

IFHT2016

The Fourth International Forum on Heat Transfer

November 2 – 4, 2016

Sendai International Center, Sendai, Japan

Organized by

Heat Transfer Society of Japan 

Cooperating Societies

Asian Union of Thermal Science and Engineering

ASME International Japan Section

Chemical Society of Japan

Combustion Society of Japan

French Heat Transfer Society

International Centre for Heat and Mass Transfer

Japan Institute of Energy

Japan Organization for Supporting Thermal Science Research

Japan Society of Energy and Resources

Japan Society of Fluid Mechanics

Japan Society of Thermophysical Properties

Japanese Society for Multiphase Flow

Society of Chemical Engineers, Japan

Turbomachinery Society of Japan

Visualization Society of Japan

Preface

On behalf of the Organizing Committee and Executive Committee, it is our great pleasure to welcome you to the 4th International Forum on Heat Transfer, IFHT2016.

The IFHT is an international forum organized by the Heat Transfer Society of Japan. The present forum is the fourth one in the series since 2004. The first forum was held in Kyoto, November, 2004, the second forum in Tokyo, September, 2008, the third forum in Nagasaki, November, 2012. This year, the fourth IFHT takes place in Sendai, Japan.

IFHT2016 is composed of more than 180 presentations from 13 countries. The oral and poster presentations have been classified into 14 organized sessions including general session. Besides the oral and poster session, 6 keynote speakers from China, Korea, the United States, Australia, and Japan, and the recipient of the Nukiyama Memorial Award are invited to deliver lectures. The keynote speakers are the world's top level scholars in the areas of heat transfer enhancement, fuel cell system, heat recovery, phase-change, energy conversion and combustion science. The Nukiyama Memorial Award is an international award established by the Heat Transfer Society of Japan on its 50th anniversary to commemorate outstanding contributions by Professor Shiro Nukiyama at Tohoku University. The third prestigious Award is bestowed to Prof. Mamoru Tanahashi, Professor of Tokyo Institute Technology in Japan.

With the holding of the IFHT2016, we would like to express our sincere appreciation for all the cooperation and support from our cooperating societies, including ASME International Japan Section, International Center for Heat and Mass Transfer (ICHMT), Asian Union of Thermal Science and Engineering (AUTSE), French Heat Transfer Society, Chemical Society of Japan, Combustion Society of Japan, Japan Institute of Energy, Japan Society of Energy and Resources, Japan Society of Fluid Mechanics, Japan Society of Mechanical Engineers, Japan Society of Refrigerating and Air Conditioning Engineers, Japan Society of Thermophysical Properties, Japanese Society for Multiphase Flow, Society of Chemical Engineers, Japan, Turbomachinery Society of Japan, and Visualization Society of Japan. The financial support by Sendai Tourism, Convention and International Association and Inoue Foundation for Science is also appreciated.

Finally, we all hope you enjoy presentations and lively discussions in the Forum and have a wonderful time in Sendai, a traditional and historical city. Also we would like to take this opportunity to express our gratitude and appreciation to you.

Taku Ohara, Tohoku University, Organizing Committee Chair
Koji Fumoto, Hirosaki University, Executive Committee Chair
Atsuki Komiya, Tohoku University, Local Committee Chair

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General Information

Registration Desk

The registration desk will be located in front of the room “Tachibana” on the 2nd floor during the forum. The attendee can pick up forum materials with conference bag. Registration will be available from Tuesday, November 1 to Friday, November 4. **Cash (JPY) payment is accepted for on-site registration. Payment by credit card is accepted on the web even for the on-site registration.** The office hours are shown blow.

Date	Office hour
Tuesday, November 1 (DAY 0)	16:00 – 19:00
Wednesday, November 2 (DAY 1)	08:00 – 17:30
Thursday, November 3 (DAY 2)	08:00 – 17:30
Friday, November 4 (DAY 3)	08:00 – 12:30

Welcome Reception

There will be a welcome reception on the evening of Tuesday, November 1 at the room “Hagi”. All attendees of the forum are invited. The welcome reception will start at 17:00 and end at 18:30. The complimentary light meals, snacks and drinks will be served in the reception.

Wi-Fi

In Sendai International Center, a free Wi-Fi is available. Attendees will find signboards which indicates a Wi-Fi information everywhere.

Keynote Lecture

Keynote lectures will be held in the room “Tachibana”. A full-color projector equipped with a connection cable with D-sub mini 15 pin connector for RGB-video is available. A Windows PC with Microsoft Powerpoint and Adobe Acrobat Reader installed is also available for use if you bring your presentation data on your USB flash drive.

Session

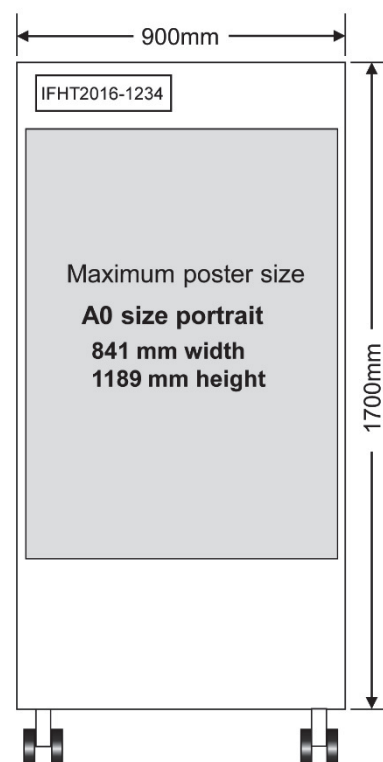
All technical sessions except for keynote lectures and the Nukiyama memorial award lecture include **both** short oral presentation and poster presentation. In each session, first 30 min is for short oral presentation in the room “Tachibana”, and all attendees move to the room “Hagi” for poster session after short oral presentation. The poster session has 60 min with coffees and light meals.

Short Oral Presentation

The short oral presentation is limited to “**1 min**” and entire slideshow should be set up **in landscape orientation** prior to the session by the forum organizer. Animations (visual effects and movies) cannot be used.

Poster Presentation

Each poster will have an assigned space in the room “Hagi”. The size of the poster board is 900mm W × 1700mm H, which is suitable for A0-size poster (841mm W and 1189mm H). It is strongly recommended that posters are printed on a single A0-size sheet. Please mount your poster by yourself on the board with your presentation ID at least **1 hour before** your presentation. Pins will be provided by the Forum secretariat. Please remove your poster by yourself at the end of the poster session.



Banquet

The forum banquet will be held on Thursday, November 3 from 18:00 to 20:00 at the room “Sakura”. All attendees are cordially invited to attend the banquet dinner. Come and join us for enjoying the Japanese cuisine.

Coffee Break

In this forum, core coffee breaks are not scheduled. Alternatively, coffees, drinks, light meals and snacks will be served in the room “Hagi” through the poster sessions. All attendees can take the meals during the session.

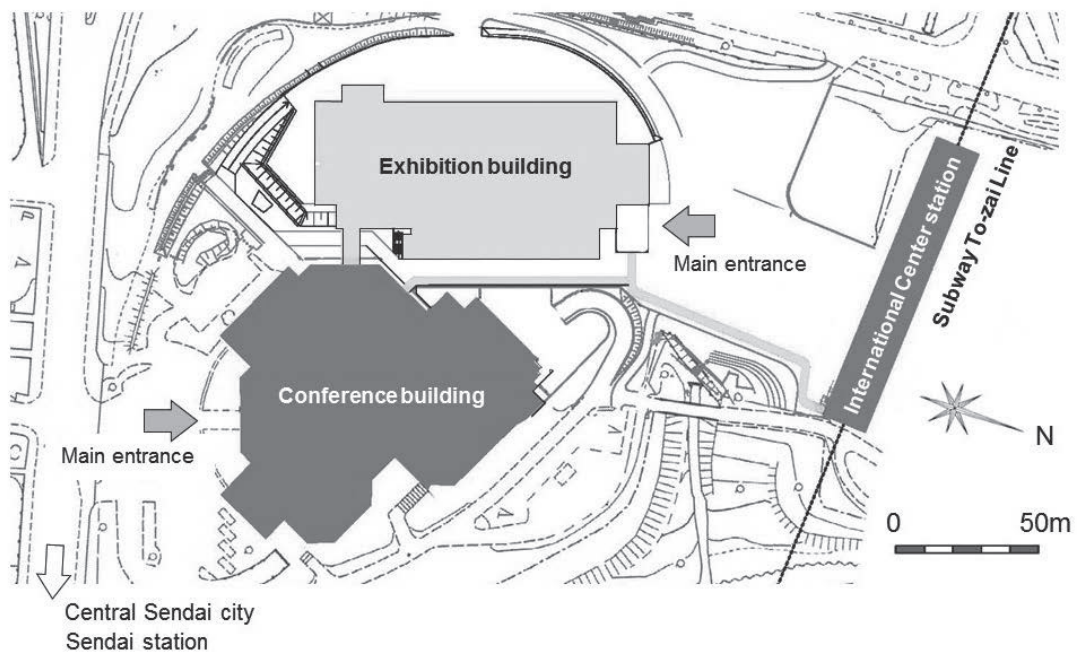
Best Presentation Award

All presenters are automatically nominated for “IFHT2016 Best Poster Award”. The awardees will be announced and commended at the closing ceremony on November 4.

Emergencies

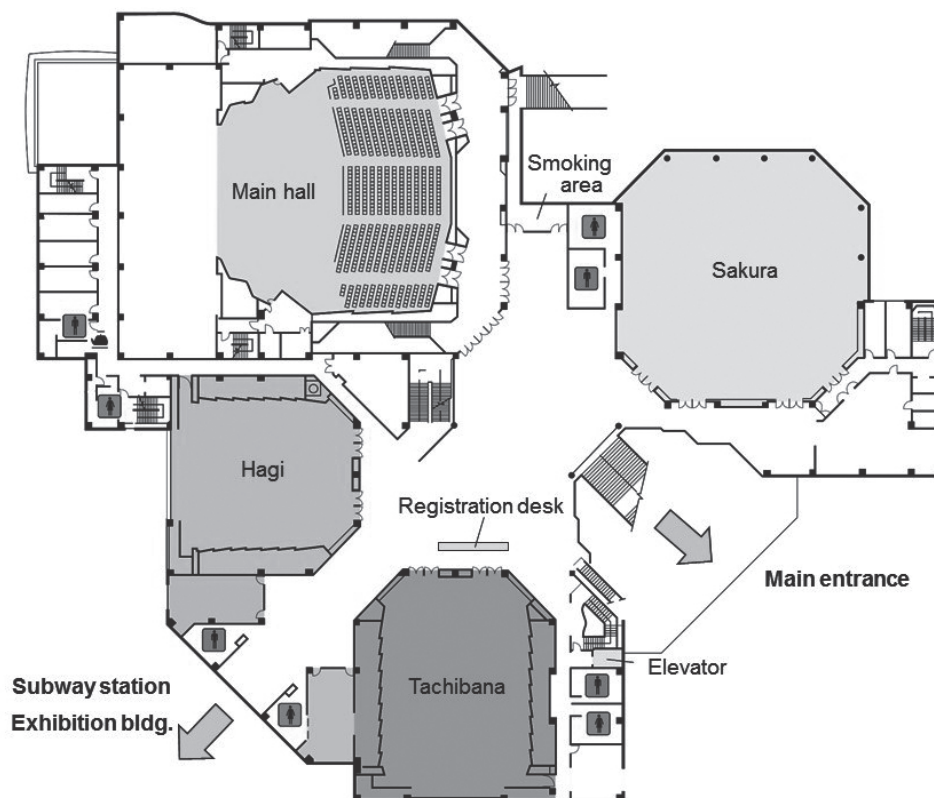
In case of medical or serious emergencies, dial 119, and contact to registration desk. Please feel free to contact the forum staff if you are at the site of the forum.

Location



The IFHT2016 will be held on the 2nd floor in “Conference Building”. Walk through the foyer of exhibition building from the subway station, and turn left at the end of the foyer. Directly you can go to the 2nd floor of conference building

Conference Building 2nd floor



IFHT2016 Program at a glance

	DAY 0 November 1	DAY 1 November 2	DAY 2 November 3	DAY 3 November 4
8:00		Registration	Registration	Registration
9:00		Opening		
10:00		Keynote 01 Prof. Young-Hoon Song	Keynote 03 Prof. Yoshinori Itaya	Keynote 05 Prof. Gary Rosengarten
11:00		Keynote 02 Prof. Shohji Tsushima	Keynote 04 Prof. Evelyn N. Wang	Keynote 06 Prof. Wen-Quan Tao
12:00		Oral/Poster Session 01 (OS-03,OS-12)	Oral/Poster Session 05 (OS-02,OS-11)	Oral/Poster Session 08 (OS-09)
13:00		LUNCH	LUNCH	LUNCH
14:00		Oral/Poster Session 02 (OS-05,OS-07)	Oral/Poster Session 06 (OS-06)	Oral/Poster Session 09 (OS-01,OS-08, OS-10)
15:00		Oral/Poster Session 03 (OS-07)	Oral/Poster Session 07 (OS-06)	Oral/Poster Session 10 (OS-04)
16:00	Registration	Oral/Poster Session 04 (OS-13,GS)	Nukiyama Award	Closing
17:00	Welcome Reception			
18:00				
19:00			Banquet	
20:00				
21:00				

Keynote Speakers

Keynote 01



Young-Hoon Song

Professor

Korea Institute of Machinery & Materials, Korea

Presentation title:

Thermal Management Technologies for Control of Diesel Emission

Abstract: Thermal management technology to control diesel emissions has been developed based on plasma assisted diesel fuel combustion. The present study includes various stages of development, such as a fundamental investigation on interactive phenomena between combustion and high temperature rotating arc plasma, an engine and a vehicle test to examine the performance of the diesel burner aided by plasma. In the earlier sections of the paper, phenomena of flammability limits extended by the plasma are introduced. An analysis with OES (Optical Emission Spectroscopy) from the flame and the arc plasma revealed the role of the energetic electrons and molecules to extend the flammability limits. Following after the section, a concept of a two-staged combustion technology using with the plasma is introduced, which is the key technology to obtain a stable diesel flame without excessive air supply and large space. In the later sections, a case study of diesel emission control technology operated with the diesel burner aided by plasma is demonstrated, which is activation of the catalysts in DPF (Diesel Particulate Filter) under low temperature exhaust gas condition.

Keynote 02



Shohji Tsushima

Professor

Osaka University, Japan

Presentation title:

Understanding, Designing and Fabricating Fuel Cells and Batteries: Coupled Processes of Transport Phenomena and Electrochemical Reactions

Abstract: Fuel cells and batteries have been gathering much attentions to be expected to play vital roles to make our society sustainable in the future. One of the most important advantages of these electrochemical energy conversion devices is to generate and/or store electrical energy with a better efficiency of energy conversion. “How minimizing energy losses in fuel cells and batteries under operation” is still an open question covering lots of disciplines and their interdisciplinary fields. In theory, the answer is so simple as “Better transport and reaction to being achieved”. However, in reality, this is a considerably challenging because mass transport of reactants, products, ions and electrons is highly coupled with the electrochemical reaction in nano/micro-scaled porous electrodes in fuel cells and batteries. The rate of transport to the reaction site in the porous electrode can affect or even dominate the overall reaction rate. Thereby, fundamental understandings of transport phenomena in fuel cells and

batteries under operation are of great importance and can be transferred to better designing and fabricating these devices. This paper is devoted to present our recent activities on polymer electrolyte membrane fuel cells (PEMFCs) and redox flow batteries (RFBs), especially focusing on transport processes unveiled by in- and ex-situ diagnostics and novel fabrication methodology to achieve optimal structures of these electrochemical energy conversion devices.

Keynote 03



Yoshinori Itaya

Professor
Gifu University, Japan

Presentation title:

Non-homogeneous Heat and Mass Transfer Problems in Upgrading Processes of Low Rank Energy

Abstract: Selected topics are presented on non-homogeneous heat and mass transfer problems relating to upgrading processes of low rank energy sources. Sludge is a representative low rank of biomass as it includes high moisture ash content and is easily degenerated. Effective thermal treatment like drying or dewatering of sludge will be a key technology for upgrading sludge and extending energy recycle. If sludge treatment is combined with composting or biodrying, an innovative system consisting of self-energy recovery processes can be established to yield dry sludge and to produce sequentially activated char without adding auxiliary fuel. Dry sludge and its activated char are applicable to soil conditioner, biofuel for coal firing boilers, gas cleaning and so on. Exhausted heat at lower temperature than 100°C is generally unused low rank energy as well. A LiBr/water absorption heat pump system (AHP) is introduced to simultaneously generate hot air over 120°C and steam from exhausted heat as low temperature level as 80°C. Furthermore, LiBr crystal fine-particle slurry is proposed as an excellent candidate for significantly improving the performance of AHP. Those thermal treatments are examples of non-homogeneous heat and mass transfer processes for upgrading low rank energy to promote utilizing renewable energy and exhausted heat.

Keynote 04



Evelyn N. Wang

Professor
Massachusetts Institute of Technology, USA

Presentation title:

Liquid-Vapor Phase-Change via Nanoengineered Surfaces

Abstract: The combination of surface chemistry and structures offer opportunities to manipulate liquid-to-vapor phase change processes at the nano and microscale. We first demonstrate the ability to rapidly and reversibly turn nucleate boiling ‘on and off’ and

thus alter heat transfer performance up to an order of magnitude through molecular manipulation of the boiling surface. This active control is achieved by electrostatically adsorbing and desorbing charged surfactants to alter the wettability of the surface. In addition, we incorporated surface microstructures into microchannels to generate capillary-assisted flow and suppress dry-out. We show significantly enhanced flow stability and critical heat flux through this design. These studies provide new insights to develop advanced phase-change approaches for applications ranging from high performance thermal management to efficient large-scale power generation.

Keynote 05



Gary Rosengarten

Professor

RMIT University, Australia

Presentation title:

Towards Next Generation Solar Thermal Collections: Keeping Things Hot and Cold

Abstract: The market success for solar collectors boils down to installation cost per kW of energy production (there will always be a market for niche applications where there is no access to gas or grid electricity). The \$/kW for PV has been falling sharply, particularly over the last ten years, partly due to reductions in manufacturing cost, and partly due to efficiency improvements. In contrast, solar thermal costs and efficiencies have remained almost stagnant. In this paper we dissect the physics associated with solar thermal collector efficiency and suggest methods of decreasing the \$/kW through efficiency improvements, and making the output hotter, and thus more useful. These include concentrating the sunlight, vacuum insulation, selective surfaces and beam splitting for creating decoupled high temperature heat, and electricity with cooled photovoltaic cells.

Keynote 06



Wen-Quan Tao

Professor

Xi'an Jiaotong University, China

Presentation title:

On the Beauty of Field Synergy Principle for Enhancing Convective Heat Transfer

Abstract: Field synergy principle (FSP) was proposed at the end of last century. It says: for a fixed flow rate and temperature difference, the smaller the intersection angle between fluid velocity and its temperature gradient, the larger the heat transfer rate. In this paper the beauty of field synergy principle is discussed in detail. The six points of beauty of science: (1) concept clarity, (2) simplicity, (3) unification, (4) natrularity, (5) symmetry and (6) analogy, are analyzed individually for FSP based on numerous numerical and experimental results. It shows that FSP possesses all six ingredients of the beauty of science.

IFHT2016 PROGRAM

Tuesday, November 1 (DAY 0)

16:00 - 18:30 REGISTRATION

17:00 - 18:30 WELCOME RECEPTION

Wednesday, November 2 (DAY 1)

8:40 - 8:55 OPENING

9:00 - 9:50 KEYNOTE 01

Thermal Management Technologies for Control of Diesel Emission

Professor Young-Hoon Song (Korea Institute of Machinery & Materials, Korea)

Chair: *Katsunori Hanamura (Tokyo Institute of Technology)*

10:00 - 10:50 KEYNOTE 02

Understanding, Designing and Fabricating Fuel Cells and Batteries:

Coupled Processes of Transport Phenomena and Electrochemical Reactions

Professor Shohji Tsushima (Osaka University, Japan)

Chair: *Yutaka Tabe (Hokkaido University)*

11:00 - 12:30 SESSION 01

OS-03: Combustion, OS-12: Thermophysical Properties

Chair: *Hiroshi Iwai (Kyoto University)*

1844 **Numerical Investigation on Ignition Criterion and Flame Kernel Growth of Ultra-Lean and High EGR Rate Methane-Air Turbulent Mixture**

Naoyuki Saito (Tokyo Institute of Technology), Yuki Minamoto, Basmil Yenerdag, Masayasu Shimura, Mamoru Tanahashi*

1849 **Heat Flux Measurement of Single Cycle Engine Simulator (RCEM) with MEMS Sensor**

Osamu Nakabeppu (Meiji University), Yuto Nakamura, Keisuke Nagasaka, Tomohiro Tsuchiya, Ryota Yamada (Tokyo Institute of Technology), Susumu Sato, Hidenori Kosaka*

1853 **Development of Engine Control System for Air-to-Fuel Ratio Using Heat Transfer Model at Intake System**

Mitsuhsa Ichiyanaagi (Sophia University), Toshiyuki Kimura, Takashi Suzuki*

1877 **An Experimental Study on Dynamics of Turbulent Premixed Flame Stabilized in a Swirl Flow by High-Speed OH PLIF Measurements**

Koji Yabuta (Tokyo Institute of Technology), Kozo Aoki, Yuki Minamoto, Masayasu Shimura, Mamoru Tanahashi*

1943 **The Effect of Ambient Gases on Evaporation Characteristics of n-Hexadecane Droplet under Atmospheric Pressure**

Yuiko Sato (Hokkaido University), Yushin Naito, Nozomu Hashimoto, Takahiro Murakoshi (Nihon University), Yusuke Saganuma, Hiroshi Nomura, Osamu Fujita (Hokkaido University)*

1967 **Heat Transfer on Combustion Chamber Walls Measured by a MEMS Sensor**

Kazuhito Dejima (Meiji University), Osamu Nakabeppu, Yuto Nakamura, Keisuke Nagasaka, Tomohiro Tsuchiya*

1998 **Heat Transfer Characteristics of Combustion Gas from Tubular Flame Effect of Inner Diameter of Combustion Chamber**

Jumpei Mido (Kansai University), Ryosuke Matsumoto, Daisuke Shimokuri (Hiroshima University),*

- Mamoru Ozawa (Kansai University), Masashi Katsuki (Osaka University)*
- 2023 **Mass Transfer Analysis of Oxidant Around a Single Coal Particle during Devolatilization under High Ambient Pressure Conditions**
Shota Akaotsu (Tohoku University), Kengo Ishimoda, Tatsuya Soma, Yasuhiro Saito, Yohsuke Matsushita, Hideyuki Aoki*
- 2032 **Low NO_x and High Efficient Oxygen Mild Combustion for Heating Furnace**
Sang Soon Hwang (Incheon National University), Ho Yeon Lee, Chun Loon Cha, Pil Hyoung Lee*
- 1886 **Properties of Heat Transfer Coefficients of Thermal Insulations**
Takahiro Ohmura (NIT, Wakayama College), Yusuke Nakamura, Akira Kondo (Osaka University), Tseng Wen Lian, Makio Naito*
- 1887 **Thermal Conductivity Measurement of Molten Salt FLiNaK by Transient Hot-Wire Method**
Yoshitaka Ueki (Osaka University), Naoyuki Fujita, Juro Yagi (NIFS), Masahiko Shibahara (Osaka University), Akio Sagara (NIFS)*
- 1893 **Comprehensive Raman Spectroscopy Method to Measure Thermal Conductivity and Thermal Diffusivity of Suspended and Supported 1D Nanomaterials**
Qin-Yi Li (Tsinghua University), Xing Zhang*
- 1898 **Study on Multi-Functional Thermal Management Device Based on LSMO/CMK-3 for Micro-Satellite**
Daeil Park (Nagoya University), Jihoon Kim, Sumitaka Tachikawa (JAXA/ISAS), Hosei Nagano (Nagoya University)*
- 1924 **Study of Surface Wetting Control by Metal Nano-Particles and Thermal Treatment**
Yang Ming Fan (Tokyo Institute of Technology), Takushi Saito, Tatsuya Kawaguchi, Isao Satoh*
- 1946 **Effect of Water Content on Thermophysical Properties of a Shape Memory Gel**
Hyune Omokawa (Yamagata University), Masato Akamatsu, Hidemitsu Furukawa, Mitsuhiro Yamano (Shiga Prefecture University)*
- 1964 **Numerical Analysis of the Percolation Path Effect on the Thermal Conductivity in Composite Materials**
Kosuke Soga (Tokyo Institute of Technology), Takushi Saito, Kazunori Ishikawa (Nippon Kayaku Co., Ltd.), Tatsuya Kawaguchi (Tokyo Institute of Technology), Isao Satoh*
- 1969 **Thermo-Electro-Structural Coupling Simulation of Melting Phenomenon and Hole Creation at Notch Tip under High Electric Load**
Thomas Jin-Chee Liu (Ming Chi University of Technology)*
- 1975 **Single-Particle Diffusion Measurement in a PDMS Layer during Curing Process**
Ryo Iwao (Nagoya University), Yu Matsuda, Hiroki Yamaguchi, Tomohide Niimi*
- 1994 **Optical Sensing of Diffusion Coefficient Using Laser-Induced Dielectrophoresis**
Makoto Kamata (Keio University), Kan Yamada (Kyodo International, Inc.), Yoshihiro Taguchi (Keio University), Yuji Nagasaka*
- 2028 **Local Thermal Conductivity Measurement by Contact Temperature Method for Low Thermal Conductivity Materials**
Hoshi Kawamura (Meiji University), Osamu Nakabeppu*
- 2040 **Characteristics of Gas Permeability and Effective Thermal Conductivity in Metal Hydride Packed Bed of CaNi₂**
Kazuki Yoshida (Saga University), Koutaro Tsubaki, Yuichi Mitsutake, Akitoshi Fujisawa (Kobe Steel, Ltd.), Shinichi Miura*

13:30 - 15:00 **SESSION 02**

OS-05: Convection, OS-07: Energy Technologies and Environmental Technologies

Chair: Yasuhiro Saito (Tohoku University)

- 1842 **Effects of Air Bypass on Heat Transfer Performance in a Channel Flow with Metallic Porous Media**
Roger A. Larrabee (Doshisha University), Mami Yamamoto, Kyoji Inaoka, Mamoru Senda*
- 1845 **Melting of Phase Change Materials in a Cylindrical Enclosure: Parameters Influencing Natural**

- Convection Onset**
Mohammad Azad (Dalhousie University), Dhanush Dineshan, Dominic Groulx, Adam Donaldson*
- 1855 **Modeling of Unsteady Heat Transfer Phenomena at Intake System of Internal Combustion Engine**
Emir Yilmaz (Sophia University), Mitsuhsa Ichiyanagi, Takashi Suzuki*
- 1857 **A Numerical Analysis on the Influence of Forced Oscillation upon 3D Thermal Convection in Zero Gravity**
Masaki Nobuhara (Doshisha University), Masato Kodama, Keisuke Tatsumoto, Hirochika Tanigawa (Maizuru Tech.), Katsuya Hirata (Doshisha University)*
- 1865 **Numerical Study of the Thermal Performance of a Ventilated Facade**
Francois Gloriant (INSA Strasbourg ICUBE), Monica Siroux*
- 1907 **Heat Transfer Characteristics of the Micro-Capsule Slurry in a Horizontal Duct Heated Upper/Lower Surface**
Akihiko Horibe (Okayama University), Hyungsup Im, Naoto Haruki, Yutaka Yamada, Sintaro Maeda*
- 1957 **Magnetothermal Convection on a Heated/Cooled Pipe Flow of Paramagnetic Fluid**
Masayuki Kaneda (Osaka Prefecture University), Kazuhiko Suga*
- 1986 **Heat Transfer Control by Light Irradiation to Low Reynolds Number Flows Using a Photosensitive Micellar Solution**
Takeshi Enya (Kyoto University), Reiko Kuriyama, Kazuya Tatsumi, Kazuyoshi Nakabe*
- 2006 **Thermocapillary Convection in Free Liquid Film State in Transition Region of Basic Flow**
Yosuke Kowata (Tokyo University of Science), Linhao Fei, Toshihiro Kaneko, Ichiro Ueno*
- 2008 **Basic Study on Flow and Heat Transfer Characteristics of Curved Rectangular Ducts in Electronic Equipment**
Kota Kobayashi (Iwate University), Takashi Fukue, Koichi Hirose, Jun Ikehata, Yosuke Hata (Brother Industries Ltd.), Hiroyuki Ishikawa*
- 2018 **Heat Transfer Characteristics of Phase Change Emulsion**
Takashi Moromoto (Aoyama Gakuin University), Hiroyuki Kumano, Kenichi Togashi*
- 2038 **Density-Fluctuation Effects on Transition to Turbulence in Natural-Convection Boundary Layer Developed along a Vertical Heated Plate**
Yasuo Hattori (Central Research Institute of Electric Power Industry), Keisuke Nakao, Hitoshi Suto, Akiko Sakamoto (Denryoku Computing Center), Shuji Ishihara, Yuzuru Eguchi (Central Research Institute of Electric Power Industry), Hiromaru Hirakuchi*
- 2041 **Heat Transfer Characteristic of Shere-packed Rectangular Channel for High Prandtl Number Fluid under One-sided Heating Condition**
Dorota Smakulska (Tohoku University), Shohei Yasunaga, Masaki Ohishi, Shinji Ebara, Hidetoshi Hashidume*
- 2059 **Thermal Analysis in Vessel When the Gas is Leaking through the Orifice**
Yuuki Kawano (Kyushu University), Taichi Kuroki, Naoya Sakoda, Masamichi Kohno, Yuichi Mitsutake (Saga University), Masanori Monde, Yasuyuki Takata (Kyushu University)*
- 1825 **Modelling of Plate-Fin Heat Exchangers - Some Unique Aspects for Stainless Steel Exchangers**
Vishwas V. Wadekar (PS2E Institute)*
- 1830 **Mechanism of Gasification Rate-Enhancement Elucidated by Cross-Sectional Analysis of Catalyst-Supporting Biochars**
Yukihiko Okumura (NIT, Maizuru College)*
- 1854 **Reduction Method of Combustion Fluctuation Using Estimation Technique of Maximum in-Cylinder Pressure of Internal Combustion Engine**
Mitsuhsa Ichiyanagi (Sophia University), Shogo Takara, Takashi Suzuki*
- 1858 **Modeling and Experimental Analysis of Micro Combined Heat and Power Systems Coupled with Residential Buildings**
Monica Siroux (INSA Strasbourg ICUBE), Jean-Baptiste Bouvenot, Benjamin Latour*
- 1862 **Reduction of ZnO Powder by Radio-Frequency Dielectric Heating**
Koudai Matsuzawa (Ehime University), Shinobu Mukasa, Nobuyuki Doi, Hiromichi Toyota, Shinfuku Nomura*

15:00 - 16:30 **SESSION 03**

OS-07: Energy Technologies and Environmental Technologies

Chair: Kazuya Tatsumi (Kyoto University)

- 1873 **Selective Acoustic Amplification in Circular Pipe with Narrow Channels Subject to Temperature Gradient**
Tomoaki Kyoden (NIT, Toyama College), Yukio Tada (Kanazawa University), Yuya Iida (NIT, Toyama College)*
- 1880 **Development of Thermoacoustic Engine by Utilizing Gas-Liquid Phase Change**
Yukio Tada (Kanazawa University), Hajime Onishi, Tomoaki Kyoden (NIT, Toyama College)*
- 1895 **Basic Study on the Performance of Hot Water Heat Storage for Solar Heat Utilization Systems**
Shigemitsu Shuchi (Akita Prefectural University), Ryota Yamazaki*
- 1901 **Latent Heat Transportation with Super-Hydrophobic Gel**
Hiroshi Suzuki (Kobe University), Ruri Hidema, Kota Inoue, Yoshiyuki Komoda, Masao Iwaya (Daicel Corporation), Tomoya Mizuta, Masanori Yoshikane*
- 1903 **Phase Change Behavior of Carbon Based Nanocomposites in Vertical Latent Heat Shell-Tube Thermal Energy Storage Systems**
Nitesh Das (Indian Institute of Technology, Mandi), Yasuyuki Takata (Kyushu University), Masamichi Kohno, Sivasankaran Harish (Kyushu University)*
- 1909 **An Optimal Feedback Control Strategy of Heat Exchanger Networks with Load Fluctuations**
Yi-Fei Wang (Tsinghua University), Qun Chen*
- 1913 **Flow and Heat Transfer Characteristics of Ammonia Alum Hydrate Slurries with Additives**
Kohei Nakamura (Toho Gas Co., Ltd., Kobe University), Takashi Ina (Toho Gas Co., Ltd.), Hiroshi Suzuki (Kobe University), Yoshiyuki Komoda, Ruri Hidema*
- 1929 **Effects of Liquid Water Distribution on the Thermal Resistance of a Gas Diffusion Layer of PEFCs**
Koki Kobayashi (Yokohama National University), Ryotaro Minami, Takuto Araki (Yokohama National University, PRESTO, JST)*
- 1933 **A Synthesizing Optimization Method for a Practical Power Generation System with Supercritical Carbon Dioxide Brayton Cycle**
Rong-Huan Fu (Tsinghua University), Xing Zhang*
- 1952 **Numerical Analysis on the Effect of Geometry Aspect Ratio for Planar Intermediate Temperature Solid Oxide Fuel Cell**
Wee Choon Tan (Kyoto University, Universiti Malaysia Perlis), Hiroshi Iwai, Masashi Kishimoto, Grzegorz Brus (Kyoto University, AGH University of Science and Technology), Janusz S. Szymd (AGH University of Science and Technology), Hideo Yoshida (Kyoto University)*
- 1953 **2D Numerical Simulation of Anode Supported Planar SOFC Considering Microstructure of Electrodes**
Nurul Zieyana (Kyoto University), Hiroshi Iwai, Masashi Kishimoto, Grzegorz Brus (Kyoto University, AGH University of Science and Technology), Janusz S Szymd (AGH University of Science and Technology), Hideo Yoshida (Kyoto University)*
- 1959 **Energy Conversion System Using the Cold Energy**
Junta Endou (Akita University), Takahiro Adachi, Takanori Hirasawa (Original Engineering Consultants Co., Ltd.)*
- 1974 **Numerical Fluid Analysis and Modelling Consideration of Data Center Environment**
Toshihiro Ikeda (Future Facilities KK), Takayuki Hikichi, Takumi Isobe*
- 1983 **Optimization of Quasi-Transient Thermoelectric Power Generation**
Kazuaki Yazawa (Purdue University), Ali Shakouri*
- 1985 **Impact of Carbon/Carbonate Slurry Characteristics around the Anode on Performance of Direct Carbon Fuel Cells**
Hirotsu Watanabe (Tokyo Institute of Technology), Daisuke Umehara*
- 2004 **Theoretical Solutions for Power Output of Free Piston Thermal-Lag Stirling Engine**
Chin-Hsiang Cheng (National Cheng Kung University), Hang-Suin Yang*

- 2009 **Direct Water Injection for Better Thermal and Water Management of PEM Fuel Cells with Porous Gas Flow Field**
Masaya Kozakai (Hokkaido University / Hitachi, Ltd.), Yutaka Tabe (Hokkaido University), Takemi Chikahisa*
- 2012 **Heat-Momentum Model for Heat Loss Calculations - Description and Implementation into MARS-KS System Code for Differential Heat Loss Calculations and RHS Evaluation of ATLAS**
Marton Szogradi (Korea Atomic Energy Research Institute, University of Science and Technology), Ki-Yong Choi*
- 2016 **Design and Simulation of a Solar Chimney PV/T Power Plant in Northwest China**
Fei Cao (Hohai University), Qingjun Liu, Tian Yang, Yufei Mao, Tianyu Zhu*
- 2022 **Development of the Compact Waste Heat Recovery System Using Both ORC and LHTS**
Shin-ichiro Wakashima (NIT, Ichinoseki College), Akira Hoshi (Tohoku Gakuin Univeristy), Sho Chiba (Nippon Piston Ring Co.,Ltd.), Daiki Sugawara (NIT, Ichinoseki College)*
- 2047 **Study on Supercooling Suppression of Phase Change Material in Emulsion by Addition of Surfactants**
Wataru Abe (Kobe University), Tsuyoshi Kawanami, Koji Fumoto (Hirosaki University), Katsuaki Shirai (Kobe University), Shigeki Hirasawa*

16:30 - 18:00 **SESSION 04**

OS-13: Visualization and Measurement, GS: General Session

Chair: *Yoshihiro Taguchi (Keio University)*

- 1884 **Study on Multipoint Temperature Measurement Using Laser Interferometry**
Naruki Shoji (NIT, Toyama College), Tomoaki Kyoden, Shunsuke Akiguchi, Tomotaka Homae, Noboru Momose, Hideaki Yoshioka (NIT, Ishikawa College), Tadashi Hachiga (NIT, Toyama College)*
- 1891 **Improvement of the Fluid Temperature Scanner for Practical Use**
Tomoya Houra (Nagoya Institute of Technology), Hiroki Tomita, Masato Tagawa*
- 1932 **Three-Dimensional Flow Measurement of a Sphere-Packed Pipe by Digital Holographic-PTV**
Masataka Kuniyasu (Tokyo University of Science), Noriyuki Unno (Tokyo University of Science, Yamaguchi), Shin-ichi Satake (Tokyo University of Science), Kazuhisa Yuki (Tokyo University of Science, Yamaguchi), Yohji Seki (National Institutes for Quantum and Radiological Science and Technology)*
- 1951 **Investigation of the Interactions between a Femtosecond Laser Pulse and Ultrapure Water**
Yuki Iburi (Shizuoka University), Yuki Mizushima, Takayuki Saito
- 1987 **Fluid Temperature Measurement in Microchannels Using Fluorescence Polarization Method**
Atsushi Suzuki (Kyoto University), Chi-Hsuan Hsu, Kazuya Tatsumi, Reiko Kuriyama, Kazuyoshi Nakabe*
- 1997 **Reconstruction of 3D Temperature Distributions in Free Convection Field around a Small Heated Sphere in Water**
Tomohiro Miyake (Tottori University), Naoto Kakuta (Tokyo Metropolitan University), Fujioka Ryota, Yuji Oyamada (Tottori University), Kazu Mishiba, Katsuya Kondo*
- 2021 **Visualization of CO₂ Absorption Process in the Vicinity of Gas-Liquid Interface**
Toru Saito (Tohoku University), Atsuki Komiya, Junnosuke Okajima, Shigenao Maruyama*
- 2042 **Visualization of Impact and Bounce Motions of Droplets Impacting on Textured Surfaces**
Ken Yamamoto (Tokyo University of Science), Hideyuki Takezawa (Tokyo Metropolitan University), Masahiro Motosuke (Tokyo University of Science), Satoshi Ogata (Tokyo Metropolitan University)*
- 2046 **Fundamental Investigation of Oxygen Concentration Measurement in Narrow Channel of Fuel Cell Based on Fiber-Optic Laser Absorption Spectroscopy**
Ryoga Nakauchi (Kyoto Institute of Technology), Yuya Maeda, Kosuke Nishida, Toyofumi Umekawa (Plumtech, Inc.), Masahiro Kawasaki (Nagoya University)*
- 2052 **Shear Stress Determination with Micron-Resolution by Single-Viewing Imaging**
Yoshiyasu Ichikawa (Tokyo University of Science), Ken Yamamoto, Makoto Yamamoto, Masahiro Motosuke*

- 2054 **Three-Dimension Velocity Measurement of Particles by Doppler Phase-Shifting Holography**
Tepei Kindaichi (Utsunomiya University), Nao Ninomiya*
- 1850 **Micro-Solidification of Bi-Te Alloy Melts with Non-Uniform Supercooling**
Hideaki Yoshioka (NIT, Ishikawa College), Toru Kato, Yukio Tada (Kanazawa University)*
- 1861 **The Melting Behavior of Ice in a Calcium Chloride Aqueous Solution with Heat and Mass Transfer**
Akinori Miura (Akita University), Makoto Tago, Yoshimi Komatsu, Takehiro Akata, Masahiro Sugawara*
- 1869 **Paper Shrinkage after Fusing Process in Electrophotography**
Shunichi Oohara (RICOH Co., Ltd.), Makoto Wada (Kyushu Institute of Technology), Hirofumi Tanigawa, Takaharu Tsuruta*
- 1904 **Evaluation of the Thermal Analysis for Mars Airplane Balloon Experiment-1**
Yasuyuki Oda (Tohoku University), Takurou Daimaru, Hiroki Nagai, Koji Fujita (JAXA/ISAS), Akira Oyama (JAXA/ISAS)*
- 1950 **Proposal of Improvement of Cultivation Environment for Homogeneous Growth in Plant Factory Based on Environmental Measurement**
Koji Moriuchi (Seiken Co., Ltd.), Yasushi Ueda, Nobuya Okamura (Daiwa House Industry Co., Ltd), Atsumasa Yoshida (Osaka Prefecture University), Shinichi Kinoshita*
- 1982 **Investigation of Temperature Dependence of Diffusion in Aqueous Solutions by Near-Infrared Absorption Imaging**
Hiroki Yamashita (Tokyo Metropolitan University), Naoto Kakuta, Daisuke Kawashima, Katsuya Kondo (Tottori University), Hidenobu Arimoto (AIST), Yukio Yamada (The University Electro-Communications)*
- 2001 **Visualization and Analysis of Unstable Interface between Two Aqueous Solutions with and without Chemical Reaction**
Daisuke Kawashima (Tokyo Metropolitan University), Naoto Kakuta, Katsuya Kondo (Tottori University), Hidenobu Arimoto (AIST), Yukio Yamada (The University of Electro-Communications)*
- 2060 **Stability Analysis of the Stagnation Point Flow over a Stretching/Shrinking Sheet with Slip Effect**
Anuar Ishak (Universiti Kebangsaan Malaysia)*

Thursday, November 3 (DAY 2)

9:00 - 9:50 **KEYNOTE 03**
Non-Homogeneous Heat and Mass Transfer Problems in Upgrading Processes of Low Rank Energy
Professor Yoshinori Itaya (Gifu University, Japan)
 Chair: *Hiroshi Suzuki (Kobe University)*

10:00 - 10:50 **KEYNOTE 04**
Liquid-Vapor Phase-Change via Nanoengineered Surfaces
Professor Evelyn N. Wang (Massachusetts Institute of Technology, USA)
 Chair: *Hiroyasu Ohtake (Kogakuin University)*

11:00 - 12:30 **SESSION 05**
 OS-02: Boiling and Condensation, OS-11: Thermodynamics
 Chair: *Takashi Fukue (Iwate University)*

- 1841 **Flow Boiling Heat Transfer in a Vertical Small-Diameter Tube: Effect of Different Fluid and Surface Characteristics**
Asseel M. Al-Gaheeshi (University of Karbala), Mohamed M. Mahmoud (Zagazig University), Tassos G. Karayiannis (Brunel University)*
- 1874 **Liquid Supply Processes to Heated Surface for CHF Enhancement Using a Honeycomb Porous Plate in a Saturated Pool Boiling**
Naru Maruoka (Yokohama National University), Shoji Mori, Ryosuke Imai, Kunito Okuyama*

- 1905 **Visualization Experiment of Spatial Condensation of Humid Air in a Low-Temperature Chamber**
Kaoru Yasuhara (Yamagata University), Junya Sugiyama*
- 1914 **Re-Flooding of High-Temperature Tube and Simplified Modeling of Cooling Process**
Takeaki Yoshimi (Kansai University), Atsushi Okawara, Mamoru Ozawa*
- 1926 **Study on Functional Surface Creation by Micro Unevenness (1), Development of Micro Unevenness Indenting Machine and Heat Transfer Characteristic Evaluation Device**
Yoshihiko Matsuo (Nagasaki University), Shinji Nakadeguti, Satoru Momoki, Takanori Yazawa, Kenji Kuranari, Reiko Yamada, Hideshiro Moritaka*
- 1917 **Study on Functional Surface Creation by Micro Unevenness(2), Heat Transfer Characteristic Evaluation of Micro Unevenness Surface**
Shinji Nakadeguchi (Nagasaki University), Yoshihiko Matsuo, Satoru Momoki, Takanori Yazawa, Kenji Kuranari, Reiko Yamada, Hideshiro Moritaka*
- 1941 **Control on Bubble Size by Two-Stage Microwave Irradiation**
*Shunsuke Nishijima (University of Hyogo), Ryosuke Nakata, Shungo Matsumura, Yusuke Asakuma**
- 1976 **Boiling Heat Transfer of Porous Nichrome Plate Heater in Liquid Nitrogen**
Masakazu Nozawa (NIT, Akita College), Suguru Takada (National Institute for Fusion Science), Suguru Saga (NIT, Akita College), Yuki Shirahata*
- 1991 **Pool Boiling CHF Enhanced with Superhydrophilic Micro/Nano Structures Fabricated by Thermal Spray and Chemical Oxidation**
Takanori Tanaka (Kyushu Institute of Technology), Tomohide Yabuki, Koji Miyazaki*
- 2005 **Void Fraction Characteristics of Gas-Liquid Two-Phase Flows in Small Diameter Square Tube**
Yuma Murata (Kobe University), Taisaku Gomyo, Ryosuke Ukena, Hideki Murakawa, Hitoshi Asano, Katsuhiko Sugita (TEPCO), Shuichi Umezawa*
- 2007 **Effect of Acoustic Field on Microbubble Emission Boiling**
Takahiro Tsuruta (Tokyo University of Science), Kazuna Horiuchi, Toshihiro Kaneko, Ichiro Ueno*
- 2017 **Condensation Heat Transfer of R1234ze(Z) on a Plane Tube and a 3D Finned Tube**
Kenichiro Teshima (Kyushu University), Ryuichi Nagata, Chieko Kondou (Nagasaki University), Nobuo Takata (Kyushu University), Shigeru Koyama*
- 2025 **Numerical Simulation on Expanding Process of Vapor Bubble by Evaporative Heat Transfer in Microchannel**
Junnosuke Okajima (Tohoku University), Peter Stephan (Technische Universite Darmstadt)*
- 2043 **Cooling on High Superheated Surface by Using Spray Nozzle (Influence of Droplet Size and Droplet Velocity)**
Hiroyasu Ohtake (Kogakuin University), Yoshiaki Hasebe, Koji Hasegawa*
- 2044 **Effect of Local Heat Transfer Coefficient on Lower Limit of Saturated Film Boiling of Finite Length Vertical Cylinder**
Win Pa Pa Myo (Nagasaki University), Satoru Momoki, Tomohiko Yamaguchi*
- 1900 **Thermodynamics Investigation of Nanofluid Flow in Heat Exchanger Bundles Using Temperature-Dependent Correlations for Nano Particles**
Mehrdad Torabi (Islamic Azad University), Mohsen Torabi (Georgia Institute of Technology), G.P. Bud Peterson*
- 2015 **Calculation and Design the Pure Coconut Oil Heating System by Direct Utilizing the Exhaust Gas Energy of Diesel Engine**
Tuan Anh Hoang (Ho Chi Minh University of Transportation)*

13:30 - 15:00 **SESSION 06**

OS-06: Cooling, Refrigeration and Heat Transfer Devices

Chair: Masakazu Nozawa (NIT, Akita College)

- 1829 **Characterization of Mini Heat Transport Devices Using Thermo-Sensitive Magnetic Fluid**
Shohei Ogawa (Hirosaki University), Koji Fumoto, Tsuyoshi Kawanami (Kobe University), Takao Inamura (Hirosaki University)*

- 1833 **The Investigation of Porous Heat Transfer Flow in the Supercritical CO₂ Metal Foam Hx**
David T.W. Lin (National University of Tainan), Yi-Ming Wang*, Jui-Ching Hsieh (Industrial Technology Research Institute)
- 1852 **Heat Dissipation of Passive Two-Phase Cooling Using Low-GWP Refrigerant R1234ze(E) and Super-Hydrophilic Surface for Electronic Devices**
Kosuke Watanabe* (Nagasaki University), Shohei Umemoto, Taisuke Matsuzono, Chieko Kondou, Shigeru Koyama (Kyusyu University), Yutaka Mitooka (Industrial Technology Center of Okayama Prefecture)
- 1860 **Phase Change with Liquid Column Oscillation in Pulsating Heat Pipe: Experimental Study Using Forced Oscillation System**
Masayoshi Miura* (Tokyo Institute of Technology), Takao Nagasaki, Yu Ito
- 1863 **Vibration of the Gas Column in the Two-Phase Flow Cyclone Nozzle**
Yoshiyuki Yokoyama* (Toyohashi University of Technology), Satoshi Nakao, Yosuke Kawamura, Masafumi Nakagawa
- 1866 **Fractal-Link Geometry for Improving Heat Dissipation of Heat Sinks**
Yuuya Isshiki* (Okayama University), Kazuhiro Umetani, Satoshi Sakai (Kyoto University), Satoshi Higashino (Kashii Co. Ltd.), Maki Yoshino, Yuki Hayashi, Eiji Hiraki (Okayama University)
- 1868 **Effects of Clearance around Heating Prism on Cooling Performance of Pulsating Airflow**
Takashi Fukue* (Iwate University), Koichi Hirose, Hidemi Shirakawa (NIT, Toyama College), Jun Suzuki (Iwate University), Yosuke Saga
- 1870 **A Transient Energy Flow Model for Analyzing the Dynamic Behaviour of Heat Transfer Systems**
Junhong Hao* (Tsinghua University), Qun Chen
- 1883 **Gas-Liquid Distributions of Refrigerant Two-Phase Flow in Multi-Pass Channels**
Yuki Nakao* (Mie University), Hidetaka Nomoto (DENSO Corporation), Akira Ekawa (Mie University), Masafumi Hirota, Naoki Maruyama, Akira Nishimura
- 1925 **Investigation on the Coupled Heat and Mass Transfer Process between Extremely High Humidity Air and Liquid Desiccant in the Counter-Flow Adiabatic Packed Tower**
Zhenying Wang* (Tsinghua University), Xiaoyue Zhang, Zhen Li
- 1927 **Operating Characteristics of a Loop Heat Pipe with Two Evaporators and Two Condensers, Experiment Result and Mathematical Model under Thermal Vacuum Condition**
Xinyu Chang* (Nagoya University), Hosei Nagano, Shun Okazaki (JAXA), Hiroyuki Ogawa, Hiroki Nagai (Tohoku University)
- 1930 **Analytical Modelling of Phase-Change Phenomena in the Process of Reverse Brayton Cycle**
Osamu Sato* (Shimadzu Corporation), Hiroshi Iwai (Kyoto University), Hideo Yoshida
- 1936 **Improvement of Cooling Efficiency in Peltier Device Driven by DC Current Converted from Pulse Current**
Ryo Sekiguchi* (Toyo University), Yuhan Liu, Yuji Sano
- 1938 **Visualization Study of the Vapor-Liquid Two-Phase Flow Characteristics in Multiple Evaporators Loop Heat Pipe**
Masafumi Kizawa* (Nagoya University), Hosei Nagano
- 1942 **Boiling Heat Transfer on a Mixed-Wettability Evaporator Surface in a Closed Two-Phase Thermosyphon**
Hongbin He* (Kyushu University), Kento Furusato, Masayuki Yamada, Biao Shen, Sumitomo Hidaka, Masamichi Kohno, Koji Takahashi, Yasuyuki Takata
- 1948 **Various Effects on the Flow-Deflector Performance for a Diffuser**
Tomohiro Ozaki* (Doshisha University), Taishi Inoue, Hiroaki Mihara (GBRC), Katuya Hirata (Doshisha University)
- 1960 **Study on the Heat Transfer and Three Dimensional Flow Field in a Rectangular Duct with a 45-deg Inclined Pin-Fin**
Naoto Kushida* (Tokushima Bunri University), Kenichiro Takeishi, Masaki Asahara, Yutaka Oda (Kansai University), Yusuke Motoda (Toto Ltd.)

- 1970 **The Fabrication and Performance Test of Aluminum Alloy Vapor Chambers**
*Chen-Kang Huang** (National Taiwan University), *Cherng-Yuh Su* (National Taipei University of Technology)

15:00 - 16:30 **SESSION 07**

OS-06: Cooling, Refrigeration and Heat Transfer Devices

Chair: *Kaoru Yasuhara* (Yamagata University)

- 1916 **Thermal Fluid Analysis on Heat Transfer Enhancement for Heat Exchanger**
*Shigeru Ogawa** (NIT, Kure College), *Soma Usui, Ikumi Akaishi*
- 1971 **Temperature Change of a Film Layer Coated with Silica-Gel Micro Particles Adsorbing Water Vapor on a QCM Sensor**
Yoshinori Hamamoto (Kyushu University), *Takehiro Nakamori**, *Hideo Mori*
- 1972 **Estimation of Local Heat Transfer Coefficients for Laminar Flow in a Desiccant Rotor with Distributions of Heat Flux**
Yoshinori Hamamoto (Kyushu University), *Keisuke Teshima** *Hideo Mori*
- 1973 **Study on Characteristics of Two-Phase Thermal Hydraulics in Porous Structure Based on Microscale Infrared Observation and Modeling**
*Kimihide Odagiri** (Nagoya University), *Masahito Nishikawara* (Toyohashi University of Technology), *Hosei Nagano* (Nagoya University)
- 1980 **Analytical Investigation of Effects by Container Shape and Tube Ellipticity on Natural Convection in Ice Heat Storage System**
*Qiang Sheng Wang** (Iwate University), *Koichi Hirose, Takashi Fukue*
- 1981 **Research on the De-Frost-Free Technology with Fine Irregularities Surface**
*Takeshi Yajima** (TEPCO Holdings, Inc.), *Hidetoshi Ohkubo* (Tamagawa University), *Mitsuo Seki* (NATOMICS Corporation)
- 1990 **Heat Transfer Characteristics of Fin-and-Tube Heat Exchanger Using Airfoil-Shaped Tube**
*Hajime Onishi** (Kanazawa University), *Hajime Kikuchi* (Mitsubishi chemical engineering), *Yukio Tada* (Kanazawa University)
- 2014 **Effect of the Number of Turns on the Orientation Dependence of Micro Pulsating Heat Pipes**
*Soohwan Jun** (Korea Advanced Institute of Science and Technology), *Sung Jin Kim*
- 2020 **Heat Transfer Enhancement in a Parallel Finless Heat Exchanger Using a Longitudinal Vortex Generator**
*Jiyang Li** (The University of Tokyo), *Chaobin Dang, Eiji Hihara*
- 2024 **Study on Underground Heat Exchanger for Ground Source Heat Pump That Use Direct Expansion Method**
*Tetsuaki Takeda** (University of Yamanashi), *Shuhei Ishiguro, Shumpei Funatani*
- 2034 **Heat Exchange Performance of Loop Typed Thermosyphon for Electronic Devices**
*Kohei Tamura** (Kyushu University), *Mizuki Hayashida, Shingo Kasaki, Chieko Kondo* (Nagasaki University), *Shigeru Koyama* (Kyushu University)
- 2035 **Experimental Study on the Flow Boiling of R245fa and R1233zd(E) in a Mini-Channel**
*Shingo Kasaki** (Kyushu University), *Kohei Tamura, Mizuki Hayashida, Nobuo Takata, Shigeru Koyama*
- 2037 **Boiling Heat Transfer and Flow Regime of Water Flowing Vertically Upward in a Mini-Channel**
*Masaharu Ono** (The University of Electro-Communications), *Taichi Nakamura, Koji Enoki, Tomio Okawa, Mamoru Ozawa* (Kansai University)
- 2049 **Characteristics of Frost Formation and Heat Transfer in the Plate-Fin Tube Heat Exchanger -Effect of the Bypass Flow Channel-**
*Kazuma Kagebayashi** (Kansai University), *Ryousuke Matsumoto, Takuma Uechi*
- 2050 **Environmental Control System for Aircraft Pod**
*Samet Akcay** (Tubitak), *Abdurrahman Aydemir*

2055 **Measurement of Three-Dimensional Microstructure of Frost Layer by Using X-ray Computed Tomography**

Takuma Uechi (Kansai University), Ryosuke Matsumoto, Kazuma Kagebayashi*

2057 **Scale Effects on the Evaporative Heat Transfer Mechanism in Carbon Nanotube Wick for Heat Pipe**

Qiang Chen (Shanghai Jiao Tong University), Yonghua Huang*

16:30 - 17:30 **THE NUKIYAMA MEMORIAL AWARD CEREMONY AND LECTURE**

Impacts of DNS and Advanced Laser Diagnostics on the Next-Generation IC Engine Development

Professor Mamoru Tanahashi (Tokyo Institute of Technology, Japan)

Chair: *Hideo Yoshida (Kyoto University)*

18:00 - 20:00 **BANQUET**

Friday, November 4 (DAY 3)

9:00 - 9:50 **KEYNOTE 05**

Towards Next Generation Solar Thermal Collectors: Keeping Things Hot and Cold

Professor Gary Rosengarten (RMIT University, Australia)

Chair: *Tsuyoshi Totani (Hokkaido University)*

10:00 - 10:50 **KEYNOTE 06**

On the Beauty of Field Synergy Principle for Enhancing Convective Heat Transfer

Professor Wen-Quan Tao (Xi'an Jiaotong University, China)

Chair: *Shigenao Maruyama (Tohoku University)*

11:00 - 12:30 **SESSION 08**

OS-09: Molecular and Nano-Scale Thermal Engineering

Chair: *Masahiro Motosuke (Tokyo University of Science)*

1839 **Effect of Hydrophilic Domains on Nanobubble Generation**

Takashi Nishiyama (Kyushu University), Ayumu Iwanaga, Koji Takahashi, Yasuyuki Takata*

1856 **Comparison of Closed Electrokinetic Cell Technique and Current Monitoring Technique for Zeta-Potential Measurement in Microchannel**

Kaede Hiratsuka (Sophia University), Takashi Suzuki, Mitsuhsa Ichianagi*

1876 **Molecular Mechanism for Thermal Boundary Conductance over Fluorinated SAM-Solvent Interfaces**

Mitsuru Nemoto (Tohoku University), Gota Kikugawa, Takeshi Bessho (Toyota Motor Corporation), Seiji Yamashita, Taku Ohara (Tohoku University)*

1888 **Interfacial Thermal Resistance of Step-Shaped Silicene Nanosheets by Molecular Dynamic Simulations**

*Yuan Feng (Tsinghua University), Xingang Liang**

1889 **Molecular Dynamics Mechanism to Determine Viscosity of Thermal Medium Liquids**

Satoru Harada (Tohoku University), Gota Kikugawa, Taku Ohara*

1896 **Study of the Vibrational Spectra and Vibrational Relaxation Pathways of DNA Nucleotides in Graphene Nanopore**

*Hiroki Mizuguchi (Toyama University), Tatiana Zolotoukhina**

1897 **Molecular Dynamics Study on Effect of Slit Structure at Nanometer Scale on Time and Spatially Resolved Interfacial Thermal Resistance during Condensation**

Masahiko Shibahara (Osaka University), Takanori Suwa, Kenshiro Matsui*

- 1899 **Wettability of Ionic Liquid on Single Carbon Nanotubes**
*Yutaka Yamada** (Okayama University), *Koji Takahashi* (Kyushu University), *Yasuyuki Takata*, *Khellil Sefiane* (University of Edinburgh), *Naoto Haruki* (Okayama University), *Akihiko Horibe*
- 1911 **Heat Conduction in Nanoporous Silicon Thin Films by Phonon Monte Carlo Simulations**
*Bingyang Cao** (Tsinghua University), *Yuchao Hua*
- 1919 **An Investigation of the Potential Barrier for Hydrogen Diffusion in Iron by Molecular Simulation with Quantum Effect**
*Shohei Ikawa** (Tohoku University), *Hiroki Nagashima* (University of the Ryukyus), *Shin-ichi Tsuda* (Kyusyu University), *Takashi Tokumasu* (Tohoku University)
- 1931 **Evaporation-Induced Aggregation of Nanoparticles Studied by Molecular Dynamics Simulations toward Understanding Deposit Formation in Internal Combustion Engines**
*Taisuke Sugii** (Hitachi, Ltd.), *Tomoyuki Hosaka*, *Kazuki Yoshimura*, *Eiji Ishii*
- 1955 **The Mechanism of Particle Formation under Microwave Irradiation by Addition of Glycerin**
Shungo Matsumura (University of Hyogo), *Shunsuke Nishijima*, *Yusuke Asakuma**
- 1984 **Molecular Dynamics Study on Evaporation of a Single Mixture Liquid Droplet**
*Hiroki Imori** (Osaka University), *Masahiko Shibahara*, *Yoshitaka Ueki*
- 1988 **Study on Thermal Conductivity and Spin Seebeck Effect in Nanostructured Bulk YIG**
*Asuka Miura** (The University of Tokyo), *Takashi Kikkawa* (Tohoku University), *Ken-ichi Uchida*, *Ryo Iguchi*, *Eiji Saitoh*, *Junichiro Shiomi* (The University of Tokyo)
- 1999 **Molecular Simulations of Water Adsorption and Transport in Non-uniform Silica Nanopores**
*Sho Nagatsu** (The University of Tokyo), *Hirofumi Daiguji*
- 2029 **Numerical Investigation of Dispersion/Aggregation Behaviors of Organic Modified Nanoparticles in Nanofluids under Shear Flow Conditions**
*Shin Usune** (Tohoku University), *Masaki Kubo*, *Takao Tsukada*, *Osamu Koike* (Products Innovation Association), *Masahiro Fujita* (Josai University), *Tadafumi Adschiri* (Tohoku University)
- 2036 **Electricity Generation of Nano-Thermophotovoltaic System Using Pillar-Array Structured Emitter**
*Naphatsorn Vongsoasup** (Tokyo Institute of Technology), *Katsunori Hanamura*
- 2039 **Energy Accommodation Coefficients of Reflecting Molecules at Non-equilibrium Condensing Surface**
*Atsushi Tokunaga** (NIT, Ube College), *Gyoko Nagayama* (Kyushu Institute of Technology), *Takaharu Tsuruta*

13:30 - 15:00 **SESSION 09**

OS-01: Bio and Medical, OS-08: Mass Transfer, OS-10: Radiation

Chair: *Satoshi Ito* (Tohoku University)

- 1836 **A Numerical Study of Hyperbolic Heat Conduction: Non-Fourier Effect of Laser-Mediated Thermal Behaviors in Bio-Tissues**
*Yong Zhang** (Xi'an Jiaotong University), *Bin Chen*, *Dong Li*
- 1840 **Numerical Investigation on Photo-disruption of Dermal Blood Vessels with Multiple Pulses in Laser Skin Surgery**
*Hao Jia ** (Xi'an Jiaotong University), *Dong Li*, *Bin Chen*
- 1910 **Investigation of Effect of Skin Structure and Temperature Distribution in Body on Non-Invasive Measurement of Effective Thermal Conductivity of Human Skin**
*Takahiro Okabe** (Hirosaki University), *Junnosuke Okajima* (Tohoku University), *Taku Fujimura*, *Atsuki Komiya*, *Setsuya Aiba*, *Shigenao Maruyama*
- 1921 **Voxel-Based Simulation of Air-Conditioning in the Human Nasal Cavity**
*Shinya Kimura** (Chiba University), *Yusuke Kimura*, *Takashi Sakamoto*, *Gaku Tanaka*, *Toshihiro Sera* (Kyushu University), *Hideo Yokota* (RIKEN), *Kenji Ono*
- 1944 **Effects of Pulse Repetition and Interval on Cell Mortality by Irreversible Electroporation**
*Masahiro Yoshida** (Kyushu University), *Shuto Yoshimatsu*, *Kosaku Kurata*, *Hiroshi Takamatsu*

- 1881 **An Improvement of Diffusion-Limited Model with Implicit Initial Condition and the Physical Mechanism Based on Thermal Engineering to Fabricate Light Emitting Diodes from Liquid Solution**
*Hiromoto Susawa** (*The Originator of Light Emitting Diode with Distributed Bragg Reflector*)
- 1915 **Effects of Heating Methods on Drying Performance and Shrinkage Deformation of Foods (Comparison between Microwave and Warm-Air Heating)**
*Keita Yamawaki** (*Kyushu Institute of Technology*), *Akiyoshi Nakakura*, *Hirofumi Tanigawa*, *Takaharu Tsuruta*
- 1977 **Estimation of Mass Transfer Coefficient in Microchannel by Using Luminol Reaction**
*Ryosuke Mizuguchi** (*Kansai University*), *Ryosuke Matsumoto*
- 2030 **Relation between Crack Formation and Spatial Structures of Nanoparticles in Polymer Composite Thin Films during Solvent Casting**
*Naoto Kobayashi** (*Tohoku University*), *Masaki Kubo*, *Takao Tsukada*, *Seiichi Takami*, *Tadafumi Adschiri*
- 2053 **Controlled Mixing and Surface Reaction by Microscale Property Variation of Liquid**
*Masahiro Motosuke** (*Tokyo University of Science*), *Motoki Hino*, *Ken Yamamoto*
- 1827 **Effect of Ink Dot Area on the Color Phase in Ink Jet Printing**
*Hiroki Gonome** (*Shibaura Institute of Technology*) *Yuki Ishikawa*, *Takahiro Kono*, *Jun Yamada*
- 1843 **Enhancement of Thermal Transport in Polymers Using Control of Thermal Radiation Spectrum for Thermal Management of Electronic Devices**
*Shinichiro Tsuda** (*Tohoku University*), *Makoto Shimizu*, *Fumitada Iguchi*, *Hiroo Yugami*
- 1851 **Wavelength-Selective Heating in Drying Furnace Using Meta-Material**
*Tsuyoshi Totani** (*Hokkaido University*), *Yoshio Kondo* (*"NGK Insulators, Ltd.*), *Hiroshi Yamaki* (*Asahi Kasei E-materials Corporation*), *Atsushi Sakurai* (*Niigata University*)
- 1892 **Performances of a Few-Layer Metallo-Dielectric Absorber-Emitter for Solar-Thermophotovoltaics**
*Makoto Shimizu** (*Tohoku University*), *Asaka Kohiyama*, *Etienne Blandre* (*Universite de Lyon 1, CNRS, INSA-Lyon*), *Olivier P. Chapuis*, *Rodolphe Vaillon*, *Hiroo Yugami* (*Tohoku University*)
- 1937 **Thermal Radiation of Spectrally Selective Solar Absorber Based on MOD Method**
*Zhuoya Zheng** (*Kyushu Institute of Technology*), *Tomohide Yabuki*, *Laurent Tranchant*, *Atsushi Sakurai* (*Niigata University*), *Koji Miyazaki* (*Kyushu Institute of Technology*)
- 1966 **Experimental Detection of Enhanced Thermal Properties of Glass Thin Films due to Long Range Surface Phonon-Polaritons**
*Laurent Tranchant** (*Kyushu Institute of Technology*), *Jose Ordonez-Miranda* (*CNRS, Universite de Poitiers-ENSMA*), *Taihei Matsumoto* (*Kyushu Institute of Technology*), *Sebastian Volz* (*CNRS, Universite Paris-Saclay*), *Koji Miyazaki* (*Kyushu Institute of Technology*)
- 1978 **Electromagnetic Resonances of High Temperature Solar-Selective Absorbers with Refractory Nanoparticle Arrays**
*Tomoaki Kawamata** (*Niigata University*), *Atsushi Sakurai*

15:00 - 16:30 **SESSION 10**

OS-04: Computational Heat and Mass Transfer

Chair: *Kosaku Kurata* (*Kyushu University*)

- 1834 **Porosity Distribution Optimization for Methanol Decomposition in Solar Parabolic Trough Receiver-Reactor by the Variational Method**
*Yun Liu** (*Tsinghua University*), *Kang Hu*, *Junhong Hao*
- 1871 **Numerical Study of Temperature Control in Tablet Computers Using Phase Change Materials Thermal Energy Storage**
Benjamin Sponagle (*Dalhousie University*), *Dominic Groulx**
- 1882 **Modelling of Transport Phenomena in Horizontal CVD for Silicon Epitaxial Growth from Dichlorosilane**
*Imama Zaidi** (*Chonbuk National University*), *Yeonho Jang*, *Dong Guk Ko*, *Ik-Tae Im*
- 1890 **Thermal Rectification over Solid-Liquid Interfaces of Gold (Au) Contacting Liquid Methane (CH₄)**

- Abdul Rafeq Saleman* (Tohoku University), Hari Krishna Chilukoti, Gota Kikugawa, Taku Ohara*
- 1902 **Numerical Analysis of TEFC Induction Motor Using Thermal Network Method**
Huan-Sen Peng (TECO Electric & Machinery Co., Ltd.)*
- 1912 **Thermal Management of Payload Data Processing and Storage Unit**
Erdirinç Mermer (Tubitak Space Technologies Research Institute), Barış Mıhçak, Altuğ Okan, İsa Kavas*
- 1918 **Molecular Dynamics Simulation of Droplet, Bubble, and Crystal Nucleation**
Donguk Suh (Keio University), Kenji Yasuoka*
- 1939 **Numerical Simulation of Thermal Convection in a Supercritical State with Cartesian Mesh Method**
Takashi Furusawa (Tohoku University), Masaaki Tange, Kenji Kagaya, Hironori Miyazawa, Satoru Yamamoto*
- 1958 **DNS for Observation of Combined Turbulent Boundary Layer along Vertical Flat Plate Having Thermal Entrance Region**
Kazuki Oura (Nagoya Institute of Technology), Hirofumi Hattori, Tomoya Houra, Masato Tagawa*
- 1963 **Applications of Laplace Adomian Decomposition Method for Heat Transfer and Thermal Stress Analysis of Annular Fins**
*Hsiang-Wen Tang (National Cheng Kung University), Yu-Ting Chen, Cha'o-Kuang Chen**
- 1979 **Heat and Moisture Transfer in a Desiccant Airflow Unit for Air-Conditioning Applications**
Wei-Lun Hsu (The University of Tokyo), Soumyadeep Paul (The University of Tokyo, Indian Institute of Technology), Jubair A. Shamim (The University of Tokyo), Hirofumi Daiguji*
- 1995 **Convective Heat Transfer Analysis of Stirred Tank by the Lattice Boltzmann Method**
Shing-Cheng Chang (National Cheng Kung University), Chieh-Li Chen, Yan-Bai Lin*
- 2010 **Numerical and Experimental Investigation on the Effect of Thermo-Fluid Distribution on Gas Species Transport Characteristics in a PEMFC Membrane**
Sabrina Yousfi (Ecole Polytechnique Federale de Lausanne), Nguyen The Truc (Tokyo Institute of Technology), Shun Ito, Saiful Hasmady (Universiti Tenaga Nasional), Doan Hong Duc (University of Engineering and Technology), Kazuyoshi Fushinobu (Tokyo Institute of Technology)*
- 2026 **Numerical Simulation of Solidification in an Annulus with the Presence of Density Difference**
Truong V. Vu (Hanoi University of Science and Technology), Anh V. Truong, Anh D. Le (Tohoku University)*
- 2033 **Modeling of Flow and Heat Transfer to Supercritical Fluids in Tubes by Integral Boundary Layer Equations**
Yufei Mao (Hohai University), Qingjun Liu, Tian Yang, Fei Cao, Tianyu Zhu*
- 2051 **Numerical Study of Laminar Forced Convection Cooling of Electronic Component Mounted on a Substrate**
Yassine Kabar (Jijel University), Rachid Bessaih (Freres Mentouri Constantine University)*
- 2056 **Numerical Simulation of Heat Transfer on a Small Heated Surface in Solid-Gas Two Phase Flow in a Vertical Duct by Coupled DEM-LBM**
Tomohiko Yamaguchi (Nagasaki University), Akira Tsutsui, Satoru Momoki*
- 2058 **Dynamic Behavior of Hydrogen Temperature and Pressure during Filling**
Taichi Kuroki (Kyushu University), Naoya Sakoda, Kan'ei Shinzato, Masamichi Kohno, Masanori Monde (Saga University), Yasuyuki Takata (Kyushu University)*

16:30 - 16:45 **CLOSING**

