

## Executive Committee Members

Shigeru Obayashi (General Co-Chair of ICFD2021, Tohoku University)  
Hong G. Im (General Co-Chair of ICFD2021, King Abdullah University of Science and Technology)  
Kaoru Maruta (Director of IFS, Tohoku University)

## International Scientific Committee Members

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Weihua Li  
Gary Rosengarten  
Victoria Timchenko

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Kentaro Doi  
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Yao-Hsien Liu  
Jongshinn Wu

### USA

Igor V. Adamovich  
Jeongmin Ahn  
Yiguang Ju  
Kozo Saito  
Rongjia Tao

## Conference Venue

ICFD2021 will be held as an online virtual conference.

## Registration Fee

Registration Fee	Without Banquet	
	GENERAL	5,000JPY
STUDENT	2,000JPY	

\*The registration fee is discounted. Special price just this once.

All participants are required to make a registration through the website.

## Important Dates

- June 15, 2021:** Deadline for **Presentation Submission Extended to July 1, 2021**  
Please present your paper title / author name / keywords through Presentation Submission page of ICFD2021 website.
- July 23, 2021:** Deadline for **Short Paper (2 or more pages) Submission**
- Sep. 15, 2021:** Presenter: Deadline for Registration
- Oct. 22, 2021:** Audience: Deadline for Registration

## Publication & Special Issues of International Journals

It will be available to download the proceedings through the ICFD2021 website. The URL and password will be informed the participants by e-mail in the morning on October 27, 2021. Special Issue of the Conference is being planned to be published in a journal. For more details, please visit ICFD2021 website.

## ICFD Secretariat

For further details and related questions, please contact ICFD2021 Secretariat: [icfd2021@grp.tohoku.ac.jp](mailto:icfd2021@grp.tohoku.ac.jp)  
ICFD2021 Secretariat, Institute of Fluid Science, Tohoku University  
2-1-1, Katahira, Aoba-ku, Sendai, 980-8577, JAPAN  
TEL&FAX: (81)22-217-5301  
<http://www.ifs.tohoku.ac.jp/icfd2021/>

# The 18<sup>th</sup> International Conference on Flow Dynamics

Second Circular

As of June 16, 2021

<http://www.ifs.tohoku.ac.jp/icfd2021/index.html>

Organized by  
Executive Committee of ICFD

Supported by  
Institute of Fluid Science,  
Tohoku University



## October 27 - 29, 2021

## ICFD2021 will be held as an online virtual conference.



## SCOPE

The 18th International Conference on Flow Dynamics (ICFD2021), in the annual series since 2004, will be held from October 27th to 29th, 2021 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, ICFD2021 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 a comprehensive scientific field 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 ICFD2021 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 October 2021 or not. If so, we believe that you will enjoy beautiful and pleasant atmosphere of the autumn at Sendai, since late October is the best season of Sendai. If not, we will do our best to make ICFD2021 successful as the online conference.

Shigeru Obayashi, Professor,  
Tohoku University &  
Hong G. Im, Professor,  
King Abdullah University of Science and Technology

General Co-Chairs, ICFD2021

### General Session:

#### GS1: General Session

Co-Organizers: S. Obayashi, K. Shimoyama

### Symposium / Workshop / Organized Sessions:

#### OS1: The Ninth International Symposium on Innovative & OS3: Energy Research I & III

##### OS1: Advanced Materials and its Energy Application

Organizer: S. Samukawa

##### OS3: Multiphase Energy Science and Technology (Combination of Monozukuri-Fluid Science / Engineering)

Organizer: J. Ishimoto

#### OS2: The Ninth International Symposium on Innovative Energy Research II: Combustion Technology and Fundamentals

Co-Organizers: P. Dagaut, H. Im, N. I. Kim, K. Maruta

#### OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 13th Edition

Co-Organizers: T. Shimada, K. Sawada

#### OS5: Advanced Applications of Multi-functional Fluids

Co-Organizers: H. Takana, T. Fujino, K. Doi, N. Takeuchi, Y. Iwamoto

## Sessions

#### OS6: New Dimensions of Magnetic Suspension and Balance System

Co-Organizers: S. Obayashi, K. Asai

#### OS7: Smart Fluids & Soft Matters and Their Advanced Applications

Co-Organizers: M. Nakano, X. Gong, W. Li, G. Sebald

#### OS8: Advanced Physical Stimuli and Biological Responses

Co-Organizers: T. Sato, T. Ohashi, S. Kawano, R. Shirakashi

#### OS9: Biomedical Flow Dynamics

Co-Organizers: H. Anzai, M. Zhang, K. Takashima, T. Nakayama, A. Qiao, M. Ohta

#### OS10: Biomolecular Dynamics

Co-Organizers: Y. Mukai, K. Etchuya, M. Ohta

#### OS11: Microfluidics and Microphysiological Modeling

Co-Organizers: K. Funamoto, T. Fukui

#### OS12: Canceled

#### OS13: Flow Realization, Measurement and Visualization

Co-Organizers: T. Yamagata, S. Funatani, S. Iio, K. Funamoto

#### OS14: Porous Media

Co-Organizers: A. Suzuki, S. Tupin, M. Ohta

#### OS15: Turbulence: from Fundamentals to Applications

Co-Organizers: Y. Hattori, T. Ishihara, Y. Tsuji

#### OS16: Vortex Motion

Co-Organizers: Y. Hattori, S. Llewellyn Smith

#### OS17: Supercritical Fluid

Co-Organizers: Y. Kanda, Y. Feng, J. Chen, A. Komiya

#### OS18: Flow Dynamics of Diffusion -reactive and Phase Transition Systems

Co-Organizers: J. Okajima, R. Fursenko, V. Guvernov, S. Minaev

#### OS19: Liaison Office Session

Co-Organizers: M. Ohta, T. Uchimoto, T. Tokumasu, A. Komiya

#### OS20: The 17th International Students / Young Birds Seminar on Multi-scale Flow Dynamics

Co-Organizers: T. Akiba, T. Ikami, S. Morita  
Supervisors: A. Suzuki, S. Takeda, Y. Kanda, J. Okajima, A. Hayakawa

#### OS21: The 21st International Symposium on Advanced Fluid Information (AFI-2021)

➤ IFS Collaborative Research Forum

Co-Organizers: H. Masuda, S. Obayashi

#### OS22: AFI-2021 IFS Lyon Center Collaborative Research Forum

Organizer: T. Uchimoto

#### OS23: 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: K. Maruta, M. Sarathy, N. Mary, F. Ohuchi