

34th LEEDS-LYON SYMPOSIUM ON TRIBOLOGY

LYON, 4 - 7 SEPTEMBER 2007

TRIBOLOGICAL CONTACTS AND COMPONENT LIFE

Material transformation, fatigue, crack initiation and propagation.

FINAL PROGRAMME

Laboratoire de Mécanique des Contacts et des Structures – UMR CNRS5259

The Symposium will be held at INSA, 20, avenue Albert Einstein, Villeurbanne, France

TUESDAY 4th SEPTEMBER

9:00 - 14:00 Registration in Auditorium Hall, Building Louis Néel

14:00 - 15:30 *SESSION I (Amphi Capelle): OPENING*

Chairman : Prof. D. DOWSON

- "Crack formation and propagation in lubricated rolling contacts" by **A. Olver, P. Ruo, D. Dini** (Imperial College, Dept. of Mechanical Engineering, London, UK)
- "Wear can be a friend: wear and rolling contact fatigue in a ductile material", by **A. Kapoor** (University of Newcastle, Newcastle upon Tyne, UK), **JH Beynon** (Swinburne University of Technology, Australia)

16:00 – 17:20 *SESSION II (Amphi Turing): FATIGUE 1*

Chairman : Prof. L. FLAMAND

- "Effects of lubricants on micropitting and wear ", **A.V. Olver, E. Lainé**, (Imperial College, London UK), **T.A. Beveridge** (Caterpillar Inc., Peoria, IL, USA),
- "Rolling contact fatigue life under pure rolling in hydrogen environment" by **H. Tanaka, T. Yamamoto, Y. Yamamoto and J. Sugimura** (Kyushu University, Japan)
- "Micropitting performance of nitriding steel gears lubricated with mineral and ester oils", **N. Cardoso, R. Martins** (INEGI, Faculdade de Engenharia, Porto, Portugal), **J. Seabra** (Faculdade de Engenharia, Universidade do Porto, Portugal)
- "Fatigue mechanics of TiC-based Cemented Carbides" by **F. Sergejev, I. Preis, J. Kübarsepp** (Tallinn University of Technology, Estonia)

16:00 – 17:40 *SESSION III (Amphi Curie): LUBRICATION OF TEXTURED SURFACES*

Chairman : Prof. G. DALMAZ

- "Micro-EHL of Simple Sliding Elliptical Contacts with sinusoidal roughness" by **M. Kaneta, T. Yamada** (Kyushu Institute of Technology, Japan) and **J. Wang** (Qingdao Technological University, China)
- "Contact pressure in indented wide elliptical ehl contacts" by **N. Biboulet, A.A. Lubrecht** (LaMCoS, INSA Lyon, France), **L. Houpert** (Timken Europe, France)
- "In situ Pressure Measurements in Dimpled Elastohydrodynamic Sliding Contacts by Raman Microspectroscopy" by **K. Yagi** (Kyushu University, Japan), **Ph. Vergne** (LaMCoS, INSA Lyon, France), **T. Nakahara** (Tokyo Institute of Technology, Japan)
- "Analysis of Hydrodynamic Lubrication on Patterned Slide Way" by **A. Korenaga, S. Sasaki, Y. Ando**, (AIST Tsukuba EAST, Japan)
- "Effects of microtexture on the formation and failure of lubricating film" by **H. Shiomi, H. Tanaka, J. Sugimura**, (Kyushu University, Japan)

16:00 – 17:50 *SESSION IV (Amphi Hamilton): FRICTION*

Chairman : Prof. H. LIANG

- "The behaviour of Complete Sliding Contacts" by **D.A. Hills** (Oxford University), **D. Dini** (Imperial College)
- "Microscopic investigations into lubricated friction pairs in synchronisers" by **G. Poll, S. Neudörfer, T. Skubacz**, (Leibniz Universität, Gemany)
- "Friction Properties of Oil Impregnated Sintered Bearing" by **H. Akita, O. Gokita** (Hitachi Construction Machinery Co.,Ltd, Japan) and **T. Yanase, K. Maruyama** (Hitachi Powder Material Co., Ltd., Japan)
- "Sliding friction at elastomer / glass contact: Influence of the damping condition and instability analysis" by **F. Deleau** (Valeo Système d'Essuyage & LTDS, France), **D. Mazuyer** (LTDS, ECL France) and **A. Koenen** ((Valeo Système d'Essuyage, France)
- "Numerical determination of lateral frictional force in atomic friction microscope" by **G. Michal, C. Lu and A. Kiet Tieu** (University of Wollongong, Australia)

16:00 – 18:00 *SESSION V (Amphi Coriolis): BIOMEDICAL 1*

Chairman : Dr. P. CANN

- "A steady-state EHL model of natural hip joints with physiological loading and anatomical position" by **A Felix-Quinonez, J Fisher and ZM Jin** (Institute of Medical and Biological Engineering, The University of Leeds, UK)
- "The Effect of Albumen Adsorption on Friction between Artificial Joint Materials" by **X. Chen** (School of Mechanical Engineering, University of Leeds, UK and Wuhan University of Technology, P. R. China), **Z. Jin, J. Fisher** (School of Mechanical Engineering, University of Leeds, UK)
- "Tribological testing of articular cartilage of the medial compartment of the knee using a friction simulator " by **L. McCann, S. Graindorge, I. Udofia, E. Ingham, Z. Jin, J.Fisher** (School of Mechanical Engineering, University of Leeds, UK)
- "Microabrasion-corrosion of cast CoCrMo alloy in simulated body fluids" by **D. Sun, J.A. Wharton, R.J.K. Wood** (University of Southampton, UK)
- "A Study of the Effect of Model geometry and Lubricant Rheology upon the Elastohydrodynamic Lubrication performance of Metal-on-metal Hip Joints" by **W.-Z. Wang** (The University of Leeds, Leeds, U.K.), **Z. Jin** (The University of Leeds, U.K.) and **D. Dowson** (The University of Leeds, Leeds, U.K.), **Y. Hu** (Tsinghua University, P.R.China)
- "Tribo-corrosion analysis of wear and metal ion release interactions from Metal-on-Metal and Metal-on-Ceramic contacts for the application of artificial prostheses" by **Y. Yan, A. Neville, D. Dowson, J. Fisher** (University of Leeds, Leeds, UK)

19:15 Departure for SYMPOSIUM DINNER

WEDNESDAY 5th SEPTEMBER
(Morning)

8:30 - 10:00 *SESSION VI (Amphi Capelle) : CRACKS*

Chairman : Prof. J. TICHY

- "Mixed mode plasticity at crack tip and history effects" by **S. Pommier** (L.M.T. Cachan, France), **P. Lopez-Crespo** (University of Sheffield, UK)
- "Atomic simulation of effect of dislocation on crack propagation in FCC metals" by **C. Lu, Y. Gao, A. Kiet Tieu** (University of Wollongong, Australia)
- "A Discrete Element Model to Investigate Sub Surface Damage due to surface polishing" by **I. Iordanoff, A. Battentier** (ENSAM, LAMEFIP, France), **J. Néauport** (CEA CESTA, France) and **J.L. Charles** (ENSAM, LAMEFIP, France)
- "Hydrogen Effects on Fracture Morphology in Rolling Bearing" by **H. Uyama, H. Yamada, H. Hidaka and N. Mitamura** (NSK Ltd. Japan)

10:30 – 12:20 *SESSION VII (Amphi Turing) : ELASTOPLASTIC 1*

Chairman : Prof. J. BEYNON

- "Shakedown in Frictional Contact" by **M. Ciavarella** (CEMEC-PoliBA, Italy), **A. Klarbring** (University of Michigan, USA), **J.R. Barber** (University of Linköping, Sweden)
- "Experimental and theoretical investigation of asperity flattening process under large bulk strain" by **C. Lu, D. Wei, Z. Jiang, A. Kiet Tieu** (University of Wollongong, Australia)
- "An experimental and numerical study of material transformation induced by repeated impacts" by **G. Kermouche** (LTDS, ENISE France), **C. Langlade** (Université technologique de Belfort-Montbéliard, France), **A. Sekkal, A.B. Vannes** (LTDS, ENISE France)
- "Friction induced structural modifications of the near-surface layer" by **A. Eleöd**, (Budapest University of Technology and Economics, Hungary), **Y. Berthier** (LaMCoS, INSA Lyon, France), **E. Lach** (French-German Research Institute, France), **T. Törköly, G. Juhász** (Budapest University of Technology and Economics, Hungary)
- "A study of plastic deformation about crack tip using crystal plasticity finite element method" by **N.N. Huynh, C. Lu, L. Si, Kiet Tieu** (University of Wollongong, Australia)

10:30 – 12:30 *SESSION VIII (Amphi Curie) : EHL*

Chairman : Prof. M. KANETA

- "The effect of surface texturing on the contact fatigue life under thin film EHD lubrication" by **I. Krupka, M. Hartl, M. Vrbka** (Brno University of Technology, The Czech Republic)
- "Two- and three-dimensional CFD Modelling of Elastohydrodynamic Lubrication" by **M. Hartinger, D. Gosman, S. Ioannides, H. Spikes**, (Imperial College, London, UK)
- "Film-formability and traction of oils containing specially designed non-dispersant type polymethacrylates under EHD conditions" by **K. Nakamura, M. Muraki** (Shonan Institute of Technology, Japan)
- "Experimental Investigation of Temperature Rise in Elliptical EHL-Contacts Related to Rolling, Sliding, and Spin Motion" by **S. Miyata** (NSK Ltd, Japan), **B.-R. Höhn, K. Michaelis, O. Kreil** (Technical University of Munich, Germany)
- "Stress Distribution of Coated Film with interlayer under EHL Condition" by **T. Fujino, K. Iwamoto, K. Tanaka, M. Shima** (Tokyo University of Marine Science and Technology, Japan)
- "Surface Pitting Life Prediction in Rolling/Sliding Thermo-EHL Line Contacts Involving a Mixture of Two Fluids" by **P. Kumar, P. K. Saini** (National Institute of Technology, Kurukshetra, India)

10:30 – 12:30 *SESSION IX (Amphi Hamilton): FRETTING*

Chairman : Prof. D. HILLS

- "The relationship between accumulated AE outputs and dissipation energy under the fretting condition" by **S. Ito** (Tokyo University of Marine Science and Technology, Japan), **M. Shima, T. Jibiki**, (Faculty of Marine Engineering, Tokyo, Japan), **H. Akita** (Hitachi Construction Machinery Co., Ltd, Japan)
- "Fretting Fatigue Life Prediction in Shafts Using a Combined Slip-Stress-Strain Parameter" by **J. Vidner, E. Leidich** (Chemnitz University of Technology, Germany)
- "Tribological optimisation of bearing materials in a complex dry fretting contact" by **F. Doyen, H. Zaidi** (Laboratoire LMS, Poitiers France), **J. P. Riviere** (Laboratoire LMP, Poitiers France), **B. Leclercq** (Groupe Carbone Lorraine Industrie, France), **J. Rocchi** (Liebherr Aerospace, France), **M. Amirat** (Laboratoire LMS, Poitiers France),
- "Analysis of Fretting Problems using a Numerical Method Based on Cauchy Singular Integral Equation" by **C. Y. Lee, L.S. Tian, J. W. Bae, Y.S. Chai** (Yeungnam University, Gyongsan, Korea)
- "Development a dual crack nucleation – crack propagation approach to formalize the Fretting Fatigue damages: Introduction of a Fretting-Fatigue Mapping concept", by **S. Fouvry, K. Kubiak, H. Proudhon** (ECL, LTDS, Ecully, France)
- "Impact of the contact size effect on the fretting wear rate under dry and lubricated conditions: application to a AISI 52100 / AISI 52100 interface", by **R. Merhej, S. Fouvry** (ECL, LTDS, Ecully, France)

10:30 – 12:10 *SESSION X (Amphi Coriolis): THERMAL ASPECTS*

Chairman : Prof. R. WOOD

- "In-depth local strain mapping of plane contacts under normal load" by **Y. Liu** (Technische Universität Ilmenau & Max-Planck-Institut für Metallforschung, Germany)
- "A study of contact temperature and tribological behaviour of magnetized sliding brass/steel couple in different environments" by **M. Amirat, H. Zaidi** (Laboratoire LMS, Futuroscope Chasseneuil, France)
- "A 2D-Finite-Element-Approach for the Computation of Hydrodynamic Effects in Mixed Lubrication of Rubber Components" by **Y. Öngün, M. André** (Robert Bosch GmbH, Waiblingen, Germany) **L. Deters, D. Bartel** (University of Magdeburg, Germany)
- "Friction Modeling of Tribofilm Performance in a Bench Tribometer" by **R. Roshan, M. Priest, A. Neville, A. Morina, X. Xia** (University of Leeds, UK)
- "Ionic Liquids as Lubricants and Additives in Base Oil and Grease. Tribo-Corrosion and the Protective Role of Tricresyl Phosphate" by **M.F. Fox, M. Priest** (School of Mechanical Engineering, Leeds, UK)

12:30 – 12:45 Photograph

WEDNESDAY 5th SEPTEMBER
Afternoon

14:30 – 16:10 *SESSION XI (Amphi Capelle): COATINGS 1*

Chairman : Prof. K. TIEU

- "Selective growth of epitaxial Ag film using Tribo-assisted reorientation " by **M. Goto** (Ube National College of Technology, Japan), **K. Akimoto** (Nagoya University, Japan), **F. Honda** (Toyota Technological Institute, Japan)
- "Ultra low friction of dlc lubricated with alcohol" by **M. Kano, M. Kumagai, K. Yoshida, T. Horiuchi** (Kanagawa Industrial Technology Center, Japan)

- "Role of PTFE on anti-seizure properties of peek-based bearing materials", by **S. Inami, S. Takayanagi** (DAIDO Metal CO., LTD. Japan), **T. Kubo, H. Nanao, I. Minami, S. Mori** (Iwate University, Japan)
- "The influence of elastically graded interfaces on interfacial failure in repeated sliding contact" by **K.L. Dahm** (IETSI, School of Mechanical Engineering, University of Leeds, UK)
- "Effect of wettability on tribological properties of DLC films" by **T. Nakahigashi** (Nippon ITF Inc, Japan), **T. Numata** (Nisan Arc Ltd, Japan), **K.Miyake, M. Nakano** (AIST Tsukuba, Japan), **S. Sasaki** (AIST Tsukuba & Tokyo University of Science Japan)

16:30 – 18:10 *SESSION XII (Amphi Turing) : COATINGS 2 DLC*

Chairman : Prof. M. CIAVARELLA

- "Effect of thermal treatment on tribological properties of DLC coatings under various lubrication conditions" by **H. Ito and K. Yamamoto** (Kobe Steel Ltd, Japan)
- "Molecular Dynamics Simulations of Growth of Ultrathin Diamond-Like Carbon Films" by **Tian-bao Ma, Yuanzhong Hu, Hui Wang** (Tsinghua University, Beijing, China)
- "On the performance of W doped DLC coatings in boundary lubrication conditions" by **B. Krzan** (University of Ljubljana, Slovenia), **F. Novotny-Farkas** (OMV Refining & Marketing GmbH, Austria), **J. Vizintin** (University of Ljubljana, Slovenia)
- "Measurements of Water Density at Near-Surfaces of DLC films with Various Surface Energies by Neutron Reflectometry" by **T. Hirayama, T. Uno, T. Matsuoka** (Doshisha University, Japan), **K. Inoue** (Ryukoku University, Japan), **T. Ebisawa** (Japan Atomic Energy Agency, Japan), **S. Tasaki, M. Hino** (Kyoto University, Japan)
- "The Performance of DLC coatings in reciprocating sliding and the onset of coating penetration" by **R. Mills, R. Dwyer-Joyce** (University of Sheffield, UK)

16:30 – 18:30 *SESSION XIII (Amphi Curie) : PHYSICS OF LUBRICATION*

Chairman : Prof. G. POLL

- "Structures Analysis of Base Oils Under High Pressure by Synchrotron Radiation X-ray Diffraction Method " by **T. Hirayama, K. Nemoto, S. Hayase, Y. Mitsunaga, T. Matsuoka**, (Doshisha University, Japan), **T. Hattori** (Japan Atomic Energy Agency, Japan)
- "A continuum model for third body thin film flow:interactions with discrete simulation, and some experimental evidence" by **J. Tichy** (Rensselaer Polytechnic Institute USA), **Y. Berthier** (LaMCoS, INSA Lyon, France), **I. Iordanoff** (Centre d'Enseignement et de Recherche, France)
- "Metastability of hydrogen and superlubricity" by **J. Lepage** (Ecole des mines de Nancy, France)
- "Reynolds Equation, Apparent Slip and Viscous Friction in a Three layered Fluid Film" by **M.-H. Meurisse** (LaMCoS, INSA Lyon, France), **G. Morales-Espejel** (SKF-ERC, the Netherlands)
- "Ultrasonic Measurement of Viscosity in Thin Lubricant Films" by **S. Kasolang** (University of Sheffield, UK & Universiti Teknologi MARA, Malaysia), **R. S. Dwyer-Joyce** (University of Sheffield, UK)
- "Tribology of thermo-reversible gel-lubricants" by **Y. Shitara, T. Kaimai** (Japan Energy Corporation, Japan), **N. Ohno** (Saga University, Japan), **S. Mori** (Iwate University, Japan)

16:30 – 17:50 *SESSION XIV (Amphi Hamilton) : FRICTION AND WEAR MODELS*

Chairman : Prof. R. DWYER-JOYCE

- "Critical re-assessment of corrugation models and the "roaring rails" enigma" by **M. Ciavarella** (Politecnico di Bari, Italy), **JR Barber** (University of Michigan, Ann Arbor, USA)
- "Superficial cracks and material detachments due to unstable vibrations of bodies in sliding contact: an application" by **F. Massi** (LaMCoS, INSA Lyon, France & University of Rome "La Sapienza" Italy), **Y. Berthier** (LaMCoS, INSA Lyon, France), **L. Baillet** (University Joseph Fourier, France)

- "Friction signals making sources of tactile sensation: a biomimetic tribosystem finds particle size" by **K. Nakano** (Yokohama National University, Japan)
- "Modeling of Stick-Slip Contact: Influence of the Nature and Geometry of Contacting Surfaces on the Stress Distribution" by **D. Nélias, A.-A. Memon, L. Gallego** (INSA LaMCoS, France)

16:30 – 18:30 *SESSION XV (Amphi Coriolis) : INDUSTRIAL*

Chairman : Prof. K. HOLMBERG

- "Innovation Is the Way to Sustaining Sustainability" **H. Heshmat** (Ph.D./ Fellow ASME & STLE), (Mohawk Innovative Technology, Albany, New York, USA)
- "Wheel/Rail contact and rail maintenance" **L. Girardi**, (SNCF, Direction de l'Ingénierie, Paris, France)
- "Towards next generation DLC coatings: the scientific challenges", **L. Mourier, P. Maurin-Perrier, L. Houzé**, (Hydromécanique et frottement , Andrézieux-Bouthéon, France)
- "Engineering tribology", **G. Cavallaro, M. El Fassi**, (PSA Vélizy, France)
- "Aeronautic Carbon Brake, Braking under severe conditions" **G.B. Mazet** (Messier Bugatti , Velizy, France)

<p>THURSDAY 6th SEPTEMBER Morning</p>

8:30 - 10:00 *SESSION XVI (Amphi Capelle) : WEAR 1*

Chairman : Prof. P. EVANS

- "The surface failure and wear of graphite seals" by **A. Torrance** (Trinity College, Ireland), **M. Roe** (Australian Rail Track Corporation Ltd, Australia)
- "Seeing Soot in-Situ: Influence on Wear of Lubricated Steel " by **M. A. Torrance, A. V. Olver, R. J. Chater** (Imperial College London, UK)
- "Influence of intergranular nanoparticles on the wear behaviour of Al₂O₃-Fe-Cr nanocomposites rubbing on Ti6Al4V" by **Ph. Stempflié, F. Pollet** (ENIT, France), **L. Carpentier** (ENSMM, France), **Ch. Laurent** (Centre Interuniversitaire de Recherche et d'Ingénierie des Matériaux, France)
- "Effect of Sliding Wear on the Lubrication Performance" by **W. Zhong Wang** (Beijing Institute of Technology, China), **Y. Hu** (Tsinghua University, China), **D. Zhu** (Innovation Center, Michigan, USA)

10:30 – 12:10 *SESSION XVII (Amphi Turing) : WEAR 2*

Chairman : Prof. A. TORRANCE

- "The Polarity of Lubricants and Wear" by **Y. I. Kar, H. Liang** (Texas A&M University, USA)
- "Wear debris analysis of polyoxymethylene by DTA/TGA and mathematical morphology" by **P. Samyn, A. Ledda, I. Van Driessche, J. Quintelier, G. Schoukens** (Ghent University, Department Mechanical Construction & Production, Belgium)
- Monitoring of cam and follower wear by electrostatic charge detection" by **J.E. Booth, T.J. Harvey, R.J.K. Wood** (University of Southampton, UK), **H.E.G. Powrie** (Smiths Aerospace, Information Systems, UK)
- "Modelisation of abrasion application on superfinishing by belt grinding process" by **M. Bigerelle** (Laboratoire Roberval, France), **O. Saber** (Laboratoire Roberval & ENSAM LMPGM, France), **M. El Mansori** (ENSAM LMPF, France)
- "Effect of tangential force on surface originated flaking under contaminated lubrication" by **T. Ueda, N. Seno and N. Mitamura** (NSK Ltd. Japan) (*previously session II*)

10:30 – 12:30 **SESSION XVIII (Amphi Curie): ADDITIVES 1**

Chairman : Prof. A. NEVILLE

- "Tribological properties of Fe-Mo alloys lubricated with oils containing some different additives" by **T. Murakami, K. Kaneda, M. Nakano, A. Korenaga, H. Mano, S. Sasaki** (National Institute of Advanced Industrial Science and Technology, Japan)
- "Prevention of Oxidative Degradation of Antiwear Additive by Microcapsulation; and Verification of Antiwear Performance" by **M. Masuko, H.Sato, A. Suzuki** (Tokyo Institute of Technology, Japan), **O. Kurosawa** (Nippon Oil Co, Japan)
- "Friction-velocity characteristics of some zinc dialkylthiophosphates" by **M. Muraki**, (Shonan Institute of Technology, Japan), **K. Nakatsu, K. Nakamura, T. Ebihara** (Graduate school of Shonan, Japan)
- "Effect of Alkyl Acid Phosphate on Boundary Friction under Low Speed and Low Contacting Pressure Conditions" by **F. Itoigawa** (Nagoya Institute of Technology, Japan), **T. Norihisa, A. Ishihara** (OKUMA Corporation, Japan), **T. Ogawa** (Nagoya Institute of Technology, Japan), **T. Nakamura** (OKUMA Corporation, Japan)
- "Boundary Lubrication Film Formation from Phosphorus Anti-wear additives with Application to Metal V-Belt Pushing type CVT Fluids", by **K. Narita, M. Priest** (School of Mechanical Engineering, University of Leeds, UK)
- "Tribological Performance of Dichalcogenides Formed by the Decomposition of Water-based Tetraammonium Thiometallates Lubricant Additives" by **J. Lara-Romero** (Universidad Michoacana de San Nicolás de Hidalgo, México), **G. Alonso-Núñez** (CIMAV, México), **F. Chiñas-Castillo** (Instituto Tecnológico de Oaxaca, México), **J.D.O. Barceinas-Sánchez** (CIATEQ, México), **S. Jiménez-Snadoval** (CINVESTAV, México)

10:30 – 12:30 **SESSION XIX (Amphi Hamilton): NANOTRIBOLOGY**

Chairman : Dr. H. HESHMAT

- "Investigation of tribo-chemistry by means of stable isotopic tracers; Mechanism for durability of monomolecular boundary film" by **I. Minami, T. Furesawa, T. Kubo, H. Nanao, S. Mori** (Iwate University, Japan)
- "Dangling bonds in C60 and onionlike carbon studied by electron spin resonance as related to adhesion and friction" by **N. Ohmae, M. Yonetani, N. Matsumoto** (Kobe University, Japan)
- "Tribological Properties of Self-assembled Monolayers Covalently Bonded to Si" by **M. Nakano, T. Ishida** (National Institute of Advanced Industrial Science and Technology, Japan) **H. Sano, H. Sugimura** (Kyoto University, Japan), **K. Miyake, Y. Ando** (National Institute of Advanced Industrial Science and Technology, Japan), **S. Sasaki**
- "AFM study on nanotribology between advanced carbon materials in UHV" by **N. Matsumoto, H. Kinoshita, N. Ohmae** (Kobe University, Japan)
- "Modification of Interactions between Molecularly Thin Lubricant Films and Magnetic Disk Surfaces Using Ultraviolet Irradiation: Effect of End-Group Functionality" by **H. Zhang** (Dept. of Complex Systems Science Nagoya University Japan), **Y. Mitsuya** (Dept. of Micro-Nano Systems Engineering Nagoya University Japan), **Y. Kudo** (Dept of Electronic-Mechanical Engineering, Nagoya University, Japan), **K. Fukuzawa** (Dept. of Micro-Nano Systems Engineering Nagoya University Japan)
- "Quantification of the breakdown initiation and progress of thin oil films induced by quasi-static loading" by **K. Manabe, K. Nakano** (Yokohama National University, Japan)

10:30 – 12:30 **SESSION XX (Amphi Coriolis): COATINGS 3**

Chairman : Prof. Z. JIN

- "Tribochemical interactions of friction modifiers" by **T. Haque, A. Morina, A. Neville** (University of Leeds, UK), **R. Kapadia, S. Arrowsmith** (Infiniteum UK Limited, UK)

- "Surface stresses in coated steel surfaces – influence of a bond layer on surface fracture" by **K. Holmberg, A. Laukkanen and H. Ronkainen** (VTT Technical Research Centre of Finland)
- "Friction and Wear Properties of lubricated contact of Cr doped and non-doped DLC coating" by **H. Renondeau, I. Taylor** (Shell Global Solutions UK), **A. Torrance** (Trinity College University, Ireland)
- "Contact fatigue testing to assess the long-term adhesion of surface coatings" by **K.L. Dahm** (University of Leeds, UK)
- "Mechanisms of blistering and chipping during scratching of a glassy polymer with a thin film coating" by **V. Le Houérou, Ch. Gauthier, R. Schirrer** (Institut Charles Sadron, France)
- "PVD-CFUBMS Grown Me(Nb,Ti)-DLC films and their Characterization" by **D. Uğur** (Boğaziçi University, Turkey), **İ. Efeoğlu** (Ataturk University, Turkey), **S. Altıntaş** (Boğaziçi University, Turkey)

THURSDAY 6th SEPTEMBER
Afternoon

14:15 – 15:55 *SESSION XXI (Amphi Capelle) : FATIGUE 2*

Chairman : Prof. N. OHMAE

- "Experimental Study of the Rolling Contact Fatigue in Epoxy Resin" by **H. Abbouchi, A. Francisco, B. Villechaise** (Université de Poitiers, France)
- "Stress, Friction and Life in Micro Actuator Contact Surfaces" **F. Pape, H. H. Gatzen** (Leibniz Universitaet Hannover, (Germany))
- "Rolling Contact Fatigue Life of Ion-Nitrided Sintered Roller and Its Life Estimation" by **Y. Ohue** (Kagawa University, Japan), **M. Seki**, (Okayama University, Japan), **A. Yoshida** (Hiroshima International University, Japan)
- "Flexure Strength of Silicon Nitride as Indication of Rolling Contact Performance Measured on Ball-on-Rod and Modified Four-Ball Testers" by **W. Wang** (Bournemouth University, UK), **A.A. Wereszczak** (Oak Ridge National Laboratory, USA), **M. Hadfield** (Bournemouth University, UK)
- "Novel Acoustic Emission Measurement for Evaluation of Rolling Bearing's Lubricating Condition" by **H. Mano, A. Korenaga, Y. Ando and S. Sasaki** (National Institute of Advanced Industrial Science and Technology, Japan)

16:15 – 17:55 *SESSION XXII (Amphi Turing) : FATIGUE & MICROSTRUCTURE*

Chairman : Dr. A. OLVER

- "Effects of laser texturing on morphological and mechanical microproperties of nitride steel " by **A. Borghi** (CNR-INF, Modena Italy), **E. Gualtieri** (CNR-INF, Modena & Università degli Studi di Modena e Reggio Emilia Italy), **L. Calabri** (CNR-INF, Modena Italy), **N. Pugno** (Politecnico di Torino, Italy), **S. Valeri** (CNR-INF, Modena & Università degli Studi di Modena e Reggio Emilia Italy)
- "Microstructural and tribological characterization of titanium oxides films obtained by Nd : YAG laser treatment " by **L. Lavisse, G.-P. Pillon, C. Marco De Lucas** (Université de Bourgogne, France), **C. Langlade** (UTBM, - Site de Montbéliard, France)
- "Ceramic-metal composite surface transformation under erosive and abrasive wear" by **I. Hussainova, M. Antonov** (Tallinn University of Technology, Estonia)
- "Investigations on the Rotating Bending Fatigue of Cemented Carbides" by **F. Sergejev, M. Antonov, I. Hussainova** (Tallinn University of Technology, Estonia)
- "The effects of tribological processes on gear failures ", **R. Rakić, Z. Rakić** (NIS-Petrol, Novi Sad, Serbia)

16:15 – 17:55 *SESSION XXIII (Amphi Curie) : ENGINE COMPONENTS*

Chairman : Prof. M. PRIEST

- "Friction and Wear Bench Tests of Different Engine Liner Surface Finishes" by **E. Tomanik** (MAHLE Brazil Tech Center, Brazil)
- "Novel Method of Measuring Tappet Rotation and the Effect of Lubricant Rheology", by **R.A Mufti, A. Jefferies** (Global Lubricants Technology, UK)
- "Influence of base oil in gear power loss" by **R. Martins N. Cardoso** (INEGI, Faculdade de Engenharia, Portugal), **J. Seabra** (Universidade do Porto, Porto)
- "Artificial Intelligence as efficient technique for ball bearing contact damage prediction", by **T. Kolodziejczyk, R. Toscano, S. Fouvry**, (ECL, LTDS Ecully, France) **G. Morales** (SKF Engineering & Research Center, The Netherlands)
- "Experimental and theoretical studies on surface failure of bearings and piston/ring/cylinder system in engines" by **C. Zhang, M. Tao, and Y. Fu** (Tongji University, China), **Y. Wang, J. Tang, Z. Zhou, and Y. Tan** (CSR Qishuyan Locomotive and Rolling Stock Technology Research Institute, China)

16:15 – 18:15 *SESSION XXIV (Amphi Hamilton) : ROUGH CONTACT 1*

Chairman : Prof. J. SEABRA

- "Energy Dissipation in Rough Contacts under Partial Slip" by **D. Dini** (Imperial College, London, UK), **D. A. Hills** (University of Oxford, UK)
- "A modified theoretical model of boundary friction in conjunction with rough-surface contacts " by **T. Nakahara** (Dept. of Mechanical Science & Engineering, Tokyo Institute of Technology, Japan) **S. Momozono** (Dept. of Mechanical & Aerospace Engineering, Tokyo Institute of Technology, Japan)
- "A Rough Surface Contact Model for Anisotropically Elastic Materials" by **U. Scholz** (Robert Bosch GmbH, Germany), **D. Bartel, L. Deters** (Otto-von-Guericke-University Magdeburg, Germany)
- "Frictional behaviour accompanied by ultra mild wear: effects of surface roughness" by **M. Kosinskiy, Y. Liu** (Institut für Physik, Technische Universität Ilmenau, Germany), **M. Gubisch, L. Spiess** (Institut für Werkstofftechnik Technische Universität Ilmenau, Germany), **J. A. Schaefer** (Institut für Physik, Technische Universität Ilmenau, Germany)
- " Comparison of Fatigue Model Results for rough surface Elastohydrodynamic Lubrication" by **H Qiao** (Cardiff School of Engineering & Romax Technology, UK), **H P Evans, R W Snidle** (Cardiff University, UK)
- "Effect of adhesion hysteresis and roughness upon solid-liquid and solid-solid friction" by **M. Nosonovsky** (National Institute of Standards and Technology, USA)

16:15 – 17:55 *SESSION XXV (Amphi Coriolis) : WEAR 3*

Chairman : Prof. A. ELEOD

- "A predictive modeling scheme for wear in pin-on-disc and twin-disc tribometers" by **V. Hegadekatte** (Universität Karlsruhe, Germany), **S. Kurzenhäuser** (Universität Karlsruhe, Germany), **N. Huber** (Institut für Werkstofforschung & Institut für Werkstoffphysik und Technologie, Germany), **O. Kraft** (Universität Karlsruhe, & Institut für Materialforschung II, Germany)
- "Friction and wear of doped metal coatings (DMCs) and cast-iron in an ester base oil environment" by **P.A Dearnley** (University of Leeds UK), **M. Fischer** (Federal Mogul, Germany)
- "Fretting wear mapping of glaze layer activation" by **R. Rybiak, S.Fouvry**, (ECL, France), **B. Bonnet** (SNECMA, France)
- "Valve recession: the importance of impact wear" by **T. Slatter, R. Lewis** (The University of Sheffield, UK)
- "Nanoindentation and nanowear of a Sn-Ni alloy film on copper" by **J. Chen, S. J. Bull, A. Kapoor** (Newcastle University, UK)

FRIDAY 7th SEPTEMBER
Morning

8:30 - 10:00 *SESSION XXVI (Amphi Capelle) : ADDITIVES 2*

Chairman : Prof D. COY

- "Investigation on the tribofilm formed on diamond-like carbon coatings in presence of zinc dialkyl dithiophosphate" by **S. Equey** (Swiss Federal Laboratories for Materials Testing and Research & ETH Zurich, Switzerland), **R. Hauert** (ETH Zurich, Switzerland), **A. Rossi** (ETH Zurich, Switzerland & University of Cagliari, Italy), **N.D. Spencer** (ETH Zurich, Switzerland), **R. Crockett** (Swiss Federal Laboratories for Materials Testing and Research, Switzerland)
- "Low Friction Tribofilm Formed by the Reaction of ZDDP with Iron Oxide" by **K. Ito**, **K. Adachi** (Tohoku University, Japan) **J.M. Martin**, **C. Minfray** (ECL, LTDS France), and **K. Kato** (Tohoku University, Japan)
- "Performance alteration of MoS₂ Solid Lubricant due to Long Exposure Duration to LEO Space Environment aboard ISS" by **K. Matsumoto** (Japan Aerospace Exploration Agency –JAXA, Japan), **M. Belin**, **J. Fontaine**, **Th. Le Mogne** (ECL – LDTS, France), **M. Suzuki** (Japan Aerospace Exploration Agency –JAXA, Japan), **M. Tagawa** (Kobe University Japan), **M. Akiyama** (IHI Aerospace Co., Ltd. Japan)
- "A New Method to Evaluate the Overall Anti-shudder Property of Automatic Transmission Fluids – Multiple Parameters Spider Chart Evaluation", by **H. Zhao**, **A. Morina**, **A. Neville** (University of Leeds, UK)
- "Relationship between frictional and mechanical property of boundary lubricating films formed under sliding condition using various CVT oils" by **K. Yamamoto** (Kobe Steel Ltd. Japan), **T. Ichihashi** (Idemitsu Kosan Co. Ltd, Japan), **Y. Kato** (JATCO Ltd., Japan)

10:30 – 12:10 *SESSION XXVII (Amphi Turing) : ADDITIVES 3*

Chairman : Prof. M. FOX

- "Lubricant/surface interaction for gear applications: Additivated lubricants interacting at a steel/steel surface" by **K. Mistry**, **A. Morina**, **A. Neville**, **M. Webster** (University of Leeds, UK)
- "ZDDP and MoDTC tribological performance on Al-Si alloy lubricated in the boundary regime", by **X Xia**, **A. Neville**, **M Priest**, **A. Morina**, **R Roshan** (University of Leeds, UK)
- "Influence of slide-to-roll ratio on tribofilm generation" by **M. Meheux** (CETIM, France), **C. Minfray** (ECL, LTDS, France), **F. Ville** (LaMCoS, INSA Lyon, France), **Th. Le Mogne** (ECL, LTDS, France), **A.A. Lubrecht** (LaMCoS, INSA Lyon, France), **J. M. Martin** (ECL, LTDS, France), **H. P. Lieurade** (CETIM, France)
- "Evaluation of dispersant and friction modifiers on a simulated automatic transmission tribo-couple " by **T.J. Harvey**, **J.E. Booth** (University of Southampton, UK), **K.D. Nelson** (Chevron Oronite Company, USA), **R.J.K. Wood** (University of Southampton, UK), **H.E.G. Powrie** (Smiths Aerospace, Information Systems, UH), **S. Yeh**, **P. Rogers** (Chevron Oronite Company, USA)
- "Evaluation of gear oil additives in a simulated manual transmission contact" by **K.D. Nelson** (Chevron Oronite Company, USA), **J.E. Booth**, **T.J. Harvey**, **R.J.K. Wood** (University of Southampton, UK) **H.E.G. Powrie** (Smiths Aerospace, Information Systems, UK), **S. Yeh** (Chevron Oronite Company, USA)

10:30 – 11:50 *SESSION XXVIII (Amphi Curie): SCRATCH*

Chairman : Dr. J. SUGIMURA

- "Finite element analysis of the viscoelastic and elastic-plastic behavior of amorphous polymeric surfaces during sliding indentation" by **A.-L. Durier**, **H. Pelletier**, **Ch.Gauthier**, **R. Schirrer** (Institut Charles Sadron, France)

- "Scratch-test method: Energy dissipation and crack morphology" by **S. Krenn, E. Badisch, A. Pauschitz** (AC²T research GmbH, Austria)
- "Experimental and finite element analysis of scratches on amorphous polymeric surfaces " by **H. Pelletier, Ch. Gauthier, R. Schirrer** (Institut Charles Sadron, France)
- "Numerical analysis of the mechanical behavior of glassy polymers during a scratch test" by **N. Aleksy** (École Nationale d'Ingénieur de Saint-Étienne & ECL – LTDS, France), **G. Kermouche** (École Nationale d'Ingénieur de Saint-Étienne, France), **A. Vautrin** (Centre Science des Matériaux et des Structures, département Mécanique et Matériaux, France), **J.M. Bergheau** (École Nationale d'Ingénieur de Saint-Étienne, France)

10:30 – 12:10 *SESSION XXIX (Amphi Hamilton): ROUGH CONTACT 2*

Chairman : Prof.. T. NAKAHARA

- "Leakage Studies with Seals for Solid-Oxide Fuel Cells" by **C. Green, J. Streater**, (Georgia Institute of Technology, USA), **C. Haynes** (Georgia Tech Research Institute, USA), **E. Lara-Curzio** (Oak Ridge National Laboratory, USA)
- "Effect of rough surfaces under starved conditions on Rolling Contact Fatigue" by **A. Labiau, F. Ville, P. Sainsot, E. Querlioz, A.A. Lubrecht** (LaMCoS, INSA Lyon, France)
- "Transition of Frictional States and Surface Roughness Effects in Lubricated Contacts" by **Shun Wang, Yuan-zhong Hu** (State Key Laboratory of Tribology, China), **Wen-zhong Wang** (Beijing Institute of Technology, China), **Hui Wang** (State Key Laboratory of Tribology, China)
- "The effects of solid particulate contamination in the shoe-floor contact" by **R. Mills, R.S. Dwyer-Joyce, M. Loo-Morrey** (University of Sheffield, UK)
- "Characterization of Coefficient of Friction of rough Surfaces" by **J. Abdo** (Sultan Qaboos University, Oman)

10:30 – 12:10 *SESSION XXX (Amphi Coriolis): WEAR 4*

Chairman : Prof. K. IWAMOTO

- "Impacts of tribological parameters on wear behaviour investigated on nanometer scale" by **M. Jech, Th. Wopelka, A. Pauschitz** (AC²T research GmbH, Austria), **F. Franek** (AC²T research GmbH & Vienna University of Technology, Austria)
- "AFM nanotribology study of the frictional properties of hydroxyquinolines isomers and ethanolamine oligomers" by **A. Bogus, T. Aumeyr, C. Pieczetowski, C.A. Vasko** (Vienna University of Technology, Austria), **N. Doerr** (AC²T research GmbH, Austria), **I.C. Gebeshuber** (Vienna University of Technology & AC²T research GmbH, Austria)
- "On optimal shapes of contact interfaces generated in steady wear processes" by **I. Paczelt** (University of Miskolc, Hungary), **Z. Mróz** (Institute of Fundamental Technological Research, Warsaw, Poland)
- "Effect of Oil Rheology and chemistry on Journal Bearing Friction and Wear" by **A. Jefferies, G. D Lamb, R.A Mufti, A.G Smith, Ch.P Warrens** (Global Lubricants Technology, UK)
- "Effect of pulse electrodeposition parameters on the wear behaviour nano-structure composite coatings Ni-SiC" by **A. Rahimi, A. Amadeh** (University of Tehran, Iran), **H. Moradi** (Maham Industries, Tehran, Iran), **B. Farshchian, M. Lari** (University of Tehran, Iran)

12:15 *SESSION XXXI (Amphi Capelle): CLOSURE/AWARD ATTRIBUTION*