



Institute of Fluid Science Tohoku University



Greetings from the Director

Tackling the challenges of future society based on the science of flow

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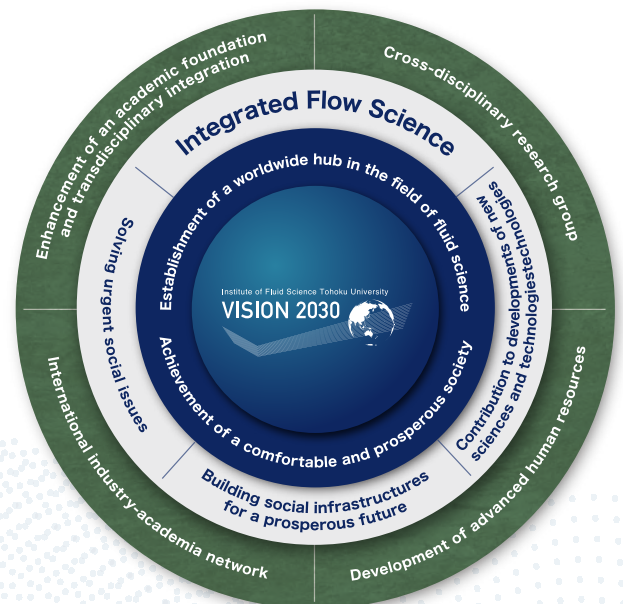
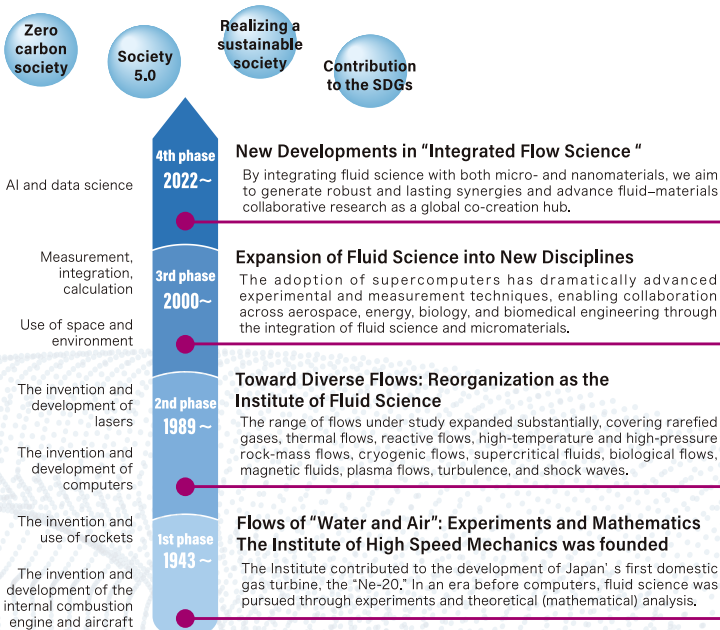
Since its establishment in 1943 as the Institute of High Speed Mechanics, the Institute of Fluid Science (IFS) has engaged with a wide range of academic fields and societal challenges, grounded in the science of "flow." Today, our research extends across diverse fields—including environment and energy, aerospace, biomedical engineering, and nanotechnology—and engages in elucidating flow phenomena across multiple hierarchical scales, from macroscopic flows down to the molecular and atomic levels.

At the Institute, we are advancing "Integrated Flow Science," a research framework that fuses experiments, measurements, numerical simulations, and data science. By leveraging world-class research infrastructure such as supercomputers and large-scale wind tunnel facilities, we promote collaboration with researchers in Japan and around the world through our role as a Joint Usage / Research Center, while also dedicating our efforts to international collaborative research and human resource development.

In recent years, we have also engaged in research on next-generation energy, including ammonia as a fuel, as well as innovative process research aimed at realizing a decarbonized society. As a research hub that opens new frontiers in fluid science and contributes to a sustainable society, we are committed to continuing to take on bold challenges.

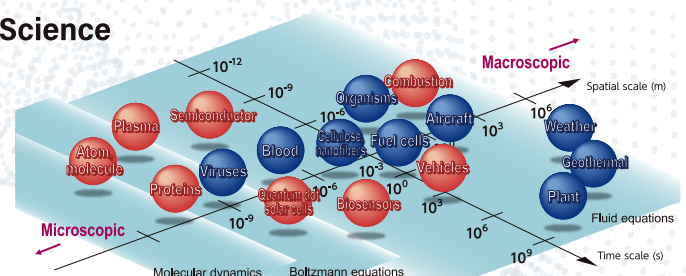
The History of IFS and Toward Vision 2030

As Japan's only research center for fluid science, the Institute of Fluid Science has organized four interdisciplinary research clusters under Vision 2030: "Environment and Energy," "Nano-Micro," "Health, Welfare, and Medicine (Life Science)," and "Aerospace." We aim to form an international hub where researchers from around the world gather, and to solve societal challenges through interdisciplinary integration and industrial collaboration.



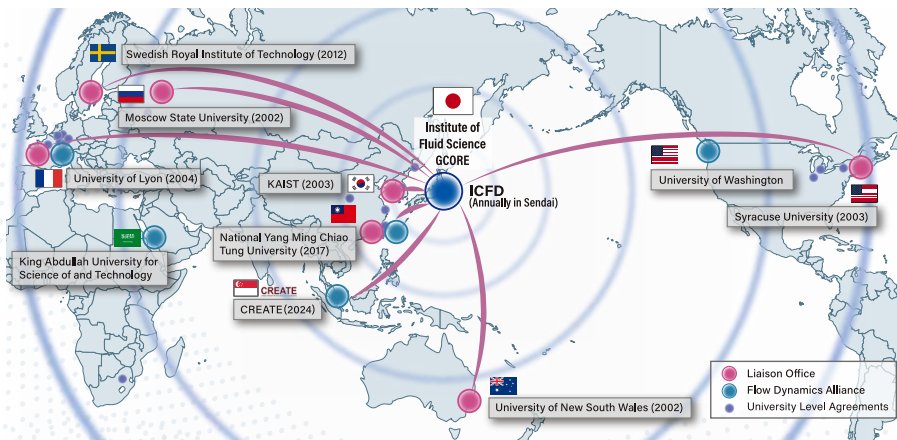
The Broad Academic Scope of Integrated Flow Science

"Integrated Flow Science" is grounded in a strong academic foundation in fluid science and aims to contribute to solutions for societal challenges across a wide range of applied fields. It is a vast academic foundation, spanning both space and time, which starts from our cornerstone — fluid science — and extends down to molecules and atoms.



An Alliance-Based International Hub Creating Social Impact and Communicating with the World

The Institute of Fluid Science promotes international collaboration to extend its work across diverse application fields. Through active joint research and education with overseas centers in France, Taiwan, Saudi Arabia, the United States, Singapore, Australia, and elsewhere, we are working to become an alliance-based international hub that creates social impact, particularly in areas such as innovative semiconductor devices and ammonia as a fuel.



International Collaboration of the Institute of Fluid Science



International Conference on Flow Dynamics (ICFD)

Trends in ICFD Participation and Number of Presentations



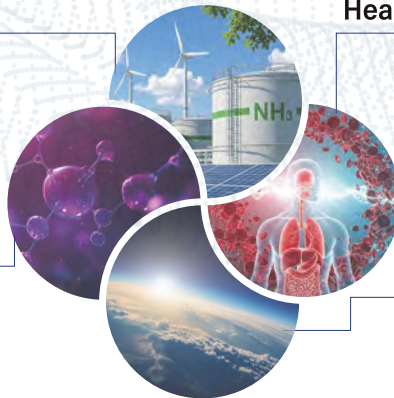
Four Research Clusters Addressing Societal Challenges

Environment and Energy Cluster

Toward realizing a decarbonized society and creating new energy systems, this cluster advances research ranging from fundamental to applied technologies that contribute to solving environmental and energy issues.

Nano-Micro Cluster

By elucidating flow phenomena that emerge at the nano and micro scales, this cluster pursues research with an eye toward industrial applications, including innovative devices and processing technologies.



Health, Welfare and Medical Cares Cluster

This cluster investigates transport phenomena in living bodies and their interactions with physical stimuli from the perspective of fluid science, aiming to create medical and welfare technologies that support a healthy, safe, and secure society.

Aerospace Cluster

This cluster elucidates and controls the complex flow fields associated with spacecraft and aircraft, contributing to the advancement of next-generation aerospace technologies and highly efficient systems.

Large-Scale Facilities Supporting Pioneering Research

As world-class experimental facilities, the IFS operates the Low-Turbulence Heat-Transfer Wind Tunnel Facility and the Shock Wave Research Facilities. These facilities can reproduce and measure a wide range of flow phenomena with high precision, from low-speed flows comparable to a gentle breeze to hypersonic flows encountered during atmospheric re-entry. We also promote research that integrates large-scale experimental facilities with supercomputer-based simulations and advanced visualization, thereby contributing to a wide range of research and industrial applications in fields such as aerospace, energy, and the environment.



Low-Turbulence Heat Transfer Wind Tunnel



Shock Wave Research Facilities



Flow Visualization using Supercomputer

Organization chart



| Number of Full-time Staff (2026.5.1)

Professors	Associate Professors	Assistant Professors	Specially Appointed Professors	Specially Appointed Associate Professors	Specially Appointed Senior Assistant Professors	Specially Appointed Assistant Professors	Specially Appointed Research Fellow	Administrative Staffs	Technical Staffs	Limited Regular Employees	Total
18 (1)	11 (3)	7 (0)	1 (0)	5 (1)	1 (0)	7 (5)	13 (3)	8 (3)	13 (0)	12 (11)	96 (27)

※Numbers in parenthesis represent the number of females, and are included in the totals

| Number of Students (2026.5.1)

B4	M1	M2	D1	D2	D3	Total
45 (3)	68 (9)	65 (4)	23 (1)	17 (2)	24 (1)	242 (20)

※Numbers in parenthesis represent the number of females, and are included in the totals

| Expenses (FY2024)

(Units : Million yen)

Operational Grants		External funding						Total	
Personal Expenses	Operation Expenses	Grants-in-Aid for Scientific Research	Sponsored Reserch Fund	Joint Reserch Fund	Sponsored Project Fund	Grants	Scholarship Donations		
649	791	234	700	222	28	21	19		

| Academic presentations (FY2024)

Journal papers (International)	Journal papers (Domestic)	Presentation in International confrences	Presentation in Domestic confrences	Total
171	2	408	304	885

| Building

Total building area	13,167 m ²
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2026.6

