

Biotribology



**The 8th International Biotribology Forum
and The 36th Biotribology Symposium**

Satellite Forum of
International Tribology Conference (ITC) Tokyo 2015

Date: **September 21-22, 2015**

Venue: **Yokohama Symposia**
Yokohama, Japan

Organized by

Biotribology Forum Organizing Committee

Japanese Society of Biotribologists

Jointly organized by

Research Center for Advanced Biomechanics,

Kyushu University

Foreword

Since 1978, Biotribology Symposium has been held as the annual meeting of Japanese Society of Biotribologists. From 2000, International Biotribology Forum was intermittently held together with this symposium as a satellite meeting of International Tribology Conference in many cases. In these meetings, the discussions have been mainly concentrated within orthopedic fields because of the enormous developments of joint prostheses. Recently, the theme was, however, expanded to ophthalmologic field, dental field, dermatological field or others. Therefore, in the present forum, any themes are welcome if they are interesting or funny. Let's gather to enjoy the free-minded discussions.

Chairmen

Kiyoshi MABUCHI

Professor of Kitasato University

President of Japanese Society of Biotribologists

Teruo MURAKAMI

Professor of Kyushu University

Office of Japanese Society of Biotribologists

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Organizing Committee

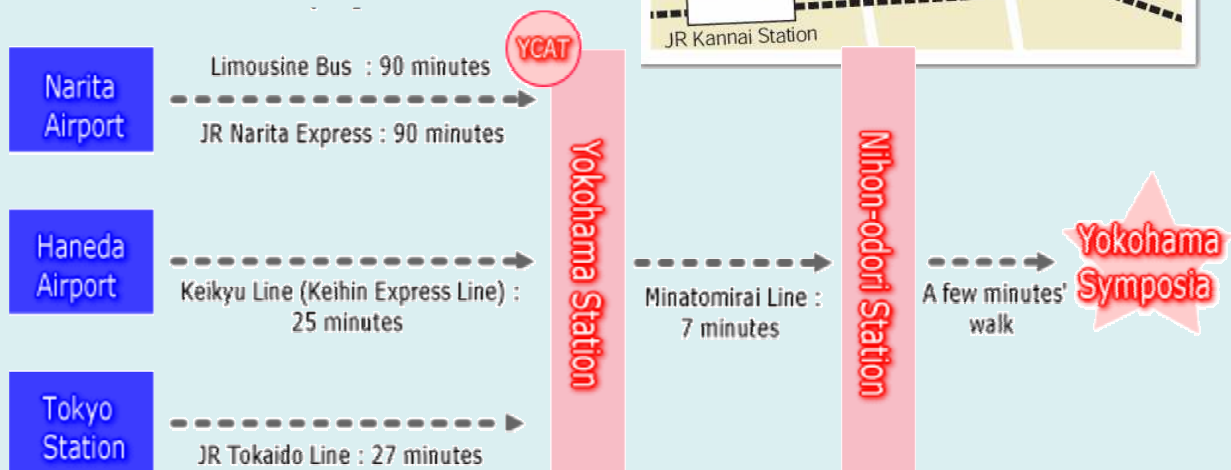
Dr. P. M. Cann (Imperial College, UK)
Prof. H. Fujie (Tokyo Metropolitan University, Japan)
Dr. K. Hirakawa (Shonan Kamakura Joint Reconstruction Center, Japan)
Prof. H. Iguchi (Nagoya City University, Japan)
Prof. Y. Iwamoto (Kyushu University, Japan)
Prof. Z. Jin (Xi'an Jiaotong University, China and University of Leeds, UK)
Prof. K-Y. Lee (Sejong University, Korea)
Prof. S. Matsuda (Kyoto University, Japan)
Prof. J.B. Medley (University of Waterloo, Canada)
Prof. M. Morita (Saitama University, Japan)
Prof. Y. Nakanishi (Kumamoto University, Japan)
Prof. K. Nakano (Yokohama National University, Japan)
Dr. K. Nakashima (Kyushu University, Japan)
Prof. N. Sakai (Kyushu Institute of Technology, Japan)
Prof. R. Sakai (Kitasato University, Japan)
Dr. H. Sakoda (National Institute of Health Sciences, Japan)
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Prof. N. Tomita (Kyoto University, Japan)
Dr. M. Ueno (Kyocera Medical Corporation, Japan)
Prof. M. A. Wimmer (Rush University, USA)
Prof. Z. Zhou (Southwest Jiaotong University, China)

Venue

Yokohama Symposia Industry and Trade Center 9F

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Kanagawa Pref. Japan, 231-0023

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General information

Time for each presentation

10 minute presentation followed 2 minute discussion

Registration fee

One person: Yen 5,000-

Student: Yen 2,000-

Banquet ticket

Yen 3,000-

September 21st

**The 8th International Biotribology Forum
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Program

[September 21st]

Opening remark

9:25-9:30

Chairman of Organizing Committee

Murakami T

Keynote Lecture

9:30-10:00

Chairperson: Jin ZM

K1. Synergistic Lubricating Function with Different Modes for Artificial Hydrogel Cartilage

Murakami T (Research Center for Advanced Biomechanics, Kyushu University, Japan), Yarimitsu S (Tokyo Metropolitan University, Japan), Nakashima K (Kyushu University, Japan), Sakai N (Kyushu Institute of Technology, Japan), Yamaguchi T, Sawae Y (Kyushu University, Japan), Suzuki A (Yokohama National University, Japan)

Session 1 Tribology on gel

10:05-10:41

Chairpersons: Nakano K, Suzuki A

1. Evaluation of Lubrication Property of Chondrocyte-Agarose Gel Construct Considering Extracellular Matrix Structure

Kubota R (Graduate School of Life and Medical Sciences, Doshisha University, Japan), Morita Y, Nakamachi E (Doshisha University, Japan)

2. Evaluation of Lubrication Properties of Hydrogel Artificial Cartilage Materials for Joint Prosthesis

Yarimitsu S (Tokyo Metropolitan University, Japan), Yoshida A, Sasaki S, Murakami T (Research Center for Advanced Biomechanics, Kyushu University, Japan) Suzuki A (Yokohama National University, Japan)

3. Frictional Properties of Physically Cross-Linked PVA Hydrogels as Artificial Cartilage

Sasaki S, Murakami T (Research Center for Advanced Biomechanics, Kyushu University, Japan), Suzuki A (Yokohama National University, Japan)

Session 2 Wear of Implants

10:50-11:38

Chairpersons: Hirakawa K, Medley JB

4. A Biotribo POD Wear Testing Method for Orthopedic Biomaterials

Hua ZK, Tang F, Chen JJ (Shanghai University, China), Jin ZM (Xi'an Jiaotong University, China, University of Leeds, UK)

5. Computational Wear Prediction of Artificial Knee Joints Using Different Wear Models

Zhang J, Chen Z (Xi'an Jiaotong University, China), Jin ZM (Xi'an Jiaotong University, China, University of Leeds, UK)

6. Effect of Particle Size on Biological Response by Human Monocyte-Derived Macrophages

Nakanishi Y, Chikaura H, Nakashima Y (Graduate School of Science and Technology, Kumamoto University, Japan), Fujiwara Y, Komohara Y, Takeya M (Graduate School of Medical Sciences, Kumamoto University, Japan)

7. UHMWPE/MWCNTs Nanocomposites; Wear Characterization and Biological response

Emami N (Luleå University of Technology, Sweden), Tipper JL (Institute of Medical and Biological Engineering, University of Leeds, UK), Suñer S (Luleå University of Technology, Sweden)

Lunch

Keynote Lecture

12:50-13:20

Chairperson: Murakami T

K2. A Wear Simulator Protocol for Reverse Total Shoulder Arthroplasty

Medley JB (Waterloo University, Canada), Langohr GDG, Athwal GS, Johnson JA (Western University, Canada)

Session 3 Tribology of joint prostheses

13:25-14:13

Chairpersons: Minehara H, Zhou ZR

8. Effects of Changing Reverse Total Shoulder Arthroplasty Implant Configuration on Articular Contact Mechanics During Abduction

Langohr GDG, (Western University, Canada), Willing R (Binghamton University, USA), Medley JB (University of Waterloo, Canada), Athwal GS, Johnson JA (Western University, Canada)

9. Swing Tribological Behavior for CoCrMo /UHMWPE Contact Surface under Dynamic Loading

Zhang D, Zhang GF, Luo Y, Wang QL, Ge SR (China University of Mining and Technology, China)

10. Prediction of Contact Mechanics of UHMWPE Hip Implant under Realistic Joint Loading

Zhang X (Xi'an Jiaotong University, China) Jin ZM (Xi'an Jiaotong University, China, University of Leeds, UK)

11. The Effect of Metallic Shell Deformation on the Contact Mechanics of Ceramic - on - ceramic Hip Implants

Qiu CD (Xi'an Jiaotong University, China) and Jin ZM (Xi'an Jiaotong University, China, University of Leeds, UK)

Session 4 Wear of Polyethylene

14:20-15:08

Chairpersons: Nakashima K, Tomita N

12. Evaluation of the Biological Response to Crosslinked Ultra-High Molecular Weight Polyethylene Particles

Niikura M, Ye H, Nogi S, Turner A (Graduate School of Engineering, Kyoto University, Japan), Tomoyo Yutani, Keita Uetsuki (Teijin Nakashima Medical Co.,Ltd., Japan), Naohide Tomita (Graduate School of Engineering, Kyoto University, Japan)

13. Effects of Lipids on the Wear of Ultra-High Molecular Weight Polyethylene Used for Total Artificial Joints

Sakoda H, Niimi S (National Institute of Health Sciences, Japan)

14. Minimum 7-year results of Highly Cross-linked Remelted UHMWPE: Prospective Multi-Center Comparison

Hirakawa K (Shonan Kamakura Joint Reconstruction Center, Japan), Matsubara M (Tamagawa Hospital, Japan), Ohhashi H (Saiseikai Nakatsu Hospital, Japan), Mashima N (Ehime University, Japan), Iwaki H (Nakanoshima Iwaki Hospital, Japan)

15. Proving Superior Wear Performance with Highly Cross-Linked Polyethylene in Total Hip Arthroplasty

Tsuji K, Hirakawa K, Takayanagi S, Nakura N, Saito A, Ochiai S, Tamaki Y (Shonan Kamakura Joint Reconstruction Center, Japan)

September 21st

Session 5 Wide spectrum tribology

15:20-15:56

Chairpersons: Sakai N, Stachowiak GW

16. Knee Bone Textures Analysis Using Augmented Variance Orientation Transform Method in Diagnosis and Prognosis of Osteoarthritis

Wolski M, Podsiadlo P, Stachowiak GW (Curtin University, Australia)

17. Low Tangential Permeability in the Superficial Layer Improves the Frictional Property of Articular Cartilage

Fujie H (Kogakuin University, Tokyo Metropolitan University, Japan), Mitsui H, Imade K (Tokyo Metropolitan University, Japan)

18. A Functional Effect of the Superficial Mechanical Properties of Articular Cartilage as a Load Bearing System in a Migrating Contact Condition

Sakai N, Hashimoto C (Kyushu Institute of Technology, Japan), Yarimitsu S (Tokyo Metropolitan University, Japan), Sawae Y (Kyushu University, Japan), Komori M (Kyushu Institute of Technology, Japan) Murakami T (Research Center for Advanced Biomechanics, Kyushu University, Japan)

Extraordinary Talk

16:10-16:40

Chairperson: Fujie H

Ex1. A fantasy of an IG Nobel Prize winner - From tribology on banana peels to a mystery of organics -

Mabuchi K, Sakai R (Kitasato University, Japan)

Banquet at on-Site Lounge

17:00-19:00



[September 22nd]

Keynote Lecture

9:30-10:00

Chairperson: Sawae Y

K3 Dental Biotribology: Recent Progresses and Future Perspectives

Zheng J, Zhou ZR (Southwest Jiaotong University, China)

Session 6 Tribology on organic substance

10:05-10:53

Chairpersons: Mabuchi K, Sakoda H

19. Effect of Enamel Microstructure on the Lubricating Properties of Human Saliva

Zhang YF, Wang ZB, Zheng J, Zheng L, Zhou ZR (Southwest Jiaotong University, China)

20. Objective Evaluation of Operation Feeling of Rotary Switches

Suzuki K, Nakano K (Yokohama National University, Japan)

21. Contact Behavior at Minimally Invasive Grasper - Soft Tissue Interface

Li W, Zhou ZR (Southwest Jiaotong University, China)

22. Tribological Properties and Blood Compatibility of DLC Deposited on the Ti6Al4V

Luo Y, Ge SR, Zhang D, Wang QL (China University of Mining and Technology, China)

Session 7 Joint kinematics and lubrication

11:00-12:00

Chairpersons: Takahira N, Emami N

23. Effect of Inclination Angle on Kinematics and Contact Mechanics of Dual Mobility Hip Implant

Gao YC (Xi'an Jiaotong University, China), Jin ZM (Xi'an Jiaotong University, China, University of Leeds, UK)

24. Radial Head Hemiarthroplasty Contact Mechanics: An Exploration of Proximal Radioulnar Joint Geometry and Implant Material Stiffness

Langohr GDG, Johnson AJ (Western University, Canada), Willing R (Binghamton University, USA), Medley JB (University of Waterloo, Canada), King GJW, Johnson JA (Western University, Canada)

25. Six Degree Polished Taper Design Trunion Combined with 26mm CoCr head had excellent 15 years clinical results in Total Hip Arthroplasty

Hirakawa K, Takayanagi S, Nakura N, Tsuji K, Saito A, Ochiai S, Tamaki Y (Shonan Kamakura Joint Reconstruction Center, Japan)

26. An Experimental Investigation of Lubricant Film Formation in Artificial Hip Joints

Nečas D, Vrbka M, Urban F, Křupka I, Hartl M (Brno University of Technology, Czech Republic), Gallo J (University Hospital Olomouc, Czech Republic)

27. Behavior of Protein Film Adsorbed on Joint Prosthesis Material under Rubbing

Nakashima K, Sawae Y, Kudo S, Murakami T (Kyushu University, Japan)

Session 8 Metal corrosion and surface texture 13:10-13:58

Chairpersons: Kapsa PH, Nakanishi Y

28. Tribocorrosion Properties of CoCrMo and 316L Stainless Steel in Condition of Calf Serum

Wang QL, Ge SR, Zhang D, Luo Y (China University of Mining and Technology, China)

29. Effect of Friction Displacement on a Passive Film of Cobalt Chromium Alloy

Honna M, Mabuchi K (Graduate School of Medical Sciences, Kitasato University, Japan)

30. Effect of Surface Texturation on Friction and Wear of CoCrMo/PE and CoCrMo/CoCrMo Contacts for Heads of Hip Joints

Kapsa PH, Fridrici V, Crisan N (Université de Lyon, France)

31. Role of Surface Texture and Roughness on Friction and Transfer Film Formation when UHMWPE Sliding Against Steel

Menezes PL (University of Nevada Reno, USA), Kailas SV (Indian Institute of Science, India)

Session 9 Expansions

14:10-14:46

Chairpersons: Urabe K, Sakai R

32. Finite Element Analysis of the Tibial Post in Posterior-Stabilized Knee Prosthesis

Tanaka K, Sakai R, Mabuchi K (Graduate School of Medical Sciences, Kitasato University, Japan)

33. The Stress Distribution in the Femoral Medullary Cavity Form and Surrounding of Hip Stems: A Finite Element Analyses

Yoneo T, Nakao M, Sakai R, Fukushima K, Uchiyama K, Takahira N, Mabuchi K (Graduate School of Medical Sciences, Kitasato University, Japan)

34. Response of Bone on Stationary Load From the Implant

Nakao M, Uchida K, Sakai R, Mabuchi K (Graduate School of Medical Sciences, Kitasato University, Japan)

Closing Remark

Chairman of Organizing Committee Mabuchi K

Announcement of the special publication

We plan to publish selected papers from the present forum in a special issue of Biosurface and Biotribology, new scientific journal recently launched from Elsevier. Authors of this meeting are cordially invited to submit a full length article to the Special Issue before October 31st 2015.

Papers must be submitted electronically in accordance with the normal processes and format of the journals. For further information, please follow the links to the journal below.

<http://www.journals.elsevier.com/biosurface-and-biotribology/>

Organizing committee of The 8th International Biotribology Forum