Sixth International Conference on Flow Dynamics

Program

Plenary Lectures

SENDAI (EAST)
November 4, 2009

9:20-10:10  Rheology for Efficient Energy Production, Transportation, and Conservation
Rongjia Tao (Temple University, USA)

10:15-11:05  An Odyssey to Experimentally Verify the Onsager Reciprocity in Flow of Charged Particles in Solids
Han-Ill Yoo and Woo-Seok Park (Seoul National University, Korea)

11:10-12:00  Ultimate Nanofabrication Technology by Neutral Particle Beam
Seiji Samukawa (Tohoku University, Japan)
Hybrid Rocket Propulsion and Related Fluid Dynamics

FUJI
November 4, 2009

Keynote Lectures
Chair: Toru Shimada (Japan Aerospace Exploration Agency, Japan)

2:1 Development of Throttlatable Hybrid Rockets (Invited)
13:00-13:40 Daniele Barbagallo (Italian Space Agency, Italy), Nicola Ierardo (AVIO SpA, Italy), E. D’Aversa and A. De Lillis (Italian Space Agency, Italy)

2:2 Roll Torque Prediction in SRM: a Numerical Approach (Invited)
13:40-14:20 Fulvio Stella, M. Giangi (University of Rome “La Sapienza”, Italy), Daniele Barbagallo and A. Scaccia (Italian Space Agency, Italy)

Regression Rate and Ablation
Chair: Keisuke Sawada (Tohoku University, Japan)

2:3 Effect of Local O/F on Regression Rate of Solid Fuels in CAMUI Hybrid Rocket Motor
14:30-14:50 Harunori Nagata, Kenta Uejima, Shunsuke Hagiwara, Masashi Wakita, Tsuyoshi Totani (Hokkaido University, Japan), and Tsutomu Uematsu (Camuispaceworks Co., Ltd., Japan)

2:4 Study on the Regression Rate of Some Hybrid Rocket Fuels
14:50-15:10 Ichiro Nakagawa and Satoshi Hikone (Tokai University, Japan)

2:5 Application of Temperature-Sensitive Paint to Heat Flux Measurement in High Temperature Gas Flow
15:10-15:30 Seungwon Ha, Ryosuke Sawamura, Hiroaki Sakamoto, Daiju Numata, Hiroki Nagai, and Keisuke Asai (Tohoku University, Japan)

2:6 Charring Behavior within Thermal Protection Material
15:30-15:50 Masami Tomita, Mitsunobu Kuribayashi (Nagoya University, Japan), Toshiyuki Suzuki, Kazuhiisa Fujita (Japan Aerospace Exploration Agency, Japan), Kazutaka Kitagawa (Aichi Institute of Technology, Japan), Kenichi Hirai (IHI Aerospace, Co., Ltd., Japan) and Takeharu Sakai (Nagoya University, Japan)

15:50-16:00 BREAK

Simulation I
Chair: Harunori Nagata (Hokkaido University, Japan)

16:00-16:20 Rajesh K. Sharma, R. Bhargava and I. V. Singh (IIT-Roorkee, India)

2:8 Numerical Study of VEGA Third Stage Re-Entry Phase (Invited)
16:20-16:40 Fulvio Stella, M. Giangi (University of Rome “La Sapienza”, Italy), Daniele Barbagallo and A. Scaccia (ESA-ESRIN Frascati, Italy)
Numerical Simulation on Unsteady Compressible Low-Speed Flow Using Preconditioning Method: Re Effects on Drag for 2D Cylinder
Nobuyuki Tsuboi (Kyushu Institute of Technology, Japan), Katsuyoshi Fukiba (Muroran Institute of Technology, Japan) and Toru Shimada (Japan Aerospace Exploration Agency, Japan)

A Numerical Simulation Using Hyperbolic Tangent Approximation Model for Diffusion Combustion in a Laminar Boundary Layer on a Flat Plate
Keiichi Ishiko, Vasily Novozhilov, and Toru Shimada (Japan Aerospace Exploration Agency, Japan)

Simulation II
Chair: Ichiro Nakagawa (Tokai University, Japan)

Higher-Order Accurate Numerical Simulation of Swirling Flowfield in Combustion Chamber for Hybrid Rocket Engine
Kazuki Yoshimura and Keisuke Sawada (Tohoku University, Japan)

Reynolds Averaged Numerical Simulation for Swirling-Oxidizer-Type Hybrid Rocket Engine
Mikiro Motoe (Tokai University, Japan), Toru Shimada (Japan Aerospace Exploration Agency, Japan), Saburo Yuasa (Tokyo Metropolitan University, Japan) and Katumi Hiraoka (Tokai University, Japan)

Quasi-1D Simulation of Hybrid Rocket Flow with a Fast Chemistry Nonpremixed Flame Model
Yuki Funami (The University of Tokyo, Japan), Vasily Novozhilov and Toru Shimada (Japan Aerospace Exploration Agency, Japan)
Functionality Design of the Contact Dynamics

FUJI
November 5, 2009

Chair: Julien Fontaine (Ecole Centrale de Lyon, France)

3-1  Keynote Lecture
9:00-9:35  On the Vital Importance of Dynamics and Modifications in Tribological Surfaces – Illustrating Examples from Practical Applications (Invited)
Staffan Jacobson and Sture Hogmark (Uppsala University, Sweden)

3-2  Dynamic Aspects of the Contact of Rough Surfaces (Invited)
9:35-10:00  Boyko Stoimenov (Ecole Centrale de Lyon, France), Koshi Adachi (Tohoku University, Japan) and K. Kato (Nihon University, Japan)

3-3  Effect of Surface Texture on Frictional Sound
10:00-10:15  Zahrul Fuadi, Toshiyuki TAKAGI, Koshi ADACHI and Hiroyuki MIKI (Tohoku University, Japan)

10:15-10:25  BREAK

Chair: Staffan Jacobson (Uppsala University, Sweden)

3-4  Tribological Properties of Nanocomposite Metal-Containing DLC Coatings: the Key-Role of Metal Flow Between Sliding Surfaces (Invited)
10:25-10:50  Julien Fontaine, M. Ruet, S. Bec, C. Guerret-Picourt, M. Belin (Ecole Centrale de Lyon, France), H. Miki, T. Takeno (Tohoku University, Japan) and K. Ito (Nihon University, Japan)

3-5  DLC Film for Space Application
10:50-11:15  - Improvement of Tribological Properties by Metal Doping - (Invited)
Koji Matsumoto (Japan Aerospace Exploration Agency, Japan), Takanori Takeno and Hiroyuki Miki (Tohoku University, Japan)

3-6  Critical Thickness of Polycrystalline Ag Layers Yielding Friction Reduction due to Tribo-assisted Reorientation (Invited)
11:15-11:40  Minoru Goto (Ube National College of Technology, Japan) and Koichi Akimoto (Nagoya University, Japan)

11:40-11:50  BREAK

Chair: Koji Matsumoto (Japan Aerospace Exploration Agency, Japan)

3-7  Ultrasonic Nondestructive Evaluation of CVD Diamond Coating with Various Deposition Condition (Invited)
11:50-12:15  Dong-Yeol Kim, Hak-Joon Kim, Sung-Jin Song (Sungkyunkwan University, Korea), Sung Duk Kwon (Andong National University, Korea), Toshiyuki Takagi, Tetsuya Uchimoto and Hiroyuki Miki (Tohoku University, Japan)

3-8  Tribological Behavior of Partly Polished CVD Diamond Films Against Stainless Steel in Humid Environment
12:15-12:30  Hiroyuki Miki, Kotaro Bando, Takanori Takeno, Toshiyuki Takagi and Takeshi Sato (Tohoku University, Japan)
Advanced Control of Smart Fluids and Fluid Flows

FUJI
November 5, 2009

13:00-13:05 Opening Address
Masami Nakano (Tohoku University, Japan)

Chair: Masami Nakano (Tohoku University, Japan)

4·1 Keynote Lecture
13:05-13:45 Control Applications of Smart Electrorheological and Magnetorheological Fluids (Invited)
Seung-Bok Choi and Young-Min Han (Inha University, Korea)

4·2 Development of Micro-motor for MEMS utilizing Novel Smart Polymers (Invited)
13:45-14:15 Miklós ZRÍNYI (Semmelweis University, Hungary), Masami NAKANO and Teppei TSUJITA (Tohoku University, Japan)

4·3 Experimental and Analytical Evaluation of Passive Type MR Damper
14:15-14:35 Takahiro Murakami, Michiya Sakai (CRIEPI, Japan) and Masami Nakano (Tohoku University, Japan)

4·4 Development of Passive Force Display and Rehabilitation System for Upper Limbs Using Redundant Number of ER Fluid Brakes
14:35-14:55 Hiroshi Kobayashi, Junji Furusho and Makoto Haraguchi (Osaka University, Japan)

4·5 Characteristic Evaluation of a MHD Power Generator Using Low-Melting-Point Gallium Alloy
14:55-15:15 Xiao-Dong Niu and Hiroshi Yamaguchi (Doshisha University, Japan)

15:15-15:20 BREAK

Chair: Masaya Shigeta (Tohoku University, Japan)

4·6 Flow Control by Sway Motion of Pliant Rectangular Plate (Invited)
15:20-15:50 Toshihiro Abe, Kazumichi Okajima, Takatoshi Hamada, Shunsuke Yamada and Hitoshi Ishikawa (Tokyo University of Science, Japan)

4·7 Disk Wake: From Open-Loop To Closed-Loop Controls (Invited)
15:50-16:20 Hirosi Higuchi, Makan Fardad, Mark N. Glauser, Rory Bigger, Zacharay Berger and Aaron J. Orbaker (Syracuse University, USA)

4·8 Experimental and Numerical Investigations of Droplet Patterns from a Continuous Ink Jet
16:20-16:40 Tameo NAKANISHI (Yamagata University, Japan), Masami NAKANO (Tohoku University, Japan) and Masafumi YOKOYAMA (Yamagata University, Japan)
November 6, 2009

Chair: Hidemasa Takana (Tohoku University, Japan)

4:10 Impact of Low Weber Number Molten Tin Droplets on Solid Surfaces Comprising Microgrooves (Invited)
Deivandren Sivakumar (Indian Institute of Science, India), Kazunari Katagiri, Tomoki Nakajima, Hidemasa Takana, and Hideya Nishiyama (Tohoku University, Japan)

4:11 Flow Behavior and Microstructure of Electro-Rheological Nano-Suspensions before and after Yielding (Invited)
Katsufumi Tanaka, Ryuichi Akiyama (Kyoto Institute of Technology, Japan) and Masami Nakano (Tohoku University, Japan)

4:12 Numerical Solution of Magneto-micropolar Fluid Past a Continuously Moving Plate with Varying Surface Conditions
Lokendra Kumar and Sanjeev Sharma (Jaypee Institute of Information Technology University, India)

10:20-10:25 BREAK

Chair: Yu Fukunishi (Tohoku University, Japan)

4:13 Effects of Inflow Pulsation on a Turbulent Coaxial Jet (Invited)
Seong Jae Jang and Hyung Jin Sung (Korea Advanced Institute of Science and Technology, Korea)

4:14 Experimental and Numerical Flow Control of Bypass Transition (Invited)
Fredrik Lundell, Antonios Monokrousos and Luca Brandt (KTH Royal Institute of Technology, Sweden)

4:15 Effect of Wall Temperature Condition on the Evolution of a Supersonic Turbulent Boundary Layer
Yusuke Tokura, Hiroshi Maekawa, Daisuke Watanabe and Youichi Ogata (Hiroshima University, Japan)

4:16 Influence of a DBD Plasma Actuator on Aerodynamic Characteristics and Flow Field of Wings
Yusuke SUZUKI, Yuta YANASE, Oho KIDA, Tomohisa OHTAKE, Akinori MURAMATSU and Tatsuo MOTOHASHI (Nihon University, Japan)
**FUYOH**  
November 6, 2009

Chair: Kazuo Matsuura (Tohoku University, Japan)

13:00-13:45 **Short Oral Presentation**  
(4 min for Short Oral Presentation)

**4.17**  
Multiparametric Problems of Boundary Control for Boussinesq Model of Heat Convection  
Gennady V. Alekseev and Dmitry A. Tereshko (IAM FEB RAS, Russia)

**4.18**  
Experimental Evaluation of a CFD-based Flow Observer Applied to the Case of a Turbulent Jet in a Co-flowing Stream  
Gabriele Bellani (KTH Royal Institute of Technology, Sweden), Kentaro Imagawa (Tohoku University, Japan), Hiroshi Higuchi (Syracuse University, USA), Fredrik Lundell (KTH Royal Institute of Technology, Sweden) and Toshiyuki Hayase (Tohoku University, Japan)

**4.19**  
Turbulence Transition in Two-Dimensional Boundary Layer Flow: Linear Instability  
Jim C Chen and Chen Weijia (Nanyang Technological University, Singapore)

**4.20**  
Thermal Effect on Recirculation Region of Supercritical CO2 Sudden Expansion Flow at Low Reynolds Numbers  
Bili Deng and Xin-Rong Zhang (Peking University, China)

**4.21**  
Cancelation of Instability Waves in a Flat-Plate Boundary Layer by Feedforward Control  
Hajime Okawa, Michiharu Watanabe, Masaya Shigeta, Seiichiro Izawa and Yu Fukunishi (Tohoku University, Japan)

**4.22**  
PIV and PLIF Measurement of Regular and Fractal Grid Turbulence with Scalar Transfer  
Hiroki Suzuki, Kouji Nagata, Yasuhiko Sakai and Ryota Ukai (Nagoya University, Japan)

**4.23**  
Integrated Parametric Study of Hybrid-Stabilized Argon-Water Arc under Subsonic and Supersonic Regimes (Invited)  
Jiri Jeníšta (Institute of Plasma Physics AS CR, Czech Republic), Hidemasa Takana, Hideya Nishiyama (Tohoku University, Japan), Milada Bartlová, Vladimir Aubrecht (Brno University of Technology, Czech Republic), Petr Kránek, Milan Hrabovský, Tetyana Kavka, Viktor Sember and Alan Mašlíni (Institute of Plasma Physics AS CR, Czech Republic)

**4.24**  
Analyses of Deformation and Damage of Erythrocytes in Shear Flow  
Tetsuya Yano, Norio Takahashi, Seiichi Sudo (Akita Prefectural University, Japan), and Yoshinori Mitamura (Tokai University, Japan)
Finite Element Solution of Stagnation Flow of a Micropolar Fluid towards a Vertical Permeable Surface with Variable Surface Conditions
Lokendra Kumar (Jaypee Institute of Information Technology University, India)

Chair: Teppei Tsujita (Tohoku University, Japan)
13:50-14:40 Short Oral Presentation
(4 min for Short Oral Presentation)

Direct Computation for the Sound Control of a Hole-Tone Feedback System
Kazuo Matsuura and Masami Nakano (Tohoku University, Japan)

Vibration Control of MR Suspension System Using Fuzzy Moving SMC with Hysteretic Compensator
Min-Sang Seong, Jung Woo Sohn and Seung-Bok Choi (Inha University, Korea)

Stability Analysis of Railway Wheel-set Featuring MR Suspension System
Sung Hoon Ha and Seung-Bok Choi (Inha University, Korea)

Design of Multiple-disk Brake Applying Electro-adhesive Sheet
Hidetaka Tanaka, Yasuhiro Kakinuma, Tojiro Aoyama (Keio University, Japan), and Hidenobu Anzai (Fujikura Kasei Co., Ltd., Japan)

Damper Design and Experimental Results by Using Magnetic Responsive Fluids
Katsuaki Sunakoda and Ren Ishiyama (Akita University, Japan)

Development of Compact MR Fluid Clutch / Brake (CMRFC/B)
Kikuko Otsuki, Takehito Kikuchi, Junji Furusho, Hiroya Abe (Osaka University, Japan), Junichi NOMA (KURIMOTO, LTD., Japan), and Makio Naito (Osaka University, Japan)

Force Display and Rehabilitation for Upper Limbs System Using MR Fluid Brakes
Kazuhiro Nishiwaki, Junji Furusho, Makoto Haraguchi, and Ying Jin (Osaka University, Japan)

Development of Muscle Training Machine “MEM-MRB” Using MR Fluid Brake
Shiro Isozumi, Junji Furusho (Osaka University, Japan), Kunihiko Oda (Osaka Electro-Communication University, Japan) and Takehito Kikuchi (Osaka University, Japan)
4:34 Training Evaluation on Trajectory Tracking for Upper Limbs Using 3D Rehabilitation Robot "EMUL" with ER Fluid Actuator and a Functional NIRS
Mayumi Sonobe, Makoto Haraguchi, Takehito Kikuchi, Junji Furusho (Osaka University, Japan) Masahito Mihara, Megumi Hatakenaka, Ichiro Miyai (Morinomiya Hospital, Japan)

4:35 Synthesis of Single Crystalline Fe Fine Particles and Their Magnetorheology
Junichi Noma (Osaka University and Kurimoto, LTD., Japan), Hiroya Abe, Makio Naito, Takehito Kikuchi and Junji Furusho (Osaka University, Japan)

14:40-14:50 BREAK

14:50-15:50 Poster Presentation
Numerical Analysis of Radiative Heat Transfer on Nocturnal Atmosphere in Consideration of Phase Transition (Invited)
Seigo Sakai (Yokohama National University, Japan) and Shigenao Maruyama (Tohoku University, Japan)

Flame Stabilization Studies on a Backward Facing Step Configuration Based Microcombustor (Invited)
Bhupendra Khandelwal and Sudarshan Kumar (Indian Institute of Technology Bombay, India)

Reducing Wear of Biomimetic Designed Artificial Joints through Nanotechnology (Invited)
Wenguang Zhang, Yun Luo, Chengtao Wang (Shanghai Jiao Tong University, China)

The Diffusion of Thermal Discharge into Stagnant Water
Jafar Ali, John Fieldhouse, Chris Talbot and Rakesh Mishra (University of Huddersfield, UK)

H₂ Production from Water Molecules Excited by Using Weak Infrared Laser at 2.8 Micrometer
Masayoshi Kitada (Automobile R&D Center, Honda R&D Co., Ltd., Japan), Tetsumi Sumiyoshi (Cyber Laser Inc., Japan), Yuko Amo, Yasuo Kameda, Takeshi Usuki (Yamagata University, Japan), Hiromitsu Takaba, Akira Endou, Nozomu Hatakeyama, Hokuto Hata, Kotaro Okushi, Ai Suzuki, Hideyuki Tsuboi, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

Characteristics of Radiative Heat Flux from Micro Channel with Gas Combustion
Sergey Minaev, Fedor Palessky, Roman Fursenko and Vladimir Baev (ITAM SB RAS, Russia)

Flame Dynamics in Radiative Porous Media
Roman Fursenko, Sergey Minaev (ITAM SB RAS, Russia) and Kaoru Maruta (Tohoku University, Japan)

Numerical Modeling of Unsteady Gas Flows through Porous Heat-Evolutional Objects
Vladimir Levin and Nickolay A. Lutsenko (FEB RAS, Russia)

Gas Flow through Self-Heating Porous Media: Theory and Experiment
Nickolay A. Lutsenko (FEB RAS, Russia), Evgeniy Sereshchenko and Sergey Minaev (SB RAS, Russia)
## Supersonic Technology Workshop (AFI/TFI-2009)

**AKEBONO (EAST)**
November 4, 2009

### SST-1
13:00-13:40
**Hysteresis of the Transition between Regular and Mach Reflections of Steady Shock Waves (Invited)**
Mikhail S. Ivanov, Dmitry V. Khotyanovsky and Alexey N. Kudryavtsev (Siberian Branch of the Russian Academy of Sciences, Russia)

### SST-2
13:40-13:45
BREAK

### SST-3
13:45-14:05
**A Study based on Shock Dynamics for the Generation of Secondary Shock Wave in Shock-Vortex Interaction**
Shunsuke SHIMIZU (Private, Japan)

### SST-4
14:05-14:25
**Computations of Unsteady Flow Field around an Accelerating Sphere in the Transonic Flow Velocity Region**
Kazuaki Hatanaka, Tsutomu Saito (Muroran Institute of Technology, Japan), Hiroshi Yamashita, Toshihiro Ogawa, Shigeru Obayashi and Kazuyoshi Takayama (Tohoku University, Japan)

### SST-5
14:25-14:45
BREAK

### SST-6
14:45-15:05
**Evolutionary Optimization of Natural Laminar Flow Wing in Supersonic Regime (Invited)**
E. Iuliano and Domenico Quagliarella (CIRA, Italy)

### SST-7
14:50-15:10
**Fundamental Finite Element Analysis of Building Vibration Induced by Sonic Boom**
Yusuke Naka (Japan Aerospace Exploration Agency, Japan)

### SST-8
15:10-15:30
**CFD Simulation of Weak Shock Wave Propagation in an Atmosphere (Invited)**
Takeharu Sakai (Nagoya University, Japan)

### SST-9
15:30-15:50
**Global Sonic Boom Overpressure Variation under Realistic Meteorological Condition**
Hiroshi Yamashita and Shigeru Obayashi (Tohoku University, Japan)

### SST-10
15:50-16:10
**Development of New Supersonic Mixer for Enhancement of Scramjet Engine**
Chae-hyoung Kim, In-Seuck Jeung (Seoul National University, Korea), Byungil Choi, Yoshinori Matsubara, Toshinori Kouchi and Goro Masuya (Tohoku University, Japan)

### SST-11
16:10-16:30
**An Application of DBD Plasma Actuator to Shock Wave Mitigation**
Takashi Matsuno, Takashi Kanatani, Hiromitsu Kawazoe (Tottori University, Japan) and Shigeru Obayashi (Tohoku University, Japan)
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-10</td>
<td>Preliminary Study of Interaction between Weak Shock Wave and Turbulent Flow <em>(Invited)</em></td>
<td>Atsushi Matsuda, Daisuke Takagi, J. Kim, Akihiro Sasoh, Shigeyoshi Ito, Koji Nagata and Yasuhiko Sakai (Nagoya University, Japan)</td>
</tr>
<tr>
<td>SST-11</td>
<td>Three Dimensional Free Flight Experiment Using Square Bore Ballistic Range <em>(Invited)</em></td>
<td>Atsushi Matsuda, Katsuya Shimizu, Kosuke Kikuchi, Kakuei Suzuki and Akihiro Sasoh (Nagoya University, Japan)</td>
</tr>
<tr>
<td>SST-12</td>
<td>Numerical and Experimental Analysis on Shock Wave Interaction of the Supersonic Biplane Model</td>
<td>Atsushi Toyoda, Masayuki Okubo and Shigeru Obayashi (Tohoku University, Japan), Katsuya Shimizu, Atsushi Matsuda and Akihiro Sasoh (Nagoya University, Japan)</td>
</tr>
</tbody>
</table>
IFS Collaborative Research Forum (AFI/TFI-2009)  
& IFS Research Exhibition (AFI/TFI-2009)

AKEBONO (EAST)  
November 5, 2009

Chair: Shinkyu Jeong (Tohoku University, Japan)

8:30-9:30  
**Short Oral Presentation**  
(3 min for Short Oral Presentation)

**CRF-1**  
**Blade Shape Optimization and Data mining for HSI Noise and Aerodynamics Performances of Helicopter**  
Shinkyu Jeong, Toru Sasaki (Tohoku University, Japan), Sanghyun Chae, Kwanjung Yee (Pusan National University, Korea), and Takashi Aoyama (Japan Aerospace Exploration Agency, Japan)

**CRF-2**  
**Thermo-Fluid Characteristics of Boiling Liquid Nitrogen Flowing in a Horizontal Pipe**  
Ryo Shimizu, Katsuhide Ohira, Koichi Takahashi (Tohoku University, Japan), Hiroaki Kobayashi, Hideyuki Taguchi, Takayuki Kojima and Motoyuki Hongo (Japan Aerospace Exploration Agency, Japan)

**CRF-3**  
**Experimental Study on Aerodynamic Characteristics of a Silent Supersonic Aircraft in Low Speed Flight**  
Hiromitsu Kawazoe, Takashi Matsuno (Tottori University, Japan), Shigeru Obayashi and Shinkyu Jeong (Tohoku University, Japan)

**CRF-4**  
**Numerical Simulations of Flow Field Around an Object Decelerating from Supersonic to Subsonic Velocity**  
Kazuaki Hatanaka, Tsutomu Saito (Murotan Institute of Technology, Japan) and Hiroshi Yamashita, Toshihiro Ogawa, Shigeru Obayashi, Kazuyoshi Takayama (Tohoku University, Japan)

**CRF-5**  
**Investigation of Hypersonic Flows about Leading Edges of Small Bluntness (Invited)**  
Mikhail Ivanov (ITAM, Russia), Shigeru Yonemura (Tohoku University, Japan), Yevgeniy Bondar and Dmitry Khotyanovsky (ITAM, Russia)

**CRF-6**  
**Study of Unstable Phenomena of Film Boiling in Superfluid Helium**  
Masakazu Nozawa (Tohoku University, Japan), Nobuhiro Kimura (High Energy Accelerator Research Organization, Japan), Shinichi Chiba and Katsuhide Ohira (Tohoku University, Japan)

**CRF-7**  
**Modelling of Supersonic and Turbulent Hybrid Arc for Biomass Gasification (Invited)**  
Jiri Jenista (Institute of Plasma Physics AS CR, Czech Republic), Hidemasa Takana, Hideya Nishiyama (Tohoku University, Japan) and Milan Hrabovsky (Institute of Plasma Physics AS CR, Czech Republic)
Computational Simulation of Highly Reactive Air Plasma Jet under High Pressure Conditions
Hidemasa Takana (Tohoku University, Japan), Yasunori Tanaka (Kanazawa University, Japan) and Hideya Nishiyama (Tohoku University, Japan)

Dynamics of Premixed Flames Propagating in Non-Uniform Velocity Fields: Combined Effects of Intrinsic Instability and Radiation
Satoshi Kadowaki, Hidekazu Takahashi (Nagaoka University of Technology, Japan) and Hideaki Kobayashi (Tohoku University, Japan)

Investigations of Reacting Flow in Micro Channels Directed to Development of Eco-Friendly Technologies of Energy Conversion
Sergey Minaev (ITAM SB RAS, Russia), Kaoru Maruta (Tohoku University, Japan)

Use of Fluid Inclusions in Sludge Sample for the Estimation of Thermal History of Geothermal Fields
Kotaro Sekine (Tohoku University, Japan), Masaho Adachi, Hitoshi Ozeki (Okuaizu Geothermal Co., Ltd., Japan), and Brian Rusk (James Cook University, Australia)

Distinct Element Modeling for Hydraulic Fracturing in Unconsolidated Sands
Hiroyuki Shimizu, Sumihiko Murata (Kyoto University, Japan), Takatoshi Ito (Tohoku University, Japan), Tsuyoshi Ishida (Kyoto University, Japan)

The Effects of Radiative Heat Transfer in a Turbulent Channel Flow (Invited)
Atsushi Sakurai, Kenji Takakuwa, Koji Matsubara (Niigata University, Japan) and Shigenao Maruyama (Tohoku University, Japan)

Magnetic Dynamic Process of Magnetic Layers in Grain Boundary due to Fatigue for Material Degradation
Katsuhiko Yamaguchi, Kenji Suzuki, Osamu Nittono (Fukushima University, Japan), Tetsuya Uchimoto and Toshiyuki Takagi (Tohoku University, Japan)

Energy Transfer Simulation and Analysis on Mega-scale Environment
Noboru Yamada (Nagaoka University of Technology, Japan), Atsushi Sakurai (Niigata University, Japan), Atsuki Komiya and Shigenao Maruyama (Tohoku University, Japan)

Development of Nondestructive Evaluation Method for Characterization of Surface/Sub-surface Material Properties (Invited)
Hak-Joon Kim (Sungkyunkwan University, Korea), Ho-Sang Shin (Korea Institute of Nuclear Safety, Korea), Dong-Yeol Kim, Sung-Jin Song (Sungkyunkwan University, Korea), Sung-Duk Kwon (Andong National University, Korea), Toshiyuki Takagi and Tetsuya Uchimoto (Tohoku University, Japan)

9:30-9:40 BREAK
9:40-11:00  **Short Oral Presentation**
(3 min for Short Oral Presentation)

**CRF-17**  **Mechanism of Radical Generation and Sterilization by a Plasma Flow at Atmospheric Pressure**
Takashi Miyahara (Shizuoka University, Japan), Shiroh Ochiai and Takehiko Sato (Tohoku University, Japan)

**CRF-18**  **Research on Deep Brain Magnetic Stimulation**
Toshihiko Abe, Toshiaki Ichihara, Kazumi Yashima (IFG., Ltd., Japan) and Toshiyuki Takagi (Tohoku University, Japan)

**CRF-19**  **Atrial Vortex**
Muneichi Shibata, Hisao Ito (Miyagi Cardiovascular and Respiratory Center, Japan), Tomoyuki Yambe, Ryo Koizumi, Kenichi Funamoto and Toshiyuki Hayase (Tohoku University, Japan)

**CRF-20**  **Analysis of Reactive Species in a Plasma Flow for Medical Treatment**
Tetsuji Shimizu (Max-Planck Institute for Extraterrestrial Physics, Germany), Takehiko Sato (Tohoku University, Japan), Gregor E. Morfill (Max-Planck Institute for Extraterrestrial Physics, Germany)

**CRF-21**  **Development of Stent for Cerebral Aneurysm**
Toshio Nakayama (Tohoku University, Japan), Karkenahalli Srinivas (The University of Sydney, Australia), Makoto Ohta (Tohoku University, Japan)

**CRF-22**  **Fundamental Study of Convection-Enhanced Delivery Simulation in Rat Brain**
Joshua H. Smith (Lafayette College, USA), Kenichi Funamoto (Tohoku University, Japan), Martin V. Racenis (Lafayette College, USA), and Toshiyuki Hayase (Tohoku University, Japan)

**CRF-23**  **Convection-enhanced Delivery of ACNU Under MRI Monitoring Against Recurrent Gliomas—Development of Computational Simulation of Drug Distribution**
Ryuta Saito, Yukihiko Sonoda, Toshihiro Kumabe, Ken-ichi Funamoto, Toshiyuki Hayase and Teiji Tominaga (Tohoku University, Japan)

**CRF-24**  **Impact and Solidification of Molten Metal Droplets on Stainless Steel Surfaces Patterned with Unidirectional Parallel Microgrooves (Invited)**
Deivandren Sivakumar (Indian Institute of Science, India), Kazunari Katagiri, Tomoki Nakajima, Hidemasa Takana and Hideya Nishiyama (Tohoku University, Japan)

**CRF-25**  **Bio-templated Nanostructure Fabrication with Neutral Beam**
Ichiro Yamashita (Nara Institute of Science and Technology, Japan), Seiji Samukawa and Tomohiro Kubota (Tohoku University, Japan)
Impact and Formation Mechanism of Line Edge Roughness (LER) for Advanced Interconnect
Shuichi Saito, Eiichi Soda (Semiconductor Leading Edge Technologies, Inc., Japan), Butsurin Jinnai, Koji Koyama and Seiji Samukawa (Tohoku University, Japan)

Development and Flow Evaluation of Electro-Rheological Nano-Suspensions
Katsufumi Tanaka, Masashi Komeda, Nozomi Nakagawa, Ryuichi Akiyama (Kyoto Institute of Technology, Japan), Masami Nakano and Teppei Tsujita (Tohoku University, Japan)

Transport Phenomena at Nano-Structured Interfaces
Taku Ohara (Tohoku University, Japan), Masahiko Shibahara (Osaka University, Japan), and Gota Kikugawa (Tohoku University, Japan)

Numerical Studies of the Reacting Rarefied Flows in Tubes
Yevgeniy Bondar (ITAM, Russia), Kaoru Maruta (Tohoku University, Japan), and Mikhail Ivanov (ITAM, Russia)

Fabrication of Composite Material by Compression Shearing Method under Room Temperature
Noboru Nakayama (Shinshu University, Japan), Hiroyuki Miki (Tohoku University, Japan) and Hiroyuki Takeishi (Chiba Institute of Technology, Japan)

Molecular Dynamics Study about Lubrication Phenomena of Liquid Bridges
Takashi Tokumasu (Tohoku University, Japan), Marie-Helene Meurisse, Nicolas Fillot and Philippe Vergne (INSA-Lyon, France)

Mechanism of Bubble Generation and Disappearance by Plasma
Takehiko Sato, Masanobu Oizumi (Tohoku University, Japan), Marc Tinguely, Mohamed Farhat (EPFL, Switzerland)

Production of Complex Plasma at Atmospheric Pressure
Takehiko Sato, Yutaka Iwafuchi (Tohoku University, Japan), Tetsuji Shimizu and Gregor E. Morfill (Max Planck Institute for Extraterrestrial Physics, Germany)

Optimization of Droplet Formation of Continuous Inkjet
Masami NAKANO (Tohoku University, Japan), Tameo NAKANISHI and Masafumi YOKOYAMA (Yamagata University, Japan)

A Molecular Study on the Thermodynamic and Transport Properties of Liquid Hydrogen
Hiroki Nagashima (Aoyama Gakuin University, Japan), Takashi Tokumasu (Tohoku University, Japan), Shinichi Tsuda (Japan Aerospace Exploration Agency, Japan), Nobuyuki Tsuboi (Kyusyu Institute of Technology, Japan) and K. A. Hayashi (Aoyama Gakuin University, Japan)
Tribological Behavior and Electrical Contact Resistance of Metal-Containing DLC Coating for Electrically Conductive Triboelements
Julien Fontaine (Ecole Centrale de Lyon, France), Hiroyuki Miki, Takanori Takeno (Tohoku University, Japan), Kosuke Ito (Nihon University, Japan), Maxime Ruet, Michel Belin (Ecole Centrale de Lyon, France), Koshi Adachi and Toshiyuki Takagi (Tohoku University, Japan)

Fundamental Study on Spiking Neuron Devices
T. Morie, Y. Sun, H. Liang (Kyushu Institute of Technology, Japan), M. Igarashi, C. Huang, and S. Samukawa (Tohoku University, Japan)

11:00-11:10  BREAK

11:10-12:00  Short Oral Presentation
(3 min for Short Oral Presentation)

Development of Bubble Generation Method by Plasma
Takehiko Sato, Masanobu Oizumi (Tohoku University, Japan), Takashi Miyahara (Shizuoka University, Japan) and Tatsuyuki Nakatani (Toyo Advanced Technologies Company, Ltd., Japan)

Kinetic Force Method for Rarefied Gas flows
Vladimir L. Saveliev (NCSRT, Institute of Ionosphere, Kazakhstan), S.A. Filko (Zhetysu State University, Kazakhstan), K. Tomarikawa and S. Yonemura (Tohoku University, Japan)

Realizing Scalable Visualization Through Hierarchical Provenance Management
Issei Fujishiro (Keio University, Japan), Yuriko Takeshima, Shigeru Obayashi and Toshiyuki Hayase (Tohoku University, Japan)

Numerical and Experimental Analysis of the Hole-Tone Feedback Problem
Mikael A. Langthjem (Yamagata University, Japan) and Masami Nakano (Tohoku University, Japan)

Direct Numerical Simulation on the Effects of Free-stream Turbulence on Neutral, Stably and Unstably Stratified Turbulent Boundary Layers
Kouji Nagata, Yasuhiko Sakai, Hiroki Suzuki (Nagoya University, Japan) and Toshiyuki Hayase (Tohoku University, Japan)

Meteorological Influence on Sonic Boom
Hiroshi Yamashita, Shinkyu Jeong and Shigeru Obayashi (Tohoku University, Japan)

In Situ Observation and Remote Sensing during Ocean Experiments of Perpetual Salt Fountain
Takashi Yabuki, Shigenao Maruyama, Mikihito Watanabe and Atsuki Komiya (Tohoku University, Japan)
Assessment of Volume Penalization Method for Direct Numerical Simulation of Incompressible Flows
Yuji Hattori (Tohoku University, Japan)

Chemistry Validation Using Simplified Modeling of Autoignition in Micro Flowreactor with Controlled Temperature Profile
Hisashi Nakamura, Hiroshi Oshibe, Kaoru Maruta (Tohoku University, Japan)

Blood Flow Analysis by Measurement-Integrated Simulation
Kenichi Funamoto and Toshiyuki Hayase (Tohoku University, Japan)

Computational and Experimental Studies on Supersonic Particulate Jet Process for Cavity Filling
Hidemasa Takana, HongYang Li, Kazuhiro Ogawa, Tsunemoto Kuriyagawa and Hideya Nishiyama (Tohoku University, Japan)

Mechanism of a Molecular Gas-Film Lubrication of Micro-Structured Surface
Shigeru Yonemura, Susumu Isono, Masashi Yamaguchi, Takanori Takeno, Hiroyuki Miki and Toshiyuki Takagi (Tohoku University, Japan)

Influence of Inlet and Outlet Pipe Lengths on Cavitation Surge
Yuka Iga (Tohoku University, Japan), Yoshiki Yoshida (Japan Aerospace Exploration Agency, Japan) and Toshiaki Ikohagi (Tohoku University, Japan)

Topologically-Accentuated Realization of Wake Turbulence Datasets
Yuriko Takeshima, Yosuke Hoshi, Yuichi Maki (Tohoku University, Japan), Issei Fujishiro (Keio University, Japan), S. Takahashi (The University of Tokyo, Japan), Takashi Misaka and Shigeru Obayashi (Tohoku University, Japan)

12:00-12:20 BREAK

12:20-14:30 Poster Session
The Fifth International Students/ Young Birds Seminar
on Multi-scale Flow Dynamics

AKEBONO (WEST)
November 4, 2009

13:00-13:05   Opening

Session 1  
13:05-13:41   Award Session

Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9-1 Effect of Confinement on Wake Instability: Comparison of Local, Global Linear and Nonlinear Methods
Outi Tammisola, Fredrik Lundell, Daniel Söderberg (KTH Royal Institute of Technology, Sweden), Matthew Juniper (Cambridge University, UK), P. Schlatter (KTH Institute of Technology, Sweden)

9-2 Carbon Particle Formation in Micro Flowreactor with Controlled Temperature Profile
Ryu Tanimoto, Takuya Tezuka, Susumu Hasegawa, Hisashi Nakamura, Kaoru Maruta (Tohoku University, Japan)

9-3 An Infinite Elastic Plate Model of Atherosclerotic Plaque Rupture by Nonlinear Particle/Matrix Interfacial Decohesion
Chien M. Nguyen, Alan J. Levy (Syracuse University, USA)

9-4 The Investigation into the Effect of Using Different Nano-micro Metallic Powders on Sunlight Reflectivity of Pigmented Coatings
Mehdi Baneshi, Shigenao Maruyama, Atsuki Komiya (Tohoku University, Japan)

9-5 Magnetorheological Effect in Shear Mode of MR Rubber Composite
Yutaka Takano, Masami Nakano, Masashi Imai and Teppet Tsujita (Tōhoku University, Japan)

9-6 Investigation of the Effects of Cavitation on Atomization of a High Speed Liquid Jet
Cameron Stanley, Gary Rosengarten and Tracie Barber, B. Milton (UNSW, Australia)

9-7 Numerical Study of Three-shock Intersection at Von Neumann Paradox Conditions
Georgy V. Shoev, Dmitry V. Khotyanovsky, Yevgeny A. Bondar, Alexey N. Kudryavtsev, and Mikhail S. Ivanov (Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia)

9-8 Application of a Negative Capacitance Circuit in Synchronized Switch Damping Techniques for Vibration Suppression
Hongli Ji, Jinhao Qiu, and Jun Cheng (Nanjing University of Aeronautics and Astronautics, China)
9:9 An Investigation of the Features of SMAC and SIMPLE for Incompressible Unsteady-state Fluid Flow Solutions
Y. Saito, K. Yasumura, Y. Matsushita, H. Aoki, T. Miura (Tohoku University, Japan), S. Ogasawara, M. Daikoku (Hachinohe Institute of Technology, Japan), T. Igarashi, K. Matsuyama, M. Shirota, T. Inamura (Hirosaki University, Japan)

13:41-14:20 Poster Presentation

Session 2

- Award Session –

15:00-15:36 Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9:10 Accelerate the CFD Performance by Using Graphic Hardware
Wu-Shung Fu, Chung-Gang Li (National Chiao Tung University, Taiwan)

9:11 Skin-Friction Measurement of Flow around Bluff Body Using Luminescent Oil-Film Technique
Tomoya Kakuta, Atsushi Koyama, Daisuke Yorita, Daiju Numata, Hiroki Nagai, Keisuke Asai (Tohoku University, Japan)

9:12 Thermodynamic Properties of Y$_2$Cu$_2$O$_5$
Maslova I., Savelieva O., Volkova O., Vasiliev A. (Moscow State University, Russia)

9:13 Analysis of CO$_2$/DME Heat Pump Cycle with Consideration of Heat Transfer Degradation
Yoji Onaka, Akio Miyara, Koutaro Tsubaki, Shigeru Koyama (Saga University, Japan)

9:14 Cassie to Wenzel State Transition of Liquid Droplets on Textured Metallic Surfaces
V. Vaikuntanathan, D. Sivakumar (Indian Institute of Science, India)

9:15 Measurement of Thermophysical Properties of Freezing Skin Using Peltier Modules for Cryosurgery
Hiroki Takeda (Tohoku University, Japan), Daniel Fingas (University of Toronto, Canada), Junnosuke Okajima, Atsuki Komiya and Shigenao Maruyama (Tohoku University, Japan)

9:16 Use of Active Learning to Design Experimental Fluid Flow Problems
Ankur Srivastava, Andrew J. Meade (Rice University, USA)

9:17 A Numerical Investigation of the Effect of the Size of Painting Droplets on Transfer Efficiency with Rotary Bell-cup Atomizer
K. Yasumura, Y. Saito, Y. Matsushita, H. Aoki, T. Miura (Tohoku University, Japan), S. Ogasawara, M. Daikoku (Hachinohe Institute of Technology, Japan), T. Igarashi, K. Matsuyama, M. Shirota, and T. Inamura (Hirosaki University, Japan)
Direct Numerical Simulation of Axisymmetric Impinging Fountains
Luthfi, Steven W. Armfield (The University of Sydney, Australia), Wenxian Lin (James Cook University, Australia) and Masud Behnia (The University of Sydney, Australia)

Poster Presentation

FUYOH
November 5, 2009

Session 3
9:00-9:36 Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9:19 Fundamental Study on Restitution Coefficient under Impedance Control for Free-Flying Space Robot
Naohiro Uyama, Hiroki Nakanishi, Kazuya Yoshida (Tohoku University, Japan)

9:20 Restoration of p53-DNA Interaction Loss upon R273H Mutation by CP-31398: An Ultra Accelerated Quantum Chemical Molecular Dynamics Approach
Shah Rauf, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)

9:21 Ultra-Low-Damage Surface Modification of Carbon Nanotube for P-type and N-type Field-Effect Transistor by Neutral Beam Process
Akira Wada, Yoshinori Sato (Tohoku University, Japan), Satoru Suzuki (NTT Corporation, Japan), Masahiko Ishida, Fumiyuki Nihey (NEC Corporation, Japan), Yoshihiro Kobayashi (NTT Corporation, Japan), Kazuyuki Tohji and Seiji Samukawa (Tohoku University, Japan)

9:22 Theoretical Approach for Estimating Air Friction in Laser Scanning Mirror
Manh Hoang Chu, Toshiyuki Takagi and Kazuhiro Hane (Tohoku University, Japan)

9:23 Evaluation of Fatigue Strength of Me-DLC Coating on NiTi Shape Memory Alloy for Medical Applications
Hiroyuki Shiota, Takanori Takeno, Hiroyuki Miki and Toshiyuki Takagi (Tohoku University, Japan)

9:24 Analysis of Shock-wave Structures in a Supersonic Busemann Biplane by Sharp Focusing Schlieren System
Masumi Hagiwara, Hiroki Nagai, Daiju Numata, Keisuke Asai (Tohoku University, Japan)
Kazumi Serizawa, Hiroaki Onuma and Itaru Yamashita (Tohoku University, Japan), Hiromi Kikuchi, Kazuma Suesada and Masaki Kitagaki (Hiroshima University, Japan), Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takada and Momoji Kubo (Tohoku University, Japan), and Akira Miyamoto (Tohoku University, Japan)

9:26 A High-level GPU Programming Framework for Fluid Dynamics Simulation  
Katsuto Sato, Hiroyuki Takizawa, Hiroaki Kobayashi (Tohoku University, Japan)

9:27 Three-Dimensional Simulation of a Valveless Pump  
Soo Jai Shin and Hyung Jin Sung (Korea Advanced Institute of Science and Technology, Korea)

9:36-10:16 Poster Presentation

Session 4  
10:30-11:06 Short Oral Presentation  
(4 min for Short Oral Presentation including PC preparation)

9:28 Unsteady Pressure Distribution Measurement on a Square Cylinder using Pressure-Sensitive Paint  
Daisuke Yorita (Tohoku University, Japan), Tomohiro Narumi (Kyushu Institute of Technology, Japan), Hiroki Nagai and Keisuke Asai (Tohoku University, Japan)

9:29 New Functional Device Characteristics with 2-Dimensional Array of Si Nanodisks Fabricated by Combination of Bio-Template and Ultimate Top-down Etching  
Makoto Igarashi, Chi-Hsien Huang, Maju Tomura (Tohoku University, Japan), Masaki Takeguchi (National Institute for Materials Science, Japan), Susumu Horita (JAPAN Advanced Institute of Science and Technology, Japan), Yukiharu Uraoka, Takashi Fuyuki (Nara Institute of Science and Technology, Japan), Ichiro Yamashita (Nara Institute of Science and Technology & Panasonic Co., Ltd., Japan), Takashi Morie (Kyushu Institute of Technology, Japan) and Seiji Samukawa (Tohoku University, Japan)

9:30 Bifurcation Phenomenon for Forced Convection of Supercritical CO₂ Fluid in Plane Symmetric Sudden Expansion  
Bili Deng, X.R Zhang (Peking University, China)

9:31 Study on Multi-stage Oxidation of Hydrocarbon-Air Mixture in Micro Flowreactor with Controlled Temperature Profile  
Hiroshi Oshibe, Akira Yamamoto, Takuya Tezuka, Susumu Hasegawa, Hisashi Nakamura and Kaoru Maruta (Tohoku University, Japan)
9:32 Development of Artificial Cochlea Using Microfabrication Method Based on P(VDF-TrFE)
Harto Tanujaya, Hirofumi Shintaku, Toshiya Kanbe, Yohei Nakamoto, Satoyuki Kawano, Takayuki Nakagawa and Juichi Ito (Hokkaido University, Japan)

9:33 Resonant Gas Oscillation with Evaporation and Condensation at Vapor-Liquid Interface
Masashi Inaba (Hokkaido University, Japan), Takeru Yano (Osaka University, Japan), Masao Watanabe and Shigeo Fujikawa (Hokkaido University, Japan)

9:34 Boundary Lubrication by C60 Fullerene: Computational Chemistry and Experimental Investigations
Tasuku Onodera (Tohoku University, Japan), Vanessa Chauveau (Ecole Centrale de Lyon, France), Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba (Tohoku University, Japan), Thierry Le Mogne, C. Minfray, Fabrice Dassenoy (Ecole Centrale de Lyon, France) and Momoji Kubo (Tohoku University, Japan) and Jean Michel Martin (Ecole Centrale de Lyon, France), Akira Miyamoto (Tohoku University, Japan)

9:35 Investigation of Flow-induced Vibrations on Side-view Mirrors
Mehmet N. Tamac and James W. Gregory (The Ohio State University, USA)

9:36 Comparison of Diffusive Motion in Supercooled Liquid CuZr between Simulation and Mode Coupling Theory
Yuto Kimura, and Michio Tokuyama (Tohoku University, Japan)

11:06-11:46 Poster Presentation

Session 5
13:00-13:40 Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9:37 Prediction of UVI/VUV Irradiation Damage of Interlayer Dielectrics in Plasma Etching Using On-wafer Monitoring Technique
Butsurin Jinmai, Seiichi Fukuda, Hiroto Ohtake, and Seiji Samukawa (Tohoku University, Japan)

9:38 Investigation of Aerodynamic Performance due to Automotive Engine-cooling Exit Flow
Chen-Guang Lai, Yasuaki Kohama, Shigeru Obayashi, and Shinkyu Jeong (Tohoku University, Japan)

9:39 Novel Prediction Method for Emission Efficiency of Eu2+-doped Phosphors Based on Quantum Chemistry
Hiroaki Onuma, Itaru Yamashita, Kazumi Serizawa, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)
Takayoshi Nagai, Katsuhide Ohira, Koichi Takahashi (Tohoku University, 
Japan)

9:41  Application of an EMAT/EC Dual Probe for Material Characterization of 
Cast Irons 
Keitaro Ohtaki, Tetsuya Uchimoto, Toshiyuki Takagi (Tohoku University, 
Japan)

9:42  Structural and Magnetic Properties of Melt-span Ferromagnetic Shape 
Memory Ribbons 
E. Avilova (Moscow State Mining University, Russia), V. Kholaylo 
(Moscow State Mining University and State Technological University 
"Moscow Institute of Steel and Alloys", Russia), B. Hernando 
(Universidad de Oviedo, Spain), V. Koledov, D. Kuchin, V. Shavrov, V. 
Zolotarev (Kotelnikov Institute of Radioengineering and Electronics of 
RAS, Russia)

9:43  Evaluation of Friction Properties in Polished Polycrystalline Diamond 
Films on Steel Substrates 
Atsushi Tsutsui, Hiroyuki Miki, Takanori Takeno and Toshiyuki Takagi 
(Tohoku University, Japan)

9:44  Super-Low-k SiOCH Film (k=1.9) with High Water Resistance and High 
Thermal Stability Formed by Neutral-Beam-Enhanced-CVD 
Toru Sasaki, Shigeo Yasuhara (Tohoku University, Japan), Tsutomu 
Shimayama, Kunitoshi Tajima, Hisashi Yano, Shingo Kadomura, Masaki 
Yoshimaru, Noriaki Matsunaga (Semiconductor Technology Academic 
Research Center (STARC),Japan) and Seiji Samukawa (Tohoku 
University, Japan)

9:45  Evaluation of Susceptibility to Stress Corrosion Cracking in Austenitic 
Stainless Steels based on Non-linear Eddy Current Method 
Ryota Oikawa, Tetsuya Uchimoto, Toshiyuki Takagi and Ryoichi Urayama 
(Tohoku University, Japan), Yoshiyuki Nemoto and Shigeru Takaya 
(JAPAN Atomic Energy Agency, Japan), Sathoshi Keyakida (Sumitomo 
Metal Technology Inc., Japan)

9:46  Measurement and Simulation of Temperature and Flow in an Operation 
Date Centre 
F. Horikiri (Tohoku University, Japan), N. Srinarayana, J. Cornford, S. 
Wong, S. W. Armfield, M. Behnia (The University of Sydney, Australia), K. 
Sato, K. Yashiro and J. Mizusaki (Tohoku University, Japan)

13:40-14:20  Poster Presentation

Session 6 
15:00-15:40  Short Oral Presentation 
(4 min for Short Oral Presentation including PC preparation)
Semi-Autonomous Operation of Tracked Vehicles on Rough Terrain Using Autonomous Control of Active Flippers
Yoshito Okada, Keiji Nagatani and Kazuya Yoshida (Tohoku University, Japan)

A Study of Micro Flow Visualization in Imprinting Process
Yu-Min Hung, Chih-Yung Huang and Cheng-Kuo Sung (National Tsing Hua University, Taiwan)

Development of a One-side Actuating Micro-mixer
B. R Chen, K. T Lin, C. Y Tu, S. W Chen, N. H Chen, H. K Ma (National Taiwan University, Taiwan)

The Development of Upper Limbs Rehabilitation Robot System based on the Motor Performance
Keunyoung Park, Goro Obinaga (Nagoya University, Japan)

Numerical Study on Growth and Decay of Disturbance in a Flat-plate Boundary Layer
Shuta Noro, Masaya Shigeta, Seiichiro Izawa and Yu Fukunishi (Tohoku University, Japan)

Spatially Developing DNS of Turbulent Heat Transfer in Channel Flow with a Rib or Ribs
Takahiro Miura, Koji Matsubara and Atsushi Sakurai (Niigata University, Japan)

A Study of Turbulent Combustion Mechanism in a Packed Pebble Bed at High Pressure
Masaki Okuyama, Yasuhiro Ogami, Yasuhiro Ichikawa (Tohoku University, Japan), Manabu Kumagami (JGC Corporation, Japan), and Hideaki Kobayashi (Tohoku University, Japan)

Performance Enhancement of In-flight Particle Spheroidization Process with a Small Power DC-RF Hybrid Plasma Flow System
Ju Yong Jang, Junji Igawa, Tomoki Nakajima, Hidemasa Takana, O. Soloenko (Institute of Theoretical and Applied Mechanics, SB RAS, Russia), and Hideya Nishiyama (Tohoku University, Japan)

A Multi-scale Simulation on Metal-free Organic Dye-sensitized Solar Cells
Mari Onodera, Kei Ogiya, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)

A Computational Study on Carrier Dynamics in Conjugated Polymers
Itaru Yamashita, Kazumi Serizawa, Hiroaki Onuma, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)

Poster Presentation
Session 7
9:00-9:40

Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9:57

Experimental Study of Slush Nitrogen Flow in a Horizontal Bend Pipe.
Masaru Shinya (Tohoku University, Japan), Naoto Okazaki (Mitsubishi Motors Corporation, Japan) and Katsuhide Ohira (Tohoku University, Japan)

9:58

Advanced QCMD Study to Investigate the Interactions between Enzyme and Its Inhibitor
Kamlesh Kumar Sahu, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)

9:59

Estimation of Kinetic Parameters of Polymer Pyrolysis in High-Temperature Air Combustion Combining Experiment and Numerical Analysis
Makoto Mori, Kentaro Yoshinaga, Yasuhiro Ogami and Hideaki Kobayashi (Tohoku University, Japan)

9:60

Separation Control Using the Characteristic of the Three-dimensional Boundary Layer Transition
Yu Nishio, Yasuaki Kohama (Tohoku University, Japan), Takuma Kato (Chiba Institute of Technology, Japan) and Shuya Yoshioka (Ritsumeikan University, Japan)

9:61

Influence of the Surface Hydrogen Vacancy for the Dissociative Adsorption of H2 on Pd (111) Surface: A Quantum Chemical Molecular Dynamics Study
Farouq Ahmed, Md. Khorshed Alam, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

9:62

Ultra Accelerated Quantum Chemical Molecular Dynamics Study of Surface Reduction Process of CeO2(111) and CeO2(110) by H2
Md. Khorshed Alam, Farouq Ahmed, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo, Akira Miyamoto (Tohoku University, Japan)

9:63

Optical Fiber Sensor Capable of Measuring Pressure and Temperature from Luminescent Lifetime
Naoyuki Sugai, Daisuke Yorita, Daiju Numata, Hiroki Nagai, Keisuke Asai (Tohoku University, Japan)

9:64

Application of Nonlinear Sound Resonance to Evaporation Coefficient Measurement
Shigeto Nakamura (Hokkaido University, Japan), Takeru Yano (Osaka University, Japan), Masao Watanabe and Shigeo Fujikawa (Hokkaido University, Japan)
9:65  Development of Thin Film Strain Sensor Using Tungsten-containing Amorphous Carbon Coatings
Takeshi Ohno, Takanori Takeno, Hiroyuki Miki and Tosiyuki Takagi (Tohoku University, Japan)

9:66  A Simulation of Fragmentation Reaction of Fucosylated Oligosaccharides by Using Quantum Chemical Molecular Dynamics Method
Xiaolei Wang, Kazumi Serizawa, Ai Suzuki, Hideyuki Tsuboi, Nozomu Hatakeyama, Akira Endou, Hiromitsu Takaba, Momoji Kubo and Akira Miyamoto (Tohoku University, Japan)

9:40-10:20  Poster Presentation

Session 8
10:30-11:10  Short Oral Presentation
(4 min for Short Oral Presentation including PC preparation)

9:67  Evaluation of Supersonic Ejector Performance under Low Pressure
Masayuki Anyoji, Daiju Numata, Hiroki Nagai, Keisuke Asai (Tohoku University, Japan)

9:68  Mechanism for Generation of Molecular-Level Line-Edge Roughness of ArF Photoresist during Plasma Etching Processes
Koji Koyama, Butsurin Jinnai (Tohoku University, Japan), Shinichi Maeda, Keisuke Kato, Atsushi Yasuda, Hikaru Momose (Mitsubishi Rayon Co. Ltd., Japan), and Seiji Samukawa (Tohoku University, Japan)

9:69  High-Performance Three-terminal FinFETs by Combination of Damage-Free Neutral-Beam Etching and Neutral-Beam Oxidation Technologies
Keisuke Sano, Masahiro Yonemoto, Akira Wada (Tohoku University, Japan), Kazuhiko Endo, Takashi Matsukawa, Meishoku Masahara (National Institute of Advanced Industrial Science and Technology, Japan) and Seiji Samukawa (Tohoku University, Japan)

9:70  Investigation on Local Wall Thinning with Method of Pulsed Eddy Current Testing in Nuclear Power Plants
Shejuan Xie, Toshiyuki TAKAGI and Tetsuya Uchimoto (Tohoku University, Japan)

9:71  Ultraprecision Machining of Reaction-bonded Silicon Carbide
Zhiyu Zhang, Jiwang Yan, Hideya Nishiyama, and Tsunemoto Kuriyagawa (Tohoku University, Japan)

9:72  Analysis of Human Dexterity While Performing Tasks and Its Implementation on a Humanoid Robot
Shunsuke Komizunai, Atsushi Konno, Masaru Uchiyama (Tohoku University, Japan)
9:73  Experimental Study on a Catheter Movement for Evaluating Catheter Designs using an In-Vitro Tracking System  
Chang Ho YU, Hiroyuki Kosukegawa, Keisuke Mamada, Kanju Kuroki (Tohoku University, Japan), Kazuto Takashima (RIKEN, Japan), Kiyoshi Yoshinaka (The University of Tokyo, Japan), Makoto Ohta (Tohoku University, Japan),

9:74  Dynamic Analysis on Post-impact Behavior of Space Robots during Tumbling Target Capturing Operation  
Tomohisa Oki, Hiroki Nakanishi and Kazuya Yoshida (Tohoku University, Japan)

9:75  The Effect of Water from Tap, River and Sea on Friction and Wear properties of SiC  
Mitsuo Matsuda, Atsushi Hashimoto, Seiji Shimizu and Koji Kato (Nihon University, Japan)

9:76  Swelling Kinetics of Polyelectrolyte Gels  
Kristof Molnar, Zsofia Varga, Viktoria Torma and Miklós Zrínyi (Semmelweis University, Hungary)

11:10-11:50  Poster Presentation
The 10th Japan-Korea Students’ Symposium  
*Fast Ion Transport in Solids and Through Interfaces*  
*The Related Materials and Phenomena*  

**SEIUN**  
November 4, 2009

Chair: H. S. Kim (Seoul National University, Korea) and Y. Fukuda (Tohoku University, Japan)

10:1  
**13:00-13:20**  
The Effect of Variable-Valent Acceptor on Oxygen Nonstoichiometry of SrTiO₃  
N.-J. Heo and H.-I. Yoo (Seoul National University, Korea)

10:2  
**13:20-13:40**  
Semiconductor-Insulator Transition of Undoped BaTiO₃ in Quenched State  
H.-S. Kwon and H.-I. Yoo (Seoul National University, Korea)

10:3  
**13:40-14:00**  
Conductivities and Defect Equilibrium of Polycrystalline Donor-doped SrTiO₃ Oxide Ceramics  
E. Niwa, K. Sato, K. Yashiro and J. Mizusaki (Tohoku University, Japan)

10:4  
**14:00-14:20**  
Thermoelectric Power Factor of SrRu₁₋ₓTiₓO₃ Solid Solution  
H. Jang and H.-I. Yoo (Seoul National University, Korea)

Chair: W. S. Chang (Seoul National University, Korea) and Y. Goya (Tohoku University, Japan)

10:5  
**14:30-14:50**  
Defect and Crystal Structure of Perovskite Type Oxide La₀.₈Sr₀.₂Ga₀.₈Mg₀.₁₅Co₀.₀₅O₃₋δ  
S. Nakayama, S. Hashimoto, K. Sato, K. Yashiro, K. Amezawa and J. Mizusaki (Tohoku University, Japan)

10:6  
**14:50-15:10**  
Preparation and Microstructural Characterization of Apatite-type Solid Electrolytes Lanthanum Silicates  
Y. Kim, E.-C. Shin, H.-H. Seo, J.-S. Lee (Chonnam National University, Korea)

10:7  
**15:10-15:30**  
Phase Stability of Yttria-Stabilized Zirconia  
S. Yuyama (Tohoku University, Japan)

10:8  
**15:30-15:50**  
Preparation of Single Phase of the Perovskite Oxygen Ion Conductor La₀.₈Sr₀.₂Ga₀.₈Mg₀.₂ₓCo₀.₂₋ₓO₃₋δ and Phase Relationships under Intermediate Temperature of SOFCs  
Mohd. Ashrol Bin Haji Ini (Tohoku University, Japan)

Chair: D. R. Jung (Seoul National University, Korea) and Y. Iwai (Tohoku University, Japan)

10:9  
**16:00-16:20**  
Degradation Modes and Effective Reaction Zone of Ni-GDC Cermet Anode for SOFC  
H. Watanabe (Tohoku University, Japan)

10:10  
**16:20-16:40**  
Effects of Redox Cycles on the Mechanical Reliability of Anode Supported SOFCs  
Y. Chen, H. Lin, C. Ding (Tohoku University, Japan)
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:11</td>
<td>Fabrication of Nickel Pattern Electrode by PLD and Dependency of the</td>
<td>S. Osugi</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>Electrochemical Characteristics on the Length of TPB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:12</td>
<td>Electrode Reaction Mechanism of Mixed Conducting Oxide for Cathode of</td>
<td>I. Nakano</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>Solid Oxide Fuel Cells</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:00</td>
<td>Chair: N. J. Heo (Seoul National University, Korea) and K. Nagao</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Tohoku University, Japan)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:13</td>
<td>Wet Chemical Synthesis of Pd·Ag Alloy Powders for Dual Functional</td>
<td>C.-H. Kim, J.-S. Lim, J.-K. Kim, S.-J. Song</td>
<td>Chonnam National University, Korea</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Separation Membranes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:50</td>
<td>Interaction between Supercritical Carbon Dioxide and Rocks for</td>
<td>S. Nakagawa</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>Geological CO₂ Sequestration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:10</td>
<td>The Effect of Nitrogen on the Cycling Performance in Thin-film Si₁₋ₓNx</td>
<td>D. Ahn, S. Nam, Y. Oh, C. Kim, J.-G. Lee, and B. Park</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td></td>
<td>Anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:30</td>
<td>Development of Fractional Derivative–Based Mass Transport Model for</td>
<td>A. Suzuki</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>Evaluation of Complex Crustal Fluid Flow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SEIUN**

November 5, 2009

Chair: E. Niwa (Tohoku University, Japan) and H. S. Kwon (Seoul National University, Korea)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:17</td>
<td>A Multi-Scale Simulation on the Reaction on the Automotive Exhaust</td>
<td>S. Jung, A. Suzuki, H. Tsuboi, N. Hatakeyama, A. Endou, H. Takaba, M. Kubo, and A. Miyamoto</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>Catalyst</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:10</td>
<td>Oxygen Permeation Properties and Phase Stability of</td>
<td>T. Lee and H.-I. Yoo</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td></td>
<td>BaCo₀.₇Fe₀.₃₂Nb₀.₀₂O₉₋δ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:30</td>
<td>Hydration and Dehydration Kinetics of Proton Conducting BaZr₀.₈Y₀.₂O₅₋δ</td>
<td>J. I. Yeon and H.-I. Yoo</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:19</td>
<td>Electrochemical Properties and Thermodynamic Stability of</td>
<td>Y. Mori, K. Yashiro, K. Sato, and J. Mizusaki</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td></td>
<td>(La, Sr)CoO₃₋δ / La₂NiO₄₋δ Composite Cathodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:30</td>
<td>Non-equilibrium Type Potentiometric NO₂ Sensor based on Catalytic</td>
<td>M.-S. Lee, T. Lee, and H.-I. Yoo</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td></td>
<td>Activity of CuCrO₂ Electrode Coupled with YSZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Title</td>
<td>Speaker(s)</td>
<td>Institution(s)</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>10:23</td>
<td>Modification of Gold Catalysis with Aluminum Phosphate for Oxygen-Reduction Reaction</td>
<td>Y. Park, B. Lee, C. Kim, J. Kim, S. Nam, Y. Oh, and B. Park</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td>11:00-11:20</td>
<td>The Effect of Al₂O₃-Coating Coverage on the Electrochemical Properties in LiCoO₂ Thin Films</td>
<td>Y. Oh, D.Ahn, S. Nam, and B. Park</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td>11:20-11:40</td>
<td>Nanostructured Sn/TiO₂/C Composite as a High-Performance Anode for Li-Ion Batteries</td>
<td>W.-S. Chang, C.-M. Park, and H.-J. Sohn</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td>11:40-12:00</td>
<td>Stibnite (Sb₂S₃) and Its Amorphous Composite as Dual Electrodes for Rechargeable Lithium Batteries</td>
<td>Y. Hwa, C.-M. Park, N.-E. Sung, and H.-J. Sohn</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td>13:20-13:40</td>
<td>La-Sr-Co-O Layered Cathode for Intermediate Temperature SOFC</td>
<td>K. Nagao</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td>13:40-14:00</td>
<td>The Real-time Observation of La₁₋ₓSrₓMnO₃±δ Micro-structural Changes under Pseudo-operation with Environmental Scanning Electron Microscope (ESEM)</td>
<td>Y. Goya, K. Yashiro, K. Sato, and J. Mizusaki</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td>14:00-14:20</td>
<td>Study of La₁₋ₓSrₓCo₁₋ₓFeₓO₃±δ Cathode for IT-SOFC</td>
<td>M. Y. Oh</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td>14:20-14:40</td>
<td>Effect of Compressive Stress on Electrical Property of Conductive Ceramics</td>
<td>T. Izumi, R. Narumi, K. Sato, K. Yashiro, T. Hashida, and J. Mizusaki</td>
<td>Tohoku University, Japan</td>
</tr>
<tr>
<td>14:40-15:00</td>
<td>Highly Luminescent Surface-Passivated ZnS:Mn Nanoparticles by a Simple One-Step Synthesis</td>
<td>D.-R. Jung, D. Son, J. Kim, C. Kim, and B. Park</td>
<td>Seoul National University, Korea</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Speaker</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>10:33</td>
<td>Electronic Properties of La$<em>{0.5}$Sr$</em>{0.5}$CoO$_{3+\delta}$ Oxide Thin Film at 600 °C and 800 °C</td>
<td>Y. Nagara, D. Henmi, M. Sase, T. Nakamura, K. Sato, K. Yashiro, and J. Mizusaki (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:34</td>
<td>Microstructure Dependent Electrical Properties of Nano-structured GDC Thin-film via Pulsed Laser Deposition</td>
<td>K.-R. Lee, J.-H. Lee (KIST, Korea), and H.-I. Yoo (Seoul National University, Korea)</td>
<td></td>
</tr>
<tr>
<td>10:35</td>
<td>Effects of Oxygen Partial Pressure on the Mechanical Properties of SOFC Constituent Ceramics</td>
<td>Y. Takeyama (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:36</td>
<td>Evaluation of Mechanical Properties at YSZ/MnO$_x$ Interface by Nano-indentation Tests</td>
<td>H. Ito (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:37</td>
<td>Investigation of Elastic Modulus and Internal Friction of SOFC Electrolytes at High Temperature Using Resonance Method</td>
<td>T. Kushi (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:38</td>
<td>High Temperature Defect Equilibrium, Solid State Properties and Crystal Structure of La$<em>{0.5}$Sr$</em>{0.5}$Co$_{1-y}$Fe$<em>y$O$</em>{3+\delta}$ for Cathode of Solid Oxide Fuel Cells</td>
<td>Y. Fukuda, S. Hashimoto, K. Sato, K. Yashiro, and J. Mizusaki (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:39</td>
<td>High-temperature Transport Properties of La$<em>{0.4}$Sr$</em>{0.6}$Co$_{1-y}$Fe$<em>y$O$</em>{3+\delta}$</td>
<td>M.-B. Choi, S.-Y. Jeon, and S.-J. Song (Chonnam National University, Korea)</td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>In-situ Raman Scattering Spectroscopy of SOFC Components in Operating Conditions</td>
<td>M. Nagai, F. Iguchi, K. Sato, K. Yashiro, H. Yugami, and J. Mizusaki (Tohoku University, Japan)</td>
<td></td>
</tr>
<tr>
<td>10:41</td>
<td>Ionic Transport Properties of GdBaCo$<em>2$O$</em>{5+\delta}$</td>
<td>S.-Y. Jeon, M.-B. Choi (Chonnam National University, Korea), H.-J. Hwang (Inha University, Korea), and S.-J. Song (Chonnam National University, Korea)</td>
<td></td>
</tr>
<tr>
<td>10:42</td>
<td>Application of Spectral Selective Thermal Radiation for Cooling Electronic Device Packaged in Resin</td>
<td>M. Shimizu, and H. Yugami (Tohoku University, Japan)</td>
<td></td>
</tr>
</tbody>
</table>
Chair: H. Watanabe (Tohoku University, Japan) and M. S. Lee (Seoul National University, Korea)

10:43 Characterization of TiO\(_2\) Photoanodes in Non-immersion Type in a Miniature PEC Cell
E.-C. Shin, D. L. Cho, J.-H. Kim (Chonnam National University, Korea), E.-Y. Jun, T.-J. Chung, K.-S. Oh (Andong National University, Korea), M. Lerch (Technical University Berlin, Germany), and J.-S. Lee (Chonnam National University, Korea)

11:00-11:20

10:44 Using Computational Chemistry Method Predict the Platinum Redistribution in PEFC
D. Kim, B. Kim, A. Suzuki, H. Tsuboi, N. Hatakeyama, A. Endou, H. Takaba, M. Kubo, and A. Miyamoto (Tohoku University, Japan)

11:20-11:40

10:45 NMR Imaging of \( ^7\)Li and \(^1\)H in Lithium-Ion Battery
Y. Iwai, D. Ohno and J. Kawamura (Tohoku University, Japan)

Chair: T. Lee (Seoul National University, Korea) and Y. Mori (Tohoku University, Japan)

10:46 Suppression of Electronic Conductivity of CeO\(_2\)-based Electrolytes by Electron Traps
J. Chun and H.-I. Yoo (Seoul National University, Korea)

11:00-11:20

10:47 Control of Mixed Protonic and Electronic Conductivity by Mixing Rare-Earth Ortho-Borates
H. Takahashi (Tohoku University, Japan)

11:20-11:40

10:48 Crystal Structure, Oxygen Nonstoichiometry, and Electronic Structure of La\(_{2-x}\)Sr\(_x\)NiO\(_{4+\delta}\)
T. Nakamura, K. Yashiro, K. Sato, and J. Mizusaki (Tohoku University, Japan)

11:40-12:00

10:49 Degeneracy Effect in Thermoelectric Power of Undoped La\(_2\)NiO\(_{4+\delta}\)
H.-S. Kim, and H.-I. Yoo (Seoul National University, Korea)

12:00-13:00

14:20-14:25 Closing Remark
Hyung-Soon Kwon (Seoul National University, Korea)
**Current Topics in Flow Dynamics**

**FUYOH**  
November 4, 2009

Chair: Shigeru Maruyama (Tohoku University, Japan)

11:1  
13:00-13:20  
**Parallel Computation of CFD by using Graphic Hardware (Invited)**  
Wu-Shung Fu, Chung-Gang Li (National Chiao Tung University, Taiwan)

11:2  
13:20-13:40  
**Effect of Inclination on the Two-phase Flow in a Distributor (Invited)**  
Koutaro Tsubaki, Akio Miyara and Tomoaki Shigetomi (Saga University, Japan)

11:3  
13:40-14:00  
**Heat Transfer Characteristics Inside the SAM Layer and at the SAM Interface**  
Gota Kikugawa, Taku Ohara (Tohoku University, Japan), Toru Kawaguchi, Ikuya Kinefuchi, Yoichiro Matsumoto (The University of Tokyo, Japan)

Chair: Tetsuya Uchimoto (Tohoku University, Japan)

11:4  
14:00-14:20  
**Investigation of the Rear Flap Configuration of a Pickup Truck using Design of Experiments**  
Jongsoo Ha, Shinkyu Jeong, and Shigeru Obayashi (Tohoku University, Japan)

11:5  
14:20-14:40  
**Lamb Wave Generation and Sensing with Metal-core Piezoelectric Fibers for Structural Health Monitoring (Invited)**  
Jian Liu, Jinhao Qiu, Weijie Chang, Hongli Ji, Kongjun Zhu (Nanjing University of Aeronautics and Astronautics, China)

11:6  
14:40-15:00  
**Evaluation of Plastic Deformation in Steels by Magnetic Hysteresis Measurements (Invited)**  
Gabor Vértesy (Research Institute for Technical Physics and Materials Science, Hungary), S. Ueda (Japan Society of Maintenology, Japan), T. Uchimoto, T. Takagi (Tohoku University, Japan), I. Tomáš (Institute of Physics, Czech Republic)

**AKEBONO (WEST)**  
November 5, 2009

Chair: Michiko Furudate (Tohoku University, Japan)

11:7  
15:00-15:20  
**Use of Active Learning in Experimental Fluid Dynamics (Invited)**  
Andrew J. Meade and Ankur Srivastava (Rice University, USA)

11:8  
15:20-15:40  
**Accelerometer Balances for Force Measurement in Ultra-Short Duration Test Facilities**  
Viren Menezes and Abhinav Kumar (Indian Institute of Technology Bombay, India)
11:9-11:10 Flow Past Immersed Bodies Solved By Least Squares Fictitious Domain Method With High-Order Approximation (Invited) Lucia Parussini, V. Pediroda and Carlo Poloni (University of Trieste, Italy)

Chair: Keisuke Asai (Tohoku University, Japan)

11:10-11:11 Luminescent Molecular Sensors for Assessment of Temperature and Lubrication in Machining Processes (Invited) Chih-Yung Huang (National Tsing Hua University, Taiwan), Srinivasan Chandrasekar and John P. Sullivan (Purdue University, USA)

11:11-11:12 Bubble Flow Dynamics and Kinematic Characteristics of Bubble Flow Motion in a Paramagnetic Liquid Under Microgravity Conditions Thilanka Munasinghe (West Virginia University, USA)

11:12-11:18 Recent Developments in Unsteady Pressure-Sensitive Paint Methods (Invited) James W. Gregory, Di Peng, Pradeep Kumar, and Shuo Fang (The Ohio State University, USA)
GCOE, IFS-Tsinghua University Joint Workshop 2009

AKEBONO (WEST)
November 5, 2009

Chair: Shigenao Maruyama (Tohoku University, Japan)

12-1 8:00-8:24  Investigation of Interfacial Thermal Resistance of Bi-layer Nanofilms (Invited)
Shenghong Ju, Xingang Liang, Shuaichuang Wang (Tsinghua University, China)

12-2 8:24-8:48  Primary Experimental study on Patients’ Safety with Deep Brain Stimulation in RF electromagnetic field (Invited)
Xu Jun, Li Luming and Hao Hongwei (Tsinghua University, China)

12-3 8:48-9:12  Experimental Studies on Removal Efficiencies of Carbon Dioxide by Fine Spray of Aqueous Ammonia and MEA Solution (Invited)
Guo Yincheng, Niu Zhenqi and Lin Wenyi (Tsinghua University, China)

12-4 9:12-9:36  Microchannel Heatsink Geometry Optimization By Genetic Algorithm (Invited)
Xu Xianghua, Liu Mingyan and Liang Xingang (Tsinghua University, China)

12-5 9:36-10:00  Could We Obtain Fractional Lorenz Equations in Fluid Dynamics? (Invited)
Fan Yang and Ke-Qin Zhu (Tsinghua University, China)

12-6 10:00-10:24  Investigation on the Shock-vortices Interaction in a Two-dimensional Spatially Developing Supersonic Mixing Layer (Invited)
Zhang Huiqiang, Xue Shuyan, Wang Bing and Wang Xilin (Tsinghua University, China)

10:24-10:30  BREAK

Chair: Xin-Gang Liang (Tsinghua Univesrity, China)

12-7 10:30-10:43  Nonlinear Dynamics of Disturbed Vortices
Yuji Hattori (Tohoku University, Japan) and Yasuhide Fukumoto (Kyushu University, Japan)

12-8 10:43-10:56  Entransy and Its Application in Heat Exchanger Analysis
Weiming Song, Xiongbin Liu, Zhixin Li (Tsinghua University, China)

12-9 10:56-11:09  Microgravity Experiment and Numerical Simulation on Droplet Combustion in Varying Forced Convection at Elevated Pressure
Yasuhiro Ogami, Mehdi Jangi and Hideaki Kobayashi (Tohoku University, Japan)
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:09-11:22</td>
<td><strong>Study on Combustion Chemistry Using Micro Flowreactor with</strong></td>
<td>Hisashi Nakamura, Hiroshi Oshibe and Kaoru Maruta (Tohoku University, Japan)</td>
</tr>
<tr>
<td>11:22-11:35</td>
<td><strong>Dynamics of Thermomass Fluid</strong></td>
<td>Quan-Wen Hou, Zeng-Yuan Guo (Tsinghua University, China)</td>
</tr>
<tr>
<td>11:35-11:48</td>
<td><strong>Thermal Energy Transfer in Liquids with Ordered/Random Structures</strong></td>
<td>Taku Ohara and Gota Kikugawa (Tohoku University, Japan)</td>
</tr>
<tr>
<td>11:48-12:01</td>
<td><strong>Molecular Simulation of Nanoscale Flow in Polymer Electrolyte Fuel Cell</strong></td>
<td>Takashi Tokumasu (Tohoku University, Japan)</td>
</tr>
<tr>
<td>12:00-13:00</td>
<td>LUNCH</td>
<td></td>
</tr>
<tr>
<td>13:00-13:24</td>
<td><strong>Micro-scale Effects on Dry-gas Seal Performance (Invited)</strong></td>
<td>Bing Wang, Hui-Qiang Zhang and Hong-Jun Cao (Tsinghua University, China)</td>
</tr>
<tr>
<td>13:24-13:37</td>
<td><strong>A Molecular Gas-Film Lubrication Expressed in Micro Gas Flow</strong></td>
<td>Shigeru Yonemura, Susumu Isono, Masashi Yamaguchi, Takanori Takeno, Hiroyuki Miki and Toshiyuki Takagi (Tohoku University, Japan)</td>
</tr>
<tr>
<td>13:37-13:50</td>
<td><strong>Study of the Flow on a Supercritical Wing with Control Devices(VG)</strong></td>
<td>Jing-Bo Huang, ZX Xiao and, Song Fu (Tsinghua University, China)</td>
</tr>
<tr>
<td>13:50-14:03</td>
<td><strong>Numerical Analysis of Turbulent Cavitation Around a Hydrofoil</strong></td>
<td>Genki Yamamoto, Yuka Iga (Tohoku University, Japan) and Motohiko Nohmi (EBARA Corporation, Japan), Toshiaki Ikohagi (Tohoku University, Japan)</td>
</tr>
<tr>
<td>14:03-14:08</td>
<td>BREAK</td>
<td></td>
</tr>
<tr>
<td>14:08-14:21</td>
<td><strong>Visualization of Absorption Process of Carbon Dioxide into Alkanolamine Solutions at Gas-liquid Surface</strong></td>
<td>Atsuki Komiya, Kaoru Maruta, Yoshikatsu Nakano and Hisashi Nakamura (Tohoku University, Japan)</td>
</tr>
<tr>
<td>14:21-14:34</td>
<td><strong>The Linear Stability Analysis of Core-annular Flow of Two Power Law Fluids</strong></td>
<td>Xue-Wei Sun, Jie Peng and Ke-Qin Zhu (Tsinghua University, China)</td>
</tr>
<tr>
<td>14:34-14:47</td>
<td><strong>The Sensing-based High-fidelity Risk Mitigation Control of Hydrogen Dispersion</strong></td>
<td>Kazuo Matsuura, Masami Nakano and Jun Ishimoto (Tohoku University, Japan)</td>
</tr>
</tbody>
</table>
Integrated Computation of Primary Atomization with Micro-Cavitation in Injector Nozzle
Jun Ishimoto (Tohoku University, Japan), Fuminori Sato and Gaku Sato (KEIHIN Co., Japan)
Liaison Office Session

**SENDAI (EAST)**
November 5, 2008

17:00-17:20  State and Plan of International Education in Tohoku University
Goro Masuya (Tohoku University, Japan) Chair: Toshiyuki Takagi

17:20-19:00  Part 1: Panel Discussion on Education System to Joint Education and
International Summer School, Chair: Toshiyuki Takagi
  Masud Behnia (The University of Sydney)
  Alexander Vasiliev (Moscow State University)
  Hyung jin Sung (KAIST)
  Hiroshi Higuchi (Syracuse University)
  Joël Courbon (INSA-Lyon)
  Fredrik Lundell (KTH Royal Institute of Technology)
  Shigenao Maruyama (Tohoku University)

Part 2: Questions and Discussion
Alumni Session

AKEBONO (WEST)
November 6, 2009

Chair: Shigenao Maruyama (Tohoku University, Japan)

9:00~9:05 Opening Address
Shigenao Maruyama (Tohoku University, Japan)

9:05~10:45 Session 1-1 Introduction of Institution and Research (14-1~14-15)

14-1 Goro Obinata
9:05~9:11 (Nagoya University, Japan) (Invited)

14-2 Wu-Shung Fu
9:11~9:17 (National Chiao Tung University, Taiwan) (Invited)

14-3 Shigeo Fujikawa
9:17~9:23 (Hokkaido University, Japan) (Invited)

14-4 Hideyuki Tanno
9:23~9:29 (Japan Aerospace Exploration Agency, Japan) (Invited)

14-5 Yasuhiro Egami
9:29~9:35 (Nagoya University, Japan) (Invited)

14-6 Vladimir Khovaylo
9:35~9:41 (Moscow Institute of Steels and Alloys, Russia) (Invited)

14-7 Satoyuki Kawano
9:41~9:47 (Osaka University, Japan) (Invited)

14-8 Xing-Rong Zhang
9:47~9:53 (Peking University, China) (Invited)

9:53~10:03 BREAK

14-9 Seigo Sakai
10:03~10:09 (Yokohama National University, Japan) (Invited)

14-10 Tsutomu Saito
10:09~10:15 (Muroran Institute of Technology, Japan) (Invited)

14-11 Yun Luo
10:15~10:21 (Shanghai Jiao Tong University, China) (Invited)

14-12 James W. Gregory
10:21~10:27 (Ohio State University, USA) (Invited)

14-13 Deivandren Sivakumar
10:27~10:33 (Indian Institute of Science, India) (Invited)

14-14 Nam Il Kim
10:33~10:39 (Chung-Ang University, Korea) (Invited)
14:15  Chih-Yung Huang  
10:39~10:45 (National Tsing Hua University, Taiwan) *(Invited)*

10:45~12:00  *Session1-2 Poster presentation (14-1~14-15)*

12:00~13:00  LUNCH

13:00~13:54  *Session2-1 Introduction of Institution and Research(14-16~14-24)*

14:16  Mikhail Ivanov  
13:00~13:06 (Siberian Branch of the Russian Academy of Sciences, Russia) *(Invited)*

14:17  Sudarshan Kumar  
13:06~13:12 (Indian Institute of Technology Bombay, India) *(Invited)*

14:18  Hamid Hosseini  
13:12~13:18 (Kumamoto University, Japan) *(Invited)*

14:19  Atsushi Sakurai  
13:18~13:24 (Niigata University, Japan) *(Invited)*

14:20  Yoshio Wakamatsu  
13:24~13:30 (Japan Aerospace Exploration Agency, Japan) *(Invited)*

14:21  Jinhao Qiu  
13:30~13:36 (Nanjing University of Aeronautics and Astronautics, China) *(Invited)*

14:22  Kosuke Ito  
13:36~13:40 (Nihon University, Japan) *(Invited)*

14:23  Takeshi Yokomori  
13:42~13:48 (Keio University, Japan) *(Invited)*

14:24  Koutaro Tsubaki  
13:48~13:54 (Saga University, Japan) *(Invited)*

13:54~15:00  *Session2-2 Poster presentation(14-16~14-24)*

15:00~16:00  *Alumni Reunion Session*