

First International Conference on Flow Dynamics

November 11 - 12, 2004
Sendai International Center, Sendai, Japan

Organized and Sponsored by

The 21st Century COE program, "International COE of Flow Dynamics," Tohoku University,

SCOPE

Flow dynamics is a basic research field that deals with physical phenomena appearing in wide spatial and temporal scales. Also, it involves various applications including keys to solve serious problems in this century -- about environment, energy, safety, biology, transportation, etc. The "International COE (Center of Excellence) of Flow Dynamics," Tohoku University, is selected as a 21st Century COE program, Ministry of Education, Culture, Sports, Science and Technology. This international conference would provide unique opportunities for promoting discussions and information exchange on this attractive subject.

Plenary Lecture

"Dynamic Activity of Water on the Nature Technology"

Dr. Hideki Ishida, INAX Corporation/Tohoku University

Organized Sessions

A. Highly-Coupled Flow Systems

OS1 "Research and Development of Japan Made High Performance Jet Plane"

Organizer: Yasuaki Kohama

OS2 "Nano-Mega Ground Effect and Applications"

Organizer: Toshiyuki Takagi

OS3 "Functional Fluids Flow Dynamics in Interactive Systems"

Organizer: Hideya Nishiyama

B. Shock-Wave-Driven Flow Functions

OS4 "Force Generation through Shock Wave Dynamics"

Organizers: Goro Masuya, Hideaki Kobayashi, Keisuke Asai, Akihiro Sasoh

OS5 "Alleviation of Shock-Induced Impacts"

Organizers: Akihiro Sasoh, Kazuyoshi Takayama, Tsutomu Saito, Shigeru Obayashi

OS6 "Planetary Entry Flow Physics"

Organizers: Keisuke Sawada, Akihiro Sasoh

C. Energy and Material Flows

OS7 "Water Dynamics"

Organizer: Kazuyuki Tohji

D. Interdisciplinary Session

OS8A "Young Birds Hatchery Seminar on Flow Dynamics"

Organizer: Atsushi Shirai

OS8B "International Students /Young Birds Session on Flow Dynamics"

Organizer: Hideaki Kobayashi

Proceedings

Symposium proceedings will be published based on materials that are presented in the symposium.

21st Century COE Program "International COE of Flow Dynamics" Members

Shigenao Maruyama	Hideaki Kobayashi
Toshiyuki Takagi	Keisuke Asai
Yasuaki Kohama	Goro Masuya
Taku Ohara	Kazuyuki Tohji
Shigeru Obayashi	Junichiro Mizusaki
Kazuhiro Nakahashi	Kaoru Maruta
Hideya Nishiyama	Michio Tokuyama
Satoyuki Kawano	Takatoshi Ito
Akihiro Sasoh	Hiroaki Niitsuma
Keisuke Sawada	Toshiyuki Hashida

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Program

Hagi

Plenary Lecture

November 12, 2004

9:00-10:00 **Dynamic Activity of Water on Nature Technology**
Hideki Ishida (INAX Corporation/ Tohoku University, Japan)

Tachibana

OS1 Research and Development of Japan Made High Performance Jet Plane

November 12, 2004

OS1-1 Chair: Yasuaki Kohama (Tohoku University, Japan)
10:10-10:40 **An Optimal Design of Supersonic Fighter Wing for Multi-Fight Conditions**
(Invited)
Dongho Lee (Seoul National University)

10:40-11:00 Break

OS1-2 Chair: Shuya Yoshioka (Tohoku University, Japan)
11:00-11:20 **Future Small Aircraft and Its Transportation System**
Keisuke Kamo (Fuji Heavy Industries Ltd., Aerospace, Japan)

OS1-3 **A Concept of Future Airborne System and Aircraft in Japan**
11:20-11:40 Akira Nishizawa, Shohei Takagi (Japan Aerospace Exploration Agency (JAXA), Japan), Shigeru Aso (Kyushu University, Japan) and Shigeru Obayashi (Tohoku University, Japan)

OS1-4 **Cluster Fan VTOL**
11:40-12:00 Shiki Iwase, Yoshio Saito and Yukio Matsuda (Japan Aerospace Exploration Agency (JAXA), Japan)

12:00-13:30 Lunch

OS1-5 **Toward the Development of Environmentally Friendly High Performance Small Jet Aircraft**
13:30-13:50 Shigefumi Tatsumi (Mitsubishi Heavy Industries, Ltd., Japan)

OS1-6 Chair: Shohei Takagi (Japan Aerospace Exploration Agency (JAXA), Japan)
13:50-14:10 **Improvement of Aerodynamic Performance of Wings on Wing-in-Ground Effect Vehicle**
Dong-Hee Yoon, Shuya Yoshioka, Satoshi Kikuchi, Takuma Kato and Yasuaki Kohama (Tohoku University, Japan)

OS1-7 **Numerical Study of Instabilities in Three-Dimensional Boundary Layers**
14:10-14:30 Ayumu Inasawa, Seiichiro Izawa, Ao-Kui Xiong and Yu Fukunishi (Tohoku University, Japan)

- 14:30-14:50 Break
- OS1-8 **Energy Efficient 1.5 Engine Business Jet Plane Concept**
14:50-15:10 Yasuaki Kohama (Tohoku University, Japan)
- OS1-9 **Let's Create World No.1 Glider!**
15:10-15:30 Katsuo Sakurai (Ena Tokai Rika CO.,LTD. , Japan)
- OS1-10 **The Report of Activity of "Team Windnauts Tohoku Univ." and Result of 28th JIBR**
15:30-15:50 Kenji Nishide, Yasuaki Kohama (Windnauts, Tohoku University, Japan)
- OS5-9/OS1-11 See OS5 (November 11, 16:50-17:30, Room5)

Room6 OS2 Nano-Mega Ground Effect and Applications

November 12, 2004

- [DLC (1)] Chair: Toshiyuki Takagi (Tohoku University, Japan)
10:00-10:10 Opening speech
Toshiyuki Takagi (Tohoku University, Japan)
- OS2-1 **New Characteristics of DLC Coatings Produced by Pulsed-DC Glow at Room Discharge Temperature** (Invited)
10:10-10:40 Enric Bertran (Barcelona University, Spain)
- OS2-2 **Tribological Properties of Diamond-Like Carbon Films Deposited under Different Vias Voltage**
10:40-10:55 Takanori Takeno, Toshihiko Komoriya, Hiroyuki Miki, Toshiyuki Takagi, Takeshi Sato (Tohoku University, Japan), Alexei Bozhko (Moscow State University, Russia) and Mikhail Shupegin (Moscow Power Engineering Institute, Russia)
- 10:55-11:05 Break
- [Tribology(1)] Chair: Naoto Ohtake (Tokyo Institute of Technology, Japan)
OS2-3 **Achieving superlow friction with hydrogenated amorphous carbon : the key-role of transfer phenomena** (Invited)
11:05-11:35 Julien Fontaine(Invited speaker), Thierry LE Mogne , Jean Luc Loubet , Michel Belin, (Ecole Centrale de Lyon, France)
- OS2-4 **Very Low Friction Behavior of a Partly Polished CVD Diamond Film Slide on a Metal Plate**
11:35-11:50 Toshihiko Abe, Toshiyuki Takagi, Tetsuya Uchimoto and Yasuaki Kohama (Tohoku University, Japan)
- 11:50-13:30 Lunch

- [Ground effect] Chair: Tsuguyori Ohana: (National Institute of Advanced Industrial Science and Technology (AIST), Japan)
- OS2-5
13:30-14:00 **A Possible New Research Field in Nano-Mega Scale Wing-in-Ground Effect**
Yasuaki Kohama (Tohoku University, Japan)
- OS2-6
14:00-14:15 **An Analysis of Ground Effects on Aerodynamic Characteristics of Aerofoils with a Secondary Aerofoil using Boundary Layer Approximation**
Yuji Takahashi (Miyakonojo National College of Technology, Japan), Masanori Kikuchi, Kimitaka Hirano (University of Miyazaki, Japan) and Yasuaki Kohama (Tohoku University, Japan)
- OS2-7
14:15-14:30 **Aerodynamic Characteristics of V-shaped Aero-Train Wing**
Tomoyuki Ishizuka (Tohoku University, Japan)
- 14:30-14:40 Break
- [Tribology(2)] Chair: Enric Bertran (Barcelona University, Spain)
- OS2-8
14:40-15:10 **Tribological Behaviors of Diamond-Like Carbon and Carbon-Based Protective Coatings in Dry and Fluid-Lubricated Conditions** (Invited)
Sam Zhang (Invited speaker) and Xuan Lam Bui (Nanyang Technological University, Singapore)
- OS2-9
15:10-15:25 **Molecular Thermal and Fluid Phenomena in a Nanoscale Liquid Lubrication System**
Daichi Torii and Taku Ohara (Tohoku University, Japan)
- 15:25-15:35 Break
- [DLC(2)] Chair: J. Fontaine: (Ecole Centrale de Lyon, France)
- OS2-10
15:35-16:05 **Preparation and Characteristics of Diamond-like Carbon Films** (Invited)
Naoto Ohtake (Tokyo Institute of Technology, Japan)
- OS2-11
16:05-16:20 **Amorphous Metal-Carbon Nanocomposites and Their Applications**
Toshiyuki Takagi, Takanori Takeno, Hiroyuki Miki (Tohoku University, Japan), Alexei Bozhko (Moscow State University, Russia)
- 16:20-16:30 Break
- [Tribology (3)] Chair: Sam Zhang (Nanyang Technological University, Singapore)
- OS2-12
16:30-17:00 **Tribological Properties of Diamond-Like Carbon Films in a Water Environment** (Invited)
Tsuguyori Ohana (Invited Speaker) and Akihiro Tanaka (National Institute of Advanced Industrial Science and Technology (AIST), Japan)
- OS2-13
17:00-17:15 **Numerical Analysis of Nano-Ground Effect on Slider by Using Direct Simulation of Monte Carlo Method**
Ichiro Nakamori (Innovation Plaza Miyagi, Japan Science and Technology

Agency, Japan), Toshihiko Abe, Tetsuya Uchimoto, Yasuaki Kohama, Toshiyuki Takagi (Tohoku University, Japan)

17:15-17:20 *Closing remarks*
Toshiyuki Takagi (Tohoku University, Japan)

Room4 OS3 Functional Fluids Flow Dynamics in Interactive Systems

November 11, 2004

[Plasma Flow] Chair: H. Nishiyama (Tohoku University, Japan) and M. Okubo (Osaka Prefecture University, Japan)

OS3-1 **Micrometallurgy of Splats: Theory, Computer Simulation and Experiment**
(Invited)

14:00-14:40 O. P. Solonenko, A. N. Cherepanov, V. N. Popov, A. V. Smirnov, A. A. Mikhalchenko, A. A. Golovin, E. V. Kartayev, I. Yu. Gulyaev and A. V. Leonov (Siberian Branch of the Russian Academy of Sciences, Russia)

OS3-2 **Approach to Numerical Simulation of High Temperature Materials Processing from a Computational Calculation of Arc-Electrodes System**

14:40-15:00 M. Tanaka, M. Ushio (Osaka University, Japan) and J. J. Lowke (Commonwealth Scientific & Industrial Research Organization (CSIRO), Australia)

OS3-3 **Temperature Decay of Ar Inductively Coupled Thermal Plasmas at Atmospheric Pressure by Injection of Polymer Powder**

15:00-15:20 Y. Tanaka, T. Numada (Kanazawa University, Japan), S. Kaneko and S. Okabe (Tokyo Electric Power Company, Japan)

15:20-15:30 Break

OS3-4 **Numerical Analysis for Preparation of Silicon-Based Intermetallic Nano-Particles in Induction Thermal Plasma Flow Systems**

15:30-15:50 M. Shigeta and T. Watanabe (Tokyo Institute of Technology, Japan)

OS3-5 **Diesel Particulate and NO_x Aftertreatment System Using Indirect Nonthermal Plasma Processing**

15:50-16:10 M. Okubo, T. Kuroki and T. Yamamoto (Osaka Prefecture University, Japan)

OS3-6 **Basic Characteristics of Sterilization by a Coaxial Microwave Plasma**

16:10-16:30 T. Sato (Tohoku University, Japan), K. Fujioka, R. Ramasamy, T. Urayama and S. Fujii (Adtec Plasma Technology Co. Ltd., Japan)

16:30-16:50 Break

[Innovation] Chair: T. Sawada (Keio University, Japan)

OS3-7 **Development of Intelligent Fluid Using Multiphase Flow**

16:50-17:10 K. Yoshida, H. Sirako and I. Kataoka (Osaka University, Japan)

- OS3-8 **Mathematical Simulation of Flexible Fiber Motion in Turbulent Flows**
 17:10-17:30 M. Shams (K. N. Toosi University of Technology, Iran) and G. Ahmadi
 (Clarkson University, USA)
- OS3-9 **Impact of Liquid Drops on Solid Substrates with Micro Grooves**
 17:30-17:50 D. Sivakumar, K. Katagiri, T. Sato and H. Nishiyama (Tohoku University,
 Japan)
- OS3-10 **A Novel Concept Solar Energy Powered Rankine Cycle Using Supercritical
 CO₂**
 17:50-18:10 X. R. Zhang, H. Yamaguchi (Doshisha University, Japan), K. Fujima
 (Mayekawa MFG. Co., Ltd., Japan), M. Enomoto (Showa Denko K. K., Japan)
 and N. Sawada (Showa Tansan Co., Ltd., Japan)
- OS3-11 **Numerical Simulation on Transient Responses of Plasma Direct Energy
 Conversion System**
 18:10-18:30 H. Takana (Tohoku University, Japan), Y. Okuno and H. Yamasaki (Tokyo
 Institute of Technology, Japan)

November 12, 2004

[MR Suspensions] Chair: M. Nakano (Yamagata University, Japan)

- OS3-12 **Engineering with Magnetorheological Fluids** (Invited)
 10:20-11:00 J. D. Carlson (Lord Corporation, USA)
- OS3-13 **Membrane Formation Using Functional Fluids for Flow Control Application**
 11:00-11:20 H. Yamaguchi, T. Kuwahara, A. Nakajima (Doshisha University, Japan) and
 H. Nishiyama (Tohoku University, Japan)
- OS3-14 **Torque Characteristics of a Clinical Rehabilitation Teaching Robot Using
 MR-Fluid Clutches for a Knee Joint**
 11:20-11:40 H. Hakogi, M. Ohaba, N. Kuramochi (Toin University of Yokohama, Japan)
 and H. Yano (Sendai Medical Technology College, Japan)
- OS3-15 **Magnetic Fluid Devices for Driving Micro Machines**
 11:40-12:00 S. Sudo, Y. Takaki, Y. Hashiguchi (Iwaki Meisei University, Japan) and H.
 Nishiyama (Tohoku University, Japan)

12:00-13:30 Lunch

[Magnetic Fluid] Chair: S. Sudo (Iwaki Meisei University, Japan)

- OS3-16 **Characteristic Properties of Ultrasonic Propagation Velocity in Magnetic
 Fluids under Magnetic Field**
 13:30-13:50 M. Motozawa, Y. Matsumoto and T. Sawada (Keio University, Japan)
- OS3-17 **Rheological and Magnetic Characteristics of Amorphous Compound Fluid**
 13:50-14:10 K. Shimada (Fukushima University, Japan), A. Shibayama (Akita University,

Japan) and E. Yuze (Akita Prefectural Resources Technology, Japan)

OS3-18 **Basic Equations and Constitutive Equations of Micropolar Ferrofluids**

14:10-14:30 Y. Ido (Nagoya Institute of Technology, Japan)

14:30-14:50 Break

[ER Fluids] Chair: H. Yamaguchi (Doshisha University, Japan)

OS3-19 **Dynamic Shear Flow Behavior of Electro-Rheological Suspensions between Two Rotating Parallel Disks**

14:50-15:10

M. Nakano, S. Koizumi and K. Tsuge (Yamagata University, Japan)

OS3-20 **Flow Characteristics of a Liquid Crystal Mixture in the Circular Pipe Electrodes**

15:10-15:30

T. Tsukiji, E. Koyabu (Sophia University, Japan), T. Tsuji and S. Chono (Kochi University of Technology, Japan)

OS3-21 **Flow Rate Estimation of Liquid Crystal in a Minute ER Device with Patterned Electrodes**

15:30-15:50

T. Narumi (Niigata University, Japan), Y. Yamaguchi, N. Sasaki (Niigata University, Japan) and T. Hasegawa (Niigata University, Japan)

OS3-22 **Thickness Control of a Liquid Crystal Film in a Sliding Bearing by Electric Fields**

15:50-16:10

Y. Matsumura (Hitotsubashi University, Japan), S. Morishita and T. Shiraishi (Yokohama National University, Japan)

Room2

OS 4 Force Generation through Shock Wave Dynamics

November 12, 2004

[Engines] Chair: Goro Masuya (Tohoku University, Japan)

OS4-1 **Scramjet Engine Tests at JAXA-Kakuda (Invited)**

10:30-11:00 Nobuo Chinzei (Japan Aerospace Exploration Agency (JAXA), Japan)

OS4-2 **Heat Flux Prediction for Scramjet Engines**

11:00-11:20

Toshinori Kouchi (Tohoku University, Japan), Tohru Mitani, Tetsuo Hiraiwa, Masatoshi Kodera (Japan Aerospace Exploration Agency (JAXA), Japan) and Goro Masuya (Tohoku University, Japan)

OS4-3 **Conceptual Studies of Ramjet-Rocket Combined-Cycle Engine**

11:20-11:40

Takeshi Kanda (Japan Aerospace Exploration Agency (JAXA), Japan)

OS4-4 **Designs of Variable Mach Number Nozzles and Scramjet Inlet Tests**

11:40-12:00

Eijiro Kitamura (Tohoku University, Japan), Tohru Mitani, Masahiro Takahashi (Japan Aerospace Exploration Agency (JAXA), Japan), LiHong Chen (Institute of Mechanics, China) and Goro Masuya (Tohoku University, Japan)

12:00-13:30 Lunch

[Laser Propulsion]Chair: Shigeo Obata (National Defense Academy, Japan)

OS4-5 **Propulsion Performance of Laser-Driven In-Tube Accelerator (LITA)**

13:30-13:50 Toshiro Ohtani and Yu Xilong (Tohoku University, Japan)

OS4-6 **Blast Wave Expansion and Impulse Generation Characteristics for Monatomic Gases in Laser-Driven In-Tube Accelerator**

13:50-14:10

Yu Xilong, Toshiro Ohtani, Sukyung Kim, Toshihiro Ogawa, In-Seuck Jeung, and Akihiro Sasoh (Tohoku University, Japan)

OS4-7 **Useful Propulsive Impulse Generation Powered by Laser Energy in Low Ambient Pressure**

14:10-14:30

Keiko Watanabe and Akihiro Sasoh (Tohoku University, Japan)

OS4-8 **Preliminary Experiments on the Interaction between the Laser-Generated Gas Breakdown and a Shock Wave**

14:30-14:50

Koichi Mori and Akihiro Sasoh (Tohoku University, Japan)

14:50-15:10 Break

[Shock Wave] Chair: Takeshi Kanda (Japan Aerospace Exploration Agency (JAXA), Japan)

OS4-9 **The Shock Induced Mixing of Helium Gas into Supersonic Air Stream from the Inside of Boundary Layer**

15:10-15:30

Shigeo Obata (National Defense Academy, Japan)

OS4-10 **Combustion of Hydrogen Jet under Interaction with Shock Waves in a Supersonic Air-Stream**

15:30-15:50

Hisashi Nakamura, Hideaki Kobayashi, Susumu Hasegawa, Goro Masuya (Tohoku University, Japan), and Takashi Niioka (Akita Prefectural University, Japan)

OS4-11 **Study on Supersonic Internal Flows with Pseudo-Shock Waves**

15:50-16:10

Hiromu Sugiyama, Kazuhide Mizobata, Ryojiro Minato, Akira Tojo, and Yohei Muto (Muroran Institute of Technology, Japan)

OS4-12 **Pseudo-shock Waves Produced by Heat Addition in Supersonic Duct Flow with a Diverging Section**

16:10-16:30

Goro Masuya, Minho Han, Masahiro Amano, and Kenichi Takita (Tohoku University, Japan)

Room5

OS5 Alleviation of Shock-Induced Impacts

November 11, 2004

{ Shock Impacts in Earth Science } Chair: Koichi Mori (Tohoku University, Japan)

- OS5-1 **Volcanic Blast Wave: A Review and Our Recent Attempt** (Invited)
10:20-10:40 Hiromitsu Taniguchi (Tohoku University, Japan)
- OS5-2 **Analogous Experiments of Volcanic Eruption Flow Dynamics**
10:40-11:00 Takeshi Furukawa, Akihiro Sasoh, Akio Goto and Hiromitsu Taniguchi
(Tohoku University, Japan)
- OS5-3 **Shock-Induced Hazards by Extraterrestrial Impacts and Its Alleviation**
11:00-11:20 Yasunori Miura (Yamaguchi University, Japan)
- OS5-4 **Development of Diaphragm-Less Gas Gun Useful for Shock-Induced Impact
Studies**
11:20-11:40 Shin Oshiba, Takeshi Furukawa and Akihiro Sasoh (Tohoku University,
Japan)
- [Safety against Shock Impacts] Chair: Akihiro Sasoh (Tohoku University, Japan)
- OS5-5 **Safety Development against Explosive Hazards** (Invited)
14:00-14:40 Masatake Yoshida (National Institute of Advanced Industrial Science and
Technology (AIST), Japan)
- OS5-6 **Determination of the Compressive Failure Threshold of Brittle Materials**
14:40-15:20 (Invited)
Eugene Zaretsky (Tohoku University, Japan / Ben-Gurion University,
Beer-Sheva, Israel)
- 15:20-15:40 Break
- [Sonic Boom (1)] Chair: Kazuhiro Nakahashi (Tohoku University, Japan)
- OS5-7 **Multi-Fidelity Design of Low-Boom Supersonic Jets** (Invited)
15:40-16:20 Juan J. Alonso, Seongim Choi, Ilan Kroo (Stanford University, U.S.A.), and
Mathias Wintzer (Desktop Aeronautics, U.S.A.)
- OS5-8 **Multi-Objective Optimization for Low-Drag/Low-Boom Design with Robust
Objective Function**
16:20-16:40 Yoshikazu Makino (Japan Aerospace Exploration Agency (JAXA), Japan) and
Ilan Kroo (Stanford University, U.S.A.)
- 16:40-16:50 Break
- [Sonic Boom (2)] Chair: Yoshikazu Makino (Japan Aerospace Exploration Agency (JAXA),
Japan)
- OS5-9/OS1-11 **A New Concept in the Development of Boomless Supersonic Transport
Aircraft** (Invited)
16:50-17:30 Kazuhiro Kusunose (Tohoku University, Japan)
- OS5-10 **Reduction of Wave Drag by Supersonic Formation Flying**
17:30-17:50 Yuichiro Goto, Shigeru Obayashi and Yasuaki Kohama (Tohoku University,
Japan)

Room5**OS6 Planetary Entry Flow Physics**

November 12, 2004

10:10-10:20 OS6 Opening

OS6-1 **Review of Aerothermodynamic Problems of Planetary Entries** (Invited)
10:20-11:10 Chul Park (Korea Advanced Institute of Science and Technology(KAIST), Korea)

OS6-2 **Preliminary Assessment of Venus Entry Capsule Heating Environment**
11:10-11:35 Kazuhisa Fujita, Tetsuya Yamada and Nobuaki Ishii (Japan Aerospace Exploration Agency (JAXA), Japan)

OS6-3 **Atmospheric Contribution and Reaction at Entry of Extraterrestrial Projectiles**
11:35-12:00 Yasunori Miura (Yamaguchi University, Japan)

12:00-13:30 Lunch

OS6-4 **Numerical Simulation of Hypersonic Double-Cone Experiments** (Invited)
13:30-14:20 Graham Candler (University of Minnesota, U.S.A)

OS6-5 **Enthalpy Measurement of Inductively-Coupled Plasma Flow Using Laser Absorption Spectroscopy**
14:20-14:45 Makoto Matsui, Kimiya Komurasaki (University of Tokyo, Japan), Georg Herdrich and Monika Auweter-Kurtz, (University of Stuttgart, Germany)

OS6-6 **Investigation about Secondary Diaphragm Rupture of Expansion Tube**
14:45-15:10 Takanobu Aochi, Keisuke Sawada, Suguru Nagata and Akihiro Sasoh (Tohoku university, Japan)

15:10-15:25 Break

OS6-7 **Capsule Flow CFD Analysis in JAXA/ISTA**
15:25-15:50 Keiichi Murakami, Toshiyuki Suzuki and Yukimitsu Yamamoto (Japan Aerospace Exploration Agency (JAXA), Japan)

OS6-8 **Numerical Study on Low-Ballistic-Coefficient Atmospheric Entry Vehicle with Membrane Aeroshell**
15:50-16:15 Kojiro Suzuki, Eiko Nakazawa and Kazuhiko Yamada (University of Tokyo, Japan)

OS6-9 **Possibility of Electro-Magnetic Heat Shield for Reentry Vehicle**
16:15-16:40 Takashi Abe (ISAS, Japan), D. Konigorsky (EADS, Germany), Otsu (Shizuoka University, Japan) and Yuji Takizawa (University of Tokyo, Japan)

16:40-17:00 Discussions and closing

Room8**OS7 Water Dynamics**

November 11-12, 2004

Chair: Kazuyuki Tohji

(For details, please refer to separate program.)

Room7**OS8-A Young Birds Hatchery Seminar on Flow Dynamics**

November 11, 2004

Chair: Atsushi Shirai, (Tohoku University, Japan)

OS8A-1 **Symmetry Breaking and Symmetry Recovery Caused by Vortex-Body**10:40-11:40 **Interaction** (Invited)

Makoto Iima, (Hokkaido University, Japan)

11:40-13:30 Lunch

OS8A-2 **In Vitro Study on Behavior and Dynamic Deformability of Human Erythrocyte Using a Micro-Channel as a Model of Human Blood Capillary**
14:30-15:30 (Invited)

Tsutomu Tajikawa (Kansai University, Japan)

15:30-15:50 Break

OS8A-3 **Numerical Simulation of Flows with Complex Geometries in a Regular Cartesian Grid** (Invited)

15:50-16:50

Kensuke Yokoi, (Tokyo University, Japan)

16:50-17:10 Break

OS8A-4 **Overview of the First Stage Propulsion System of H-IIA Launch Vehicle**
17:10-18:10 (Invited)

Masaharu Uchiumi (Japan Aerospace Exploration Agency (JAXA), Japan)

Shirakashi1**OS8-B International Students/Young Birds Session on Flow Dynamics**

November 12, 2004

Chair: Hideaki Kobayashi (Tohoku University, Japan)

10:10-10:20 Opening Address

Hideaki Kobayashi (Tohoku University, Japan)

Session 1

10:20-11:04 Short Oral Presentation

(3 min presentation + 1 min PC preparation for each paper)

11:05-11:55 Poster Presentation

OS8B-1 **Effects of Various D2 Injection Angle Positioning on DF Chemical Laser Performance** (Invited)

Jun Sung Park and Seung Wook Baek (Korea Advanced Institute of Science

and Technology (KAIST), Korea)

- OS8B-2 **A Study on the Effect of Stratified Mixture Formation on Combustion Characteristics in a Constant Volume Combustion Chamber** (Invited)
C. H. Lee and K. H. Lee (Hanyang University, Korea)
- OS8B-3 **Structural and Morphological Changes of Incipient Soot Particles in Inverse Diffusion Flames**
Kwang Chul Oh, Uen Do Lee, and Hyun Dong Shin (Korea Advanced Institute of Science and Technology (KAIST), Korea)
- OS8B-4 **Ignition Characteristics of Premixed Gases Flowing in a Heated Narrow Channel**
Takuya Kataoka, Nam Il Kim, Takeshi Yokomori, Shigenao Maruyama, and Kaoru Maruta (Tohoku University, Japan)
- OS8B-5 **In-Situ Observation of Crystal Growth Using Real-Time Phase Shifting Interferometer and Temperature Controlling Test Cell**
Kohei Ueno, Shigenao Maruyama, and Atsuki Komiya (Tohoku University, Japan)
- OS8B-6 **Design and Synthesis of CdS Nanoparticles for Efficient Splitting of Hydrogen Sulphide under Sunlight**
Takeo Arai, Yoshinori Sato, Kozo Shinoda, Balachandran Jeyadevan, and Kazuyuki Tohji (Tohoku University, Japan)
- OS8B-7 **Motion of Nanoparticles in Rarefied Gas Flows**
K. Nanbu and T. Otsuka (Tohoku University, Japan)
- OS8B-8 **Fracture Due to Oxygen Potential Gradients in Samarium-Doped Ceria Solid Oxide Fuel Cell**
Kazuhisa Sato, Keiichi Yashiro, Toshiyuki Hashida, and Junichiro Mizusaki (Tohoku University, Japan)
- OS8B-9 **Numerical Simulation of Vortex-Surface Interaction Sound**
Masaaki Mori, Nozomu Hatakeyama, and Osamu Inoue (Tohoku University, Japan)
- OS8B-10 **Intrinsic Instabilities of Hydrogen/Air premixed Planar Flames under High Pressure**
Kazuya Tsuboi and Goro Masuya (Tohoku University, Japan)
- OS8B-11 **PIV Measurement of Longitudinal Vortices Produced by Ramp and Twin Jets**
Shunsuke Koike and Goro Masuya (Tohoku University, Japan)
- 12:00-13:30 Lunch
- Session 2**
- 13:30-14:14 Short Oral Presentation
(3 min presentation + 1 min PC preparation for each paper)
- 14:15-15:05 Poster Presentation
- OS8B-12 **Pressure Field Measurement in Unsteady Shock Wave Phenomena Using Pressure-Sensitive Paint**

Aya Nishikawa, Yu Xilong, Akihiro Sasoh, and Keisuke Asai (Tohoku University, Japan)

- OS8B-13 **Evaluation of Roughness Effects on a Hydraulically Induced Slip and on a Fluid Flow into a Fracture**
Katsumi Nemoto, Hirokazu Moriya, and Hiroaki Niitsuma (Tohoku University, Japan)
- OS8B-14 **Mathematical Modeling of Oxygen Plasma for Sterilization Processes**
Takashi Misaka and Satoyuki Kawano (Tohoku University, Japan)
- OS8B-15 **Numerical Solutions for Oldroyd-B Fluid Temperature Distributions in Pipe-Liked Domains**
F. Rashidi and R. Alizadeh (AmirKabir University of Technology, Iran)
- OS8B-16 **An Experimental Study on the Lift-off Characteristics of the Triple Flame with Concentration Gradient and Mean Velocity**
Jeong Il Seo, Kwang Chul Oh, Hyun Dong Shin (Korea Advanced Institute of Science and Technology (KAIST), Korea), and Nam Il Kim (Tohoku University, Japan)
- OS8B-17 **The Effects of Heat Loss on the Burning Velocity in a Micro Combustor**
(Invited)
Hanbee Na (Korea Aerospace Research Institute, Korea), Dae Hoon Lee (Korea Institute of Machinery and Materials, Korea), Won Young Choi, and Sejin Kwon (Korea Advanced Institute of Science and Technology (KAIST), Korea)
- OS8B-18 **The Design, Fabrication and Performance Evaluation of a Micro Catalytic Reactor for Reforming Methanol**
Taekyu Kim (Korea Advanced Institute of Science and Technology (KAIST), Korea), Dae Hoon Lee (Korea Institute of Machinery and Materials, Korea), and Sejin Kwon (Korea Advanced Institute of Science and Technology (KAIST), Korea)
- OS8B-19 **Experiment on Cryoprobe Taking Account of Precise Heat Transfer Control**
Kazuto Nakagawa, Shigenao Maruyama, and Atsuki Komiya (Tohoku University, Japan)
- OS8B-20 **Ion Transport Phenomena and Nano-Structure Effect in Sintered Materials**
Shinya Isaka, Atsushi Kaimai, Keiji Yashiro, Hiroshige Matsumoto, Tatsuya Kawada, Junichiro Mizusaki (Tohoku University, Japan)
- OS8B-21 **Molecular Dynamics Analysis of Ionic Conductivity and Elastic Modulus in Ceria Ceramics**
Kazuhisa Sato, Ken Suzuki, Toshiyuki Hashida, and Junichiro Mizusaki (Tohoku University, Japan)
- OS8B-22 **The Application of FT-IR for the In Situ Investigation of High Temperature Electrodes of SOFC**
Takuya Murai, Keiji Yashiro, Atsushi Kaimai, Tatsuya Kawada, and Junichiro Mizusaki (Tohoku University, Japan)
- 15:10-15-25 Break

Session 3

15:25-16:09

Short Oral Presentation

(3 min presentation + 1 min PC preparation for each paper)

16:10-17:00

Poster Presentation

OS8B-23

An Experimental and Numerical study on the Uneven Flow Distribution in the Windbox of an Oil-Fired Boiler (Invited)

Young Gun Go (Korea Advanced Institute of Science and Technology (KAIST), Korea), Young-Zoo Kim (Korea Electric Power Research Institute, Korea), and Sangmin Choi (Korea Advanced Institute of Science and Technology (KAIST), Korea)

OS8B-24

Growth of Flame Instability and the Effect on Turbulent Combustion in High Pressure and High Temperature Conditions

Hirokazu Hagiwara, Hideaki Kaneko, Yasuhiro Ogami, and Hideaki Kobayashi (Tohoku University, Japan)

OS8B-25

A Numerical Study of Polypropylene Combustion Process in Counterflow Diffusion Flame

Kentaro Yoshinaga and Hideaki Kobayashi (Tohoku University, Japan)

OS8B-26

Comparison of Radiation Element Method and Discrete Ordinates Interpolation Method Applied to Three-Dimensional Radiative Heat Transfer

Atsushi Sakurai (Tohoku University, Japan), Tae-Ho Song (Korea Advanced Institute of Science and Technology (KAIST), Korea), Shigenao Maruyama (Tohoku University, Japan), and Hyun Keol Kim (Korea Advanced Institute of Science and Technology (KAIST), Korea)

OS8B-27

Effect of Varying Heat Transfer Rate on the Formation of Macroseggregation during Solidification of Aluminum-Copper Alloys (Invited)

Beom Soo Seo and Do Hyung Choi (Korea Advanced Institute of Science and Technology (KAIST), Korea)

OS8B-28

Preparation and Mechanical Evaluation of Carbon Nanotube Solids

Go Yamamoto, Yoshinori Sato, Toru Takahashi, Mamoru Omori, Kazuyuki Tohji, and Toshiyuki Hashida (Tohoku University, Japan)

OS8B-29

Application of Bacterial Polysulfide Reduction for Hydrogen Generation with Sulfur Cycle

Yui Takahashi, Koichi Suto, Chihiro Inoue, and Tadashi Chida (Tohoku University, Japan)

OS8B-30

Effects of pH Value on Reduction of Carbon Dioxide under Hydrothermal Conditions

Takamasa Onoki, Toshinari Kori, Nakamichi Yamasaki, and Toshiyuki Hashida (Tohoku University, Japan)

OS8B-31

Generalized Annular Couette Flow of a Non Ideal Bingham Plastic Fluid

Fariborz Rashidi and Behzad Khodakarami (AmirKabir University of Technology, Iran)

OS8B-32

Optimization of In-Flight Particle Characteristics in a DC-RF Hybrid Plasma Flow System

K. Kawajiri and H. Nishiyama (Tohoku University, Japan)

OS8B-33

Measurement of Upwelling Flow Velocity Generated by the Perpetual Salt Fountain in the Pacific Ocean

H. Mitsugashira, K. Tsubaki, S. Maruyama, and A. Komiya (Tohoku University, Japan)