

9:10 - 10:10

Rising Star Award Session – 2

Chair: **Edgar O'Rear, Tamas Alexy**

RSA2-1 Blood flow thrombosis simulation to understand complex phenomenon of thrombosis under blood flow condition.

***Shinichi Goto¹, Noriko Tamura³, Masamitsu Nakayama², Shu Takagi⁴, Shinya Goto²**

¹Brigham and Women's Hospital, Harvard Medical School, ²Tokai University School of Medicine, ³Niigata University of Health and Welfare, ⁴Graduate School of Engineering, The University of Tokyo

RSA2-2 Suspension rheology of red blood cells under oscillatory shear flow

***Naoki Takeishi¹, Marco E Rosti², Naoto Yokoyama³, Shigeo Wada¹, Luca Brandt⁴**

¹Osaka University, ²OIST, ³Tokyo Denki University, ⁴KTH

10:20 - 11:20

Free Communication (Video Presentation)

11:30 - 12:30

Plenary Lecture for ISB

Chair: **Peter Butler**

Lessons from Red Blood Cell Mechanics to Endothelial Cell Mechanobiology

Kris N. Dahl

Carnegie Mellon University

13:50 - 14:50

Keynote Lecture 3

Chair: **Toshiaki Dobashi**

Coagulation of blood: a possible triggering mechanism of the intrinsic coagulation pathway, and assessment of anticoagulant effect of DOACs using a seesaw-type device

***Makoto Kaibara¹, Hiroshi Ujiie²**

¹Past affiliation: RIKEN (The Inst. Phys. Chem. Res.), ²Ujiie Neurosurgical & Medical Clinic

Keynote Lecture 4

Chair: **Nobuo Watanabe**

CFD analysis to optimize the design of rotary blood pumps

Masahiro Nishida

National Institute of Advanced Industrial Science and Technology

Keynote Lecture 5

Chair: **Toru Maruyama**

Dynamics of blood fluidity under the various pathologic conditions. The roles of endothelial anticoagulant activities and their pathophysiologic conditions

***Ikuro Maruyama**

Department of Systems Biology in Thromboregulation, Kagoshima University Graduate School of Medical and Dental Sciences

15:00 - 16:30

SYMPOSIUM S16: Hemorheological and metabolic properties of red blood cells

Chairs: **Björn Neu, Olivera Korculanin**

S16-1 Competition between red blood cell aggregation and breakup: Depletion force due to filamentous viruses vs. shear flow

***Olivera Korculanin^{1,2}, Tatiana Kochetkova¹, Pavlik Minne Paul Lettinga^{1,2}**

¹Biomacromolecular Systems and Processes (IBI-4), Forschungszentrum Juelich GmbH, Germany,

²Laboratory for Soft Matter and Biophysics, KU Leuven, Belgium

S16-2 Sphingosine-1-phosphate and Adenosine affects the oxygen dependence of erythrocyte metabolism

***Francesco Misiti**

Cassino and Lazio Meridionale University

S16-3 The role of macromolecular depletion on the adhesion of red blood cells with a reduced sialic acid content

*** Björn Neu¹, Huimin Teo², Zhengwen Zhang²**

¹Rhine-Waal University of Applied Sciences, ²Nanyang Technological University

S16-4 The Mizar®: a novel, fully-automated aggregometer

***Lennart Kuck¹, Francesco A. Frappa², Michael J. Simmonds¹**

¹Biorheology Research Laboratory, Menzies Health Institute Queensland, Australia, ²Alcor Scientific Inc., Rhode Island, USA

SYMPOSIUM S17: Microrheological responses of blood cells under normal and pathological conditions

Chairs: **Alexei Muravyov, Nadia Antonova**

S17-1 Development of experimental microfluidic device and methodology for assessing microrheological properties of blood

***Nadia Mladenova Antonova¹, Khristo Khristov², Anika Svilenova Alexandrova³, Alexei Vasilievich Muravyov⁴**

¹Dept. Biomechanics, Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, ²Institute of Physical Chemistry at the Bulgarian Academy of Sciences, Sofia, Bulgaria, ³Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, ⁴Yaroslavl State Pedagogical University Ushinskii, Yaroslavl, Russia

S17-2 Comparative study of the microrheological properties of the blood in patients with type 2 diabetes mellitus, using viscosimetry and microfluidic flow analysis

***Anika Svilenova Aleksandrova-Watanabe¹, Nadia Mladenova Antonova¹, Alexey Vasilievich Muravyov², Khristo Ivanov Khristov³, Irena Vasileva Velcheva⁴**

¹Dept. of Biomechanics, Institute of Mechanics, Bulgarian Academy of Sciences, Sofia, Bulgaria, ²Dept. of Medical and Biological Foundations of Sports, Yaroslavl State Pedagogical University named after K. D. Ushinsky, Yaroslavl, Russia, ³. Dept. of Interfaces and Colloids, Institute of Physical Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria, ⁴Clinic of Nervous Diseases, Uni Hospital, Panagyurishte, Bulgaria

S17-3 Microrheological responses of red blood cells (RBCs) to gasotransmitters in persons with different levels of oxygen supply to the body

***Alexei Vasilievich Muravyov¹, Pavel Valentinovich Mikhailov¹, Irina Alexandrovna Tikhomirova¹, Roman Sergeevich Ostroumov¹, Victor Vasilievich Zinchuk²**

¹State pedagogical university, Yaroslavl, ²State Medical University, Grodno, Belarus

S17-4 Effect of gasotransmitters (NO and H₂S) on hemorheology and blood clotting

***Irina Alexandrovna Tikhomirova¹, Elena Petrovna Petrochenko¹, Yulia Viktorovna Malysheva¹, Alexei Vasiljevich Muravyov¹, Alexander Sergeevich Petrochenko²**

¹Yaroslavl State Pedagogical University, ²Yaroslavl State Medical University

S17-5 Forces of pair interaction of RBCs and their relation to aggregation parameters under normal and pathological conditions.

***Alexander V. Priezzhev¹, Andrei E. Lugovtsov¹, Alexey N. Semenov¹, Larissa I. Dyachuk², Petr B. Ermolinskiy¹**

¹Physics Department of Lomonosov Moscow State University, ²Medical Research and Education Centre of Lomonosov Moscow State University

17-6 Microrheological responses of RBCs after age (density) separation

***Petr Ermolinskiy¹, Andrei Lugovtsov¹, François Yaya^{2,5}, Lars Kaestner^{2,3}, Christian Wagner^{2,4}, Alexander Priezzhev¹**

¹Physics Department, Lomonosov Moscow State University, 119991 Moscow, Russia, ²Experimental Physics, Saarland University, 66123 Saarbrücken, Germany, ³Theoretical Medicine and Biosciences, Saarland University, 66123 Saarbrücken, Germany, ⁴Physics and Materials Science Research Unit, University of Luxembourg, L-1511 Luxembourg, Luxembourg, ⁵Laboratoire Interdisciplinaire de Physique, UMR 5588 CNRS and University Grenoble–Alpes, 38058 Grenoble, France

Free Communication (Live Presentation) O1: Advance in CFD, biotissue and food science

Chairs: **Isamu Kaneda, Hiroshi Yamada**

O1-1 Effects of Mixed Starches from Different Origins on the Rheological Properties of Starch gels and Gomatofu

***Emiko Sato¹, Yuta Yokoyama²**

¹University of Niigata Prefecture, ²University of Tohto

O1-2 Comparisons of indices of low-stress stiffness and contents of elastin and collagen for human arteries with fibrous caps and aortic dissection

***Hiroshi Yamada¹, Subraya Krishna Bhat²**

¹Kyushu Institute of Technology, ²National Institute of Technology Karnataka

O1-3 Comparison of the passive mechanical property and structure of ventricles in aquatic, semiaquatic, and terrestrial Anura

***Megumi Ito, Shukei Sugita, Masanori Nakamura, Yoshihiro Ujihara**

Nagoya Institute of Technology

O1-4 Estimating CFD-based CT FFR using lattice Boltzmann method – 3D geometry auto segmentation and novel patient specific computation

***Hyeong Jun Lee, Young Woo Kim, Jun Hong Kim, Joon Sang Lee**

School of Mechanical Engineering, College of Engineering, Yonsei University

16:40 - 18:10

Canceled SYMPOSIUM S18: Multidisciplinary Rheology in Poliprofil Medicine

Chair: **Maka Mantskava, Nana Momtselidze**

SYMPOSIUM S19: Microcirculation disturbances, blood microrheological properties and functional states of leukocytes

Chairs: **Nadia Mladenova Antonova**

S19-1 Disturbances in the skin temperature oscillations and blood rheological and electrical properties in patients with Diabetes mellitus type 2

***Nadia Mladenova Antonova¹, Vasilka Krumova Paskova², Irena Vasileva Velcheva³, Sergey Yurievich Podtaev⁴**

¹Dept. Biomechanics, Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, ²Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria, ³Uni Hospital, Panagyurishte, Bulgaria, ⁴Institute of Continuous Media Mechanics, RAS, Perm, Russia

S19-2 Functional states of PMN in pregnant women with hypertension assessed with chemiluminescent method - preliminary data

B. Bechev¹, M. Magrisso², S. Stoeff¹, Sv. Jovtchev¹, S. Miteva¹, S. Alexandrov¹, J. Ivanov¹, M. Pencheva³, D. Koleva⁴, I. Buteva⁴, M. Vretenarska⁵, N. Nikolova⁶ and V. Iliev^{6,7}

¹Dept Medical Physics and Biophysics and ³Dept Biology of Medical University Sofia, Bulgaria, ²Omrad Electronics LTD, Beer Sheva, Israel, ⁴OGW/MHAT "Nadezhda" Sofia, ⁵2nd MHAT Sofia, Nephrology Ward, ⁶MC Vitclinic, ⁷Military Medical Academy of Sofia

S19-3 Participation of the polymorphonuclear leukocytes in initiation and evolvement of pathologies induced by SARS-Cov-2 virus

B. Bechev¹, S. Stoeff¹ and K. Kavaldzhieva²

¹Dept Medical Physics and Biophysics, ²Dept Biology of Medical University Sofia, Bulgaria

SYMPOSIUM S20: Nanomechanical and nanorheological assessments of various diseases

Chairs: **Malgorzata Lekka, Joanna Zemla**

S20-1 Search for efficient diagnosis and therapy of resistant BRAF mutated melanoma using biophysical methods

***Tomasz Kobiela¹, Anna Sobiepanek¹, Swamy Kasarla¹, Weronika Prorok¹, Tomasz Gambin²**

¹Warsaw University of Technology, Faculty of Chemistry, ²Warsaw University of Technology, Faculty of Electronics and Information Technology

S20-2 Rheological properties of biological materials

***Joanna Zemla¹, Claude Verdier², Malgorzata Lekka¹**

¹Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland, ²Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, CNRS, Grenoble, F-38000, France

S20-3 Nanomechanical assessment of cancer cells and solid tumors as a mechanical biomarker

***Andreas Stylianou^{1,2}**

¹European University Cyprus, ²University of Cyprus

16:40 - 18:30

Free Communication (ePoster)

19:20 - 20:00

ESCHM-ISCH-ISB Combined Business online Meeting

20:10 - 22:00

SYMPOSIUM S21: Shear Stress and Red Cell Rheology

Chairs: **Edgar O'Rear, Ozlem Yalcin**

S21-1 Cell age sensitivity of red cells to mechanical stresses and calcium load

Lennart Kuck¹, Jason N. Peart², Oliver Todd¹, *Michael J. Simmonds¹

¹Biorheology Research Laboratory, Menzies Health Institute, Griffith University Gold Coast, Queensland, Australia, ²School of Medical Science, Griffith University Gold Coast, Queensland, Australia

S21-2 Senescence and Red Cell Rheology

***Edgar O'Rear¹, James Buerck¹, Phillip Coghil², Ahmed El Banayosy³, Hendra Setiadi³**

¹University of Oklahoma, ²VADovations, Inc., ³INTEGRIS Baptist Medical Center

S21-3 Asymmetrical erythrocyte morphology to detect sublethal damage

***Nobuo Watanabe^{1,2}, Antony P. McNamee³, Jarod T. Horibin^{3,4}, John F. Fraser⁵, Masataka Inoue², Masaya Hakozaki², Fukuta Matsuzawa², Michael J. Simmonds³**

¹Biofluid Science and Engineering Laboratory, Dept. of Bio-Science and Engineering, College of Systems Engineering and Science, Shibaura Institute of Technology, Saitama, Japan, ²Biofluid Science and Engineering Laboratory, Systems Engineering and Science, Graduate School of Engineering and Science, Shibaura Institute of Technology, Saitama, Japan, ³Biorheology Research Laboratory, Menzies Health Institute Queensland, Griffith University, Gold Coast, Australia, ⁴Perth Blood Institute, West Perth, Perth, Australia, ⁵Critical Care Research Group, University of Queensland & The Prince Charles Hospital, Brisbane, Australia

S21-4 Effects of mechanical heart valves on circulating blood in patients with valvular heart diseases

***Toru Maruyama¹, Michinari Hieda¹, Aya Sato², Takehiko Fujino²**

¹Kyushu University, ²Institute of Rheological Function of Foods, Co. Ltd.

S21-5 A structured mechanical risk sensitivity assessment system using red cell deformability and fragmentation parameters

***Ozlem Yalcin^{1,2}, Elif Ugurel², Polat Goktas¹, Evrim Goksel^{1,3}, Neslihan Cilek^{1,3}, Dila Atar¹**

¹Koç University, School of Medicine, Istanbul, Turkey, ²Koç University, Research Center for Translational Medicine (KUTTAM), Istanbul, Turkey, ³Koç University, Graduate School of Biomedical Sciences and Engineering, Istanbul, Turkey

S21-6 Measurements of erythrocyte deformation in shear and extensional flows

***M Keith Sharp¹, Mohammad M Faghih²**

¹University of Louisville, ²US Food and Drug Administration

S21-7 In silico simulation of hemodynamics and blood cell mechanics inside human vasculature

***Senol Piskin¹, Aya Ahmed FaEEK Elgebal²**

¹Department of Mechanical Engineering, College of Engineering, Istinye University, Istanbul, Turkey, ²Department of Biomedical Engineering, Faculty of Electrical and Electronics Engineering, Yildiz Technical university, Istanbul, Turkey

20:30 - 22:00

SYMPOSIUM S22: Microbiorheology from molecules to tissues

Chairs: **Daisuke Mizuno, Kengo Nishi**

S22-1 Motion of molecular motors reflecting rheological properties in cells

***Takayuki Ariga**

Yamaguchi University

S22-2 Glassy cytoplasm driven by non-thermal forces

***Kenji Nishizawa^{1,2}, Daisuke Mizuno³**

¹IBDM, ²CNRS, ³Department of Physics, Kyushu University

S22-3 Metabolism-Dependent Active Diffusion in Living Cells

***Yujiro Sugino¹, Kenji Nishizawa², Daisuke Mizuno¹**

¹Department of Physics, Kyushu University, ²IBDM-CNRS

S22-4 Microrheology of concentrated emulsion as a model cytoplasm.

***Shono Inokuchi, Ryosuke Matsuoka, Daisuke Mizuno**

Kyushu University

S22-5 Non-equilibrium fluctuations in cells report on driving forces and organelle mechanics

***Kengo Nishi^{1,2}, Sufi Raja¹, An Pham¹, Fred C MacKintosh³, Christoph F Schmidt¹**

¹Duke University, ²UNC Chapel Hill, ³Rice University

SYMPOSIUM S23: Clinical studies using various assays for platelets and hemostasis

Chairs: **Paul Gurbel, Young-Hoon Jeong**

S23-1 Global Thrombosis Test

***Diana Adrienne Gorog**

University of Hertfordshire & Imperial College, London

S23-2 Thromboelastography: Viscoelastic properties of clot formation and their clinical impact in ASCVD patients

***Young-Hoon Jeong**

Gyeongsang National University Changwon Hospital

S23-3 Clinical Trial with Microfluidic Platelet Function Assays(Anysis-200): Comparison with Turbidity-based Drug Response Assay(Verify-NOW

***Byoung Kwon Lee¹, Miney Cho¹, Sehyun Shin²**

¹Cardiology, Department of Internal Medicine, Gangnam severance Hospital, Yonsei University, Seoul, Korea , ²Department of Mechanical Engineering, Korea University, Seoul, Korea

S23-4 T-TAS 01: A Novel Flow-Based System for Hemostasis Monitoring

***Jeffrey Dahlen**

Fujimori Kogyo Co., Ltd.