

# Contents

## PS1: IFS Collaborative Research Forum (AFI/TFI-2011)

### SENDAI (WEST)

November 10, 2011

Chair: Yasuhiro Ogami (Tohoku University, Japan)

9:00-10:24

#### **Short Oral Presentation**

(3 min for Short Oral Presentation)

- CRF-1      **Pressure Drop and Heat Transfer for Boiling Two-phase Flow of Liquid Nitrogen in a Horizontal Pipe**  
Tadashi Nakayama, Takayoshi Nagai, Katsuhide Ohira, Koichi Takahashi (Tohoku University, Japan), Hiroaki Kobayashi, Hideyuki Taguchi, Ttakayuki Kojima and Motoyuki Hongo (Japan Aerospace Exploration Agency, Japan)
- CRF-2      **Measurement Coupled Computation of Cooling and Wafer Cleaning Performance Using Micro-Solid Nitrogen**  
U Oh, Jun Ishimoto (Tohoku University, Japan) and Kozo Saito (University of Kentucky, USA)
- CRF-3      **Quantitative Visualization by using Background-Oriented Schlieren**  
Toshiharu Mizukaki (Tokai University, Japan), Ardian Gojani and Shigeru Obayashi (Tohoku University, Japan)
- CRF-4      **Direct Numerical Simulation on the Effects of Free-stream Turbulence on a Turbulent Boundary Layer with Heat Transfer**  
Yasuhiko Sakai, Kouji Nagata, Hiroki Suzuki (Nagoya University, Japan) and Toshiyuki Hayase (Tohoku University, Japan)
- CRF-5      **Aerodynamic Characteristics of a Badminton Shuttlecock at High Reynolds Numbers**  
Seigo Kitta, Hiroaki Hasegawa (Akita University, Japan), Masahide Murakami (University of Tsukuba, Japan) and Shigeru Obayashi (Tohoku University, Japan)
- CRF-6      **Numerical Simulation of the Aerodynamic Characteristics on a Detailed Motorcycle**  
Chenguang Lai (Chongqing University of Technology, China), Shigeru Obayashi (Tohoku University, Japan), Yuting Zhou and Haibin Xing (Chongqing University of Technology, China)
- CRF-7      **Analysis and Optimization for Multi-Hull Ship**  
Hyunyul Kim (George Mason University, USA) and Shinkyu Jeong (Tohoku University, Japan / George Mason University, USA)
- CRF-8      **Development of Efficient Hole Searching Algorithm of Overset Grid System for Helicopter Rotor Analysis and Design Framework**  
Seonhyeong Lee, Sanghyun Chae (Pusan National University, Korea), Shinkyu Jeong (Tohoku University, Japan) and Kwanjung Yee (Pusan National University, Korea)

- CRF-9            **Improvement of Reality of CG Motion Pictures by Hydrodynamic Effects**  
Takashi Ishihara (Nagoya University, Japan), Yuji Hattori (Tohoku University, Japan)
- CRF-10          **Investigation of Hypersonic Flows about Leading Edges of Small Bluntness**  
Mikhail Ivanov (Khristianovich Institute of Theoretical and Applied Mechanics, Russia), Shigeru Yonemura (Tohoku University, Japan), Yevgeniy Bondar, Dmitry Khotyanovsky, Alexey Kudryavtsev (Khristianovich Institute of Theoretical and Applied Mechanics, Russia)
- CRF-11          **Experimental Studies of Sonic Boom Using a Two-stage Light Gas Gun**  
Kazuaki Hatanaka, Tsutomu Saito (Muroran Institute of Technology, Japan), Kiyonobu Ohtani, Toshihiro Ogawa, Shigeru Obayashi (Tohoku University, Japan) and Masahide Katayama (Itochu Techno-Solutions Corporation, Japan)
- CRF-12          **Effect of Electron Behavior in front of Shock Wave on Thermo-Chemical Process behind the Shock Wave**  
Gouji Yamada, Shota Ago, Shingo Otsuta, Takashi Matsuno, Hiromitsu Kawazoe (Tottori University, Japan) and Shigeru Obayashi (Tohoku University, Japan)
- CRF-13          **Development of Force Balance for Its Application to a Silent Supersonic Biplane Model in the Low Speed Wind Tunnel**  
Hiromitsu Kawazoe, Hiroshi Suemura, Gouji Yamada, Takashi Matsuno (Tottori University, Japan) and Shigeru Obayashi (Tohoku University, Japan)
- CRF-14          **Shock Induced Temperature Measurement using Laser-Induced Thermal Acoustics**  
Toshiharu Mizukaki (Tokai University, Japan) , Shigeru Obayashi (Tohoku University, Japan)
- CRF-15          **Streamer Propagation Mechanism in Water**  
Hidemasa Fujita (Tohoku University, Japan), Seiji Kanazawa (Oita University, Japan) and Takehiko Sato (Tohoku University, Japan)
- CRF-16          **Advancement of Numerical Method for Cavitating Flow around a Hydrofoil**  
Yuka Iga, Naoya Ochiai (Tohoku University, Japan), Wang Guoyu, Zhang Mindi and Huang Biao (Beijing Institute of Technology, China)
- CRF-17          **Effect of Neighboring Solid Wall on Generation of Residual Microbubbles after Collapse of Laser-Induced Bubble**  
Takehiko Sato (Tohoku University, Japan), Marc Tinguely (Swiss Federal Institute of Technology Lausanne, Switzerland), Masanobu Oizumi (Tohoku University, Japan) and Mohamed Farhat (Swiss Federal Institute of Technology Lausanne, Switzerland)
- CRF-18          **Observation of Bubble Formation and Collapse Process by Generating a Plasma**  
Takehiko Sato (Tohoku University, Japan), Takashi Miyahara (Shizuoka University, Japan) and Tatsuyuki Nakatani (Toyo Advanced Technologies Company, Ltd., Japan)

- CRF-19      **Analysis of Plasma Flow at Gas-Liquid Interface for Biological Interaction**  
Naoya Kishimoto (Tohoku University, Japan), Tetsuji Shimizu, Gregor E.Morfill (Max-Planck Institute for Extraterrestrial Physics, Germany) and Takehiko Sato (Tohoku University, Japan)
- CRF-20      **Anti-bacterial Effect of a Dielectric Barrier Discharge Plasma against Biofilm-producing Gram Negative Bacilli**  
Yoshihisa Nakano, Shigeru Fujimura and Takehiko Sato (Tohoku University, Japan)
- CRF-21      **Computational Study on Atmospheric RF Discharge with Kinetic-Fluid Integrated Model**  
Zhi-Bin Wang, Pei-Si Le, He-Ping Li, Cheng-Yu Bao (Tsinghua University, China), Hidemasa Takana and Hideya Nishiyama (Tohoku University, Japan)
- CRF-22      **Radical Generation During Streamer Propagation in Methane/Air DBD Under High Pressure and High Temperature Conditions**  
Hidemasa Takana (Tohoku University, Japan), Yasunori Tanaka (Kanazawa University, Japan) and Hideya Nishiyama (Tohoku University, Japan)
- CRF-23      **Investigation of Supersonic Hybrid-Stabilized Argon-Water Arc for Biomass Gasification: The Role of Radiation Transfer Method Used in Computer Simulation**  
Jiri Jeništa (Institute of Plasma Physics, Czech Republic), Hidemasa Takana, Hideya Nishiyama (Tohoku University, Japan) and Milan Hrabovský (Institute of Plasma Physics, Czech Republic)
- CRF-24      **Instability of High-Temperature Premixed Flames**  
Satoshi Kadowaki, Takuya Oshima (Nagaoka University of Technology, Japan) and Hideaki Kobayashi (Tohoku University, Japan)
- CRF-25      **Real Time Modeling of Flame Front Evolution by Kinematical Model**  
Boris Mazurok, Alex Menschikov, Boris Dolgovesov (Institute of Automation and Electrometry SB RAS, Russia), Roman Fursenko, Sergey Minaev (ITAM SB RAS, Russia) and Kaoru Maruta (Tohoku University, Japan)
- CRF-26      **GPU-based Parallel Computations of Low Lewis Number Stretched Premixed Flames**  
Roman Fursenko, Sergey Minaev (Khristianovich Institute of Theoretical and Applied Mechanics, SB RAS, Russia), Kaoru Maruta and Hisashi Nakamura (Tohoku University, Japan)
- CRF-27      **Numerical Studies of the Reacting Rarefied Flows in Tubes**  
Yevgeniy Bondar, Georgy Shoev (Khristianovich Institute of Theoretical and Applied Mechanics, Russia), Kaoru Maruta (Tohoku University, Japan) and Mikhail Ivanov (Khristianovich Institute of Theoretical and Applied Mechanics, Russia)

Chair: Kaoru Maruta (Tohoku University, Japan)

10:40-11:30

**Progress in Transdisciplinary Collaborative Research Project**

Presenter: Jun Ishimoto, Kaoru Maruta, Takehiko Sato (Institute of Fluid Science, Tohoku University, Japan)

12:00-13:00      **Lunch and Poster Session**

Chair: Hidemasa Takana (Tohoku University, Japan)

13:00-14:00      **Short Oral Presentation**  
(3 min for Short Oral Presentation)

CRF-28            **Rheological Analysis of the Mechanism of Fetal Brain Hemorrhage**  
Takuya Ito, Kenichi Funamoto, Kiyoe Funamoto, Kaori Tanabe, Ai Nakamura,  
Toshiyuki Hayase and Yoshitaka Kimura (Tohoku University, Japan)

CRF-29            **Left Atrial Vortex**  
Muneichi Shibata (Miyagi Cardiovascular and Respiratory Center /Tohoku  
University, Japan), Tomoyuki Yambe, Kenichi Funamoto and Toshiyuki Hayase  
(Tohoku University, Japan)

CRF-30            **Computational Simulation of Blood Flow in Intracranial Aneurysms under  
Patient-Specific Pulsatile Inlet Condition**  
Shin-ichiro Sugiyama (Kohnan Hospital, Japan), Kenichi Funamoto, Toshiyuki  
Hayase (Tohoku University, Japan) and Teiji Tominaga (Tohoku University  
school of Medicine, Japan)

CRF-31            **Local Blood Flow Instability and Oscillatory Shear in Intracranial Aneurysms**  
Shin-ichiro Sugiyama (Kohnan Hospital, Japan), Toshio Nakayama, Makoto  
Ohta (Tohoku University, Japan) and Teiji Tominaga (Tohoku University School  
of Medicine, Japan)

CRF-32            **Detection of Microcalcification in Soft Tissue Employing B-Flow "Twinkling"  
Sign**  
Lei Liu (GE Healthcare Japan Corporation, Japan), Kei Ozawa, Kenichi  
Funamoto, Makoto Ohta, Toshiyuki Hayase (Tohoku University, Japan) and  
Masafumi Ogasawara (GE Healthcare Japan Corporation, Japan)

CRF-33            **Preliminary Experiments for Investigation on Mechanism of Contra-Coup  
Injury in Blast-Induced Traumatic Brain Injury**  
Atsuhiko Nakagawa, Kinonobu Ohtani (Tohoku University, Japan), Keisuke  
Goda (University of California, USA), Tatsuhiko Arafune (The University of  
Tokyo, Japan), Toshikatsu Washio (National Institute of Advanced Industrial  
Science and Technology, Japan), Toshiyuki Hayase and Teiji Tominaga (Tohoku  
University, Japan)

CRF-34            **Effect of Initial Conditions of Stent Geometry on Optimized Design of Flow  
Diverters**  
Hitomi Anzai (Tohoku University, Japan), Jean-Luc Falzone, Bastien Chopard  
(University of Geneva, Switzerland) and Makoto Ohta (Tohoku University,  
Japan)

CRF-35            **Friction Analysis of Biometal on PVA Biomodel**  
Hiroyuki Kosukegawa (Tohoku University, Japan), Vincent Fridrici, Philippe  
Kapsa, Boyko Stoimenov (Ecole Centrale de Lyon, France), Koshi Adachi and  
Makoto Ohta (Tohoku University, Japan)

- CRF-36      **Study of Magnetic Stimulation for the Peripheral Nerve**  
Hitoshi Mori (IFG CO., Ltd., Japan), Toshiyuki Takagi, Shinichi Izumi, Hiroyasu Kanetaka, Eizaburo Suzuki (Tohoku University, Japan) and Toshihiko Abe (IFG CO., Ltd., Japan)
- CRF-37      **Springtail Jump on Water Surface**  
Toshiya Kainuma, Seiichi Sudo (Akita Prefectural University, Japan), Atsushi Shirai and Toshiyuki Hayase (Tohoku University, Japan)
- CRF-38      **Si Single-Electron Transistor with Single-Hole Trap Formed by Photo-Irradiation**  
Michito Shinohara, Yuki Kato, Masashi Arita (Hokkaido University, Japan), Akira Fujiwara (NTT Corporation, Japan) and Yasuo Takahashi (Hokkaido University, Japan)
- CRF-39      **Optical Properties of Quantum Dot Superlattices**  
Takashi Kita, Osamu Kojima and Yuikihiro Harada (Kobe University, Japan)
- CRF-40      **Neutral Beam Fabrication Technology for the Double Gate MOSFET**  
Kazuhiko Endo (Advanced Industrial Science and Technology, Japan), Akira Wada and Seiji Samukawa (Tohoku University, Japan)
- CRF-41      **Low Damage Fabrication of Si Photonic Devices by Neutral Beam Technology**  
Jingnan Cai (The University of Tokyo, Japan), Seiji Samukawa (Tohoku University, Japan) and Kazumi Wada (The University of Tokyo, Japan)
- CRF-42      **Consolidation of Ti-6Al-4V Powder by a Compression Rotation Shearing Method at Room Temperature**  
Sou Kato, Noboru Nakayama (Shinshu University, Japan), Hiroyuki Miki (Tohoku University, Japan) and Hiroyuki Takeishi (Chiba Institute of Technology, Japan)
- CRF-43      **Development of Structure-controllable Multi-disk Single-electron Transistors by Ultimate Etching Technique with Bio-templating**  
Ichiro Yamashita (Nara Institute of Science and Technology, Japan), Seiji Samukawa (Tohoku University, Japan)
- CRF-44      **Development of High Performance Strained-Ge Channel Device Utilizing Neutral-beam Oxidized Film**  
Toru Kurebayashi, Yusuke Hoshi, Kentarou Sawano, Yasuhiro Shiraki (Tokyo City University, Japan), Akira Wada and Seiji Samukawa (Tohoku University, Japan)
- CRF-45      **Fundamental Study on Spiking Neuron Devices**  
Takashi Morie, Haichao Liang, Yilai Sun (Kyushu Institute of Technology, Japan), Makoto Igarashi and Seiji Samukawa (Tohoku University, Japan)
- CRF-46      **Numerical Simulation of Electronic States of Regularly Arrayed Si Quantum Dot System**  
Nurrul Syafawati Binti Humam, Nobuhiro Tsumori, Motoki Takahashi, Toshiharu Saiki (Keio University, Japan) and Seiji Samukawa (Tohoku University, Japan)

- CRF-47            **Development and Flow Evaluation of Electro-Rheological Nano-Suspensions**  
Katsufumi Tanaka, Takanobu Hira, Ryuichi Fukui, Haruki Kobayashi, Ryuichi Akiyama (Kyoto Institute of Technology, Japan), Masami Nakano and Shouta Enami (Tohoku University, Japan)
- 14:00-14:15        BREAK
- Chair: Hiroyuki Miki (Tohoku University, Japan)
- 14:15-15:21        **Short Oral Presentation**  
 (3 min for Short Oral Presentation)
- CRF-48            **Study of Contact Alignment for the Slider Specimen of Tribometer**  
Minoru Goto (Ube National College of Technology, Japan), Kosuke Ito (Nihon University, Japan), Hiroyuki Miki and Takanori Takeno (Tohoku University, Japan)
- CRF-49            **Tribological Behavior and Electrical Contact Resistance of Metal-containing DLC Coating for Electrically-Conductive Tribo-elements**  
Julien Fontaine, Michel Belin, Sandrine Bec, Thierry Le Mogne (Ecole Centrale de Lyon, France), Toshiyuki Takagi, Takanori Takeno, Koshi Adachi and Hiroyuki Miki (Tohoku University, Japan)
- CRF-50            **Optimization of Ink Viscosity of a Continuous Inkjet by Experiment and Numerical Simulation**  
 Masami Nakano (Tohoku University, Japan), Tameo Nakanishi and Hinoki Tsunokake (Yamagata University, Japan)
- CRF-51            **Impact of Liquid Drops on Heated Grooved Surfaces**  
Sivakumar Deivandren (Indian Institute of Science, India), Kazunari Katagiri, Tomoki Nakajima, Hidemasa Takana and Hideya Nishiyama (Tohoku University, Japan)
- CRF-52            **Transport Phenomena at Nano-Structured Interfaces**  
 Masahiko Shibahara (Osaka University, Japan), Taku Ohara and Gota Kikugawa (Tohoku University, Japan)
- CRF-53            **A Classical Molecular Dynamics Study on Thermodynamic Properties of Cryogenic Hydrogen/Oxygen System**  
Shin-ichi Tsuda (Shinshu University, Japan), Masato Tomi, Nobuyuki Tsuboi (Kyushu Institute of Technology, Japan), Hiroki Nagashima, Takashi Tokumasu (Tohoku University, Japan) and Mitsuo Koshi (The University of Tokyo, Japan)
- CRF-54            **A Molecular Dynamics Study of Momentum Transport in a Nanoscale Liquid Bridge**  
Takashi Tokumasu (Tohoku University, Japan), Marie-Hélène Meurisse, Nicolas Fillot and Philippe Vergne (INSA-Lyon, France)
- CRF-55            **Proton Transport in Hydrogen Bond Network of Confined Water**  
Nobuya Miyoshi, Ikuya Kinefuchi (The University of Tokyo, Japan), Takashi Tokumasu (Tohoku University, Japan), Shu Takagi and Yoichiro Matsumoto (The University of Tokyo, Japan)

- CRF-56      **Oscillation Characteristics of Levitated Magnet-Magnetic Fluid System**  
Michihiro Shinozaki, Seiichi Sudo (Akita Prefectural University, Japan),  
Hidemasa Takana and Hideya Nishiyama (Tohoku University, Japan)
- CRF-57      **New Exact Solutions for Vortex Rings with Swirl and Magnetic Field**  
Yuji Hattori (Tohoku University, Japan), Stefan G. Llewellyn Smith (UCSD,  
USA)
- CRF-58      **A Numerical Study of the Effect of Large Deformations of a Trailing Vortex on  
Its Breakdown**  
Naoya Takahashi (Tokyo Denki University, Japan), Takeshi Miyazaki (The  
University of Electro-Communications, Japan), Nozomu Hatakeyama, Yuji  
Hattori (Tohoku University, Japan)
- CRF-59      **The Instability of a Helical Vortex Tube with Axial Flow**  
Yasuhide Fukumoto (Kyushu University, Japan), Yuji Hattori (Tohoku  
University, Japan)
- CRF-60      **Numerical and Experimental Research on Active Control of the Hole-Tone  
Feedback Problem**  
Mikael A. Langthjem (Yamagata University, Japan), Masami Nakano (Tohoku  
University, Japan)
- CRF-61      **Entropy Flow in Magnetically Ordered Heusler Alloys under Influence of  
Temperature or Magnetic Field**  
Vladimir Khovaylo, Ekaterina Avilova (National University of Science and  
Technology, Russia), Hiroyuki Miki, Toshiyuki Takagi, Makoto Ohtsuka  
(Tohoku University, Japan), Vasiliy Buchelnikov (Chelyabinsk State University,  
Russia), Konstantin Skokov (Tver State University, Russia / Leibniz Institute  
for Solid State and Materials Research, Germany) and Oliver Gutfleisch  
(Leibniz Institute for Solid State and Materials Research, Germany)
- CRF-62      **Simulation Analysis on the Change of B-H Curve Pattern for Sensitized Alloy  
600**  
Katsuhiko Yamaguchi, Kenji Suzuki (Fukushima University, Japan), Tetsuya  
Uchimoto and Toshiyuki Takagi (Tohoku University, Japan)
- CRF-63      **Nondestructive Evaluation of Austenitic Stainless Steel Residual Strain with  
EMAT**  
Liqiang Zhong (Tsinghua University, China), Tetsuya Uchimoto, Toshiyuki  
Takagi (Tohoku University, Japan), Naoki Chigusa (Kansai Electric Power  
Company, Inc., Japan) and Luming Li (Tsinghua University, China)
- CRF-64      **Reconstruction of Wall Thinning from Pulse Eddy Current Signals**  
Zhenmao Chen (Xi'an Jiaotong University, China), Shejuan Xie (Tohoku  
University, Japan), Xiaowei Wang, Yong Li (Xi'an Jiaotong University, China),  
Tetsuya Uchimoto and Toshiyuki Takagi (Tohoku University, Japan)
- CRF-65      **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)

- CRF-66      **Heat Transfer Analysis in a Biological Tissue Exposed to Laser Irradiation**  
Atsushi Sakurai (Niigata University, Japan), Yoshiyuki Sato, Shigenao Maruyama, Junnosuke Okajima and Atsuki Komiya (Tohoku University, Japan)
- CRF-67      **Usage of the Lattice Boltzmann Method Applied to the Analysis of Radiative Transfer in a Participating Medium Subjected to Collimated Loading**  
Subhash C. Mishra, Rohan Ranganath Vernekar (Indian Institute of Technology Guwahati, India)
- CRF-68      **Detection Accuracy Analysis of Several Eddy Current Probes on the Impact Damage of Carbon-Fibre Plastic Composite**  
Jun Cheng, Jinhao Qiu (Nanjing University of Aeronautics & Astronautics, China), Toshiyuki Takagi, Tetsuya Uchimoto (Tohoku University, Japan), Fuqiang Wu (Nanjing University of Aeronautics & Astronautics, China) and Ning Hu (Chiba University, Japan)
- CRF-69      **Evaluation of Thin Coating Layers using Non-Specular Reflection of Rayleigh Waves**  
Hak-Joon Kim, Sung-Jin Song (Sungkyunkwan University, Korea), Sung-Duk Kwon (Andong National University, Korea), Toshiyuki Takagi, Hiroyuki Miki and Tetsuya Uchimoto (Tohoku University, Japan)
- 15:30-16:30      **Poster Session**