Preface

Welcome to the Nineteenth International Conference on Flow Dynamics (ICFD2022) hosted by the Institute of Fluid Science, Tohoku University.

As you all know, the world has been greatly affected by COVID-19 for the past two years, and conferences have been held mainly online, but we are finally overcoming this threat. So this year, we have decided to hold the conference in person after a long time. However, the pandemic has not been contained completely. Therefore, we have decided to hold ICFD2022 as a hybrid format with some of the presentations online, with the safety of the participants as our priority.

Flow Dynamics is an Integrated Flow Science that deals with the flow and transport phenomena concerning electrons, molecules and nanoparticles, any continuum fluids and materials, energy, information, and so forth. ICFD is expected to play significant roles in helping Flow Dynamics be a significant academic discipline that deals with various issues that human society faces, such as new energy, environment, resource, and diseases.

ICFD works as a platform of discussion to reach scientific truth and engineering solutions for all the flow-relevant problems. A wide variety of sessions are organized in ICFD to provide the seeds and fulfill the needs from the viewpoint of Flow Dynamics. We would be very grateful if it contributes to initiating scientific and technical exchanges and international research collaboration.

Another significance of this conference is that it provides unique opportunities for young researchers and students to be educated and self-developed through participation and presentation in the Student Session and special events.

The technical program consists of 3 Plenary Lectures, 1 General Session, 23 Organized Sessions, starting in the morning on Wednesday, November 9. Approximately 403 papers will be presented. It is our great pleasure to meet a large number of participants during the conference.

On behalf of the ICFD2022 organizing committee, we hope you would enjoy fruitful discussions and exchanges of information, and we would like you to have the opportunities to strengthen your friendships and meet new friends.

Hiroki Nagai, Professor,
Institute of Fluid Science,
Tohoku University
and
Chih-Yung Huang, Professor,
Department of Power Mechanical Engineering,
National Tsing Hua University
General Co-Chairs, ICFD2022

Nineteenth International Conference on Flow Dynamics

Organized by:

- Executive Committee of International Conference on Flow Dynamics

Supported by:

- Institute of Fluid Science, Tohoku University

In cooperation with:

- CFD-Bio
- Combustion Society of Japan
- Computational Science and Engineering Division, Atomic Energy Society of Japan
- Cryogenics and Superconductivity Society of Japan
- Japan Aerospace Exploration Agency
- Japan Foundry Engineering Society
- Japan Society of Maintenology
- Japanese Society of Biorheology
- The Electrochemical Society of Japan
- The Japan Society for Aeronautical and Space Sciences
- The Japan Society for Computational Engineering and Science
- The Japan Society of Applied Electromagnetics and Mechanics
- The Japan Society of Fluid Mechanics
- The Japan Society of Mechanical Engineers
- The Japan Society of Microgravity Application
- The Japanese Society for Multiphase Flow

Supported by a grant from:

- Intelligent Cosmos Academic Foundation

Projects celebrating the 115th Anniversary of Tohoku University's founding and 100th Anniversary as a Comprehensive University

SCOPE:

The 19th International Conference on Flow Dynamics (ICFD2022), in the annual series since 2004, will be held from November 9th to 11th, 2022 at Sendai, Japan. The objective of this conference is to explore new horizons in science and technology in Flow Dynamics by discussing and exchanging information related to the most advanced scientific fields and to cutting edge technologies. ICFD is now recognized by the researchers and engineers all over the world as one of the largest and the most important international conferences in the field of Flow Dynamics. It has also been playing an important role in promoting international research collaborations. Especially, ICFD2022 focuses on energy related topics, such as clean energy, hydrogen energy, and natural energy. In addition, it should be noted that ICFD provides young researchers and students with unique opportunities to develop themselves through proactive participation in the conference and young researchers and students are encouraged by awards.

The first nine ICFDs were hosted by two Tohoku University COE Programs, "The 21st Century International COE on Fluid Dynamics (21COE, Year 2003 - Year 2007)" and its successor "Global COE Program World Center of Education and Research for Trans-disciplinary Flow Dynamics (GCOE, Year 2008 - Year 2012)". Institute of Fluid Science (IFS), Tohoku University, was responsible for both 21COE and GCOE programs. GCOE ended in March of 2013. In 2013, on the occasion of its 70th anniversary, IFS was reorganized as an even more powerful research institute, particularly in energy-related research, with three new research divisions and an Innovative Energy Research Center. In this movement, IFS decided to continue to support this conference series, and ICFDs have been held annually since 2013. We pledge to maintain ICFD's dynamism and spirit as a meeting for distinguished scientists in Flow Dynamics as well as for future generations of scientists and engineers.

Flow Dynamics is an Integrated Flow Science which deals with flow and transport phenomena concerning electrons, molecules, nanoscale particles, any continuum fluid with and without chemical reaction, any material, energy, information, economic activity and so forth. It addresses multiscale, multiphysics and multidisciplinary problems and deals with all-natural phenomena including bio-processes, corrosion, weather, volcanic eruptions, earth magnetic field and tectonic motions, and in most human activities such as industrial processes, energy production & saving, and transportation. ICFD is expected to play a significant role in encouraging Flow Dynamics to become a major academic discipline, which deals with various difficult tasks that human

society is facing, such as control of nuclear power generators, global warming, energy, resource and diseases. We expect all scientists and engineers who are working or are interested in such areas to participate in ICFD2022 and extend their research areas and international human networks.

ICFD serves as a platform of discussion to reach scientific truth and engineering solutions for all the flow-relevant problems. We cordially invite researchers, teachers, students and planners exploring and studying in the relevant research and development fields of energy, bio-, nano-, material, environmental, planetary and earth sciences and technologies, particularly in the academic fields of mechanical engineering, aerospace engineering, nuclear engineering, physics, medical science and engineering, chemistry, chemical engineering and all other areas.

We are still in the middle of the COVID-19 pandemic and we are not sure if we can get together at Sendai in November 2022 or not. If so, we believe that you will enjoy beautiful and pleasant atmosphere of the autumn at Sendai, since the beginning November is the best season of Sendai. If not, we will do our best to make ICFD2022 successful as the online conference.

CONFERENCE COMMITTEE:

Executive Committee Members:

Hiroki Nagai (General Co-Chair of ICFD2022, Tohoku University)

Chih-Yung Huang (General Co-Chair of ICFD2022, National Tsing Hua University)

Kaoru Maruta (IFS Director, Tohoku University)

International Scientific Committee Members:

Chair: Shigeru Obayashi (Tohoku University)

Australia

Masud Behnia (Macquarie University)
Weihua Li (University of Wollongong)
Gary Rosengarten (RMIT University)
Victoria Timchenko (The University of NSW)

Canada

Javad Mostaghimi (University of Toronto)

China

Zhenmao Chen (Xi'an Jiaotong University)
XinGang Liang (Tsinghua University)
Jinhao Qiu (Nanjing University of Aeronautics and Astronautics)

France

Christophe Bogey (ECL)
Jean-Yves Cavaillé (INSA de Lyon)
Philippe Dagaut (CNRS-INSIS)
Vincent Fridrici (ECL)
Alexis Giauque (ECL)
Gael Sebald (INSA de Lyon-CNRS)

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Christian Boller (Saarland University)

Japan

Debasish Biswas (Toshiba Ltd.)
Ketaro Doi (Toyohashi University of Technology)
Yuji Hattori (Tohoku University)
Jun Ishimoto (Tohoku University)
Takatoshi Ito (Tohoku University)
Satoyuki Kawano (Osaka University)
Hideaki Kobayashi (Tohoku University)
Kazunori Kuwana (Tokyo University of Science)
Kaoru Maruta (Tohoku University)
Hideya Nishiyama (Osaka University)
Taku Ohara (Tohoku University)
Akihiro Sasoh (Nagoya University)
Takehiko Sato (Tohoku University)
Masaya Shigeta (Tohoku University)
Toru Shimada (Japan Aerospace Exploration Agency)
Toshiyuki Takagi (Tohoku University)
Michio Tokuyama (Tohoku University)
Satoru Yamamoto (Tohoku University)
Kazuya Yoshida (Tohoku University)

Korea
Jinsoo Cho (Hanyang University)
Nam Il Kim (KAIST)
Hyung Jin Sung (KAIST)
Russia
Sergey S. Minaev (Far-Eastern Federal University)
Saudi Arabia
Hong G. Im (King Abdullah University of Science and Technology)
Sweden
Fredrik Lundell (KTH Royal Institute of Technology)
Switzerland
Bastien Chopard (University of Geneva)
Taiwan
Chingyao Chen (National Yang Ming Chiao Tung University)
Chih-Yung Huang (National Tsing Hua University)
Jongshinn Wu (National Yang Ming Chiao Tung University)
Yao-Hsien Liu (National Yang Ming Chiao Tung University)
USA
Igor V. Adamovich (The Ohio State University)
Jeongmin Ahn (Syracuse University)
Yiguang Ju (Princeton University)
Kozo Saito (University of Kentucky)
Rongjia Tao (Temple University)

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	Sung-Jin Kim (KAIST)
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USA	Louis N. Cattafesta III (University of Florida)
	Ishwar K. Puri (Virginia Tech)
	John P. Sullivan (Purdue University)
	Satish Udpa (Michigan State University)

Organizing Committee Members:

Akihiro Hayakawa (Chair), Kaoru Maruta, Hisanori Masuda, Hiroki Nagai, Toshihiro Ogawa, Junnosuke Okajima, Anna Suzuki, Yoshitaka Suzuki, Takashi Tokumasu (Observer) Tomohiro Okazaki

ICFD2022 Secretariat:

Natsuko Hatakeyama, Kazumasa Takahashi, Tomomi Nagayoshi

Plenary Lectures

Professor Konstantinos Kontis (University of Glasgow, UK)
Title: "Some Multi-Disciplinary Advancements in Fluid Dynamics"

Professor Khalid M. Saqr (Alexandria University Hospital, Egypt / Bio-CFD Inc, USA)
Title: "Physiologic Blood Turbulence: Shifting the Mechanistic Paradigm of Vascular Disease"

Professor Hideaki Kobayashi (Tohoku University, Japan)
Title: "Ammonia Combustion for Gas Turbine Power Generation"

Sessions

General Session

GS1: **General Session**
Co-Organizers: H. Nagai, A. Hayakawa (Tohoku University)

Organized Session

OS1 &OS3: **The Tenth International Symposium on Innovative Energy Research I &III**
OS1: Advanced Materials and its Energy Application
Organizer: S. Samukawa (National Yang Ming Chiao Tung University)
OS3: Multiphase Energy Science and Technology (Combination of Monozukuri-Fluid Science / Engineering)
Organizer: J. Ishimoto (Tohoku University)

OS2: **The Tenth International Symposium on Innovative Energy Research II - Combustion Technology and Fundamentals**
Co-Organizers: P. Dagaut (CNRS-INSIS), H. Im (King Abdullah University of Science and Technology), N. I. Kim (KAIST), K. Maruta (Tohoku University)

OS4: **Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition**
Co-Organizers: T. Shimada (Japan Aerospace Exploration Agency), K. Sawada (Tohoku University / National Institute of Technology, Sendai College)

OS5: **Advanced Applications of Multi-functional Fluids**
Co-Organizers: H. Takana (Tohoku University), T. Fujino (University of Tsukuba), K. Doi (Toyohashi University of Technology), N. Takeuchi (Tokyo Institute of Technology), Y. Iwamoto (Nagoya Institute of Technology)

OS6: **Free Flight Experiment with MSBS and Ballistic Range**
Co-Organizers: S. Obayashi (Tohoku University), K. Seo (Kogakuin University), H. Nagai (Tohoku University)

OS7: **Smart Fluids & Soft Matters and Their Advanced Applications**
Co-Organizers: M. Nakano (Tohoku University), X. Gong (University of Science and Technology of China), W. Li (University of Wollongong), G. Sebald (INSA Lyon-CNRS-Tohoku University)

OS8: **Advanced Physical Stimuli and Biological Responses**
Co-Organizers: T. Sato (Tohoku University), T. Ohashi (Hokkaido University), S. Kawano (Osaka University), R. Shirakashi (The University of Tokyo), Y.-C. Cheng (National Yang Ming Chiao Tung University)

OS9: **Biomedical Flow Dynamics**
Co-Organizers: H. Anzai (Tohoku University), M. Zhang (Macquarie University), K. Takashima (Kyushu Institute of Technology), T. Nakayama (National Institute of Technology, Nara College), A. Qiao (Beijing University of Technology), M. Ohta (Tohoku University)

OS10: **Biomolecular Dynamics**
Co-Organizers: Y. Mukai (Meiji University), K. Etchuya (Aoyama Gakuin University), M. Ohta (Tohoku University)

OS11: **Microfluidics and Microphysiological Modeling**
Co-Organizers: K. Funamoto (Tohoku University), T. Fukui (Kyoto Institute of Technology), T. Omori (Tohoku University), E. Corvera Poiré (National Autonomous University of Mexico)

OS12: **Complex Thermofluid System**
Co-Organizers: C.-Y. Chen, Y.-H. Liu, Y.-H. Liao (National Yang Ming Chiao Tung University)

OS13: **Flow Realization, Measurement and Visualization**
Co-Organizers: T. Yamagata (Niigata University), S. Funatani (Yamanashi University), S. Iio (Shinshu University), K. Funamoto (Tohoku University)

OS14: **Porous Media**
Co-Organizers: A. Suzuki (Tohoku University), S. Tupin (Imperial College London), Makoto Ohta (Tohoku University)

OS15: **Turbulence: from Fundamentals to Applications**
Co-Organizers: Y. Hattori (Tohoku University), T. Ishihara (Okayama University), Y. Tsuji (Nagoya University)

OS16: **Vortex Motion**
Co-Organizers: Y. Hattori (Tohoku University), S. Llewellyn Smith (UCSD)

OS17: **Supercritical Fluid**
Co-Organizers: Y. Kanda (Tohoku University), Y. Feng (Chinese Academy of Sciences), Y. Hu (Xi'an Jiaotong University), A. Komiya (Tohoku University)

OS18: Canceled

OS19: **Fluid Flow Experiment in Geoscience**
Co-Organizers: Y. Mukuhira (Tohoku University), T. Ishibashi (AIST)

OS20: **Liaison Office Session**
Co-Organizers: M. Ohta, T. Uchimoto, T. Tokumasu, A. Komiya (Tohoku University)

OS21: **The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics**
Co-Organizers: A. Tsunoda, K. Nomoto, M. Ono (Tohoku University)
Supervisors: A. Suzuki, S. Takeda, Y. Kanda, J. Okajima (Tohoku University)

OS22: **The 22nd International Symposium on Advanced Fluid Information (AFI-2022)**
IFS Collaborative Research Forum
Co-Organizers: H. Masuda, H. Nagai (Tohoku University)
Fluid Science Research Award Lectures

OS23: **IFS Lyon Center Collaborative Research Forum**
Organizer: T. Uchimoto (Tohoku University)

OS24: **JSPS Core to Core program workshop**
-Construction of an international research exchange center for ammonia combustion and materials toward the realization of a low-carbon society-
Co-Organizers: T. Tokumasu (Tohoku University), N. Mary (INSA-Lyon), L. Y. Huang (University of Washington), M. Sarathy (KAUST), Y. Li (National Yang Ming Chiao Tung University)

General Information

Please wear a mask, disinfect hands on site. Thank you for your cooperation.

Opening: 9:00-, Wednesday, November 9 @ EX-2 & EX-1

ISC Meeting (closed): 14:10-14:30, Wednesday, November 9 @ EX-3-B

Exhibition Hall & Virtual Exhibition: Three Days @ CON-4 (13:00-19:00, Nov. 9 / 9:00-18:00, Nov. 10 / 9:00-16:00, Nov. 11) & Remo

Exhibitor Presentation Session by Nobby Tech. Ltd. 12：15-, Thursday, November 10 @ EX-2
nac Image Technology Inc. 12：30-, Thursday, November 10 @ EX-2
PHOTRON LIMITED 12：45-, Thursday, November 10 @ EX-2

Room for AFI: Three Days @ CON-SHIRAKASHI2

Coffee Service: Three Days @ CON-4 (Please take a seat and drink, and refrain from chatting with your mask off. Thank you.)
13:00-19:00, Nov. 9
9:00-18:00, Nov. 10
9:00-16:00, Nov. 11

Lunch Information: See MAP

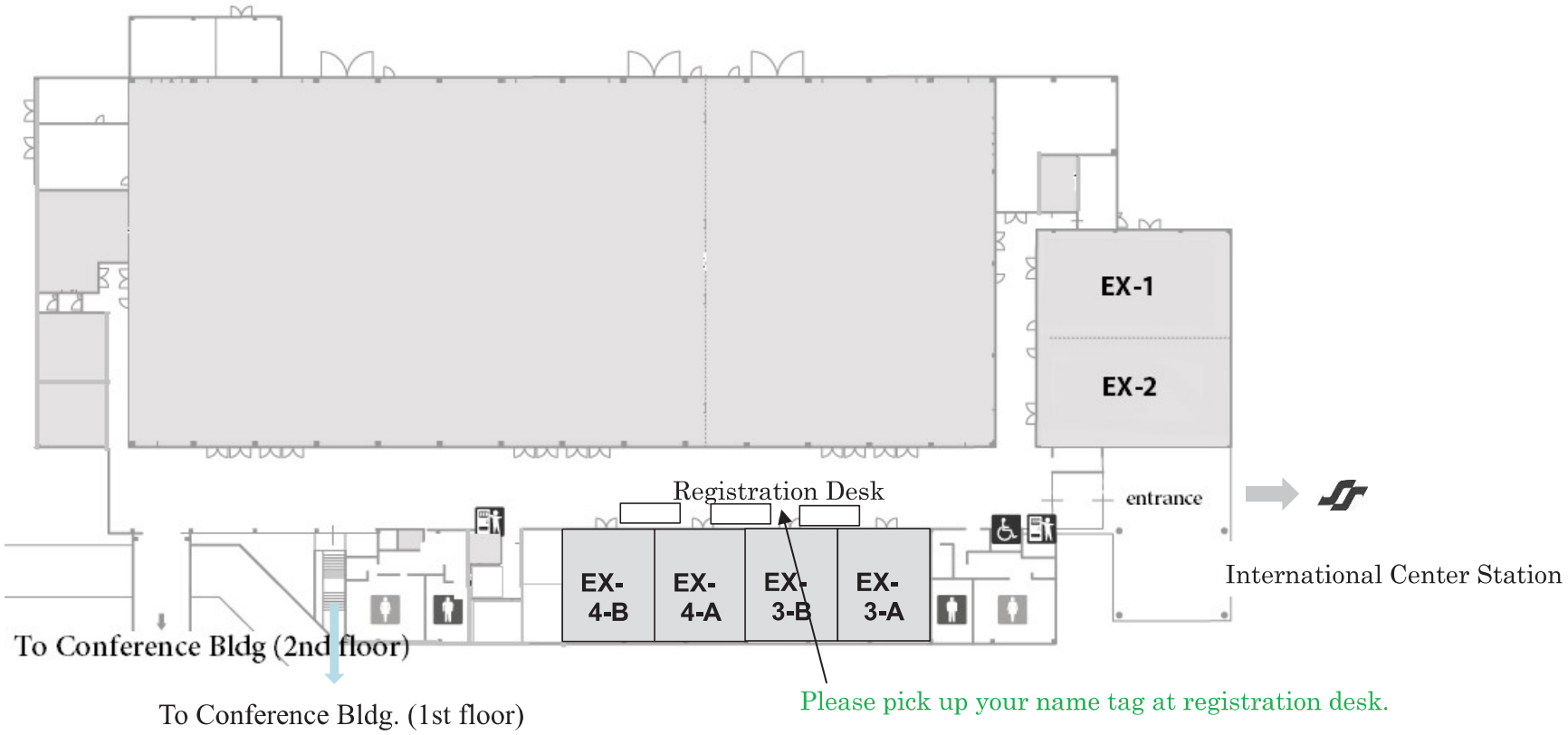
IFS Virtual Tour:
17:00-, Friday, November 11@EX-3-B

Floor Plan of Sendai International Center

Exhibition building

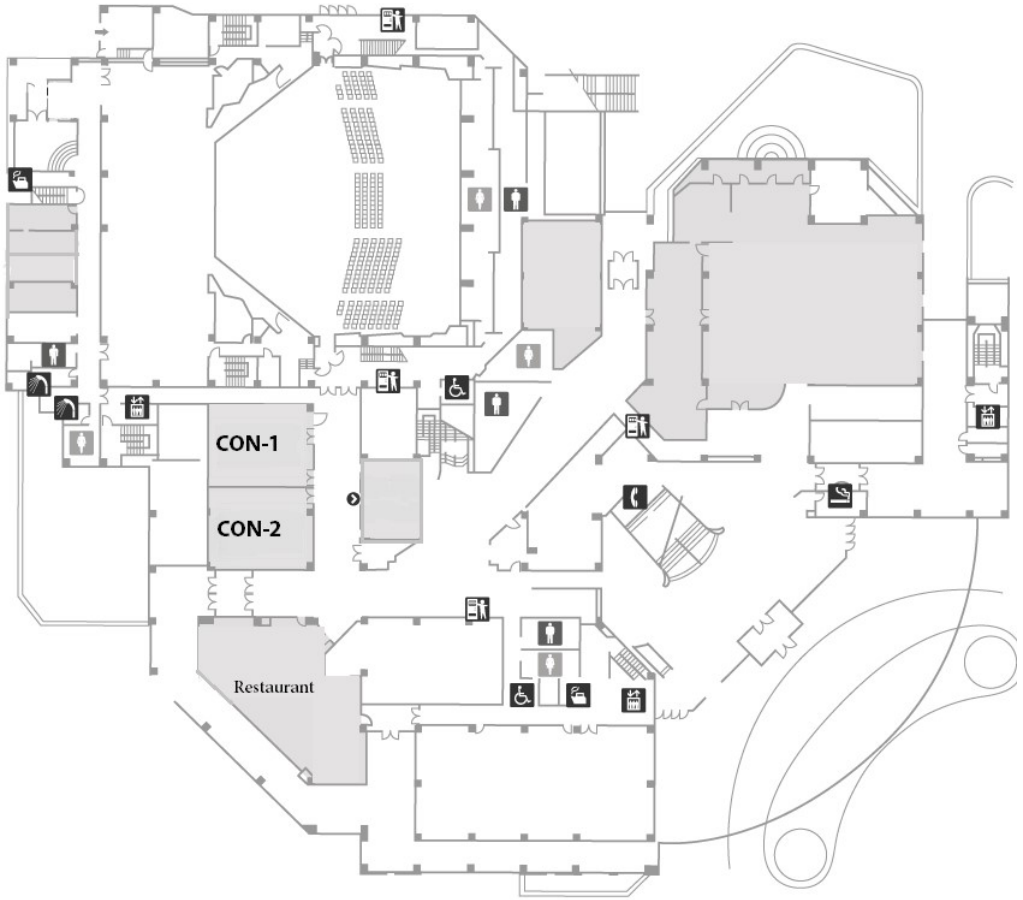
Exhibition building **1st Floor**

(EX-1, EX-2, EX-3-A, EX-3-B, EX-4-A, EX-4-B)

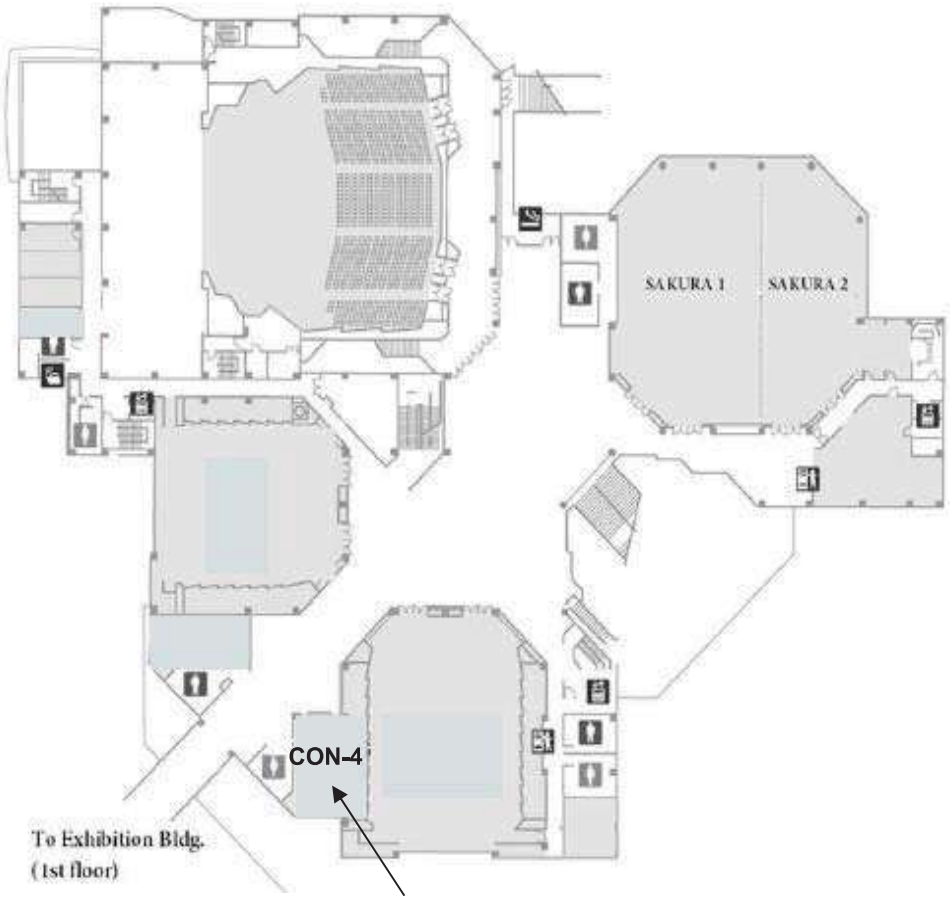


Conference building

Conference building **1st Floor**
(CON-1, CON-2)

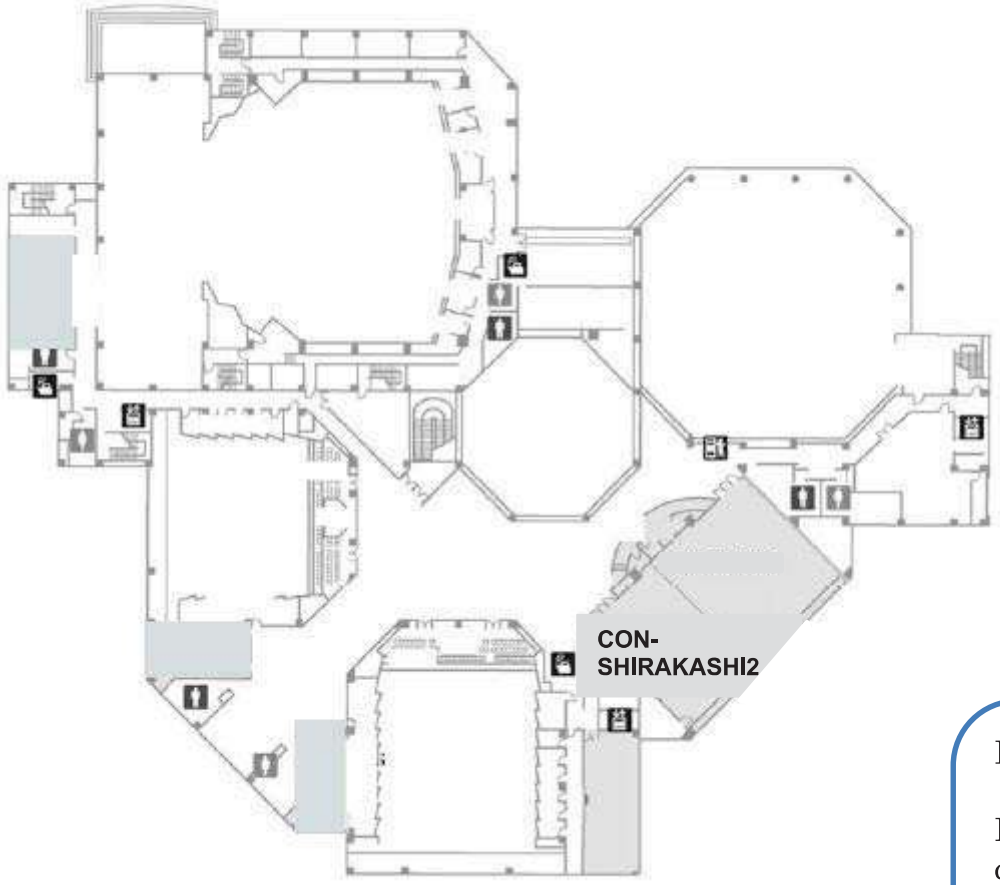


Conference building **2nd Floor**
(CON-SAKURA)



Exhibitor Hall & Coffee Service
13:00-19:00, Nov. 9
9:00-18:00, Nov. 10
9:00-16:00, Nov. 11

Conference building **3rd Floor**
(CON-SHIRAKSHI)



Please wear a mask in Sendai International Center.

If you feel unwell like symptoms of a cold such as a fever, cough, shortness of breath, fatigue, please stay at your home or hotel.

Your cooperation and understanding is appreciated.

	EX-1 (satellite) & EX-2					
9:00	**Opening Address & Plenary Lectures**					
12:10						
14:10	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA2	Remo
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS8: Advanced Physical Stimuli and Biological Responses	14:10-14:40 ISC Meeting (closed session)	OS12: Complex Thermofluid System		OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics	
15:40							
15:50	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA2	Remo
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS8: Advanced Physical Stimuli and Biological Responses	OS11: Microfluidics and Microphysiological Modeling	OS12: Complex Thermofluid System	OS14: Porous Media		OS22: IFS Collaborative Research Forum (AFI-2022)
17:20							
17:30	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA2	Remo
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS8: Advanced Physical Stimuli and Biological Responses	OS11: Microfluidics and Microphysiological Modeling	OS16: Vortex Motion	OS14: Porous Media		
19:00							

Thursday, November 10, 2022

	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	
9:00	OS1&OS3:The Tenth International Symposium on Innovative Energy Research I & III	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop		OS11: Microfluidics and Microphysiological Modeling	OS12: Complex Thermofluid System	OS13: Flow Realization, Measurement and Visualization		OS7: Smart Fluids & Soft Matters and Their Advanced Applications	OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics		9:00
10:30											10:30
10:40	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	10:40
	OS1&OS3:The Tenth International Symposium on Innovative Energy Research I & III	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS5: Advanced Applications of Multi-functional Fluids	OS11: Microfluidics and Microphysiological Modeling	OS12: Complex Thermofluid System	OS13: Flow Realization, Measurement and Visualization	OS17: Supercritical Fluid	OS7: Smart Fluids & Soft Matters and Their Advanced Applications	OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics		
12:10		Exhibitor Presentation Session									12:10
13:10	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	13:10
		OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS5: Advanced Applications of Multi-functional Fluids	OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition	OS12: Complex Thermofluid System	OS13: Flow Realization, Measurement and Visualization	OS17: Supercritical Fluid	OS7: Smart Fluids & Soft Matters and Their Advanced Applications	OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics	OS22: IFS Collaborative Research Forum (AFI-2022)	
14:40											14:40
14:50	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	14:50
	OS22: Fluids Science Research Award Lectures	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS5: Advanced Applications of Multi-functional Fluids	OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition	OS12: Complex Thermofluid System	OS13: Flow Realization, Measurement and Visualization	OS17: Supercritical Fluid	OS7: Smart Fluids & Soft Matters and Their Advanced Applications		OS22: IFS Collaborative Research Forum (AFI-2022)	
16:20											16:20
16:30	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	16:30
		OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	OS5: Advanced Applications of Multi-functional Fluids	OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition	OS12: Complex Thermofluid System	OS13: Flow Realization, Measurement and Visualization		OS7: Smart Fluids & Soft Matters and Their Advanced Applications			
18:00											18:00

	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	
9:00	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop		OS6: Free Flight Experiment with MSBS and Ballistic Range	OS9: Biomedical Flow Dynamics & OS10: Biomolecular Dynamics	OS15: Turbulence: from Fundamentals to Applications		9:00
10:30							10:30
10:40	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	10:40
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	GS: General Session	OS6: Free Flight Experiment with MSBS and Ballistic Range	OS9: Biomedical Flow Dynamics	OS15: Turbulence: from Fundamentals to Applications		
12:10							12:10
13:10	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	13:10
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	GS: General Session	OS19: Fluid Flow Experiment in Geoscience	OS9: Biomedical Flow Dynamics	OS15: Turbulence: from Fundamentals to Applications		
14:40							14:40
14:50	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	14:50
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	GS: General Session	OS19: Fluid Flow Experiment in Geoscience	GS: General Session	OS15: Turbulence: from Fundamentals to Applications	OS22: IFS Collaborative Research Forum (AFI-2022)	
16:20							16:20
16:30	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	16:30
	OS2: Combustion Technology and Fundamentals & OS20: Liaison Office Session & OS23: IFS Lyon Center Collaborative Research Forum & OS24: JSPS Core to Core program workshop	GS: General Session	IFS Virtual Tour	GS: General Session	OS15: Turbulence: from Fundamentals to Applications		
18:00							18:00

9:00

EX-1 (Satellite room) & EX-2

9:00-9:20 **Opening Address**

9:20-12:00 **Plenary Lectures**

9:20-10:10
"Some Multi-Disciplinary Advancements in Fluid Dynamics"
Konstantinos Kontis
Chair: Chih-Yung Huang

10:15-11:05
"Physiologic Blood Turbulence: Shifting the Mechanistic Paradigm of Vascular Disease"
Khalid M. Saqr
Chair: Makoto Ohta

11:10-12:00
"Ammonia Combustion for Gas Turbine Power Generation"
Hideaki Kobayashi
Chair: Kaoru Maruta

12:10

BREAK

14:10

EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA	Remo
OS20:Liaison + OS2:Combustion, OS23:Lyon, OS24:C2C	**OS8: Advanced Physical Stimuli and Biological Responses** *Chair: Y.-C. Cheng*	**ISC Meeting <closed session>**	**OS12: Complex Thermofluid System** Viscous Fingering *Chair: C.-Y. Chen*		**OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics**	
14:40- Introduction 14:45-14:55 Tohoku University *Prof. Toshiya Ueki* 14:55-15:05 INSA-Lyon *Prof. Nicolas Mary* 15:05-15:15 IFS (core to core) *Prof. Takashi Tokumasu* 15:15-15:25 KAIST *Prof. Kenichi Funamoto* 15:25-15:35 ECL *Prof. Vincent Fridrici* 15:35-15:45 Question time	**14:05-**14:10 Opening *T. Sato, T. Ohashi, Y.-C. Cheng* 14:10-14:50 OS8-1 *Invited* Preparation of Sub-100-Micron Calcium-Alginate Microspheres Using Nitrogen Flow Focusing: Dependence of Spherical Shape on Gas Streams *Y.-L. Wang, J.-J. Hu* 14:50-15:05 OS8-2 Morphologic Characteristics and Mechanical Properties of Cancellous Bones *C.-G. Xu, W.-Y. Jang* 15:05-15:20 OS8-3 Classification of Ion Current Pulses by Machine Learning Methods Integrating Large Deviation Principles *N. Maegawa, H. Yamazaki, K. Doi, S. Kawano* 15:20-15:35 OS8-4 Coupling Between the Rotational and Translational Dynamics of Water in Lysozyme Solutions *K. Hu, R. Shirakashi*	14:10-14:30 ISC Meeting	14:10-14:30 OS12-1 *Invited* Arresting Effect on Interfacial Phase Separation by an Imposed Flow *R. X. Suzuki, T. Ban, S. Seya, M. Mishra, Y. Nagatsu* 14:30-14:45 OS12-2 Effect of Pe on Miscible Viscous Fingering with Effective Interfacial Tension *Y. Deki, Y. Nagatsu, M. Mishra, R. X. Suzuki* 14:45-15:00 OS12-3 *Invited* Stabilization of Viscous Fingering in a Partially Miscible System *K. Iwasaki, R. X. Suzuki, T. Ban, M. Mishra, Y. Nagatsu* 15:00-15:15 OS12-4 Experimental Study of Immiscible Viscous Fingering via Alternating Injection *A. Kumar, C.-C. Chou, W.-C. Huang, C.-Y. Chen* 15:15-15:30 OS12-5 Numerical Simulation of Density Driven Flow Field: Reactive and Non-Newtonian Effects *Y.-S. Li, T.-H. Kuo, C.-Y. Chen*		**Poster Presentation** 14:10-15:40 OS21-1 - OS21-22	

15:40

BREAK

15:50

EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA	Remo
OS20:Liaison + OS2:Combustion, OS23:Lyon, OS24:C2C	**OS8: Advanced Physical Stimuli and Biological Responses** *Chair: T. Ohashi*	**OS11: Microfluidics and Microphysiological Modeling** *Chair: K. Funamoto*	**OS12: Complex Thermofluid System** Miscible Flow and Interface Phenomena *Chair: Y. Nagatsu*	**OS14: Porous Media** *Chair: A. Suzuki*		**OS22: IFS Collaborative Research Forum (AFI-2022)**
15:45-15:55 University of Washington *Prof. Fumio Ouchi* 15:55-16:05 Syracuse University *Prof. Riyad S. Aboutaha*	15:50-16:30 OS8-5 *Invited* Application of Electrohydrodynamics on Single Cell Property Interrogation *Y.-S. Lin, G.-Y. Chen, C.-J. Li, B. L. Pioufle, H.-Y. Wang*	15:50-16:10 OS11-1 Numerical Simulation on the Effects of Internal and External Viscosity Contrast of a Soft Particle on its Motion and Suspension Viscosity *D. Nakasue, T. Fukui*	15:50-16:05 OS12-6 Understanding of Viscous Fingering with Gel Production Reaction via Interfacial Rheology Under Large Deformation *H. Yagi, R. X. Suzuki, Y. Nagatsu*	15:50-16:20 OS14-1 *Invited* Digital Rock Physics for Geothermal Systems *J. Maes, H. P. Menke, A. Patsoukis-Dimou, A. Suzuki*		**Free Discussion** CRF-1 to 24

16:05-16:15 NYCU *Prof. Yiming Li* 16:15-16:25 KAUST *Prof. Mani Sarathy* 16:25-16:30 Question time 16:30-16:40 Thailand Office *Dr. Parichat Wetchayont* 16:40-16:50 Foreign Trade University *Ms. Had Dao* 16:50-17:00 KTH *Prof. Lundell Fredrik* 17:00-17:10 UNSW *Prof. Atsuki Komiya* 17:10-17:15 Question time 17:20 Closing remarks	16:30-16:45 OS8-6 Activation of Neutrophils by Nanosecond Pulsed Electric Fields *K. Mochizuki, T. Koga, K. Morotomi-Yano, K. Yano* 16:45-17:00 OS8-7 Effects of Short-lived and Long-lived Reactive Oxygen and Nitrogen Species Produced by Non-thermal Atmospheric Pressure Plasma on PCNA Structure *R.-Z. Zhang, S. Ann, Y.-C. Cheng* 17:00-17:15 OS8-8 Effect of Plasma-generated Electrical and Chemical Stimulation on HT-1080 Cells *A. Nakayama, T. Nakajima, S. Liu, T. Sato*	16:10-16:30 OS11-2 Hydrodynamics of Droplet Generation Through Non-Uniform T-Junction Microfluidic System *A. Venkateshwarlu, R. P. Bharti* 16:30-16:50 OS11-3 Competition of Pulsatile Pressure Gradients and AC Electroosmootic Flow in a Microchannel and Resonance Formation *I. Kaykanat, E. Corvera Poiré, K. Uguz* 16:50-17:10 OS11-4 Flow Promoted by Locomotions in *C. elegans* *Y. Asoshina, K. Kikuchi, T. Ishikawa*	16:05-16:20 OS12-7 Dual Displacement Fronts of Fluid Displacement in Porous Media: Numerical Simulations on Double Viscous Fingerings *A. Patmonoaji, Y. Nagatsu* 16:20-16:35 OS12-8 A Numerical Study of Linear Adsorption in Radial Miscible Flow in a Porous Matrix *A. Jangid, P. Verma, C.-Y. Chen, M. Mishra* 16:35-16:50 OS12-9 Non-linear Insights to Shear Instability in Two-Layer Flow *Priyanka, S. N. Maharana, M. Mishra* 16:50-17:05 OS12-10 Microparticle Sorting in High Viscosity Flow *C.-P. Teng, H.-Y. Yang, C.-Y. Wang, Y.-Y. Chiang* 17:05-17:20 OS12-11 Predict Biphasic Separation Using Machine Learning Based Classifiers and Deep Neural Network *Y.-C. Chang, Y.-J. Chen, T.-Y. Ho, Y.-Y. Chiang*	16:20-16:40 OS14-2 Transport in 3D Printing-based Microfluidics *A. Patsoukis Dimou, A. Suzuki, S. Geiger, H. Menke, J. Maes* 16:40-17:00 OS14-3 Comparison of MEA, DEA, TEA, and AMP in Multicycle Carbon Mineralization *C. Thamsiripirideeporn, T. Suekane*		
17:20							17:20
	BREAK						
17:30	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-SAKURA	Remo 17:30
	OS2:Combustion + OS20:Liaison, OS23:Lyon, OS24:C2C Transition in reactive systems *Chair: Ö. L. Gülder*	**OS8: Advanced Physical Stimuli and Biological Responses** *Chair: R. Shirakashi*	**OS11: Microfluidics and Microphysiological Modeling** *Chair: E. Corvera Poiré*	**OS16: Vortex Motion** Vortex Dynamics *Chair: Y. Hattori*	**OS14: Porous Media** *Chair: M. Ohta*		
	17:30-17:50 OS2-1 Plasma-assisted Deflagration to Detonation Transition of Dimethyl Ether in a Microchannel *M. Vorenkamp, S. Steinmetz, A. Starikovskiy, C. Kliewer, Y. Ju* 17:50-18:10 OS2-2 Numerical Study for Reproducing Knocking Experiment in a Constant Vessel with a Single Spark Igniter *Y. Morii, A. K. Dubey, H. Nakamura, K. Maruta* 18:10-18:30 OS2-3 Numerical Integration Approach with Carleman Linearization for Chemical Reactions and Combustion toward Quantum Computation *T. Akiba, Y. Morii, K. Maruta*	17:30-18:10 OS8-9 *Invited* Corona Discharge-induced Air Flow Control for Environmental and Biological Applications *S. Kanazawa, T. Mitsui, T. Furuki, K. Tachibana, R. Ichiki, T. Sato, M. Kocik, J. Mizeraczyk* 18:10-18:50 OS8-10 *Invited* Mechanical Characterization of Cellular Primary Cilia by Using Micro-tensile Testing *T. D. Do, T. Ohashi* 18:50-18:55 Closing *S. Kawano, R. Shirakashi*	17:30-17:50 OS11-5 Modeling of Internal Driving Force During Sperm Hyperactivation *S. Kamijo, T. Omori, T. Ishikawa* 17:50-18:10 OS11-6 Hydrodynamics of Droplet Generation in a T-Junction Microfluidic System *P. Dogra, A. Venkateshwarlu, R. Prakash Bharti* 18:10-18:30 OS11-7 Interfacial Instability of Immiscible Fluids Flowing in a Microchannel under an Electric Field *S. Altundemir, Y. Ağanoğlu, S. İ. Kaykanat, K. Uğuz* 18:30-18:50 OS11-8 Three-Dimensional Culture of Chick Limb Mesenchymal Cells Using Microfluidic Devices *S. Yanagita, K. Tamura, K. Funamoto*	17:30-17:50 OS16-1 Laminarization of Three-Dimensional Boundary Layer by Artificially-Sustained Crossflow Vortices *M. Hirota, Y. Ide, Y. Hattori* 17:50-18:10 OS16-2 Velocity Structure of a Vortex and Derived Vortex Stretching in a Homogeneous Isotropic Turbulence *K. Nakayama* 18:10-18:30 OS16-3 Compact Nambu Brackets for Fluid and MHD Equations *Y. Fukumoto, R. Zou* 18:30-18:50 OS16-4 Nonlinear Dynamics of Two Interlaced Helical Vortices: Theory and DNS *I. Delbende, M. Rossi, C. Selçuk*	17:30-17:50 OS14-4 Experimental Study with Interaction of Gravity and Viscous Forces in a Three-Dimensional Porous Medium *M. A. Mahardika, S. Yun, T. Koue, M. Nasir, A. Patmonoaji, S. Matsushita, T. Suekane* 17:50-18:10 OS14-5 Computation of Transport Properties within Nanoporous Molecular Sieves via Dynamic Adsorption/Desorption Measurements *U. Torres-Herrera, M. F. Ballesteros-Rivas, V. Varela-Guerrero, J. Balmaseda* 18:10-18:30 OS14-6 Reaction Induced Fingering Instability Under Asymmetrical Conditions *P. Verma, V. Sharma, M. Mishra*		
19:00							19:00

9:00	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	9:00
	OS1&OS3:The Tenth International Symposium on Innovative Energy Research I & III *Chair: J. Ishimoto*	**OS2:Combustion + OS20:Liaison, OS23:Lyon, OS24:C2C** Reactor channel systems *Chair: O. Mathieu*		**OS11: Microfluidics and Microphysiological Modeling** *Chair: T. Fukui*	**OS12: Complex Thermofluid System** Plasma science and CFD *Chair:C.-H. Dylan Tsai*	**OS13: Flow Realization, Measurement and Visualization** *Chair: T. Yamagata*		**OS7: Smart Fluids & Soft Matters and Their Advanced Applications** *Chair: M. Nakano*	**OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics**		
	9:00-10:00 OS1/3-1 *Invited* Green Nanotechnology =Atomic Layer Technologies for Nano Materials and Devices= *S. Samukawa* 10:00-10:30 OS1/3-2 An Accurate And Efficient Scheme To Capture Sharp Interface In High Speed Multiphase Flows *T.-Y. Chiu, Y.-Y. Niu, Y.-J. Chou*	9:00-9:20 OS2-4 Experimental Study of Di(2,2,2-trifluoroethyl) Carbonate Oxidation in a Shock Tube and Micro-Flow Reactor with a Controlled Temperature Profile *C. Grégoire, K. Kanayama, P. Diévart, S. Takahashi, T. Tezuka, H. Nakamura, L. Catoire, K. Maruta, E. L. Petersen, O. Mathieu* 9:20-9:40 OS2-5 Kinetic Study on Ammonia Oxidation with H_2O Addition Using a Micro Flow Reactor with a Controlled Temperature Profile *K. Tamaoki, Y. Murakami, K. Kanayama, T. Tezuka, H. Nakamura* 9:40-10:00 OS2-6 Study on N_2O Reactions with H_2 and CH_4 Using a Micro Flow Reactor with a Controlled Temperature Profile *T. Harada, Y. Murakami, K. Tamaoki, K. Kanayama, T. Tezuka, H. Nakamura* 10:00-10:20 OS2-7 Internal Cathode Tubular Solid Oxide Fuel Cell Operating on Simulated Two-Stroke Internal Combustion Engine Exhaust *A. R. Hartwell, C. VanNostrand, H. Kayton, Y. Murakami, H. Nakamura, J. Ahn*		9:00-9:20 OS11-9 Liver Circulatory Model to Study the Impact of Hepatectomy on Blood Flow and Pressure *A. M. Torres Rojas, S. Lorente, M. Hautefeuille, A. S. Cedillo* 9:20-9:40 OS11-10 Flow of a Monolithic Acrylic Microfluidic Pump: Characterization and Immunoassay Trap Compatibility. *H. O. Ochoa-Gutiérrez, G. A. Caballero-Robledo* 9:40-10:00 OS11-11 Observation of Neutrophil-like HL-60 Cell Motility under Oxygen Gradient *M. Tomita, S. Hirose, K. Funamoto* 10:00-10:20 OS11-12 Influence of Nonlocal Vibration and Elastic Foundation on Bending Dynamics of Nanotubes Conveying Flow *U. Torres-Herrera, A. A. Torres, J. O. Casarrubias Flores*	9:00-9:15 OS12-12 Experimental Study on the Strength and Reversibility of Plasma Bonding with a Micronozzle *Y.-H. Liu, C.-H. Dylan Tsai* 9:15-9:30 OS12-13 Numerical Investigation of the Thermal Flow on Ozone Generation in an Atmospheric Pressure Air Dielectric Barrier Discharge Reactor *T. Y. Liao, K. M. Lin, Y. X. Chen* 9:30-9:45 OS12-14 Numerical and Experimental Investigations of the Thermal Flow in an Atmospheric Pressure Helium Plasma Jet *Y. H. Wu, K. M. Lin, K. C. Wang* 9:45-10:00 OS12-15 Effects of Pressure on Hydrogen Plasma Properties of MPCVD *B. Wang, C. Wang, H. Li, D. Yang, M. Zhai, S. Wang, A. Avami* 10:00-10:15 OS12-16 Cancelled	9:00-9:15 OS13-1 Calibration Test of Binders for the PSP Measurement using MACOR® and Ceramic Compounds *K. Sasaki, N. Fujimatsu* 9:15-9:30 OS13-2 Image Alignment Method for Pressure-Sensitive Paint Measurement Without Using Black Markers *K. Suzuki, T. Inoue, T. Nagata, M. Kasai, T. Nonomura, Y. Matsuda* 9:30-9:45 OS13-3 Proposal of PSP Measurement Method Under Ambient Light *R. Tanaka, S. Katayama, T. Ikami, Y. Egami, H. Nagai, Y. Matsuda* 9:45-10:00 OS13-4 Flow Topology on the Ahmed Body with a Deflector by a Sub-grid Global Skin-Friction Measurement Method *T. H. Tran, M. Hijikuro, M. Anyoji, T. Uchida, T. Nakashima, K. Shimizu* 10:00-10:15 OS13-5 Study on the Flow Field Around a Pitching Cylinder with a Bi-Conic Nose Cone Using a 1-DoF Wind Tunnel Test Model *R. Tamai, S. Nonaka, K. Odagiri, H. Ogawa*		9:00-9:30 OS7-1 *Invited* Magnetic Actuators Based on 3D Printed MR Elastomer *X. Gong* 9:30-9:50 OS7-2 Flexible Anisotropic Magneto-Sensitive Elastomer Films for Bionic Actuator *J. Zhang, Y. Wang, S. Sun, B. Wang, X. Gong* 9:50-10:10 OS7-3 An Acoustic Metamaterial using Magnetorheological Elastomer for Vibration Isolation *Z. Chen, S. Sun, H. Du, W. Li* 10:10-10:30 OS7-4 A Hybrid Isolation System Using MRE and Inerter Technology for Vibration Control *S. Jin, H. Du, W. Li, S. Sun*	**Poster Presentation** 10:00-11:30 OS21-23 - OS21-44		
10:30											10:30
10:40	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	10:40
	OS1&OS3:The Tenth International Symposium on Innovative Energy Research I & III *Chair: J. Ishimoto*	**OS2:Combustion + OS20:Liaison, OS23:Lyon, OS24:C2C** Numerical ammonia combustion *Chair: K.D.K.A. Somarathne*	**OS5: Advanced Applications of Multi-functional Fluids** Advanced multi-phase flow / Magnetic fluid *Chair: H. Takana*	**OS11: Microfluidics and Microphysiological Modeling** *Chair: T. Omori*	**OS12: Complex Thermofluid System** Micfofluidics and Visualization *Chair: Y.-Y. Chiang*	**OS13: Flow Realization, Measurement and Visualization** *Chair: S. Funatani*	**OS17: Supercritical Fluid** *Chair: Y. Kanda*	**OS7: Smart Fluids & Soft Matters and Their Advanced Applications** *Chair. G. Sebald*	**OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics**		
	10:40-11:10 OS1/3-3 A Numerical Investigation on the Thermo-Hydraulic Performance of Ferro-Nanofluid Flow in Conical Helical Tube Under the Influence of Magnetic Field *F.M. Altunay, K. Arslan, M. Teki, H. K. Pazarlıoğlu, M. Ali* 11:10-11:40 OS1/3-4 Influence of Positive Bias Voltage Variation on Microwave Plasma Characteristics *B. Wang, H. Li, C. Wang, D. Yang, M. Zhai, S. Wang*	**10:30**-10:50 OS2-8 Large Eddy Simulation of Ammonia Gas Turbine Combustor with ANN Chemistry Tabulation Model *N. Kim, Y. T. Guahk, M. Lee*	10:40-11:10 OS5-1 *Invited* Continuous Fabrication of Strong and Conductive Carbon Nanotube/Cellulose Nanofibril Composite Filaments *H. G. Wise, A. B. Dichiara, H. Takana* 11:10-11:30 OS5-2 Development of Microscale pH Sensor Using Ionic Current Rectification *T. Kishimoto, K. Doi*	10:40-11:00 OS11-13 Application of Convolutional Neural Network in Micro Particle Velocimetry: Measurements of Two-Dimensional and Three-Dimensional Micro Flow Fields *P.-Y. Chou, J.-J. Sheen* 11:00-11:20 OS11-14 Microfluidic Experiment about Hypoxic Responses of Vascular Endothelial Cells Under Hyperglycemia *K. Sone, S. Hirose, D. Yoshino, K. Funamoto*	10:40-11:00 OS12-17 Microparticle Formation with Different Impact Speeds *C.-H. Dylan Tsai, H.-Z. Lu, J.-J. Hu* 11:00-11:20 OS12-18 Visualization of Streaming Flow Patterns Near the Slits of Smart-Phone Speaker Module *W.-H. Tien, Y.-Y. Lin, L. Chen, R.-X. Lin, Y.-Y. Chen, X.-H. Xu, K.-S. Chang*	10:40-10:55 OS13-6 Modal Decomposition of Fluid Motion in Blade-Free Planetary Mixer *T. Yamagata, T. Igarashi* 10:55-11:10 OS13-7 Numerical Investigation of Aerosol Blocking Effect by Desktop Air Curtain Device *H. Muto, K. Takamure, D. Kobayashi, T. Haruki, H. Amano, T. Yagi, Y. Iwatani, T. Uchiyama*	11:00-11:40 OS17-1 *Invited* Drag Force, Heat Transfer, and Porous Structure Behavior of Particles with Stefan Flow in the Supercritical Water *H. Jin, Y. Wang, C. Fan*	10:40-11:10 OS7-5 *Invited* New Liquid-Metal Magnetorheological Elastomer Composites *Q. Zhang, W. Li* 11:10-11:30 OS7-6 Stretchable and Recyclable Liquid Metal Droplets Embedded Elastomer Composite with High Mechanically Sensitive Conductivity *X. He, J. Wu, S. Xuan, S. Sun, X. Gong*	**Poster Presentation** 10:00-11:30 OS21-23 - OS21-44		

	10:50-11:10 OS2-9 Large Eddy Simulations of Turbulent Non-premixed Ammonia/Hydrogen Jet Flames at Elevated Pressure Using Flamelet-Progress Variable and Principal Component Analysis *S. Abdelwahid, M. R. Malik, H. A. Al Kader Hammoud, F. E. Hernández Pérez, B. Ghanem, H. G. Im* 11:10-11:30 OS2-10 Lewis Number Effect on Turbulent Premixed Ammonia Flame *R. Khamedov, W. Song, M. R. Malik, F. E. Hernández Pérez, H. G. Im* 11:30-11:50 OS2-11 Combustion and NOx Emission of Opposed-jet C_2H_4/N_2O Diffusion Flames *C.-W. Huang, C. Dong, T. Hirasawa, H.-Y. Shih* 11:50-12:10 OS2-12 Combustion Process in NH_3 Stratified Spray Flame for Large Two-Stroke Marine Engine *Y. Ichikawa, Y. Niki, K. Takasaki, H. Kobayashi, A. Miyanagi*	11:30-11:50 OS5-3 Preliminary Experimental Study on the Liquid-gas Segmented Flow with A Thermomagnetic Pump *J.-Y. Ji, Y.-E. Tsai, C.-Y. Huang* 11:50-12:10 OS5-4 Effect of External Magnetic Field on Dynamic Mechanical Properties of Permanent Magnet Elastomers *Y. Iwamoto, Y. Kawata, Y. Ido, H. Sakamoto*	11:20-11:40 OS11-15 Numerical Study of Particle Migration in Asymmetric Velocity Profiles. *R. Naito, T. Fukui* 11:40-12:00 OS11-16 Electroviscous Effects in the Electrolyte Liquid Flow through Heterogeneously Charged Uniform Slit Microfluidic Device *J. Dhakar, R. P. Bharti*	11:20-11:35 OS12-19 Bio-Satellite with Integrated Microfluidic Device for Deep-Space Biological Study *P.-R. Huang, J.-W. Chang, S.-Y. Huang, C.-C. Huang, Y.-C. Chen, Y.-Y. Chiang* 11:35-11:50 OS12-20 Development of Two-color Pressure-sensitive Paint for Simultaneous Pressure and Temperature Measurements *W.-C. Chen, S.-J. Fu, C. -Y. Huang* 11:50-12:05 OS12-21 Experimental Heat Transfer Analysis Of Microchannel Flow With Inclined Flat Plate Obstruction And Sidewall Heating *Y.-C. Fan, P.-C. Wang, T.-M. Liou, C.-Y. Huang*	11:10-11:25 OS13-8 Experimental Investigation of Aerosol Blocking Effect by Desktop Air Curtain Device *D. Kobayashi, H. Muto, T. Haruki, K. Takamure, H. Amano, T. Yagi, Y. Iwatani, T. Uchiyama* 11:25-11:40 OS13-9 Flying Yeast: Aerosol Particles Released during the Fermentation *R. Onishi, K. Kikuchi, T. Ishikawa*		11:30-11:50 OS7-7 Magnetic Flexible Sensor with Tension and Bending Discriminating Detection *Q. Shu, H. Deng, S. Xuan, X. Gong* 11:50-12:10 OS7-8 Performance of Shear Thickening Fluids at Low Temperatures *T. Tian, V. Sokolovski, W. Li, J. Ding*		
12:10	**Exhibitor Presentation Session** 12:15- Nobby Tech. Ltd. 12:30- nac Image Technology Inc. 12:45- PHOTRON LIMITED	**BREAK**								12:10
13:10 EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	13:10
	OS2:Combustion + OS20:Liaison, OS23:Lyon, OS24:C2C Flame dynamics 1 *Chair: K. Maruta*	**OS5: Advanced Applications of Multi-functional Fluids** Thermal plasma *Chair: T. Fujino*	**OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition** Engine Development and Instrumentation *Chair: T. Shimada*	**OS12: Complex Thermofluid System** Magnetohydrodynamic *Chair: W.-H. Wang*	**OS13: Flow Realization, Measurement and Visualization** *Chair: T. Yamagata*	**OS17: Supercritical Fluid** *Chair: Y. Kanda*	**OS7: Smart Fluids & Soft Matters and Their Advanced Applications** *Chair: W. Li*	**OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics**	**OS22: IFS Collaborative Research Forum (AFI-2022)**	
	13:10-13:50 OS2-13 *Invited lecture* Non-equilibrium Chemistry and Dynamics in Plasma Aided Combustion and Manufacturing *Y. Ju, H. Zhong, C. Burger, M. Vorenkamp* 13:50-14:10 OS2-14 Influence of n-Pentanol Blending on Soot in Spray Combustion of Kerosene *R. B. Vishwanath, P. A. Carniglia, J. K. Weber, Ö. L. Gülder* 14:10-14:30 OS2-15 Flame Propagation Regimes for Hydrogen-Air Mixtures at Cryogenic Temperatures *M. Kuznetsov, A. Denkevits, A. Friedrich, A. Veser*	13:30-13:50 OS5-5 Gasification of Livestock Manure Fuel by Using a Lab-Scale Three Phase AC (Alternative Current) Arc Plasma Torch *D.-H. Lee, D. Figuera-Michal, H.-J. Kim, S.-Y. Yang, J.-H. Seo* 13:50-14:10 OS5-6 Effects of Operating Condition on Methane Pyrolysis Process Using Thermal Plasma *Y. H. Lee, J.-H. Oh, S. Choi* 14:10-14:30 OS5-7 Investigation On Melting Process Of Non-Combustible Wastes By Using A Reverse-Polarity Hollow Electrode Plasma Torch With Power Level Of 100 Kw *D. Figuera-Michal, D.-H. Lee, H.-W. Park, N.-K. Lee, J.-H. Seo*	13:10-13:40 OS4-1 Preliminary Study of Copper-Infused Electrically Conductive Polymer Igniter for Rocket Ignition *Y. A. M. Leung, S. Hirai, Y. Nobuhara, L. T. Kamps, H. Nagata* 13:40-14:10 OS4-2 Experiment about Heat Transfer Characteristics of Liquid Oxygen Flow in a Thin Tube Surrounded by Air *K. Tanaka, K. Matsui, K. Kitagawa* 14:10-14:40 OS4-3 One-Dimensional Model for the Study of Helical Cooling Channels Based on Cryogenic Oxygen in Hybrid Rocket Engines *G. Gallo, S. Hirai, L. Kamps, H. Nagata*	13:10-13:25 OS12-22 Prediction of Axisymmetric Thermal Plasma Flow via a Non-orthogonal Grid Approach *W.-Y. Huang, S.-W. Chau* 13:25-13:40 OS12-23 A Rotating Rod Model for the Viscosity of Ferrofluids *U. Lei* 13:40-13:55 OS12-24 Motion of a Micro-magnetic-particle Chain in a Rotating Field *S.-L. Liao, C.-R. Li, C.-Y. Chen* 13:55-14:10 OS12-25 Effect of Reynolds Number Based on Lorentz Force to Flow Transition of Magnetohydrodynamic Jet *J.-H. Cheng, L.-W. Cheng, C.-Y. Chen*	13:10-13:25 OS13-10 Direct Skin Friction Measurement on Hypersonic Models *S. Pathan, M. Kshetrimayum, V. Menezes, C. S. Yerramalli* 13:25-13:40 OS13-11 Investigation of Draft Tube Shape for a Cross-flow Turbine with Guide Wall and Cavity *T. Sakai, Y. Hayashi, S. Iio, T. Kitahora, Y.-D. Choi, M. Inagaki* 13:40-13:55 OS13-12 Influence of the Nozzle Disk and Runner Clearance on Noise and Performance of a Submerged Impulse Turbine *S. Rin, T. Saito, S. Iio, D. Tsunashima*	13:10-13:30 OS17-2 Preliminary Modeling and Analysis of Supercritical CO_2 Heat Transfer Flow in Porous Media on-Chip: Effect of Inflow Conditions and Heat Input *M. Chen, L. Chen* 13:30-13:50 OS17-3 Impact of Capillary and Viscous Forces on Distinct Regimes of sCO_2 / Water Displacement in Heterogeneous Micromodels *K. Ragui, L. Chen, Y. Kanda, A. Komiya* 13:50-14:10 OS17-4 Endothermic Characterization on Hydrocarbon Fuel under Supercritical State *T. Isono, T. Miyaura, Y. Daimon, T. Onodera, S. Tomioka*	13:10-13:40 OS7-9 *Invited* Are Charge Carriers Responsible for the Electroactivity of Polyurethane? *G. Coativy, K. Yuse, G. Diguet, L. Seveyrat, V. Perrin, F. Dalmas, S. Livi, J. Courbon, H. Takana, J. Y. Cavaillé* 13:40-14:10 OS7-10 *Invited* Grease Lubrication To Improve Tribological Properties Of Steel / Polymer Contacts *V. Fridrici, T. Kunishima, P. Papsa* 14:10-14:40 OS7-11 *Invited* Study on Suction Cups Utilizing Magneto-Rheological Fluids *H. Tsukagoshi, K. Hama, M. Nakano*	**Poster Presentation** 13:10-14:40 OS21-45 - OS21-66	**Free Discussion 2** CRF-25 to 40 (Remo)	

14:40					14:10-14:25 OS12-26 Experimental Study of Magnetohydrodynamic Jet *Y.-H. Chen, Y.-R. Wei, J.-S. Liou, C.-Y. Chen* 14:25-14:40 OS12-27 The Preliminary Research of Aeroacoustic Effects in Full-scale Hearing Aids by Computational Fluid Dynamics *Y.-C. Chen, T.-H. Wang, W.-H. Wang*	13:55-14:10 OS13-13 Investigation of the Flow Field around a Guide Vane in a Cross-flow Turbine at Partial Load Operation *K. Aiba, M. Fujimori, K. Otsuka, S. Iio* 14:10-14:25 OS13-14 Measurement of Lagrangian Acceleration in Two-dimensional Channel Flow using Dynamic-hue Particle Tracking Velocimetry *X. Song, T. Okuda, M. Iwanaga, S. Yamauchi, K. Kato, M. Matsubara*	14:10-14:30 OS17-5 Hydrogen Production from Formic Acid Decomposition in Gas Phase and Supercritical Water: A Comparative Kinetic Study *G. Li, H. Chen*				14:40
	BREAK										
14:50	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	14:50
	OS22: Fluids Science Research Award Lecturers	**OS24:C2C & OS2:Combustion + OS20:Liaison, OS23:Lyon** *Chair: E. C. Okafor*	**OS5: Advanced Applications of Multi-functional Fluids** MHD/Material process *Chair: N. Takeuchi*	**OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition** Performance Improvement and Evaluation *Chair: K. Sawada*	**OS12: Complex Thermofluid System** CFD *Chair: S. W. Chau*	**OS13: Flow Realization, Measurement and Visualization** *Chair: K. Funamoto*	**OS17: Supercritical Fluid** *Chair: Y. Hu*	**OS7: Smart Fluids & Soft Matters and Their Advanced Applications** *Chair: X. Gong*		**OS22: IFS Collaborative Research Forum (AFI-2022)**	
	14:50- 15:15 FRA-1 Trends and Future Prospects of Patient-Specific Blood Flow Simulation *M. Oshima* 15:20-15:45 FRA-2 Hydrodynamics and behavioral dynamics of swimming microorganisms *T. Ishikawa* 15:50-16:15 FRA-3 Detonation Fluid Dynamics Phenomena and Its Application to Aerospace Propulsion *J. Kasahara*	14:50-15:15 OS24-1 *Invited* Ammonia for gas turbine fuelling applications - FLEXnCONFU program *S. Mashruk* 15:15-15:40 OS24-2 *Invited* The challenge to consider ammonia as fuel for transport applications *C. Rousselle* 15:40-16:00 OS2-16 Studying NH_2* and NH* Chemiluminescence During NH_3 Oxidation in a Shock Tube M. Khan-Ghauri, *C. M. Grégoire, O. Mathieu, E. L. Petersen* 16:00-16:20 OS2-17 Investigation of the Chemiluminescence Signature of Ammonia Flames *A. Karan, G. Dayma, C. Chauveau, F. Halter*	14:50-15:10 OS5-8 Numerical Prediction of Influence of MHD Flow Control on Radiative Heating in Mars Entry *K. Tabuchi, T. Fujino* 15:10-15:30 OS5-9 Plasma Behavior and Power Generation Characteristics in an Experimental Argon Plasma MHD Generator *K. Ork, Y. Okuno* 15:30-15:50 OS5-10 Numerical Analysis of Supersonic, Nonequilibrium Inductively Coupled Plasma Jet in Plasma-Assisted Aerosol Deposition *Y. Akedo, K. Ino, K. Shinoda, T. Fujino* 15:50-16:10 OS5-11 Hydrogen Diffusion and Desorption After Sodium-Water Reaction *A. Suzuki, M. Miyano, R. Miura*	14:50-15:20 OS4-4 Effects of Adding Boron and Aluminum Powders to WAX-based Solid Fuels to Improve Hybrid Rocket Performance *A. Kawasumi, A. Takahashi, A. Banno, K. Takahashi* 15:20-15:50 OS4-5 Study on Cellulose Addition to WAX-based Solid Fuels for Hybrid Rockets *Y. Nishimura, A. Takahashi, A. Banno, K. Takahashi* 15:50-16:20 OS4-6 Study on the Method of Measuring Real Time O/F of a Hybrid Rocket *I. Nakagawa*	14:50-15:05 OS12-28 Numerical Study of the Effects of Dilution Gas for the Formation of CJ Plane During the Oblique Detonation *Y.-J. Wu, Y.-Y. Niu* 15:05-15:20 OS12-29 Numerical Study on the Interaction of Compressible Gas-Liquid Reacting Flows *P.-H. Chiu, Y.-Y. Niu* 15:20-15:35 OS12-30 The Hydrodynamic Characteristics of a Swimming Rhynchobatus Australiae by Immersed Boundary Method *J. K. Lewis, H.-T. Lin, W.-H. Wang* 15:35-15:50 OS12-31 An CFD Investigation of Natural Convection by Heating Plates with Multi-GPU Implementation *H.-C. Chang, W.-H. Wang* 15:50-16:05 OS12-32 A Short Note on Runge-Kutta Discontinuous Galerkin Method with WENO Limiter *S.-Y. Lin* 16:05-16:20 OS12-33 Large-Eddy Simulation of Multi-Nozzle Powder Flow for the Laser Direct Deposition Process *Y.-T. Lai, J.-W. Lin, Y.-J. Chou, C.-C. Tseng*	14:50-15:05 OS13-15 Development of a Simultaneous Measurement Method for Volumetric Flowrates of Each Phase of Gas-Liquid Two-Phase Flow *S. Miyamoto, Y. Sakamoto, K. Horie, T. Uchiyama, K. Takamure, H. Nakayama* 15:05-15:20 OS13-16 Collection Performance of Oil Mist in T-shaped Mist Trap *S. Ando, K. Takamure, T. Uchiyama, H. Nakayama* 15:20-15:35 OS13-17 Flow Regime Classification for Upward Two-phase Flow in a Rectangular Tube using Unsupervised Learning *H.-Y. Chen, S.-W. Chen, Y.-M. Hsu, L.-T. Wu* 15:35-15:50 OS13-18 Flow Regime Identification for Air-Water Two-phase Flow in a 3×3 Rod Bundle by K-means Clustering *H.-J. Lee, S.-W. Chen, L.-H. Huang, P.-S. Ruan, M.-S. Lin* 15:50-16:05 OS13-19 Holding a Stable Air-Liquid Interface in Helix Structures *G.-Y. Lu, F. Maqbool, Y.-Y. Chen, W.-H. Tien, Y.-Y. Chiang*	14:50-15:10 OS17-6 Visualization of Acetone Diffusion in Highly Pressurized CO_2 using Phase-shifting Interferometer *R. Mukai, Y. Kanda, Y. Hu, L. Chen, A. Komiya* 15:10-15:30 OS17-7 Dynamic Behaviors of Near-critical CO_2 Fluid under Confinement Effect of a Nano-scale SiO_2 Channel *Z.-Y. Liu, L. Chen* 15:30-15:50 OS17-8 Explosive Breakup and Evolution of the Gas Layer around a Pulse-Heated Microwire in Sub- and Supercritical CO_2 *G. Wang, Z.-C. Hu*	14:50-15:20 OS7-12 *Invited* MR Effect Enhancement of MR Fluid Porous Composites *M. Nakano, Y. Takano* 15:20-15:40 OS7-13 Model Based Characterization of Novel Dry MR Fluid Rotary Damper with Variable Stiffness for Vibration Control of A Building Structure Mode *J. Yang, S. Sun, O. Taguchi, M. Nakano* 15:40-16:00 OS7-14 Development of a New MR Vibration Isolation System with Highly Stable and Wide Zero Stiffness Range Characteristics *S. Sun, J. Yang, M. Nakano, W. Li* 16:00-16:20 OS7-15 Design of a Stiffness-Tunable and Energy-Efficient Hand Exoskeleton for Enhancement of Grip Endurance and Strength *X. Mai, S. Sun, J. Yang*		**Free Discussion 3** CRF-41 to 61	
16:20	**BREAK**										16:20

16:30	EX-1	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	CON-1	CON-2	CON-SAKURA2	Remo	16:30
		OS24:C2C & OS2:Combustion + OS20:Liaison, OS23:Lyon *Chair: T. Tokumasu*	**OS5: Advanced Applications of Multi-functional Fluids** Material process *Chair: K. Doi*	**OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 14th Edition** System Analysis, Design and Development *Chair: T. Shimada*	**OS12: Complex Thermofluid System** Heat Transfer and Fluid Flow Chair: *C.-Y. Chen*	**OS13: Flow Realization, Measurement and Visualization** *Chair: S. Iio*		**OS7: Smart Fluids & Soft Matters and Their Advanced Applications** *Chair: M. Nakano*			
		16:30-16:55 OS24-3 *Invited* Circular economic hydrogen production system for synthetic ammonia combustion *C.-H. Lan* 16:55-17:20 OS24-4 *Invited* How does the degradation of thermal barrier coatings change under oxidizing and reducing environments? *K. Ogawa* 17:20-17:40 OS2-18 Emission Characteristics of Liquid Ammonia and Gaseous Ammonia Flames Co-fired with Gaseous Hydrogen in a Gas Turbine-like Combustor at Moderately High Pressure *K.D.K.A. Somarathne, H. Yamashita, S. Colson, A. Hayakawa, T. Kudo, H. Kobayashi* 17:40-18:00 OS2-19 Extinction Limits of $CH_4/NH_3/N_2$ versus High-Temperature Air Nonpremixed Counterflow Flames *Y. Murakami, T. Tezuka, H. Nakamura*	16:30-16:50 OS5-12 Attempt to Reduce the Internal Stresses Generated in Steel by a Laser Deposition Process *A. Kulish, J. Rech, F. Salvatore, J. Courbon* 16:50-17:10 OS5-13 Synthesis of Carbon Catalysts Using Ultrasonic Cavitation Plasma for Oxygen Reduction Reaction *R. Harakawa, N. Takeuchi, S. Zen, S. Imaizumi, H. Takana, O. L. Li*	16:30-17:00 OS4-7 Research on the Fuel Fragmentation for the Safety of Hybrid Rocket Propellants *A. Takahashi, N. Kanasashi, R. Saito, H. Yuki, K. Takahashi* 17:00-17:30 OS4-8 Summary of Hybrid Rocket Research Presented at ICFD Between 2009 and 2022 *T. Shimada*	16:30-16:45 OS12-34 Thermal Performance Analysis of the Multiple GaN Chips based Power Module *S. Cheng, S. Elangovan, E. Y. Chang* 16:45-17:00 OS12-35 Numerical Simulation of a Converging-Diverging Nozzle for Trilateral Flash Cycle Application *J.-W. Yeh, C.-H. Huang, Y.-H. Liu* 17:00-17:15 OS12-36 Measurement of Non-condensable Air Concentration in Refrigerant R-141b by the Method of Wavefront Sensing *M.-Y. Chung, H.-M. Tu, A.-C. Wei, C.-Y. Yang, J.-R. Sze* 17:15-17:30 OS12-37 Characteristic of Transition between Oscillating and Pulsating-Circulating Flows for Pulsating Heat Pipes *S. Ouchi, K. Kurose, K. Miyata* 17:30-17:45 OS12-38 Thermal Performance of Solid and Hollow Pin-fin Heat Sinks *A. Tiwari, A. K. Patil, M. Kumar* 17:45-18:00 OS12-39 Steady Flow of Power-law Fluids Over Two Rotating Cylinders in Side-by-side Arrangement *L. Malviya, R. P. Bharti*	16:30-16:45 OS13-20 RANS Simulations of Elliptic Underexpanded Sonic Jets *T. Nagata, S. Nakao, Y. Miyazato* 16:45-17:00 OS13-21 RANS Simulations of Rectangular Underexpanded Microjets *S. Yoshimi, S. Nakao, Y. Miyazato* 17:00-17:15 OS13-22 Study of Microjet Structure from Axisymmetric Supersonic Nozzles *T. Tashiro, S. Nakao, Y. Miyazato, Y. Ishino* 17:15-17:30 OS13-23 Unsteady Characteristics of Shock Trains in Constant-Area Straight Ducts *T. Inadomi, S. Nakao, Y. Miyazato*		16:30-17:00 OS7-16 *Invited* Elastocaloric Rubber Based System for New Refrigeration Solutions *G. Sebald, G. Lombardi, A. Komiya, G. Coativy, J. Jay, L. Lebrun* 17:00-17:20 OS7-17 Hill Climbing Characteristics of Self-propelling Drops on Heated Ratchets with Hybrid Wettability Surfaces *T. Shirahama, T. Okabe, M. Shirota*			
18:00											18:00

	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	
9:00	**OS2:Combustion** **+ OS20:Liaison, OS23:Lyon, OS24:C2C** Flame dynamics II *Chair: Y. Murakami*		**OS6: Free Flight Experiment with MSBS and Ballistic Range** *Chair: S. Obayashi*	**OS9: Biomedical Flow Dynamics** **&** **OS10: Biomolecular Dynamics** *Chair: K. M. Saqr, T. Nakayama, K. Etchuya*	**OS15: Turbulence: from Fundamentals to Applications** Modeling *Chair: Y. Hattori*		9:00
	9:00-9:20 OS2-20 Numerical Analysis of Flame Behavior Initiated from Flame Ball and Hot Spherical Zone in Counterflow Field *K. Sagawa, T. Akiba, A. Tsunoda, Y. Morii, H. Nakamura, K. Maruta* 9:20-9:40 OS2-21 Near Lean/Rich Limits Behaviors and Local Stoichiometries of Flame Balls, Counterflow Flames, and Planar Flames in a CH_4/O_2/Xe Mixture *A. Tsunoda, T. Akiba, H. Nakamura, Y. Morii, T. Tezuka, K. Maruta* 9:40-10:00 OS2-22 Instability of Expanding Hydrogen/air Flames at Normal and Cryogenic Temperatures *L. Yang, Z. Chen* 10:00-10:20 OS2-23 Transverse Mode Dynamics in a Lean-premixed Multislit Hydrogen Combustor *D. Park, K. T. Kim*		9:00-9:30 OS6-1 *Invited* An Investigation of Bluff Body Blockage Corrections Using the NASA/ODU 6-inch MSBS *C. P. Britcher, B. McGovern, D. E. Cox, M. Schoenenberger* 9:30-9:50 OS6-2 Evaluation of Reentry Capsule Magnetic Levitation Towards Wind Tunnel Testing *C. Inomata, S. Yokota, T. Nonomura* 9:50-10:10 OS6-3 Flow Field and Aerodynamic Characteristics of Next-generation Re-entry Capsules of Different Shapes at Transonic Free Flight *Y. Takikawa, Y. Hosono, K. Takahashi, T. Ogawa, H. Nagai, K. Yamada* 10:10-10:30 OS6-4 Effect of Reynolds Number on Critical Geometry of Magnetically Supported Cylinder Body *K. Fuchigami, H. Okuizumi, S. Yokota, S. Obayashi, T. Nonomura*	9:00-9:40 OS9-1 *Invited* A Relationship between Pathology and Physics in the Progression of Intracranial Aneurysms *T. Yagi* 9:40-9:55 OS9-2 A ConvNeXt-backbone Model with Multi-channel Photometric Distortion for Malignant Tumor Segmentation and Localization of Oropharyngeal Squamous Cell Carcinoma and Esophageal Squamous Cell Carcinoma *K.-T. Kao, M.-S. Hsieh, R.-F. Chang* 9:55-10:10 OS9-3 Comparing the Pharmacokinetic Parameters of ICG via Lymphatic Drug Delivery and the Intravenous Injection *N. Bridget, A. Sukhbaatar, T. Kodama* 10:10-10:25 OS10-1 Acquisition of Anti-tumor Immunity by Local Irradiation and its Application to Radioimmunotherapy *S. Kuriu, R. Mishra, A. Sukhbaatar, S. Mori, T. Kodama*	9:30-9:50 OS15-1 Searching for a Wall Model in LES using a Data-Driven Approach *G. Tabe Jamaat, Y. Hattori* 9:50-10:10 OS15-2 On the Explicit Structure of the Spectrum of Internal Vibrations for Stratified Rotating Flows *A. Giniatoulline* 10:10-10:30 OS15-3 Effect of Large Scale Motions on Taylor's Hypothesis and Attached Eddy Model *Y. Tsuji, K. Mizuno, Y. Yamamoto*		
10:30	**BREAK**						10:30
10:40	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	10:40
	OS2:Combustion **+ OS20:Liaison, OS23:Lyon, OS24:C2C** Flame dynamics III *Chair: S. Colson*	**GS: General Session** Numerical simulation *Chair: A. Yakeno*	**OS6: Free Flight Experiment with MSBS and Ballistic Range** *Chair: K. Seo*	**OS9: Biomedical Flow Dynamics** *Chair: H. Anzai, M. Zhang*	**OS15: Turbulence: from Fundamentals to Applications** Shear Flow Turbulence *Chair: Y. Tsuji*		
	10:40-11:00 OS2-24 Pairing Asymmetry-induced Collective Dynamics of Lean-premixed Model Gas Turbine Combustors *D. Bae, K. Moon, K. T. Kim* 11:00-11:20 OS2-25 Analysis of Ignition-to-Flame Propagation Transition Using a Flame in Front of High Temperature Wall and Counterflow Flames *D. Nakao, K. Akita, Y. Hirano, T. Tezuka, Y. Morii, H. Nakamura, K. Maruta* 11:20-11:40 OS2-26 Numerical Study on the Effect of Initial Ignition Condition on Flame Propagation of Dimethyl Ether (DME)/Air Mixture *A. Hashimoto, K. Akita, Y. Morii, K. Maruta* 11:40-12:00 OS2-27 Numerical Simulation of Pulsating Methane Flame Characteristics under DC Electric Field *H. Li, B. Wang, C. Wang, Z. Ma, M. Zhai*	10:40-11:00 GS1-1 Effect of Media Permeability of Plane Couette Flow in Superposed Fluid-Porous System for Heavy Oil *N. Barman, P. Bera* 11:00-11:20 GS1-2 Investigation of Collision and Forcing Schemes in Lattice-Boltzmann Method for Multiphase Flows *J. Restrepo-Cano, F. E. Hernández Pérez, T. Lei, K. H. Luo, H. G. Im* 11:20-11:40 GS1-3 Validation of Special Relativistic Magnetohydrodynamics Models by Scale Analysis *S. Yoshino, M. Hirota, Y. Hattori* 11:40-12:00 GS1-4 Wall Heat Flux Estimation using the Cartesian Cut-Cell Method *Y. Takeda, N. Baba, K. Ueno*	10:40-11:00 OS6-5 Time-Resolved Stereo PIV Measurement with 0.3-m MSBS toward Analysis of Three-Dimensional Wake Structure behind Freestream-Aligned Circular Cylinder *S. Yokota, T. Nonomura* 11:00-11:20 OS6-6 Measurement of Aerodynamic Forces Acting on a Vibrating Javelin *R. Ishiai, K. Seo, D. Tsudou, R. Sakaue, H. Okuizumi, Y. Konishi, S. Obayashi, S. Ito, M. Hiratsuka*	10:40-11:20 OS9-4 *Invited* A Plausible Explanation For The Frequency Of Cough. Pulsatile Parallel Flow Of Air And Mucus In The Trachea. *P. Alberto de la Guerra, E. Corvera Poiré* 11:20-11:35 OS9-5 Ballistic Delivery of Microliquid Jets: Analysis for Drug Delivery *P. Hankare, V. Menezes* 11:35-11:50 OS9-6 Virtual Angiography for Evaluation of Velocity Estimation Method *Y. Kohata, M. Decroocq, S. Rit, C. Frindel, M. Ohta, H. Anzai* 11:50-12:05 OS9-7 In Vivo Pharmacokinetic Profiling of Solvents of Varying Osmotic Pressures and Viscosities *R. Mishra, A. Sukhbaatar, S. Mori, T. Kodama*	10:40-11:00 OS15-4 Turbulence Statistics of Logarithmic Region in Pipe Flow at High Reynolds Number *N. Furuichi, M. Ono, Y. Tsuji* 11:00-11:20 OS15-5 The Characteristics of Elongated Large-Scale Structures in a Wall-Confined Shear Layer *T. Akao, T. Watanabe, K. Nagata* 11:20-11:40 OS15-6 Extraction of Boundary Layer Transition Process Using Controlled Free Stream Disturbance and Ensemble Averaging *A. Yoshida, T. Anada, R. Takai, K. Matsui, K. Kato, M. Matsubara* 11:40-12:00 OS15-7 Nozzle-geometry Dependence of Diffusion Characteristics in Lobed Jets *R. Fukui, M. Takahashi, K. Tsujimoto, T. Ando, T. Shakouchi*		
12:10	**BREAK**						12:10

	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo
13:10	**OS2:Combustion + OS20:Liaison, OS23:Lyon, OS24:C2C** Kinetics and blened fuel combustion *Chair: H. Nakamura*	**GS: General Session** Flow dynamics 1 *Chair: I. Oshima*	**OS19: Fluid Flow Experiment in Geoscience** *Chair: Y. Mukuhira*	**OS9: Biomedical Flow Dynamics** *Chair: K. Takashima, Y. Li*	**OS15: Turbulence: from Fundamentals to Applications** Fundamental Aspects of Turbulence *Chair: T. Ishihara*	13:10
	13:10-13:30 OS2-28 Simplification of Ionization Reaction Mechanism for Methane Combustion *C. Wang, B. Wang, H. Li, Z. Ma, M. Zhai, A. Avami* 13:30-13:50 OS2-29 Generating Compact Reaction Models for Methane and Natural Gas Using Genetic Algorithms *K. Hirose, Y. Murakami, K. Shimoyama, H. Nakamura* 13:50-14:10 OS2-30 Combustion Analysis of CH_4/NH_3 Blended Fuels Applied in a Can Combustor for a Micro Gas Turbine *S.-P. Ho, C. Cheng, H.-Y. Shih* 14:10-14:30 OS2-31 Ammonia/Hydrogen Blend Combustion Characteristics under High Pressure *C. Wang, H. Li, B. Wang, L. Guo, M. Zhai, A. Avami*	13:10-13:30 GS1-5 Numerical Analysis for Performance Prediction of Urea SCR System Using PIV Measurement and Discrete Droplet Model *S. Nara, R. Osada, N. Sugiyama, Y. Kawamoto, S. Takahashi, M. Ochiai, T. Nohara, K. Osumi, N. Ishikawa* 13:30-13:50 GS1-6 Mode Switching in Compressible Cavity Flow *Y.-X. Huang, K.-M. Chung* 13:50-14:10 GS1-7 Ground Effect Acting on the Insect-like Wing *S.-I. Yeh, Y.-H. Lee* 14:10-14:30 GS1-8 Experimental Investigation on the Initiation of Low Speed Liquid Droplet Impingement Erosion *K. Fujisawa*	13:10-13:40 OS19-1 *Invited* In-situ CT-assisted Experimental Observation of Hydro-Mechanical Behavior of Misaligned Granite Fractures *L. Zhuang, C. Sun, C. Pham, S. Yeom, H.-S. Shin* 13:40-14:00 OS19-2 Visual Observation of the Pore Pressure-induced Shear Slip in Granite Fracture *D. Asahina, T. Takemura, T. Endo, Y. Tsukurimichi* 14:00-14:20 OS19-3 Photoelastic Experiments to Visualize the Stress Distribution during the Fluid Injection *N. Yoshimitsu, S. Hirano, E. Fukuyama* 14:20-14:40 OS19-4 Flow-through Experiments on Interaction of Granite Fracture with Several Permeants *A. Hafidz, N. Kinoshita, H. Yasuhara*	13:10-13:30 OS9-8 *Invited* Virtual Multilayer Stenting Simulation based on Spring-Mass Analogy *M. R. Sudrajat, B. Nainggolan, M. Hilliard, N. K. Putra* 13:30-13:50 OS9-9 *Invited* Geometrical Analysis of Standard Cerebrovascular Coordinates *H. Anzai, K. Kitamura, N. Mori, S. Mugikura, M. Ohta* 13:50-14:05 OS9-10 A Closed-loop Geometric Multi-scale Model for Predicting Instantaneous Wave-free Ratio Based on Coronary Pre-arterioles Compensation *J. Liu, B. Li, L. Zhang, M. Zhang, A. Qiao, Y. Liu* 14:05-14:20 OS9-11 Validity of Multivariate Normality Assumption for Data Augmentation on Artery Centerlines *K. Jin, K. Kitamura, N. Mori, S. Mugikura, M. Ohta, H. Anzai* 14:20-14:35 OS9-12 Prediction of Fractional Flow Reserve Based on Reduced-Order Cardiovascular Model *Y. Feng, Y. Liu*	13:20-14:00 OS15-8 *Invited* Physical Insights on Turbulence from Numerical Simulation of Dissipative Weak Solution to the Euler Equations *T. Matsumoto* 14:00-14:20 OS15-9 Global- and Local-Analysis of Velocity Field in Grid Turbulence *Y. Zheng, T. Watanabe, K. Nagata* 14:20-14:40 OS15-10 Laminarization in Subcritical Taylor–Couette–Poiseuille Flow with Increasing Pressure Gradient *Y. Matsukawa, T. Tsukahara*	
14:40	BREAK					14:40
14:50	EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo
	OS23: IFS Lyon Center Collaborative Research Forum + OS2:Combustion OS20:Liaison, OS24:C2C	**GS: General Session** Flow dynamics 2 *Chair: H. Nakamura*	**OS19: Fluid Flow Experiment in Geoscience** *Chair: T. Ishibashi*	**GS: General Session** Heat Transfer *Chair: Y. Kanda*	**OS15: Turbulence: from Fundamentals to Applications** LES & Atmospheric Flow *Chair: T. Ishihara*	**OS22: IFS Collaborative Research Forum (AFI-2022)**
	14:50-15:10 OS23-1 Ferromagnetic-based Actuation for Electrical Protection *M. Lallart, G. Sebald, H. Miki* 15:10-15:30 OS23-2 Magnetization Mechanisms for the Non-Destructive Evaluation of Ferromagnetic Steel *B. Ducharne, S. Zhang, S. Takeda, G. Sebald, T. Uchimoto* 15:30-15:50 OS23-3 Comparison of Ultrasonic Attenuation by Different Pitches on Periodic Rough Surface *K. Terada, H. Nakamoto, P. Guy, T. Uchimoto* 15:50-16:10 OS23-4 Role of Charge Carriers in the Bending of Dielectric Elastomers *G. Coativy, K. Yuse, G. Diguet, V. Perrin, L. Seveyrat, F. Dalmas, S. Livi, J. Courbon, H. Takana, J. Y. Cavaille*	14:50-15:10 GS1-9 Numerical Study on Aerodynamic Characteristics of Base Shape for Vertical Landing Rocket *R. Tanaka, N. Fujimatsu* 15:10-15:30 GS1-10 A Study of Surface Pressure Variation Induced by Planar Shock Wave Impinging on a Circular Cylinder from Various Angles *S. Takahashi, S. Tamakuma, T. Ikami, H. Nagai* 15:30-15:50 GS1-11 Study on Visualization Method for Axisymmetric Shock Reflection in Supersonic Flow *Y. Higa, Y. Watanabe, ,T. Handa, M. Matsunaga, C. Fujio, H. Ogawa, K. Ohtani* 15:50-16:10 GS1-12 Shock-Bubble Interaction in Boiling Droplets *P. Guida, W. L. Roberts*	14:50-15:10 OS19-5 CO_2 Injection-Induced Shearing and Complex Fracturing in Naturally Fractured Geothermal Environment *E. Pramudyo, R. Goto, K. Sakaguchi, K. Nakamura, N. Watanabe* 15:10-15:30 OS19-6 Effect of Brittleness Index on Hydro-Mechanical Behavior of Soft Rocks during CO_2 Injection *T. Fujii, Y. Oikawa, X. Lei, M. Sorai* 15:30-15:50 OS19-7 Monitoring Flow Behavior of Supercritical CO_2 in Porous Sandstones with Different Permeability by P-wave Velocity *H. Honda, H. Yagi, Y. Mitani*	14:50-15:10 GS1-18 Thermal Convection of Poiseuille Flow in a Fluid Overlying an Anisotropic and Highly Porous Domain *Anjali, P. Bera* 15:10-15:30 GS1-19 Experimental Investigation of a Loop Heat Pipe in Multiple Orientations with two Different Evaporator Designs *S. Somers-Neal, H. Nagano* 15:30-15:50 GS1-20 Design Study of Loop Heat Pipe for kW-class Heat Transfer Applications *X. Chang, T. Tada, H. Nagai* 15:50-16:10 GS1-21 Experimental Verification of Loop Heat Pipe for High Heat Flux (Effects of Vapor Groove Geometry and Micro-Groove Processing) *Y. Shimada, Y. Nakatsugawa, A. Ueno, H. Nagano*	14:50-15:10 OS15-11 Application of a High Order LES Turbulence Model on Investigating the Effect of Vortex Generators on Film Cooling Effectiveness *D. Biswas, T. Jimbo* 15:10-15:30 OS15-12 Atmospheric Surface Layer Flows over a Dense City *L. Yao, C.-H. Liu* 15:30-15:50 OS15-13 Morphological Effect on the Wake Flows after a Single Fractal Tree using Large-Eddy Simulation *S. Liu, C.-H. Liu* 15:50-16:10 OS15-14 Amplitude Modulation of Velocity Fluctuations based on Atmospheric Flows over Real Urban Morphology *Y. Liu, C.-H. Liu*	**Free Discussion 4** CRF-62 to 80 (Remo)

16:20 **BREAK** 16:20

16:30 EX-2	EX-3-A	EX-3-B	EX-4-A	EX-4-B	Remo	16:30
OS23:IFS Lyon Center Collaborative Research Forum + OS2:Combustion OS20:Liaison, OS24:C2C	**GS: General Session** Flow dynamics 3 *Chair: K. Shimoyama*	**IFS Virtual Tour**	**GS: General Session** Energy and combustion *Chair: K.D.K.A. Somarathne*	**OS15: Turbulence: from Fundamentals to Applications** Droplet & Heat Transfer *Chair: Y. Hattori*		
16:30-16:50 OS23-5 Coupled Computing of Fluid-Structure Interaction Problems for Multiphase Energy Systems *J. Ishimoto, T. Elguedj* 16:50-17:10 OS23-6 Heat Exchange in Caloric Regenerators: from CFD Preliminary Analysis to Cooling Applications *G. Lombardi, G. Sebald, A. Komiya, S. X. Wway, G. Coativy, J. Jay* 17:10-17:30 OS23-7 Evolution of the Polymer Particle Thermal History During Cold Spray Process *C. Bernard, H. Takana, G. Diguet, O. Lame, K. Ogawa, J.-Y. Cavaillé* 17:30-17:50 OS23-8 Modal Approach for Extracting Flow Structure Related to the Subsonic Jet Noise Generation *S. Morita, A. Yakeno, C. Bogey, S. Obayashi* 17:50-18:10 OS23-9 Transition of Atmospheric Shear Flow Investigated by Sensitivity Analysis *R. Yoshimura, A. Yakeno, B. Pier, F. Alizard, S. Obayashi*	16:30-16:50 GS1-13 Optimization in Autonomous Underwater Vehicle (AUV) Group Formation by Computational Model *G. Li, D. Kolomenskiy, L. Duan, R. Godoy-Diana, B. Thiria* 16:50-17:10 GS1-14 POD Analysis of Front Wheelhouse Wake by Onboard PIV Measurement *N. Kuratani, T. Kawamura, K. Ambo, N. Fortunato* 17:10-17:30 GS1-15 One-way FSI Analysis of Industrial Gas Turbine Compressor under Start-up Condition *H. Miyazawa, T. Furusawa, S. Yamamoto* GS1-16 Cancelled 17:30-17:50 GS1-17 Impact on the Heat Transfer and Flow Behavior of Fin Geometry in a Rectangular Channel *M. Gürdal, H. K. Pazarlıoğlu, K. Arslan*	17:00- IFS Virtual Tour	16:30-16:50 GS1-22 Optimization of a Concentrating Photovoltaic Thermal System (CPVT) by Considering Design and Operating Parameters *A. Ustaoglu, B. Kursuncu, J. Okajima, V. Akgül* 16:50-17:10 GS1-23 Experimental Evaluation of Concentrating Photovoltaic Thermal System (CPVT) for Different Reflectance Characteristics *A. Ustaoglu, H. Buyukpatpat, H. Kaya, J. Okajima, B. Kursuncu* 17:10-17:30 GS1-24 Effect of Ammonia Enriched Gaseous Co-flow On Soot Formation In Droplet Combustion *A. Kumar, S. Yang*	16:30-16:50 OS15-15 Analysis Of Lagrangian Droplet Dynamics Using Computational Singular Perturbation *L. Angelill, P. Paolo Ciottoli, E. Hernández-Pérez, M. Valorani, H. G. Im* 16:50-17:10 OS15-16 Heat Transfer Performance of Punched Holes on Fin Surface for the Flat Tube Bank Heat Exchanger *H. K. Pazarlıoğlu, A. Ü. Tepe, K. Arslan* 17:10-17:30 OS15-17 Optimization of Influencing Parameters on Thermal Efficiency of Solar Air Heater with Elongated Impinging Jets and Dimpled Fin *E. Çalar, K. Arslan, H. K. Pazarlıoğlu, A. Ü. Tepe*		

18:00 18:00

OS21: The 18th International Students / Young Birds Seminar on Multi-scale Flow Dynamics

OS21-1: **Semi-Active Energy Harvesting with Magnetostrictive Transducer from Structural Vibration**
K. Goto, A. Li, Y. Hara, K. Otsuka, H. Kurita, F. Narita, P. Lohmuller, P. Laheurte, K. Makihara

OS21-2: **Study on Coil Shape in a Method of Producing Ultra-Thin Metal Plates with Electromagnetic Pressure**
T. Machida, S. Kobayashi, K. Masuda, N. Ono

OS21-3: **Prototype System for Three-Dimensional Visualization of a Rotating Liquid Flow during Wafer Drying**
K. Sonoda, K. Nishimura, H. Nakagami, A. Sakai, T. Ishibashi, N. Ono

OS21-4: **Three-Dimensional Observation of a Liquid Flow on the Effect of Gas Spraying Positions during Wafer Drying**
K. Nishimura, K. Sonoda, H. Nakagami, A. Sakai, T. Ishibashi, N. Ono

OS21-5: **Evaluation of the Heat Transfer Performance of Working Fluid in Elastocaloric Cooling Devices**
S. X. Way, G. Lombardi, G. Sebald, Y. Kanda, A. Komiya

OS21-6: **Cartesian-mesh CFD for Heat Flux Prediction of a Symmetric Wedge in Supersonic Flow**
K. Abe, D. Sasaki, S. Takahashi, G. Yamada

OS21-7: **Analysis of Cross-linking Reaction Process of Network Polymers by Molecular Dynamics Simulation and Quantum Chemical Calculation**
Y. Xi, H. Fukuzawa, G. Kikugawa, N. Kishimoto

OS21-8: **Effects of Air Plasma Configuration on Thruster Performance**
M. Harada, H. Moriai

OS21-9: Cancelled

OS21-10: **Heat Transfer Mechanisms for Spatially Uniform Cooling of Continuous Heating Elements**
M. Yamamoto, Y. Kanda, A. Komiya

OS21-11: **Time-Dependent Heat Flux around Contact Line of Evaporating Drops on Hydrophobic Surfaces**
K. Taguchi, T. Miyagawa, M. Shirota, T. Okabe

OS21-12: **Data-Driven Thermal Analysis for Spacecraft Systems －Evaluation of Temperature Estimation by Physics-Informed Neural Networks－**
H. Tanaka, H. Nagai

OS21-13: **Numerical Analysis of Oscillating Heat Pipe with Dynamic Liquid Film Model**
A. Kawaguchi, K. Sone, K. Matsubara, H. Nagai

OS21-14: **Experimental Study on Operating Characteristics of Gravity-Assisted Cryogenic Loop Heat Pipe**
T. Yokouchi, X. Chang, K. Odagiri, H. Ogawa, H. Nagano, H. Nagai

OS21-15: **Experimental Study on Thermal Performance of CFRP-embedded Oscillating Heat Pipe**
K. Matsubara, K. Sone, H. Nagai

OS21-16: **Numerical Simulation of Coke in a Uniaxial Compression Test at High Temperature**
T. Higo, S. Kudo, J. Hayashi, Y. Saito

OS21-17: **Measurement and Prediction of Defect Free Region Formed on Impact Surface of Molten Metal Drops**
Y. Nakagawa, T. Okawa, K. Maeda, T. Okabe, M. Shirota

OS21-18: **Numerical Study of Plasma Behavior in a Disk MHD Generator with Various Noble Gases**
T. M. S. Leung, K. Ork, Y. Okuno

OS21-19: **Temperature Measurement of a Graphene Device by Raman Spectroscopy**
Y. Kumakura, T. Suganoa, K. Misaki, S. Kinameri, A. Sakurai

OS21-20: **Effects of Dual-cavity Flameholder on Flow Field and Flame Structure in Supersonic Flows**
K. Norimatsu, S. Nishiura, T. Kudo, A. Hayakawa, H. Kobayashi

OS21-21: **Laminar Burning Velocities and Markstein Lengths of Oxygen Enriched $NH_3/O_2/N_2$ and NH_3/O_2 Premixed Flames**
Y. Shen, K. Sakai, S. Colson, T. Kudo, A. Hayakawa, H. Kobayashi

OS21-22: **Atomization and Combustion Characteristics of Airblast Atomizers Manufactured with a Metal 3D-printer**
E. Tanaka, Y. Imai, A. Shibazaki, T. Kudo, Y. Komatsu, M. Uchida, A. Hayakawa, H. Kobayashi

OS21-23: **The Topological Characteristics of Bundles of Vortical Axes in The Vortical Region in an Isotropic Homogeneous Turbulence**
K. Hyoudou, K. Nakayama

OS21-24: **Improvements of Vortex Generator for Transonic Buffet Suppression over Supercritical Airfoil**
Y. Tsukamoto, K. Kitamura

OS21-25: **A Transition of Bundles of Vorticity Lines with Coalescence of Vortical Regions in a Homogeneous Isotropic Turbulence**
Y. Adachi, K. Nakayama

OS21-26: **Visualization of Rotor Surface Flow in Hovering by cntTSP**
T. Ikami, R. Nishimura, H. Nagai

OS21-27: **Investigation on Aircraft Turbulence Using Large Eddy and Flight Simulations**
P. Schittenhelm, R. Yoshimura, J. Ito, S. Obayashi

OS21-28: **Stall Delay in Propeller Slipstream at Low Reynolds Number**
M. Okawa, R. Nishimura, T. Ikami, H. Nagai

OS21-29: **Visualization of Coaxial Rotor at Low Reynolds Number Condition**
R. Nishimura, M. Okawa, T. Ikami, H. Nagai

OS21-30: **Numerical Flow Analysis and PIV Measurement around Tandem Flapping Wings**
R. Tobisaka, W. Yamazaki, S. Takahashi

OS21-31: **Numerical Study on Propeller Scale Effect on Flow Field around Blade**
Y. Furusawa, K. Kitamura, T. Ikami, M. Okawa, H. Nagai

OS21-32: **Numerical Investigation of Liquid Film Thickness of Adiabatic Two-phase Flow in Microchannel**
D. Tsuneoka, J. Okajima

OS21-33: **Downwash Profiles behind Delta Wing at Low Reynolds Number**
N. Takeda, S. Tanaka, M. Okamoto

OS21-34: **Time Response of Anodized Aluminum Pressure-Sensitive Paint for Supersonic Phenomena**
S. Tamakuma, J. Abe, H. Nagai

OS21-35: **Investigation of Flutter Velocity and Power Generation with Piezoelectric Film**
S. Dong, T. Mukogawa, Y. Hara, K. Otsuka, B. Chen, Y. Shi, Y. Jia, C. Soutis, H. Kurita, F. Narita, K. Makihara

OS21-36: **Effects of Oscillation of Flexible-membrane Wing on Flow Field at Low Reynolds Number**
H. Kurahashi, K. Yamamoto, M. Okawa, T. Ikami, K. Takahashi, H. Nagai

OS21-37: **Development of a BCM Solver for Internal Flow in Supersonic using the IB Method**
K. Miyata, S. Ogawa, K. Mori, D. Sasaki

OS21-38: **Unsteady Characteristics of Membrane Wing Applied Dielectric Elastomer Actuator**
T. Kobayashi, K. Fujita, K. Otsuka, H. Nagai

OS21-39: **Spreading Behavior for a Non-Newtonian Droplet Impacting on a Solid Surface**
C. Zhixin, T. Okabe, M. Shirota, Y. Matsushita, Y. Matsukawa, H. Aoki, M. Daikoku, J. Fukuno, Y. Saito

OS21-40: **Influence of Electrode Position of DBD Plasma Actuator on Vortex Structures of High Reynolds Number Flows around an Airfoil**
Y. Nakamura, K. Asawa, N. Kubo, M. Tanaka, T. Fujino

OS21-41: **Investigation of Flow Characteristics for Cylinder at Low Subcritical Reynolds Number by Using OpenFOAM**
N. Okabayashi, S. Nara, S. Takahashi, G. Yamada, T. Miura

OS21-42: **Pressure-sensitive Paint Technique on Free-flight Object Surface Using a Set of Pseudo-reference Images**
Y. Hosono, K. Yomo, D. Kurihara, J. Gonzales, H. Sakaue, H. Nagai

OS21-43: **Basic Research of Two-color AA-PSP for the Application to the High-speed Fluid Phenomena**
K. Okamoto, D. Numata

OS21-44: **The Effects of the Outer Subsonic Flow on the Supersonic Jet Noise**
K. Ozeki, M. Harada, H. Moriai

OS21-45: **On-Track and Off-Track Low-Boom Supersonic Transport Designs Using Bayesian Optimization**
A. Akashi, T. Jim, K. Shimoyama

OS21-46: **Investigation of Peculiar Sub-synchronous Oscillation of Cavitation in Inducer**
K. Tamura, S. Kawasaki, Y. Iga

OS21-47: **Evaluation of Hindered Diffusion Process Affected by the Different Size of Macro-pore Membrane**
R. Zhu, J. F. Torres, S. Livi, Y. Kanda, A. Komiya

OS21-48: **In-situ Measurements of Thin Nanofluid Films and Deposition Patterns of Drying Droplets in Inkjet Processes**
T. Saito, A. Hoshino, E. Shoji, T. Biwa, M. Kubo, T. Tsukada, T. Tomai, T. Adschiri

OS21-49: **Conceptual Design of a Box Wing UAV with Distributed Electrical Propulsion**
D. Yariwake, E. Dzieminska, A. Yakeno, T. Goetzendorf-Grabowski

OS21-50: **Effect of Liquid Viscosity on Rapid Decrease in Contact Line Velocity of Impacting Drops**
A. Kodama, K. Shirai, T. Miyagawa, T. Okabe, Y. Matsushita, Y. Saito, Y. Matsukawa, H. Aoki, M. Daikoku, J. Fukuno, M. Shirota

OS21-51: **Superspreading in Wetting of Sessile Nanofluid Droplets: Measurements of Nano-thickness Films near Contact Lines**
A. Hoshino, T. Saito, E. Shoji, T. Biwa, M. Kubo, T. Tsukada, T. Tomai, T. Adschiri

OS21-52: **Free-fall Experiment of a New Re-entry Capsule Using Drone in Low-speed Region**
M. Nagata, R. Kawano, K. Takahashi, K. Fujita, H. Nagai, K. Yamada

OS21-53: **Structural Parameter Estimation for Health Monitoring and Damage Detection based on Subspace Identification**
T. Tang, M. Abe, M. Zhou, Y. Hara, K. Otsuka, K. Makihara

OS21-54: **Dynamic Stability Characteristics of Next Generation Re-entry Capsule at Transonic Speeds**
R. Kawano, Y. Hamashima, M. Nagata, K. Takahashi, H. Nagai, K. Yamada

OS21-55: **Performance Investigation of Indoor Ventilation by Changing Arrangement of HEPA Air Purifiers**
G. Hirokawa, W. Yamazaki, H. Takahashi

OS21-56: **Evaluation of Electron Temperature in Argon Plasma Flows behind Shock Waves by Continuum Radiation**
H. Hirooka, G. Yamada

OS21-57: **Unsteady Force Measurement on Cylinder Surface Using Anodized Aluminum Pressure-Sensitive Paint**
S. Tamakuma, K. Yomo, T. Ogawa, H. Nagai

OS21-58: **Experiment on Scale Effect of Cavitation Inception**
A. S. Kyaw, Y. Iga

OS21-59: **Effect of Electric Field on Liquid Jet in a Gas Crossflow**
K. Hayashi, M. Shirota, Y. Matsushita, Y. Mawatari, M. Yamamura, Y. Saito

OS21-60: **Influence of Dielectric Temperature and Ambient Pressure on Power Consumption of a DBD Plasma Actuator during Flow Control**
K. Asawa, N. Kubo, K. Nishiyama, M. Tanaka, T. Fujino

OS21-61: **Molecular Dynamics Simulations for F^- Export Mechanism in CLC^F**
A. Nakamura, T. Tokumasu, T. Mabuchi

OS21-62: **Development of a Low-cost Mechanical Exfoliation Equipment**
K. Chida, K. Hoshi, H. Tanaka, K. Misaki, A. Sakurai

OS21-63: **Non-destructive Evaluation of Fiber Distribution in Filament Winding Molded CFRP by Eddy Current Testing**
K. Tanaka, A. Seto, T. Uchimoto, S. Takeda, H. Kosukegawa, T. Takagi, T. Watanabe, Y. Urushiyama, Y. Tuchiyama

OS21-64: **Performance Evaluation of High Resolution Eddy Current Probe Using Magneto-Optical Effect**
K. Kanai, S. Takeda, T. Uchimoto, T. Ishibashi

OS21-65: **Improvement of Measurement Accuracy of Pipe Wall Thinning Inspection by Electromagnetic Acoustic Resonance Method**
S. Kimura, S. Takeda, T. Uchimoto, N. Yusa

OS21-66: **Evaluation of Cracks in Ceramics Matrix Composites by Eddy Current Testing**
K. Matayoshi, T. Uchimoto, S. Takeda, H. Kosukegawa, T. Takagi, K. Inagaki, S. Hashimoto, N. Kimura

OS22: The 22nd International Symposium on Advanced Fluid Information (AFI-2022)
IFS Collaborative Research Forum

CRF-1 **Clean Energy Power Generation Using Flow-Induced Self-Excited Vibration of an Elastic Body**
K. Shige, N. Takeda, M. Okuno, T. Ikami, T. Kobayashi, O. Terashima, Y. Konishi, H. Nagai, T. Komatsuzaki

CRF-2 **Study of Heat and Mass Transport in Evaporation inside Porous Media**
Z. Zhang, B. Shen, K. Watanabe, K. Matsubara, X. Chang, H. Nagai

CRF-3 **Simulation in Micro EHD Conduction Pump with Asymmetric Flush Electrode**
T. Ueda, M. Nishikawara, H. Yanada, H. Yokoyama, H. Nagai

CRF-4 **Calculation of Skin and Core Temperature for Repeated Bathing of Sauna**
T. Kogawa, K. Nishidate, H. Ishibashi, J. Okajima

CRF-5 **Radiation and Convection Coupling Calculation in a Direct Numerical Simulation for Misting Fire Extinguishing Devices**
H. Gonome, Y. Takagi, K. Suzuki, J. Okajima, T. Kogawa

CRF-6 **Truncation Effect on Electrical and Thermal Performances on a Concentrating Photovoltaic**
A. Ustaoglu, V. Akgül, J. Okajima, B. Kursuncu

CRF-7 **Study of Hydrothermal Behaviors of Impinging Droplets on a Heated Wall**
T. Okabe, K. Taguchi, J. Okajima, M. Shirota

CRF-8 **Study on MHD Phenomena in Co-Axial Energy Conversion Device**
H. Kobayashi, H. Takana, T. Hasebe, T. Fujino

CRF-9 **Catalyst Synthesis Using Cavitation Plasma for Oxygen Reduction Reaction**
N. Takeuchi, S. Imaizumi, R. Harakawa, H. Takana, O. L. Li

CRF-10 **Numerical Simulation of a Thermal Plasma Reactor for the Wastes to Energy**
H. Kang, J.-H. Oh, J.-H. Mun, H. Takana, S. Choi

CRF-11 **Numerical Analysis of Changes in Transport Properties in Biological Membranes due to Plasma-Induced Charges and Electric Fields**
Y. Iwata, K. Takami, S. Uchida, T. Sato

CRF-12 **The Instability of Hydrogen-Air-Steam Lean Premixed Flames: Calculations Based on the Detailed Chemical Reaction Model in Large Space**
S. Kadowaki, H. Kobayashi

CRF-13 **Effects of Pressure on Product Gas Characteristics of Ammonia/Hydrogen/Air Premixed Flames**
A. Hayakawa, M. Kovaleva, A. Valera-Medina

CRF-14 **Laminar Burning Velocity of Ammonia/Methane/Water Vapor/Air Premixed Flames**
A. Hayakawa, M. Hayashi, E. C. Okafor, H. Kobayashi

CRF-15 **Damage Evaluation for Hollow Cylindrical Tethers with Cross-Shaped Keepers**
N. Karasawa, D. Morimoto, H. Takahashi, K. Ohtani, K. Otsuka, K. Makihara

CRF-16 **Study on the Injection Process of Next-Generation Liquified Fuels**
N. Kawaharada, I. Oshima

CRF-17 **Analysis of In-Plane Thermal Conduction in Si-Nanopillar/Sige Composite Films by Laser Heterodyne Photothermal Displacement Signal and Theoretical Calculation**
H. Ohyama, T. Harada, K. Morita, S. Harada, D. Ohori, S. Samukawa, T. Ikari, A. Fukuyama

CRF-18 **Effect of Fining Hydrogen Source and Electrode Material for Ammonia Production with Plasma Method**
S. Hiramatsu, R. Shiraishi, Y. Hayamizu, N. Sehara, N. Uene, T. Tokumasu

CRF-19 **Prediction of Epitaxial Growth of Magnesium Oxide on Silicon Substrate**
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