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Jong-Shinn Wu (General Co-Chair of ICFD2019, National Chiao Tung University)  
Shigeru Obayashi (Director of IFS, Tohoku University)

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Rongjia Tao  
Satish Udpa

## Conference Venue

### Sendai International Center

Aobayama, Aoba-ku, Sendai, 980-0856  
TEL: (81)22-265-2211 FAX: (81)22-265-2485  
<http://www.aobayama.jp/english/>

## Banquet Venue

### Hotel Metropolitan Sendai

1-1-1, Chuo, Aoba-ku, Sendai, 980-8477  
TEL: (81)22-268-2525  
<http://www.sendaimetropolitan.jp/en-gb>

## Registration Fee

	With Banquet	Without Banquet
Advanced Registration Fee (on or before Aug. 30)	General 22,000 JPY	General 14,000 JPY
	Student 7,000 JPY	Student 3,000 JPY
Onsite Registration Fee (on and after Aug. 31)	General 32,000 JPY	General 22,000 JPY
	Student 11,000 JPY	Student 5,000 JPY

\*Banquet will be held on November 7 at Hotel Metropolitan Sendai.

## Important Dates

- ~~June 15, 2019:~~ Deadline for **Presentation Submission**.  
**July 1, 2019** Please present your paper title / author's name / keywords through Presentation Submission page of ICFD2019 website.
- July 26, 2019:** Deadline for **Short Paper (A4, 2pages) Submission**
- Aug. 30, 2019:** Deadline for **Advanced Registration**

## Publication & Special Issues of International Journals

Proceedings will be distributed to the conference participants with USB flash memory. Selected papers are being planned to be published in a journal after the conference. Please visit ICFD2019 website for the details.

## ICFD Secretariat

For further details and related questions, please contact ICFD2019 Secretariat: [icfd2019@fmail.ifs.tohoku.ac.jp](mailto:icfd2019@fmail.ifs.tohoku.ac.jp)  
ICFD2019 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/icfd2019/>

# The 16<sup>th</sup> International Conference on Flow Dynamics

Second Circular

As of September 13, 2019

<http://www.ifs.tohoku.ac.jp/icfd2019/>

Supported by  
Institute of Fluid Science, Tohoku University



**November 6 – 8, 2019**

**Sendai International Center  
Sendai, Japan**



## SCOPE

The 16th International Conference on Flow Dynamics (ICFD2019), in the annual series since 2004, will be held from November 6th to 8th, 2019 at the Sendai International Center, Sendai, Japan. The objectives of this conference are 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. 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 2018, on the occasion of its 75th 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 new 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 ICFD2019 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. Participants will know when they come to Sendai that a wide variety of technical sessions are available to provide the seeds and to fulfill the needs from a viewpoint of flow dynamics. We cordially invite researchers, teachers, students and planners exploring and studying in the relevant research and development fields of bio-, nano-, material, energy, 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. November is a beautiful month in Sendai. We believe that you will enjoy beautiful and pleasant atmosphere of the autumn in Sendai.

Takehiko Sato, Professor,  
Tohoku University  
and

Jong-Shinn Wu, Professor  
National Chiao Tung University  
General Co-Chairs, ICFD2019

## Plenary Lectures

**Dr. Mohamed Farhat** (EPFL, Switzerland)

"Jets, Shocks and Light Emission from Collapsing Cavitation Bubbles"

**Professor Joaquim R.R.A. Martins** (University of Michigan, USA)

"CFD-based Aircraft Design Optimization"

**Professor Luc Vervisch** (INSA de Rouen Normandie, France)

"Turbulent Reactive Flow Simulation: From Physical Modelling to Machine Learning"

## Sessions

**General Session:**

**GS1: General Session**

Co-Organizers: T. Sato, G. Kikugawa

**Symposium / Workshop / Organized Sessions:**

**OS1: The Seventh International Symposium on Innovative Energy Research I: Advanced Materials and its Energy Application**

Co-Organizers: S. Samukawa, S. Orimo

**OS2: The Seventh International Symposium on Innovative Energy Research II: Combustion Technology and Fundamentals**

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

**OS3: The Seventh International Symposium on Innovative Energy Research III: Multiphase Energy Science and Technology Related to FSI Coupled Problems (Combination of Monozukuri-Fluid Science / Engineering)**

Organizer: J. Ishimoto

**OS4: Flow Dynamics and Combustion Technology of Hybrid Rocket Propulsion, 11th Edition**

Co-Organizers: T. Shimada, K. Sawada

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

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

**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, R. Tao, 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, M. Ohta

**OS10: Biomolecular Dynamics**

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

**OS11: Microfluidics and Microphysiological Systems**

Co-Organizers: K. Funamoto, M. Ohta

**OS12: Complex Thermofluid System**

Co-Organizers: C.-Y. Chen, Y.-H. Liu, Y.-H. Liao

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

Co-Organizers: N. Fujisawa, T. Yamagata, T. Hayase, S. Funatani, S. Iio

**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: Liaison Office Session**

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

**OS18: The 15<sup>th</sup> International Students / Young Birds Seminar on Multi-scale Flow Dynamics**

Co-Organizers: T. Adachi, S. Takahashi, W. Lock Sulen  
Supervisors: A. Hayakawa, J. Okajima, S. Uehara, Y. Iga, K. Sato

**The 19<sup>th</sup> International Symposium on Advanced**

**OS19: Fluid Information (AFI-2019)**

➤ **IFS Collaborative Research Forum**

Co-Organizers: H. Masuda, T. Sato

➤ **Fluids Science Research Award Lectures**

Organizer: S. Obayashi

**OS20: AFI-2019 IFS Lyon Center Collaborative Research Forum**

Organizer: T. Uchimoto