Instituto Tecnológico de Aeronáutica – ITA, Brazil, ⁴Institute of Ion Beam Physics and Materials Research, Germany

10:50 08A.2 **Evaluation of braze bonded hard complex boride based coatings for sliding, erosion and abrasion wear**

B Palanisamy^{*1}, K Anand¹, A Upadhyaya²; ¹GE India Technology Centre Pvt Ltd, India, ²Indian Institute of Technology Kanpur, India

11:10 08A.3 **The improvement of hard facing coatings for ground engaging applications by the addition of tungsten carbide**

AH Jones^{*1}, P Roffey²; ¹Sheffield Hallam University, United Kingdom, ²ESR Technology Ltd, United Kingdom

11:30 08A.4 **Wireline wear resistance of filled and unfilled polymeric coatings for downhole applications.**

JO Bello*, RJ K Wood; University of Southampton, United Kingdom

11:50 08A.5 **Tribological behaviour of thermally sprayed Ti-Cr-Si coatings**

M Hadad^{*1}, PP Bandyopadhyay², J Michler¹, J Lesage³; ¹EMPA Thun, Switzerland, ²IIT Kharagpur, India, ³USTL, France

Session 8B – Biotribology, Wear of Skin and Restorative Materials

10:30	08B.1	Investigation of skin tribology and its effects on the tactile attributes of polymer fabrics MA Darden, CJ Schwartz*; Texas A&M University, United States
10:50	08B.2	Influence of pH values and aging time on the tribological behaviour of posterior restorative materials P Vale Antunes*, A Ramalho; CEMUC, University of Coimbra, Portugal
11:10	08B.3	Influence of surface microstructure on the sliding friction of plantar skin against hard substrates S Derler*, R Huber, M Hadad; Empa Swiss Federal Laboratories for Materials Testing and Research, Switzerland
11:30	08B.4	Wear behavior of early carious enamel before and after remineralization S Gao ¹ , S Huang ¹ , L Qian ² , H Yu* ¹ ; ¹ Sichuan University, China, ² Southwest Jiaotong University, China
11:50	08B.5	Effect of metallic nano particles on the biotribocorrosion behaviour of metal-on-metal hip prostheses Y Yan*, A Neville, D Dowson, S Williams, J Fisher; University of Leeds, United Kingdom

Session 8C – Sliding Wear of Metals and Alloys

10:30	08C.1	Wear mechanisms maps for the belt finishing of steel and cast iron S Mezghani ¹ , E Sura ² , M El Mansori* ¹ , T Del Negro ² ; ¹ Laboratoire de Mécanique et Procédé de Fabrication (LMPF-EA ⁴¹ 06), France, ² Renault SAS, France
10:50	08C.2	Influence of the gas environment on the transferred film of the Brass (Cu64Zn36) / steel AISI 1045 couple M Amirat*, H Zaïdi, A Djamaï, D Necib, D Eyidi; Laboratoire LMS Université de Poitiers, France
11:10	08C.3	Studies on friction and formation of transfer layer when Al-4Mg alloy pins slid at various numbers of cycles on steel plates of different surface texture PL Menezes, K Kishore, SV Kailas*; Indian Institute of Science, India
11:30	08C.4	Nanowear of gold and silver against silicon L Peng*, H Lee, W Weizer, H Liang; TexasA&M University, United States
11:50	08C.5	The role of wear particles under multidirectional sliding wear St Hanke* ¹ , I Samerski ² , J Schöfer ² , A Fischer ¹ ; ¹ University of Duisburg-Essen, Germany, ² Robert Bosch GmbH, Germany

Session 8D – Fretting and Impact Wear

10:30	08D.1	Use of multiple criteria to map the high-temperature scuffing behaviour of Co-based superalloys PJ Blau* ¹ , M Yao ² , J Qu ¹ , J Wu ³ ; ¹ Oak Ridge National Lab, United States, ² Deloro Stellite Inc, Canada, ³ Deloro Stellite Group, United States
10:50	08D.2	Fatigue-like failure of thermally oxidised titanium in reciprocating pin-on-plate wear tests KL Dahm*; Massey University, New Zealand
11:10	08D.3	Characterisation of fretting-induced wear debris for Ti-6Al-4V NM Everitt*, J Ding, G Bandak, PH Shipway, SB Leen, EJ Williams; University of Nottingham, United Kingdom
11:30	08D.4	Nanofretting behaviors of monocrystalline silicon (100) against spherical diamond tips in atmosphere and vacuum L Qian*, J Yu, B Yu, Z Zhou; Tribology Research Institute, China
11:50	08D.5	An investigation of fretting behaviour of several synthetic base oils Z Wang, Z Zhou*; Southwest Jiaotong University, China
12:10		Lunch Break

Session 9A – Wear Test Methods

- 13:30 09A.1 **Ultrasonic assessment of wear-induced modifications in engineering contacts**
M Pau*, B Leban; University of Cagliari, Italy
- 13:50 09A.2 **The steel wheel abrasion test (SWAT): a tool to study wear, friction and ore breakage in the mining industry**
P Radziszewski*; McGill University, Canada
- 14:10 09A.3 **Tribological evaluation of aluminum and magnesium sheet forming at high temperatures**
MD Hanna*; GM R&D Center, United States
- 14:30 09A.4 **Design and development of an advanced linear reciprocating tribometer**
CB Mohan¹, C Divakar², K Venkatesh¹, K Gopalakrishna¹, KS Mahesh Iohith¹, TN Naveen¹; ¹Centre for Emerging Technologies-SBMJCE, India, ²National Aerospace Laboratory-CSIR, India
- 14:50 09A.5 **Rare earth stearates for wear determination of UHMWPE bearings**
V Ngai¹, M Wimmer¹, J Kunze²; ¹Rush University Medical Center, United States, ²Hamburg University of Technology, Germany

Session 9B – Biotribology, Wear of Skin and Restorative Materials

- 13:30 09B.1 **Friction noise of human skin in vivo**
H Zahouani*, R Vargiolu, G Boyer, C Pailler-Mattei, L Laquière, A Mavon; University of Lyon UMR-CNRS 55¹³, France
- 13:50 09B.2 **UHMWPE wear response to opposing nitrogen S-phase coated and uncoated orthopaedic implant grade stainless steel**
CG Figueiredo-Pina¹, J Fisher², PA Dearnely²; ¹Escola Superior de Tecnologia do Instituto Politécnico de Setúbal, Portugal, ²University of Leeds, United Kingdom
- 14:10 09B.3 **Aggressive 3rd-body wear challenge to highly crosslinked polyethylene: A hip simulator model**
K Kubo^{1,2}, IC Clarke¹, PA Williams¹, T Sorimachi², A Gustafson³, K Yamamoto²; ¹Loma Linda University Medical Center, United States, ²Tokyo Medical University, Japan, ³Gustafson Orthopaedic Corporation, United States
- 14:30 09B.4 **Hip-simulator wear studies of an alumina-matrix composite (AMC) ceramic compared to retrieval studies of AMC balls with ¹ to 7 years follow-up**
IC Clarke¹, PA Williams¹, D Green², GA Gustafson³; ¹Loma Linda University, United States, ²Shore Western Mfg Inc, United States, ³Gustafson Orthopaedic, United States
- 14:50 09B.5 **Increasing the wear resistance of UHMWPE acetabular cups by adding natural biocompatible particles**
S Ge*, S Wang, X Huang; China University of Mining and Technology, China

Session 9C – Sliding Wear of Metals and Alloys

- 13:30 09C.1 **Influence of inclination angle of plate on friction, stick-slip and transfer layer - A study of magnesium pin sliding against steel plate**
PL Menezes, K Kishore, SV Kailas*; Indian Institute of Science, India
- 13:50 09C.2 **Influence of tool steel microstructure on origin of galling initiation and wear mechanisms under dry sliding against a carbon steel sheet**
A Gåård*, P Krakhmalev, J Bergström; Karlstad University, Sweden
- 14:10 09C.3 **Generation of transfer film and its effects on wear mechanisms in alumina conveying pipeline of mild steel**
AA Cenna*, KC Williams, MG Jones, NW Page; University of Newcastle, Australia
- 14:30 09C.4 **The effect of sliding velocity and sliding time on nanocrystalline tribolayer development and properties in copper**
A Emge¹, S Karthikeyan², DA Rigney³; ¹GE - Aviation, United States, ²Indian Institute of Science, India, ³The Ohio State University, United States

Session 9D – Fretting and Impact Wear

- 13:30 09D.1 **Effect of temperatures up to 400 °C on the impact-sliding of valve-seat contacts**
A Ramalho^{*1}, Ph Kapsa², G Bouvard², J-C Abry², T Yoshida³, M Charpentier⁴, et al;
¹University of Coimbra, Portugal, ²Ecole Centrale de Lyon, France, ³IHI, Japan, ⁴PSA, France
- 13:50 09D.2 **Torsional fretting wear behaviour of 7075 aluminium alloy in various relative humidity environments**
C Zhenbing, Z Minhao^{*}, S Huoming, Z Zhongrong; Southwest Jiaotong University, China
- 14:10 09D.3 **Fretting wear behaviors of micro-arc oxidation coating sealed by grease**
Z Minhao^{*}, C Zhenbing, L Xiuzhou, Z Zhongrong; Southwest Jiaotong University, China
- 14:30 09D.4 **Fretting-fatigue behaviour of bridge engineering cables in a solution of sodium chloride**
V Périer^{*1}, L Dieng¹, L Gaillet¹, C Tessier¹, S Fouvry²; 1LCPC, France, 2ECL, France
- 15:10 **Refreshments**

Session 10 – Posters

- 15:30 Poster Session A – Odd numbered panels
Poster Session B – Even numbered panels
- 17:30 **End of Sessions**

Wednesday April 22, 2009**Session 11 – Plenary**

- 08:30 11A.1 **Aspects of tribological coating design and selection**
A Matthews^{*1}, K Holmberg², S Franklin³, A Leyland¹; ¹Sheffield University, United Kingdom, ²VTT Finland, Finland, ³Philips Applied Technologies, Netherlands

Session 12A – Wear Test Methods

- 09:40 12A.1 **CMM - based procedure for polyethylene non-congruous Unicompartmental Knee Prosthesis wear assessment**
M Spinelli^{*1, 2}, S Carmignato³, S Affatato¹, M Viceconti¹; ¹Rizzoli Orthopedic Institute, Italy, ²Florence Univeristy, Italy, ³Padova University, Italy
- 10:00 12A.2 **Paper pulp refiner long-duration wear monitoring with polymer replicas**
W Frazier², D Danks^{*1}, B Hodge³; ¹Danks Tribological Services, United States, ²Retired, United States, ³Andritz Inc, United States
- 10:20 12A.3 **Experimental technique to analyse the slurry erosion-corrosion wear due to turbulence**
N Dube^{*}, A Dube, S Iyer, D Halenahally-Veeregowda; Ducom Instruments (P) Ltd, India

Session 12B – High Temperature Tribology

- 09:40 12B.1 **Effects of prior surface damage on high-temperature oxidation of Fe-, Ni-, and Co-based alloys**
PJ Blau^{*}, TM Brummett, BA Pint; Oak Ridge National Lab, United States
- 10:00 12B.2 **High temperature tribological performance of CrAlYN/CrN nanoscale multilayer coatings deposited on γ -TiAl**
JC Walker^{*1}, IM Ross¹, C Reinhard², WM Rainforth¹, PEh Hovesapien²; ¹University of Sheffield, United Kingdom, ²Sheffield Hallam University, United Kingdom

10:20 12B.3 **Dry sliding up to 7.5 m/s and 800°C of thermally sprayed coatings of the TiO₂-Cr₂O₃ system and (Ti,Mo)(C,N)-Ni(Co)**
M Woydt¹, LM Berger^{*2}, S Saaro², CC Stahr²; ¹Federal Institute for Materials Research and Testing, Germany, ²Fraunhofer Institute for Materials and Beam Technology (FHG-IWS), Germany

Session 12C – Case Studies

09:40 12C.1 **Effect of friction stir processing on the tribological performance of high carbon steel**
SH Aldajah¹, OO Ajayi^{*2}, GR Fenske², SA David³; ¹United Arab Emirates University, United Arab Emirates, ²Argonne National Laboratories, United States, ³Oak Ridge National Laboratory, United States

10:00 12C.2 **Development of wear and corrosion resistant cold work tool steels produced by diffusion alloying**
S Huth*, W Theisen, N Krasokha; Ruhr-University, Germany

10:20 12C.3 **Delamination wear of nano-diamond coated cutting tools in composite machining**
J Hu¹, F Qin¹, YK Chou^{*1}, RG Thompson²; ¹The University of Alabama, United States, ²Vista Engineering, United States

Session 12D – Abrasive Wear

09:40 12D.1 **Effects of particle crushing in abrasion testing of steels with ash from biomass-fired powerplants**
S Nahvi, PH Shipway*, DG McCartney; University of Nottingham, United Kingdom

10:00 12D.2 **Investigations into abrasive flow finishing of complex workpieces using FEM**
VK Jain, TR Kumar, PM Dixit, AM Sidpara*; Indian Institute of Technology Kanpur, India

10:20 12D.3 **Experimental investigations into rotating workpiece abrasive flow finishing**
MR Sankar*, J Ramkumar, VK Jain; IIT Kanpur, India

10:40 **Refreshments**

Session 13A – Wear Test Methods

11:00 13A.1 **Wear performance assessment of alternative stamping die materials utilizing a novel test system**
ON Cora^{*1}, K Namiki², M Koç¹; ¹Virginia Commonwealth University, United States, ²Daido Steel Co, Japan

11:20 13A.2 **Adhera research: a new approach for pavement performance evaluation**
V Cerezo*, M Gothie; ¹CETE Lyon - ERA¹², France

11:40 13A.3 **Micro slurry-jet erosion (MSE) testing of CVD TiC/TiN and TiC coatings**
Y Iwai^{*1}, T Miyajima¹, A Mizuno¹, T Honda¹, T Itou², S Hogmark³; ¹University of Fukui, Japan, ²AISHIN AW Co Ltd, Japan, ³Uppsala University, Sweden

Session 13B – Wear: Modeling and Simulations

11:00 13B.1 **Steady friction state and contact models of asperity interaction**
L Rapoport*; Holon Institute of Technology, Israel

11:20 13B.2 **A wear model based on cumulative cyclic plastic straining**
C Boher^{*1}, O Barrau², R Gras³, F Rezai-Aria¹; ¹Ecole Mines Albi, France, ²Aurock, France, ³LISMMA, France

11:40 13B.3 **Computational design of thin-film nanocomposite coatings for optimized stress and velocity accommodation response**
JD Pearson*, MA Zikry; North Carolina State University, United States

Session 13C – Case Studies

- 11:00 13C.1 **Wear of stone used to manufacture axes in the Neolithic settlement at Makriyalos in Northern Greece**
R Lewis^{*1}, J Cripps¹, V Roubos², C Tsoraki¹; ¹The University of Sheffield, United Kingdom, ²Scott Wilson Ltd, United Kingdom
- 11:20 13C.2 **The correlation of material characteristics and wear in a laboratory scale cone crusher**
P Kivikytö-Reponen^{*1}, S Ala-Kleme², J Hellman¹, J Liimatainen¹, SP Hannula²; ¹Metso Materials Technology, Finland, ²Helsinki University of Technology, Finland
- 11:40 13C.3 **Coating and treatment solutions for rolling/sliding component contacts**
EA Gallardo-Hernandez^{*}, R Lewis; The University of Sheffield, United Kingdom

Session 13D – Abrasive Wear

- 11:00 13D.1 **Abrasion and erosion behaviour of manganese alloyed permanent moulded austempered ductile iron**
K Narasimha Murthy^{*}, P Sampathkumaran, S Seetharamu; PES Institute of Technology, India
- 11:20 13D.2 **Mild and severe wear of steels and cast irons in sliding abrasion**
G Pintaude^{*1}, E Albertin², M Matos³, FG Bernardes³, A Sinatora³; ¹UTFPR, Brazil, ²IPT, Brazil, ³Aços Villares SA, Brazil
- 11:40 13D.3 **Micro-abrasion-corrosion of cast CoCrMo - effects of micron and sub-micron sized abrasives**
D Sun^{*}, RJK Wood, J Wharton; National Centre for Advanced Tribology, United Kingdom
- 12:20 **Conference Luncheon**
Presentation of Kenneth C Ludema Best Paper Award
Presentation of Peter J Blau Best Poster Award
- Talk: A poetic look at tribology**
PJ Blau, Oak Ridge National Laboratory, United States

Session 14A – Wear of Metal and Ceramic-Matrix Composites

- 14:30 14A.1 **Characteristics of electro co-deposited Ni-Al₂O₃ nano particle reinforced metal matrix composite (MMC) coatings**
H Gül, F Kiliç, S Aslan, A Alp, H Akbulut^{*}; Sakarya University, Turkey
- 14:50 14A.2 **Sliding wear behaviors of in-situ alumina/aluminum titanate ceramic composites**
Y Wang^{*}, Y Yang, Y Zhao, W Tian; Harbin Institute of Technology, China
- 15:10 14A.3 **Micromechanical properties and erosive wear performance of chromium carbide based cermets**
I Hussainova^{*1}, I Jasiuk², X Du³, M Antonov¹; ¹Tallinn University of Technology, Estonia, ²University of Illinois at Urbana-Champaign, United States, ³McGill University, Canada

Session 14B – Wear: Modeling and Simulations

- 14:30 14B.1 **A study on the interaction between fretting wear and cyclic plasticity for Ti-6Al-4V**
AL Mohd Tobi^{*}, J Ding, G Bandak, SB Leen, PH Shipway; University of Nottingham, United Kingdom
- 14:50 14B.2 **In-situ monitoring of friction surfaces and friction modelling by surface pattern analysis**
S Kano^{*}, T Suzuki, H Shimura; National Institute of Advanced Industrial Science and Technology (AIST), Japan
- 15:10 14B.3 **Understanding polyethylene wear mechanisms by modeling of debris size distributions**
PA Williams^{*}, IC Clarke; Loma Linda University, United States

Session 14C – Case Studies		
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| 14:30 | 14C.1 | Physical model for the prediction of pavement polishing
MT Do ^{*1} , M Kane ¹ , ZZ Tang ² , F de Larrard ¹ ; ¹ LCPC, France, ² Lafarge, France |
| 14:50 | 14C.2 | Effect of surface finishing such as sand-blasting and CrAlN hard coatings on the cutting edge's peeling tools' wear resistance
C Nouveau*, C Labidi, R Collet, R Marchal; ENSAM, France |
| 15:10 | 14C.3 | Applications of CrAlN ternary system in wood machining of medium density fibreboard (MDF)
Y Benlatreche ^{*1} , C Nouveau ¹ , R Marchal ¹ , JP Ferreira-Martins ² ; ¹ ENSAM, France, ² ISOROY, France |

Session 14D – Abrasive Wear		
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| 14:30 | 14D.1 | Load effect in abrasive wear mechanism of cast iron with graphite and cementite
JJ Coronado ^{*1,2} , A Sinatora ¹ ; ¹ University of Sao Paulo, Brazil, ² Universidad del Valle, Colombia |
| 14:50 | 14D.2 | Influence of the abrasive particles size in the micro-abrasion wear tests of TiAlSiN thin coatings
MFC Andrade ¹ , RP Martinho ² , FJG Silva ^{*1,4} , RJD Alexandre ³ , APM Baptista ⁴ ; ¹ ISEP-IPP, Portugal, ² ESEIG-IPP, Portugal, ³ TEandM, Portugal, ⁴ FEUP-INEGI, Portugal |
| 15:10 | 14D.3 | Investigations on the influence of graphite filler on dry slide wear and abrasive wear behaviour of carbon fabric reinforced epoxy composites
B Suresha ^{*1} , Siddaramaiah ² , Kishore ³ , S Seetharamu ⁴ , P Sampath Kumaran ⁴ ; ¹ The National Institute of Engineering, India, ² Indian Institute of Science, India, ³ Central Power Research Institute, India, ⁴ Central Power Research Institute, India |

15:30 **Refreshments**

Session 15A – Wear of Metal and Ceramic-Matrix Composites		
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| 15:50 | 15A.1 | On the role of tribofilm formation on the alumina drive components of an ultrasonic motor
J Olofsson ^{*1} , F Lindberg ¹ , S Johansson ² , S Jacobson ¹ ; ¹ Uppsala University, Sweden, ² PiezoMotor AB, Sweden |
| 16:10 | 15A.2 | Effect of Ag and CeO2 on friction and wear properties of Ni-base composite at high temperature
L Jianliang*, X Dangsheng, H Zhongjia; Nanjing University of Science and Technology, China |

Session 15B – Wear: Modeling and Simulations		
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| 15:50 | 15B.1 | Spalling depth prediction model
Y Ding*, JA Gear; RMIT University, Australia |
| 16:10 | 15B.2 | A model for wet silicon carbide tribo-corrosion
V Presser ^{*1} , KG Nickel ¹ , O Krummhauer ² , A Kailer ² , C Berthold ¹ , R Wirth ³ ; ¹ Eberhard-Karls-Universität, Germany, ² Fraunhofer-Institut für Werkstoffmechanik IWM, Germany, ³ Geoforschungszentrum GFZ, Germany |
| 16:30 | 15B.3 | Finite element analysis of single impacts of angular particles on ductile targets
M Takaffoli*, M Papini; Ryerson University, Canada |
| 16:50 | 15B.4 | Molecular dynamics simulations of sliding in an Fe-Cu tribopair system
S Karthikeyan ^{*1} , DA Rigney ² ; ¹ Indian Institute of Science, India, ² The Ohio State University, United States |
| 17:10 | 15B.5 | A simulation study of the mixing, atomic flow and velocity profiles of crystalline materials during sliding
HJ Kim ^{1,3} , S Karthikeyan ² , D Rigney ^{*3} ; ¹ Samsung Electronics, Korea, Republic of, ² India Institute of Science, India, ³ Ohio State University, United States |

17:30 15B.6 **Is porosity always detrimental to the wear resistance of materials? - A computational study on the effect of porosity on erosive wear of TiC/Cu composites**
Q Chen, DY Li*; University of Alberta, Canada

Session 15C – Case Studies

15:50 15C.1 **Polycrystalline diamond thrust bearings for down-hole oil and gas drilling tools**
C Cooley, T Sexton*; US Synthetic Corporation, United States

15:50 15C.1 **Workshop on practical wear problem-solving**
PJ Blau¹, KG Budinski², KC Ludema³, R Bayer⁴, G Dalton,⁵ ¹Oak Ridge National Laboratory, United States, ²Bud Labs, United States, ³University of Michigan, United States, ⁴Vestal, United States, ⁵TribSys Inc, Canada

16:10 15C.2 **Friction-corrosion of AISI 316L/bone cement and AISI 316L/PMMA contacts: ionic strength effect on tribological behaviour**
J Geringer*, F Atmani, B Forest; ENSM-SE, France

16:30 15C.3 **Diamond-like carbon / epoxy low-friction coatings to replace electroplated chromium**
S Podgoric^{1,2}, BJ Jones¹, R Bulpett¹, J Franks¹, G Troisi¹; ¹Brunel University, United Kingdom, ²Hawker Pacific Aerospace, United Kingdom

16:50 15C.4 **On some tribological effects of graphite nodules in wear mechanism of SG cast iron: finite element and experimental analysis**
M Ben Tkaya¹, S Mezlini³, M El Mansori¹, H Zahouani²; ¹LMPF Arts et Métiers ParisTech, France, ²LTDS UMR 55¹³ CNRS, France, ³LGM ENIM 5000, Tunisia

17:10 15C.5 **Modification of sheet metal forming fluids with dispersed nanoparticles for improved lubrication**
M Mosleh¹, N Athafu¹, J Kelso¹, J Belk²; ¹Howard University, United States, ²The Boeing Company, United States

Session 15D – Workshop

15:50 **Workshop on practical wear problem-solving**
PJ Blau¹, KG Budinski², KC Ludema³, R Bayer⁴, G Dalton,⁵ ¹Oak Ridge National Laboratory, United States, ²Bud Labs, United States, ³University of Michigan, United States, ⁴Vestal, United States, ⁵TribSys Inc, Canada

17:50 **End of Sessions**

Thursday April 23, 2009

Session 16 – Plenary

08:30 16A.1 **Surface engineering of advanced ceramics for friction and wear control**
K-H Zum Gahr*; Universität Karlsruhe, Institute of Materials Science and Engineering II and Forschungszentrum Karlsruhe, Institute for Materials Research I, Karlsruhe, Germany

09:40 **Refreshments**

Session 17A – Wear of Metal and Ceramic-Matrix Composites

10:00 17A.1 **Dry sliding wear of Al alloy/SiCp functionally graded composites: influence of processing conditions**
AC Vieira*, PD Sequeira, JR Gomes, LA Rocha; University of Minho, Portugal

10:20 17A.2 **Friction and wear characteristics of the carbon nanotube-aluminum composites with different manufacturing conditions**
Y Lee, J Lee, G Lee*, I Kim, S Baik, Y Kim; Sungkyunkwan University, Korea

10:40 17A.3 **Dry sliding wear behaviour of magnesium alloy based hybrid composites in the longitudinal direction**

AK Mondal, S Kumar*; Indian Institute of Science, India

- 11:00 17A.4 **Effect of transfer layer on dry sliding wear behaviour of cast Al-based composites synthesized by addition of TiO₂ and MoO₃**
AW Tesfay, SK Nath, S Ray*; Indian Institute of Technology Roorkee, India
- 11:20 17A.5 **Microstructure and tribological properties of ZrO₂(Y₂O₃) matrix composites doped with different solid lubricants from room temperature to 800°C**
JH Ouyang¹, YF Li¹, Y Zhou¹, YM Wang¹, T Murakami², S Sasaki³; ¹Harbin Institute of Technology, China, ²National Institute of Advanced Industrial Science and Technology, Japan, ³Tokyo University of Science, Japan
- 11:40 17A.6 **Experimental study of the effect of microtexturing on oil lubricated ceramic/steel friction pairs**
K-H Zum Gahr*, R Wahl, K Wauthier; University of Karlsruhe, Germany

Session 17B – Wear in Liquid Lubricated Regimes

- 10:00 17B.1 **Frictional anisotropy under boundary lubrication: effect of surface texture**
OO Ajayi*, RA Erck, C Lorenzo-Martin, GR Fenske; Argonne National Laboratory, United States
- 10:20 17B.2 **Tribo-mechanical etching of structural ceramic materials during lubricated severe sliding contact**
C Lorenzo-Martin*, OO Ajayi, RA Erck, JL Routbort; Argonne National Laboratory, United States
- 10:40 17B.3 **A tribological study of the hybrid lubrication of DLC films with oil and water**
R Statuti¹, P Radi², L Santos², L Bonetti², G Capote¹, V Trava-Airoldi¹; ¹INPE, Brazil, ²ITA, Brazil
- 11:00 17B.4 **Influence of roughness on contact interface in fretting under dry and boundary lubricated sliding regime**
KJ Kubiak^{1,2}, TG Mathia²; ¹University of Leeds (IETSI), United Kingdom, ²Ecole Centrale de Lyon (LTDS), France
- 11:20 17B.5 **The Striebeck curve and lubrication design for non-fully wetted surfaces**
M Kalin*, I Velkavrh, J Vižintin; University of Ljubljana, Slovenia

Session 17C – Case Studies

- 10:00 17C.1 **Experimental study of the effects of rough texture on surface deformation during cold metal forming**
D Wei, ZY Jiang*, C Lui, Y Tang; University of Wollongong, Australia
- 10:20 17C.2 **A study of surface friction and particle friction between rough surfaces**
JH Horng*, CC We, HJ Tsai, BC Shiu; National Formosa University, Taiwan
- 10:40 17C.3 **Study on the oxidation of stainless steels 304 and 304L in humid air and the friction during hot rolling**
D Wei, ZY Jiang*, AK Tieu; University of Wollongong, Australia
- 11:00 17C.4 **Tribological, physicochemical and thermal study of the abrupt friction transition during carbon/carbon composite friction**
H Kasem¹, S Bonnamy¹, Y Berthier², P Jacquemard³; ¹CRMD, France, ²LaMCoS - INSA, France, ³Messier-Bugatti, France
- 11:20 17C.5 **Friction coefficient and abrasive wear modes in ball-cratering tests conducted at constant normal force and constant pressure - preliminary results**
RC Cozza*, DK Tanaka, RM Souza; The University of São Paulo, Brazil
- 11:40 17C.6 **Wear resistance of high-speed steels and cutting performance of tool related to structural factors**
AS Chaus*, M Hudakova; Slovak University of Technology in Bratislava, Slovakia

Session 17D – Wear Test Methods

- 10:00 17D.1 **Differences in wear between load and displacement control tested total knee replacements**
T Schwenke^{*1}, D Orozco¹, E Schneider², MA Wimmer¹; ¹Rush University Medical Center, United States, ²AO Research Institute, Switzerland
- 10:20 17D.2 **TLA and wear quantification of an aluminium-silicon-copper alloy for the car industry**
E Corniani^{*1, 2}, M Jech¹, F Ditroi², Th Wopelka¹, F Franek^{1, 3}; ¹Austrian Centre of Competence for Tribology, Austria, ²Institute of Nuclear Research of the Hungarian Academy of Sciences, Hungary, ³Vienna University of Technology, Austria
- 10:40 17D.3 **The use of the pin-on-disk tribology test method to study three unique industrial applications**
NX Randall, R Nair^{*}; CSM Instruments, United States
- 12:00 ***End of Conference***