Fifth International Conference on Flow Dynamics

Program

Plenary Lecture

Ballroom A
November 17, 2008

10:00-10:55 **Energy and Environment: An Aerospace Solution** P-1
Chul Park (Korea Advanced Institute of Science and Technology)

Keynote Lectures

Ballroom A
November 17, 2008

11:05-12:00 **Molecular Sensors and Particle Image Velocimetry - Trans-Disciplinary Flow Dynamics Techniques -** K-1
John P. Sullivan (Purdue University)

Ballroom A
November 18, 2008

8:30-9:25 **A Method of Weighted Residuals Approach to Data Fusion with Aerospace Applications** K-2
Andrew J. Meade (Rice University)

Trans-disciplinary Flow Division Sessions

Ballroom A
November 17, 2008

OS1: "Trans-disciplinary Informatics Flow Division Session"

OS1-1
13:30-14:30
Globalization and engineering research in the 21st century International Conference on Flow Dynamics *(Invited)*
Eric Grulke (University of Kentucky, USA)

OS2: "Trans-disciplinary Reactive Flow Division Session"
Chair: H. Nishiyama and K. Maruta (Tohoku University, Japan)

Future Research Plan in Reactive Flow Dynamics
H. Nishiyama

OS2-1
14:30-15:00
Biomass Gasification in DC Arc Plasma Flow Generated in Hybrid Gas/Water Torch *(Invited)*
M. Hrabovsky (Institute of Plasma Physics ASCR, Czech Republic)

OS2-2
15:00-15:30
Combustion towards Alternative Fuels for 21st Century Transportation *(Invited)*
Z. Chen, S. Won, M. Bulke, and Y. Ju (Princeton University, USA)

15:30-15:45 Break

OS3: "Trans-disciplinary Nano-flow Division Session"
Chair: Taku Ohara (Tohoku University, Japan)

OS3-1
15:45-16:45
Thermal phenomena in solid nanostructures *(Invited)*
Y. Chalopin, P.-O. Chapuis (Ecole Centrale Paris, France), S. Volz (The University of Tokyo, Japan)

OS4: "Trans-disciplinary Advanced Flow Division Session"
Chair: Shigeru Obayashi (Tohoku University, Japan)

OS4-1
16:45-17:15
Progress and Expectation of CFD for Near-Future Peta-Flops Computers *(Invited)*
Kazuhiro Nakahashi (Tohoku University, Japan)

OS4-2
17:15-17:45
Methane Hydrate Production; as Transport Phenomena *(Invited)*
Koji Yamamoto (Japan Oil, Gas and Metals National Corporation, Japan)

OS9: Multi-Stage Network Session

Ballroom A
November 18, 2008

13:30-16:00 Session1 Introduction of Universities with Collaborative Agreement

16:15-17:15 Session2 Parallel Academic Discussion

1) Integrated CFD with Visual Informatics
   Chair: Jun Ishimoto and Yuriko Takeshima (Tohoku University, Japan)
2) Nuclear Engineering
   Chair: Tetsuya Uchimoto (Tohoku University, Japan)
3) Plasma / Nano Flow Dynamics
   Chair: Takehiko Sato and Takashi Tokumasu (Tohoku University, Japan)
4) Biofluid Dynamics
   Chair: Makoto Ohta and Atsushi Shirai (Tohoku University, Japan)
5) Transport Phenomena
   Chair: Atsuki Komiya and Gota Kikugawa (Tohoku University, Japan)

17:30-18:45 Session3 Liaison Office Activities
Chair: Hiroshi Higuchi (Syracuse University, Japan)

17:30-17:45 **Introduction and Future Perspective for Global COE Program: World Center of Education and Research for Trans-disciplinary Flow Dynamics**
Shigenao Maruyama (Tohoku University, Japan)

17:45-18:00 **Introduction and Future Collaboration Through ELyT - Engineering and science Lyon Tohoku Laboratory -**
Joël Courbon (INSA-Lyon, France)

18:00-18:15 **Introduction of JSPS Core to Core Program: Establishment of International Research Consortium for Advanced Biomedical Engineering in Interface Flow Dynamics for Blood Flows, Blood Vessels, and Biomaterials**
Makoto Ohta (Tohoku University, Japan)

18:15-18:30 **Research training and education with an international experience.**
Masud Behnia (University of Sydney, Australia)

18:30-18:45 **Discussion**

OS1: Trans-disciplinary Informatics Flow Division Session

Orchid
November 18, 2008

Chair: Jun Ishimoto (Tohoku University, Japan)

OS1-2 9:30-10:15 **Institute of Research for Technology Development at the University of Kentucky: Its Principles and Methods to seek Interdependent Partnership with Industry** ***(Invited)***
Kozo Saito (University of Kentucky, USA)

Chair: Makoto Ohta (Tohoku University, Japan)

OS1-3 10:15-10:45 **Recent Advances in Non-Invasive Brain Perfusion Measurement with MRI** ***(Invited)***
Ivan Zimine (Philips Electronics Japan, Japan)

10:45-10:50 Break

OS1-4 10:50-11:30 **WENO type limiters for discontinuous Galerkin methods** ***(Invited)***
Jianxian Qiu (Nanjing University, China)

OS1-5 11:30-12:10 **A Weakened Weak (W^2) Form for a Unified Formulation of Compatible and Incompatible Displacement Methods** ***(Invited)***
G. R. Liu (National University of Singapore, Singapore)

OS2: Trans-disciplinary Reactive Flow Division Session

Maple
November 18, 2008

Chair: H. Nishiyama, T. Sato and S. Yonemura (Tohoku University, Japan)

OS2-3
9:30-9:55
In-Situ Plasma Micro-Metallurgy of Mechanically Agglomerated Reacting Powder Particles *(Invited)*
O. P. Solonenko, V. A. Poluboyarov and A. N. Cherepanov (SB RAS, Russia)

OS2-4
9:55-10:20
The Applications of Atmospheric Pressure Cold Plasmas for Skin Cancer and Dental Treatments *(Invited)*
A.-A. H. Mohamed, H. W. Lee, G. J. Kim (Pohang University of Science and Technology, Korea), G. C. Kim (Pusan National University, Korea), P. K. Tiwari, S. M. Lee, J. Choi and J. K. Lee (Pohang University of Science and Technology, Korea)

OS2-5
10:20-10:45
Parametric Study of Hybrid Argon-Water Stabilized Arc for Biomass Gasification *(Invited)*
J. Jeništa (Institute of Plasma Physics AS CR, Czech Republic), H. Takana, H. Nishiyama (Tohoku University, Japan), M. Bartlová, V. Aubrecht (Brno University of Technology, Czech Republic) and M. Hrabovský (Institute of Plasma Physics AS CR, Czech Republic)

OS2-6
10:45-11:10
Pilot-scale Experiments with Diesel Particulate and NOx Aftertreatment Systems Using Nonthermal Plasma Hybrid Processes *(Invited)*
M. Okubo (Osaka Prefecture University, Japan)

OS2-7
11:10-11:35
Modeling of Reactive Modulated Thermal Plasmas and Their Applications *(Invited)*
Y. Tanaka (Kanazawa University, Japan)

OS2-8
11:35-12:00
Optimization of Small Power Reactive Air Jet for Industrial Applications
H. Takana and H. Nishiyama (Tohoku University, Japan)

Maple
November 19, 2008

Chair: K. Maruta (Tohoku University, Japan)

OS2-9
9:30-10:00
Statistical Modeling of Non-Equilibrium Reactive Flows *(Invited)*
M. S. Ivanov and Y. A. Bondar (Khristianovich Institute of Theoretical and Applied Mechanics, Russia)

OS2-10
10:00-10:30
Recent Trend of the Rocket Engines and the Hydrocarbon Propellants for the Space Exploration *(Invited)*
T. Hiraiwa (JAXA KSC, Japan)

Chair: H. Aoki (Tohoku University, Japan)

OS2-11
10:45-11:10
Plasma Assisted Ignition and Combustion
K. Takita (Tohoku University, Japan)

OS2-12
11:10-11:35

One Aspect of Entrained Flow Coal Gasifier Simulation in Japan

Y. Matsushita, H. Aoki and T. Miura (Tohoku University, Japan)

OS2-13
11:35-12:00

Combustion Characteristics of Stretched Premixed Methane-Air Flame in Front of an Inert Hot Wall

H. Nakamura, A. W. Fan, H. Minamizono, K. Maruta, H. Kobayashi (Tohoku University, Japan) and T. Niioka (Akita Prefectural University, Japan)

OS3: Trans-disciplinary Nano-flow Division Session

Rose
November 18, 2008

Chair: Takashi Tokumasu (Tohoku University, Japan)

OS3-2
9:30-10:10
A study of cation dependent Raman mode in ionic liquid $[C_nMIM]^+[TFSI]^-$ ***(Invited)***
Hyun-Joung Kwon, Si-In Kim, Dong-Myoung Shin , Hyung Kook Kim and Yoon-Hwae Hwang (Pusan National University, Korea)

OS3-3
10:10-10:50
Kinetic Numerical Methods for Semiclassical Boltzmann Hydrodynamic Transport of Gases of Arbitrary Statistics ***(Invited)***
J. Y. Yang, Yu-Hsin Shi and Tse-Yang Hsieh (National Taiwan University, Taiwan)

OS4: Trans-disciplinary Advanced Flow Division Session

Oak
November 18, 2008

Chair: Takatoshi Ito (Tohoku University, Japan)

9:55-10:00 **Opening**
T. Ito (Tohoku University, Japan)

OS4-3 **Fracturing of Sand and Soft Rock *(Invited)***
10:00-10:50 C. J. de Pater (Technical University Delft, The Netherlands)

OS4-4 **Hydraulic Fractures in Cohesionless Particulate Materials *(Invited)***
10:50-11:40 L. N. Germanovich (Georgia Tech, USA)

11:40-11:50 Break

OS4-5 **Various Patterns of Hydraulic Fractures in Unconsolidated Sands**
11:50-12:15 **Observed in Laboratory Tests**
A. Igarashi, T. ITO (Tohoku University, Japan), K. Yamamoto (JOGMEC, Japan), S. Nagakubo (Japan Drilling Co., Ltd., Japan) and K. Suzuki (National Institute of Advanced Industrial Science and Technology, Japan)

OS4-6 **Distinct Element Modeling for Hydraulic Fracturing**
12:15-12:40 H. Shimizu , S. Murata (Kyoto University, Japan), T. Ito (Tohoku University, Japan) and T. Ishida (Kyoto University, Japan)

Oak
November 19, 2008

Chair: Shigeru Obayashi

OS4-7 **Recent Development in Active Control of Turbulent Boundary Layers**
9:30-10:00 ***(Invited)***
Kwing-So Choi (University of Nottingham, UK)

OS4-8 **Fundamental Studies of the Application of the Shock Tunnel Cycle for**
10:00-10:30 **Coating Techniques *(Invited)***
H. Olivier, C. Henkes (RWTH Aachen University, Germany) and X. Luo (University of Science and Technology of China, China)

OS4-9 **Challenges and Opportunities in Aerodynamic Shape Optimization**
10:30-11:00 ***(Invited)***
David W. Zingg and Jason E. Hicken (University of Toronto Institute for Aerospace Studies, Canada)

OS4-10 **New Trends in Optimization Methodologies for Fluid Dynamics and**
11:00-11:30 **Multidisciplinary Problems *(Invited)***
Carlo Poloni, V. Pediroda, L. Parussini and M. Lettich (University of Trieste, Italy)

11:30-13:00 Lunch

OS4-11
13:00-13:30
Uncertainty Analysis in Fluid Dynamics *(Invited)*
L. Parussini, V. Pediroda and C. Poloni (University of Trieste, Italy)

OS4-12
13:30-14:00
Aerodynamic Shape Optimization using Evolutionary Algorithms, Gradient-based Methods, Computational Intelligence and Multilevel Schemes - Recent Activities *(Invited)*
K. C. Giannakoglou (National Technical University of Athens, Greece)

OS4-13
14:00-14:30
Multi-Objective Optimisation of a Compressor S-Shaped Duct Using RSM *(Invited)*
E. Naylor, M. Karakasis, R. Miller and H. Hodson (University of Cambridge, UK)

OS4-14
14:30-15:00
Optimising the Aerodynamics for Internal Stores Carriage and Release *(Invited)*
K. Knowles, B. Khanal, S. A. Ritchie, P. Geraldes and N. Taborda (Cranfield University, UK)

OS4-15
15:00-15:30
Application of Plasma Actuator for Controlling Small UAV
Tomohiro Narumi and Keisuke Asai (Tohoku Univeristy, Japan)

OS5: Prediction and Mitigation of Sonic Boom

Ballroom A
November 18, 2008

Chair: Shigeru Obayashi (Tohoku University, Japan)

OS5-1 9:30-10:20 **From Sonic Boom to Sonic Puff *(Invited)***
Kenneth J. Plotkin (Wyle Laboratories, USA)

OS5-2 10:20-11:10 **Research at NASA on Human Response to Sonic Booms *(Invited)***
Brenda M. Sullivan (NASA Langley Research Center, USA)

OS5-3 11:10-11:30 **Sonic Boom Modeling at JAXA**
Y. Naka, Y. Makino and T. Ito (Japan Aerospace Exploration Agency, Japan)

OS5-4 11:30-11:50 **Sonic Boom Propagation with Atmospheric Fluctuations of Wind and Temperature**
H. Yamashita and S. Obayashi (Tohoku University, Japan)

OS5-5 11:50-12:10 **Effects of Turbulent Flow Sheet on Weak Shock Wave *(Invited)***
Jae Hyung Kim, Atsushi Matsuda and Akihiro Sasoh (Nagoya University, Japan)

OS5-6 12:10-12:30 **Effects of Molecular Vibrational Relaxation on Weak Shock Wave Propagation *(Invited)***
T. Sakai (Nagoya University, Japan)

OS5-7 12:30-12:50 **Active Control of Separation Shock Wave on a Compression Ramp Using Plasma Actuators *(Invited)***
T. Matsuno, H. Arahori and H. Kawazoe (Tottori University, Japan)

OS6: Super Visualization: Concepts and Challenges

Ballroom A
November 19, 2008

Chair: Issei Fujishiro (Tohoku University, Japan)

OS6-1 10:00-10:30 **What is Super Visualization? -Definition and Scope-** ***(Invited)***
Kazuki Joe (Nara Women's University, Japan)

OS6-2 10:30-11:30 **Two Multi-scale Morse Theory and Data Streaming for Science Discovery** ***(Invited)***
V. Pascucci (University of Utah, USA)

OS6-3 11:30-12:00 **Manifold Learning Techniques for Visualizing Complexities** ***(Invited)***
Shigeo Takahashi (The University of Tokyo, Japan)

12:00-13:00 Lunch

Chair: Kazuki Joe (Nara Women's University, Japan)

OS6-4 13:00-13:30 **A System for Visualization of Large Irregular Volume Datasets on a Tiled Display Wall** ***(Invited)***
K. Koyamada (Kyoto University, Japan)

OS6-5 13:30-14:00 **FRUITS Time: An Interactive Visualization Technique for Time-Varying Data** ***(Invited)***
Takayuki Itoh and Yumiko Uchida (Ochanomizu University, Japan)

OS6-6 14:00-14:30 **Visualizing Social Community Evolution** ***(Invited)***
Y. Hashimoto, Y. Chen and H. Ohashi (The University of Tokyo, Japan)

OS6-7 14:30-15:00 **On the Recordability and Traceability of Visualization-Centered Knowledge Discovery Process**
I. Fujishiro and Y. Takeshima (Tohoku University, Japan)

OS7: Nano-micro Flow Dynamics of Carbon Related Coatings

Ivy
November 18, 2008

9:30- **Opening Address**
Toshiyuki Takagi (Tohoku University, Japan)

Chair: A. Erdemir (Argonne National Laboratory, USA)

OS7-1
9:35-10:00 **Wetting and Adhesion Force behavior of Undulated a-C:H Film Deposited on Nanoscale Copper Dots *(Invited)***
Young-Jun Jang and Noritsugu Umehara (Nagoya University, Japan)

OS7-2
10:05-10:30 **Development of Tribochemical Reaction Simulator Based on Quantum Chemistry and Its Application *(Invited)***
Momoji Kubo, Yusuke Morita, Tasuku Onodera, Ai Suzuki, Hideyuki Tsuboi, Michihisa Koyama, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba and Akira Miyamoto (Tohoku University, Japan)

10:35-10:45 Break

Chair: T. Takeno (Tohoku University, Japan)

OS7-3
10:45-11:10 **What is the meaning of drag reduction? *(Invited)***
Y. Kohama and H. Cao (Tohoku University, Japan)

OS7-4
11:15-11:40 **The Fundamental Mechanisms of Superlubricity and Tribochemistry in DLC Films *(Invited)***
Ali Erdemir and Osman Eryilmaz (Argonne National Laboratory, USA)

OS7-5
11:45-12:10 **Evaluation of Thin Coating Layers using Minimum Reflection Profiles of Rayleigh-Like Waves *(Invited)***
Hak-Joon Kim, Sung-Jin Song (Sungkyunkwan University, Korea), Sung D. Kwon (Andong National University, Korea), Dong-Yeol Kim (Sungkyunkwan University, Korea), T. Takagi , T. Uchimoto and T. Abe (Tohoku University, Japan)

Ivy
November 19, 2008

Chair: O. Bourgeois (CNRS-UJF, France)

OS7-6
10:00-10:25 **New carbon-based coatings deposited by Pulsed Laser Deposition *(Invited)***
Anne-Sophie LOIR, Florence GARRELIE, Christophe DONNET (Université Jean Monnet, France)

OS7-7 10:30-10:55 **Anti-Fretting Coatings Using Segment-Structured DLC Films *(Invited)***
Naoto Ohtake, Mai Takashima, Tsuyoshi Kuroda (Nagoya University, Japan), Makoto Matsuo, Yoshinao Iwamoto (iMott Inc., Japan), Masanori Saito (Tokyo Institute of Technology, Japan), Masao Kumagai, Makoto Kano (Kanagawa Industrial Technology Center, Japan), Hiroshi Kimoto (Kobe Material Testing Laboratory, Japan) and Masaru Shinohara (Kurita Seisakusyo Co. Ltd., Japan)

11:00-11:10 Break

Chair: A. Loir (Université Jean Monnet, France)

OS7-8 11:10-11:30 **Non-lubrication Sliding Mechanism and Nano-Micro Ground Effect of the partly polished CVD Diamond Surface**
H. Miki, T. Takeno and T. Takagi (Tohoku University, Japan)

OS7-9 11:35-12:05 **Running-in for Reducing Friction of CNx-coatings under Nitrogen Gas *(Invited)***
Koshi Adachi and M. Sugo (Tohoku University, Japan)

12:10-13:00 Lunch

Chair: H. Miki (Tohoku University, Japan)

OS7-10 13:00-13:25 **Carbon Nanotube Toughened Diamond-like Carbon Nanocomposite Coatings *(Invited)***
Sam Zhang, Huili Wang(Nanyang Technological University, Singapore)

OS7-11 13:30-13:55 **Surface state and electrical properties of diamond like carbon films deposited by pulsed laser *(Invited)***
A.Sikora (Université Jean Monnet, France), O. Bourgeois, H. Ftouni (CNRS-UJF, France), J.-L. Garden, A.-S. Loir, F. Garrelie and C. Donnet (Université Jean Monnet, France)

OS7-12 14:00-14:25 **Deposition of metal-doped diamond-like carbon coatings by CVD and PVD hybrid technique**
T. Takeno, H. Miki and T. Takagi (Tohoku University, Japan)

14:25- **Closing Remarks**
Hiroyuki Miki (Tohoku University, Japan)

OS8: The Fourth International Students/Young Birds Seminar on Multi-scale Flow Dynamics

Ballroom B
November 18, 2008

10:00-10:05 **Opening Address**

Session1 **-Award Session-**
10:05-11:05 **Short Oral Presentation**
(4 min for Short Oral Presentation including PC preparation)

11:05-11:20 **Break**

11:20-11:50 **Poster Presentation**

OS8-1 **The Design Concept for High-Temperature Photo-Electronic Devices using $SrTiO_3$**
Fumimasa Horikiri, Kazuhisa Sato, Keiji Yashiro, Tatsuya Kawada and Junichiro Mizusaki (Tohoku University, Japan)

OS8-2 **A Study of Cation Dependent Abnormal Properties of Ionic Liquid $[CnMIM]^+[TFSI]^-$ by using Brillouin and Dielectric Loss Spectroscopies** ***(Invited)***
Hyun Joung Kwon, Jeong Ah Seo, Tae-Young Kim, Hyung Kook Kim and Yoon Hwae Hwang (Pusan National University, Korea)

OS8-3 **Flame Synthesis of Eu^{3+} Activated Yittrium Oxysulfate Phosphors**
Yasuo Iwako, Isao Kobayashi, Toshihisa Ueda and Takeshi Yokomori (Keio University, Japan)

OS8-4 **Oxygen Nonstoichiometry of $La_{2-x}Sr_xNiO_{4+\delta}$**
Takashi Nakamura, Keiji Yashiro Kazuhisa Sato and Junichiro Mizusaki (Tohoku University, Japan)

OS8-5 **Simple yet Precise Calibration Method of Thermometers for Measuring the Temperature of Biological Tissue**
Naoya Ogasawara, Shigenao Maruyama, Atsuki Komiya, Hiroki Takeda, Takashi Seki and Tomoyuki Yambe (Tohoku University, Japan)

OS8-6 **Water Transport in Novel Nanostructured Coatings Obtained from Latex Technology** ***(Invited)***
J. Faucheu, L. Chazeau, C. Gauthier and J.Y. Cavaille (Institut National des Sciences Appliquées de Lyon, France)

OS8-7 **Numerical Investigation of Spray Combustion with Considering Secondary Atomization**
Hirotatsu Watanabe, Katsuyuki Hoshino, Takuji Harada, Haruyuki Kamata, Yohsuke Matsushita, Hideyuki Aoki and Takatoshi Miura (Tohoku University, Japan)

OS8-8 **A Quantum Chemistry Study on Flow Dynamics of Excitation Energy in Phosphors**
Hiroaki Onuma, Itaru Yamashita, Kazumi Serizawa, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-9 **Determination Method of Concentration Dependency of Mass Diffusion Coefficient by Phase Shifting Interferometer and Inverse Method**
Junnosuke Okajima, Atsuki Komiya and Shigenao Maruyama (Tohoku University, Japan)

OS8-10 **On the Development of a Starting Vortex by Dielectric Barrier Discharge Plasma *(Invited)***
Richard D. Whalley, Timothy N. Jukes and Kwing-So Choi (University of Nottingham, United Kingdom)

OS8-11 **Character of Plasma Flow at the Exit of DC Arc Gas-water Torch *(Invited)***
T. Kavka, A. Maslani, O. Chumak and M. Hrabovsky (Institute of Plasma Physics ASCR, Czech Republic)

OS8-12 **An Experimental Study of Plasma Actuator Performance in Martian Atmosphere**
Masahiko Takagaki, Hiroki Nagai and Keisuke Asai (Tohoku University, Japan)

OS8-13 **Multimodal Vibration Control using a Synchronized Switch Based on a Displacement Switching Threshold *(Invited)***
Hongli Ji, Jinhao Qiu, Yuansheng Chen and Kongjun Zhu (Nanjing University of Aeronautics and Astronautics, China)

OS8-14 **Evaluation of the Peltier Cryoprobe Availability through Animal Experiment**
Hiroki Takeda, Setsuya Aiba, Junnosuke Okajima, Atsuki Komiya and Shigenao Maruyama (Tohoku University, Japan)

OS8-15 **An Experimental Study of Micro-Synthetic Jets using MicroPIV *(Invited)***
A. Sinclair, V. Timchenko, J. Reizes, G. Rosengarten and E. Leonardi (University of New South Wales, Australia)

Ballroom B
November 19, 2008

Session2

10:00-11:00 **Short Oral Presentation**
(4 min for Short Oral Presentation including PC preparation)

11:00-11:15 **Break**

11:15-11:45 **Poster Presentation**

OS8-16 **Design of Fluid Mechanics Devices with a Topology Optimization Method *(Invited)***
Marzio Lettich (University of Trieste, Italy)

OS8-17 **The Effect of Neck Shape on Flow Pattern in Cerebral Aneurysm using Computational Fluid Simulation with Idealized Models**
Kenjiro Okuno, Toshio Nakayama (Tohoku University, Japan), Daniel A. Rufenacht (University Hospital of Geneva, Switzerland) and Makoto Ohta (Tohoku University, Japan)

OS8-18 **Higher-order Fictitious Domain approach for Navier-Stokes equations *(Invited)***
Lucia Parussini, Valentino Pediroda and Carlo Poloni (University of Trieste, Italy)

OS8-19 **Numerical Analysis on the Influence of Solid Particles in a Slush Nitrogen Two-phase Pipe Flow**
Yasuaki Mukai, Katsuhide Ohira, Jun Ishimoto and Masakazu Nozawa (Tohoku University, Japan)

OS8-20 **Runge-Kutta Discontinuous Galerkin Method using WENO Limiters II: Unstructured Meshes *(Invited)***
Jun Zhu, Jianxian Qiu (Nanjing University, China), Chi-Wang Shu (Brown University, USA) and Michael Dumbser (University of Trento, Italy)

OS8-21 **Application of Gradient Smoothing Method (GSM) for Steady and Unsteady Incompressible Flow Problems using Irregular Triangular Mesh *(Invited)***
George X. Xu (Institute of High Performance Computing, Singapore) and G.R. Liu (National University of Singapore, Singapore)

OS8-22 **Comparison of Solution Algorithms of Pressure-velocity Coupling for Unsteady-state Fluid Flow Calculations**
Yasuhiro Saito, Kotaro Yasumura, Yohsuke Matsushita, Hideyuki Aoki, Takatoshi Miura (Tohoku University, Japan), Shin Ogasawara, Masatoshi Daikoku (Hachinohe Institute of Technology, Japan) and Takao Inamura (Hirosaki University, Japan)

OS8-23 **Computational Aeroacoustic Study of a Landing Gear *(Invited)***
Bidur Khanal, Kevin Knowles, Alastair Saddington (Cranfield University, United Kingdom) and Shigeru Obayashi (Tohoku University, Japan)

OS8-24 **Spatial Correlations of Concentration Fluctuations in a Supersonic Mixing Flowfield**
Hidemi Takahashi and Goro Masuya (Tohoku University, Japan)

OS8-25 **Characteristic Length of the Downstream Recirculation Zone of Wall Injection Interacting with Incident Shock Wave**
Yoshimune Sakimitsu, Shunsuke Ishida, Hisashi Nakamura, Yasuhiro Ogami and Hideaki Kobayashi (Tohoku University, Japan)

OS8-26 **In Search of Optimal Aerodynamic Shapes: Induced Drag Minimization *(Invited)***
Jason E. Hicken and David W. Zingg (University of Toronto, Canada)

OS8-27 **Design and Construction of Mars Wind Tunnel for Simulating Atmospheric Flight on Mars**
Masayuki Anyoji, Hiroki Nagai and Keisuke Asai (Tohoku University, Japan)

OS8-28 **Multilevel Optimization Techniques in the Design of Aerodynamic Shapes *(Invited)***
Ioannis C. Kampolis (National Technical University of Athens, Greece)

OS8-29 **Automatic Detection Algorithm of Wake Vortices Considering Decay Process**
Hiroshi Kato, Takashi Misaka and Shigeru Obayashi (Tohoku University, Japan), I. Yamada (Electric Navigation Research Institute, Japan), Y. Okuno (Japan Aerospace Exploration Agency, Japan)

OS8-30 **PSP Measurement of the Leeward-Side Pressure Distribution of a Simplified Car Model in Yaw**
Daisuke Yorita, Hiroki Nagai, Keisuke Asai (Tohoku University, Japan), S. Tanaka and K. Ishida (NISSAN Motor Co. Ltd., Japan)

Session3
13:00-13:55 **Short Oral Presentation**
(4 min for Short Oral Presentation including PC preparation)

13:55-14:10 **Break**

14:10-14:40 **Poster Presentation**

OS8-31 **Relation between the Interface Characteristics and Mixing Effect in a Small-scale Channel Flow**
Shuta Noro, Masaya Shigeta, Seiichiro Izawa and Yu Fukunishi (Tohoku University, Japan)

OS8-32 **CFD Simulation of ER (electro-rheological) Fluids with Finite Volume/element Model *(Invited)***
Arpad Forberger, Gabor Stepan and Miklos Zrinyi (Budapest University of Technology, Hungary)

OS8-33 **Internal Structure of Triple-Shock-Wave Intersection Zone in Mach Reflection *(Invited)***
Yevgeniy A. Bondar, Dmitry V. Khotyanovsky, Georgiy V. Shoev, Alexey N. Kudryavtsev and Mikhail S. Ivanov (Khristianovich Institute of Theoretical and Applied Mechanics, Russia)

OS8-34 **Aeroacoustic DES Simulation of Double Diaphragm Restricted Pipe Flow *(Invited)***
S. Höttges, S. Krittian and H. Oertel (University of Karlsruhe, Germany)

OS8-35 **Development of a High-order Spectral Volume Method for 3D RANS Computation**
Takanori Haga and Keisuke Sawada (Tohoku University, Japan)

OS8-36 **Laminar Plane Free-fountains in a Homogeneous Fluid *(Invited)***
N. Srinarayana (University of Sydney, Australia), A. Komiya (Tohoku University, Japan), S. W. Armfield, M. Behnia (University of Sydney, Australia) and S. Maruyama (Tohoku University, Japan)

OS8-37 **Global Linear Stability of a Plane Liquid Jet *(Invited)***
Outi-Leena O. Tammisola, Fredrik Lundell and L. Daniel Söderberg (Royal Institute of Technology, Sweden)

OS8-38 **Experimental and Numerical Investigations of Spray Combustion Characteristic with Biodiesel Fuel**
Haruyuki Kamata, Yoshiyuki Suzuki, Katsuyuki Hoshino, Takuji Harada, Hirotatsu Watanabe, Yohsuke Matsushita, Hideyuki Aoki and Takatoshi Miura (Tohoku University, Japan)

OS8-39 **An Investigation for Lean-rich Spray Combustion using Twin-fluid Atomizer**
Katsuyuki Hoshino, Yoshiyuki Suzuki, Takuji Harada, Haruyuki Kamata, Hirotatsu Watanabe, Yohsuke Matsushita, Hideyuki Aoki and Takatoshi Miura (Tohoku University, Japan)

OS8-40 **A Numerical Investigation of Heat Transfer and Fluid Flow in a Single Droplet of Fuel**
Takuji Harada, Haruyuki Kamata, Hirotatsu Watanabe, Yohsuke Matsushita, Hideyuki Aoki and Takatoshi Miura (Tohoku University, Japan)

OS8-41 **A Computational Study of CO Oxidation Reaction on Precious Metal Catalyst Based on Ultra Accelerated Quantum Chemical Molecular Dynamics Method**
Sunho Jung, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-42 **Study on Ignition and Combustion Characteristics of DME-air Mixture in a Heated Channel**
Hiroshi Oshibe, Yosuke Tsuboi, Hisashi Nakamura, Susumu Hasegawa and Kaoru Maruta (Tohoku University, Japan)

OS8-43 **Ignition Characteristics of N_2/O_2 PJ in High Subsonic Flow**
Yoshinori Matsubara and Kenichi Takita (Tohoku University, Japan)

Session4
14:55-15:50 **Short Oral Presentation**
(4 min for Short Oral Presentation including PC preparation)

15:50-16:05 **Break**

16:05-16:35 **Poster Presentation**

OS8-44 **Computational Chemistry Study on Mechanism of Superlubricity of Molybdenum Disulfide by Misfit Angle Formation**
Yusuke Morita, Takanori Kuriaki, Tasuku Onodera, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-45 **Tribological Behaviour of Nanocrystalline Titanium Carbide/Carbon Nanotube: Amorphous**
(Invited)
Huili Wang, Sam Zhang (Nanyang Technological University, Singapore)

OS8-46 **Lubrication Mechanism of the Thin Solid Film on Rubbing Contact Surface: A Computational Chemistry Study**
Tasuku Onodera, Takanori Kuriaki, Yusuke Morita, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-47 **Comparison between Optimized Iron Oxide and Titanium Dioxide Pigmented Coatings both Thermally and Aesthetically**
Mehdi Baneshi, Shigenao Maruyama and Atsuki Komiya (Tohoku University, Japan)

OS8-48 **Studies on DC Potential Drop Method for Quantitative NDT of Metallic Foam *(Invited)***
Shejuan Xie, Zhenmao Chen, Minglong Xu and Tian-Jian Lu (Xian Jiaotong University, China)

OS8-49 **Development of Analysis Method based on Tight-binding Quantum Chemical Molecular Dynamics for Ferroelectric Ceramics**
Hongjun Xiao, Takashi Hirai, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-50 **Computational Study on Electron Transport in TiO2 Porous Electrode for Dye-Sensitized Solar Cells**
Kei Ogiya, Chen Lv, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-51 **Theoretical Study on Unzipping Degradation Mechanism of Polymer Electrolyte for Fuel Cell Technology**
Boyeong Kim, Donghyun Kim, Hiroaki Onuma, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-52 **Numerical Investigations of the Mechanism of Aggregation of Carbon Black**
Ryo Watanabe, Tomoyuki Shindo, Yohsuke Matsushita, Hideyuki Aoki and Takatoshi Miura (Tohoku University, Japan), Katsuya Nishiwaki (Asahi Carbon Corporation, Japan), Hiroshi Yamada (Bridgestone Corporation, Japan) and Okiteru Fukuda (Asahi Carbon Corporation, Japan)

OS8-53 **Molecular Study about Dissociation Phenomena of H_2 on Pt Surface**
Daigo Ito and Takashi Tokumasu (Tohoku University, Japan)

OS8-54 **Theoretical Investigation on Stereo Selectivity in Homogeneous Gold Catalysis for the Formation of Enantiomerically Pure Compounds**
Hema Malani, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-55 **Study of Surface Reduction Mechanisms over CeO_2 (111) using Ultra Accelerated Quantum Chemical Molecular Dynamics**
Md. Khorshed Alam, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-56 **Study of the Mechanism of Hydrogen Spillover at Pt/γ-Al_2O_3 Catalyst Surface by using Ultra Accelerated Quantum Chemical Molecular Dynamics**
Farouq Ahmed, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

Session5 **Short Oral Presentation**
16:50-17:40 (4 min for Short Oral Presentation including PC preparation)

17:40-17:55 **Break**

17:55-18:25 **Poster Presentation**

OS8-57 **Influence of Deposition Parameters on Tribological Behavior of Nanocomposite Cu-DLC Films *(Invited)***
Maxime Ruet (Ecole Centrale de Lyon, France), Takanori Takeno (Tohoku University, Japan), Julien Fontaine and Kosuke Ito (Ecole Centrale de Lyon, France), Hiroyuki Miki (Tohoku University, Japan), Michel Belin (Ecole Centrale de Lyon, France) and Toshiyuki Takagi (Tohoku University, Japan)

OS8-58 **Tribological Properties of Metal-containing Conductive Amorphous Carbon Films Deposited on Metal Substrate**
T. Sugawara (Tohoku University, Japan), M. Ruet (Ecole Centrale de Lyon, France), K. Ito (Ecole Centrale de Lyon, France), H. Miki, T. Takeno (Tohoku University, Japan), J. Fontaine, M. Belin (Ecole Centrale de Lyon, France) and T. Takagi (Tohoku University, Japan)

OS8-59 **Ferromagnetic Shape Memory Alloy $Ni_{54}Fe_{19}Ga_{27}$**
T. M. Vasilchikova, T. N. Voloshok, K. V. Klimov and A. N. Vasiliev (Moscow State University, Russia), Yu. I. Chumlyakov (Tomsk University, Russia), O. Heczko and S. Fähler (Institute for Metallic Materials, Germany)

OS8-60 **Giant Magnetocaloric Effect in NiCoMnIn Heusler Alloy *(Invited)***
A. N. Vasiliev, T. N. Vasilchikova, O. S. Volkova, T. N. Voloshok, A. A. Shiryaer and K. V. Klimov (Moscow State University, Russia), O. Heczko and S. Faehler (Institute of Metallic Materials), K. Oikawa, K. Ishida, R. Kainuma and W. Ito (Tohoku University, Japan)

OS8-61 **Huge Magnetostriction of Ferromagnetic Composite *(Invited)***
Gildas Diguet, Eric Beaugnon and Jean Yves Cavaille (Institut National des Sciences Appliquées de Lyon, France)

OS8-62 **Investigating the Hydroxylation of α-naphthoflavone Mediated by CYP1A2 Using Reaction Time Accelerated Molecular Dynamics**
Mohamed Ismael, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-63 **Quantum Chemical Molecular Dynamics Study to Investigate Enzyme-substrate Interactions**
Kamlesh Kumar Sahu, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-64 **Ultra Accelerated Quantum Chemical Molecular Dynamics to Study the Effect of Carcinogenic Mutations on p53-DNA Interaction**
Shah M. Rauf, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Carpio, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

OS8-65 **Multi-physics Electron Emission from MgO Surface Induced by Ion Impact Studied by Ultra Accelerated Quantum Chemical Molecular Dynamics**
Kazumi Serizawa, Hiroaki Onuma (Tohoku University, Japan), Hiromi Kikuchi, Masaki Kitagaki (Hiroshima University, Japan), Itaru Yamashita, Ai Suzuki, Riadh Sahnoun, Michihisa Koyama, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Carlos A. Del Caprio, Momoji Kubo (Tohoku University, Japan), H. Kajiyama (Hiroshima University, Japan) and Akira Miyamoto (Tohoku University, Japan)

OS8-66 **Hydrodynamic Peculiarities of Single Hollow Droplet Impact onto a Substrate *(Invited)***
Igor P. Gulyaev and Oleg P. Solonenko (Institute of Theoretical and Applied Mechanics, Russia)

OS8-67 **Fluid and Particle Simulations of Atmospheric-pressure Discharges *(Invited)***
Seung Min Lee, Yong Jung Hong, Young Sik Seo and Jae Koo Lee (Pohang University of Science and Technology, Korea)

OS8-68 **Flow Control of MR Fluid Channel Flow by Using MRF Plugging Effect**
Kotoe Mizuki (Tohoku University, Japan), Hannah Weisbecker, Stefan Odenbach (Technische Universitat Dresden, Germany), Hidemasa Takana and Hideya Nishiyama (Tohoku University, Japan)

OS10: Flow Dynamics Session

Orchid
November 19, 2008

Chair: Prof. Masami Nakano (Tohoku University, Japan)

OS10-1
9:30-10:00
Self-powered vibration damping system by a semi-passive technique *(Invited)*
Hui Shen, Hongli Ji, Jinhao Qiu (Nanjing University of Aeronautics & Astronautics, China), Adrien Badel (Savoie University, France), Yong Ma, Hao Jiang and Yongchun Zhao (Nanjing University of Aeronautics & Astronautics, China)

OS10-2
10:00-10:30
The origin of open recoil loops in nanocrystalline permanent magnets *(Invited)*
Hong-wei Zhang(IOP, CAS, China), Bo Zheng (IOP, CAS & Beihang Univ., China), Su-fen Zhao (Beihang Univ., China), Jing-lan Chen and Guang-heng Wu (IOP, CAS, China)

OS10-3
10:30-11:00
From ferrofluids to ferrogels *(Invited)*
Miklós Zrínyi (Semmelweis University, Hungary)

11:00-11:10 Break

Chair: Prof. Miklós Zrínvi (Semmelweis University, Hungary)

OS10-4
11:10-11:40
Micro-Gap Flow Dynamics of Nano- / Micro-Particle Electro-Rheological Fluids and Braille Display using ER Micro-Actuators *(Invited)*
M. Nakano (Tohoku University, Japan)

OS10-5
11:40-12:10
Field-induced martensitic transformation in magnetic shape memory alloys *(Invited)*
Guang Heng Wu (Chinese Academy of Sciences, China)

OS10-6
12:10-12:40
The $Ni_{45.7}Co_{5.2}Mn_{36.5}In_{12.6}$ Heusler alloy for the use in magnetocaloric devices *(Invited)*
A. N. Vasiliev, T. M. Vasilchikova, O. S. Volkova, T. N. Voloshok and K. V. Klimov (Moscow State University, Russia), O. Heczko and S. Faehler (Institute for Metallic Materials, Germany), K. Oikawa, K. Ishida, R. Kainuma and W. Ito(Tohoku University, Japan)

OS10-7
12:40-13:00
Inspection of Steel Degradation by Magnetic Adaptive Testing *(Invited)*
G. Vértesy (Hungarian Academy of Sciences, Hungary), I. Tomáš (Academy of Sciences of the Czech Republic, Czech Republic), S. Kobayashi (Iwate University, Japan)