

国立天文台

【コクリツテンモンダイ】

大学共同利用機関法人 SINCE 2004

自然科学

【シゼンカガク-ケンキュウキコウ】

研究機構

核融合科学研究所

【カクユウゴウカガク-ケンキュウシヨ】

分子科学研究所

【ブンシカガク-ケンキュウジョ】

生理学研究所

【セイリガク-ケンキュウシヨ】

基礎生物学研究所

【キソセイブツガク-ケンキュウシヨ】

English

NAOJ

National Astronomical Observatory of Japan

NINS

National Institutes of Natural Sciences

Inter-University Research Institute Corporation SINCE 2004

National Institute for Basic Biology

ENIJS

National Institute for Fusion Science

National Institute for Physiological Sciences

Institute for Molecular Science



The National Institutes of Natural Sciences (NINS) consists of the five research institutes of the National Astronomical Observatory of Japan, the National Institute for Fusion Science, the National Institute for Basic Biology, the National Institute for Physiological Sciences, and the Institute for Molecular Science and has provided researchers at universities and research institutes nationwide with the joint use of our state-of-the-art equipment and a place for leading joint research as a core research institute in the field of natural sciences involved in space, energy, materials, life, etc., and with striving to enhance the roles and functions of each research institute by consensus of researcher communities, has pressed ahead with cutting edge research in each specialized field.

Inter-university research institutes were reorganized into four organizations by incorporation in 2004 and their position as institutes that independently and autonomously conduct education and research was strengthened. However, steering both sides to fulfill the social missions of an organic collaboration between research institutes which is originally based on different research communities and an institute as a whole is extremely important. In addition, these institutes have provided the basis for developing original research and have played a role in supporting our researchers to continue to produce high-quality research. Their mission has been to flourish with research communities centered on universities.

NINS has promoted research in a wide range of academic fields, from astronomy to brain science, and each of the five research institutes, which are constituent institutes, has research communities based on different academic fields. When looking at expanding academics and creating new interdisciplinary fields, development confined within one research institute corporation has been limited, and collaboration with universities including the entire inter-university research institute corporation and joint use/research centers has been indispensable. For this reason, the initiatives of the Inter-University Research & Education Alliance, which was established through collaboration between the four inter-university research institute corporations and SOKENDAI (Graduate University for Advanced Studies), the Research University Consortium consisting of national, public, and private universities and the inter-university research institute corporations have already started. Furthermore, we believe that the six-year period of the fourth medium-term target period from FY 2022 to FY 2027 is an important period in which the future state of inter-university research institutes will be further questioned.

To move toward a future with a sense of pride through technological innovation and social innovation, it is essential to promote the utilization of higher education human resources. As a leading institute for research communities, NINS will contribute to the importance of higher education and activities to promote the penetration of higher education human resources into society through science.

We look forward to your continued support and cooperation to NINS.



Maki Kawai  
President  
NINS

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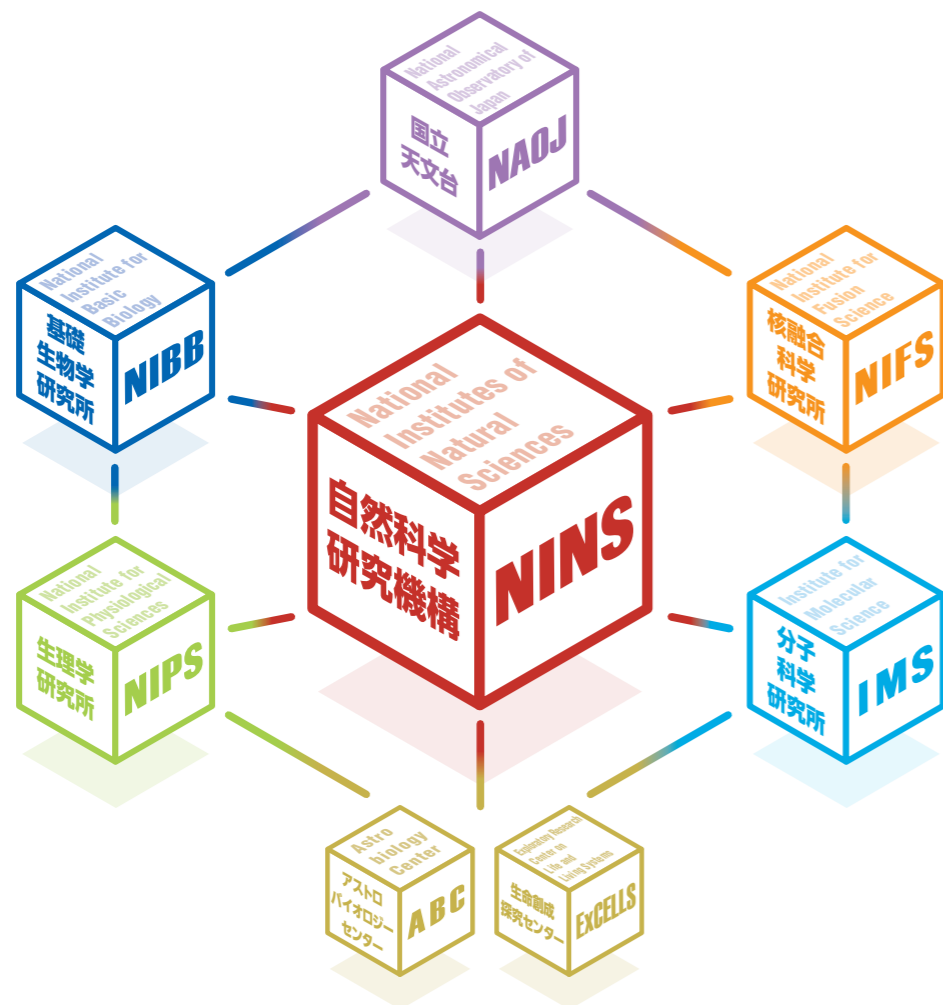
# Message

## from the President

### Maki KAWAI



# National Institutes of Natural Sciences (NINS)



The National Institutes of Natural Sciences (NINS) consists of five inter-university research institutes: the National Astronomical Observatory of Japan (NAOJ), the National Institute for Fusion Science (NIFS), the National Institute for Basic Biology (NIBB), the National Institute for Physiological Sciences (NIPS), and the Institute for Molecular Science (IMS). As a global research center in the field of natural science promoting international and advanced research, we provide joint research and collaborative research for universities and other researchers all over the country. The result of our collaborative research contributes to strengthening Japanese research capabilities.

## Sciences (NINS)

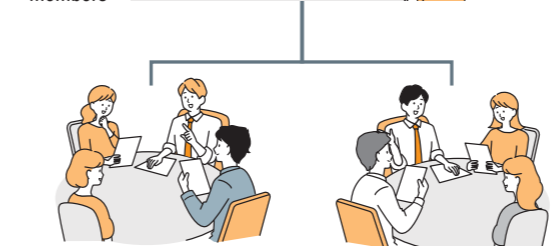
### Management of Institutes by a Community of Researchers

Each Institute constituting NINS conducts the management supported by the community by being a member representing each researcher community in universities, etc. to the advisory committee, joint research committee, faculty personnel committee, and other committees.

#### Example: National Institute for Fusion Science

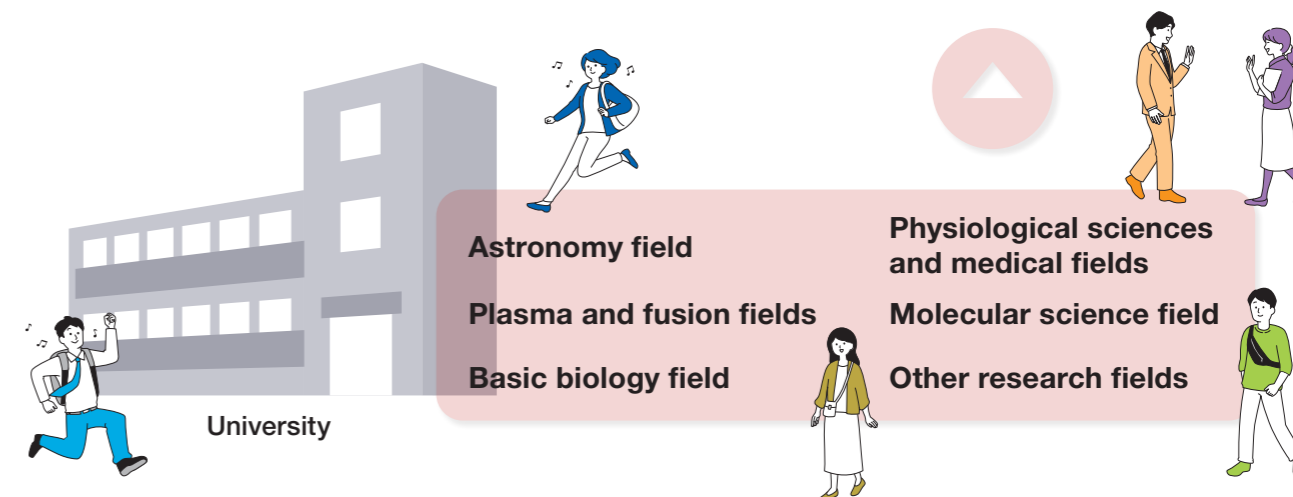
##### Advisory committee

Consists of external committee members



##### Joint research committee

##### Personnel committee



In addition, the majority of the members of the President Selection and Inspection Committee are made up of external members, while more than half of the Administrative Council and approximately half of the Education and Research Council are made up of external members.



# National Astronomical Observatory of Japan

Astronomy is one of the oldest and yet most active sciences. This means that human beings possess the fundamental desire to seek our origin and the reason for our existence through an understanding of the Universe. NAOJ utilizes our full strength to play a key role in establishing a new paradigm for understanding the Universe, the Earth, and life as a whole. For this purpose, we observe various objects, from the Earth to the most distant objects in the Universe, and we consider the fundamental theoretical laws behind the observed phenomena. We also develop new technology to support these activities.



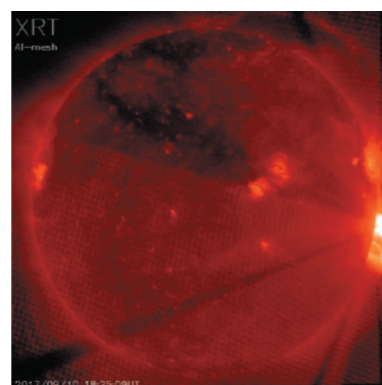
A black hole shadow at the center of Messier 87. NAOJ also joined this observation through ALMA (Atacama Large Millimeter/submillimeter Array). (EHT collaboration)

ALMA Telescope  
(Clem & Adri Bacri-Normier (wingsforscience.com) / ESO)

## Topics of Research

### 01 X-ray image of the Sun taken with “Hinode”

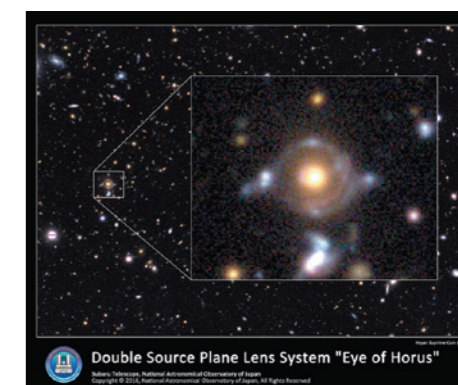
The Solar Observing Satellite Hinode has observed solar activity for more than ten years since its launch in 2006. The Sun is a typical star, but as our parent star it dominates the Solar System and facilitates life on the Earth. The Sun influences all of our surroundings and activities. The images and data obtained with Hinode are released as soon as they are acquired and are used by solar and space weather researchers all over the world.



A huge solar flare (right edge) imaged by Hinode on September 11, 2017 (JST). (NAOJ/JAXA/MSU)

### 02 Gravitational lens phenomena the “Eye of Horus”

The Subaru Telescope is undertaking a massive survey with Hyper Suprime-Cam to image a large area of the sky at an unprecedented depth. The Eye of Horus was discovered in images taken as part of this survey. A close inspection reveals two distinct arcs/rings of light with different colors. This strongly suggests that two distinct background galaxies are being lensed by the foreground galaxy. This extremely rare lens system offers a unique opportunity to probe the fundamental physics of galaxies and add to our understanding of cosmology.



Eye of Horus (false color image) discovered by Subaru Telescope. (NAOJ)

Fusion is the basic mechanism of nucleosynthesis and energy generation in the universe and is the energy source that supports the activities of stars. The sun's fusion energy also sustains our earth's environment. The National Institute for Fusion Science (NIFS) addresses a wide range of research topics, plasma physics, microscopic quantum processes and materials science, and engineering technology for the components of fusion devices necessary to realize fusion energy in a form we can use.

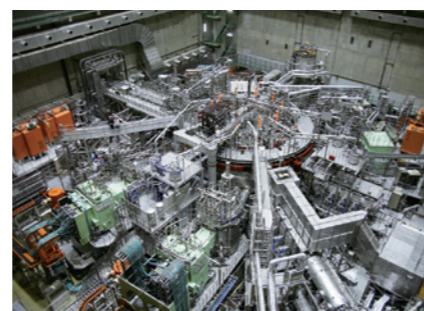
As an Inter-University Research Institute, NIFS is committed to contributing to the development of fusion science and forming a broad science and technology base by making large research facilities and various research equipment available and promoting joint research with domestic and foreign universities and research institutes.

The inside of the LHD plasma vacuum vessel.

## Topics of Research

### 01 The Large Helical Device (LHD)

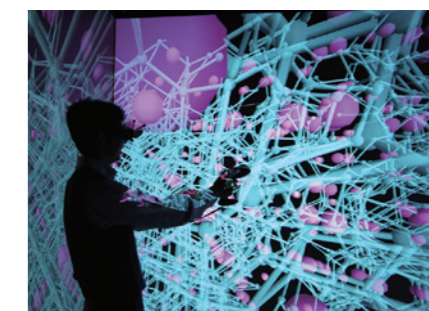
The Large Helical Device (LHD) is the world's largest superconducting plasma confinement device, which can stably produce high-temperature plasmas. The international joint research, which explores the principles of various complex phenomena common not only to fusion but also to space and astronomical plasmas, is conducted by measuring the internal structure of plasmas using various high-resolution diagnostics.



The LHD as seen from above. The LHD is 13.5m in diameter and 9.1m high. Many plasma heating systems and plasma measurement devices are attached to the LHD.

### 02 Computer simulation of plasma

A fusion plasma is a typical complex system controlled by multi-physics and multi-time/space nonlinear processes, from macroscopic phenomena, such as plasma transport, to microscopic electron dynamics. In order to understand and systematize physical mechanisms in fusion plasmas, large-scale numerical simulation research has been carried out by utilizing the full capabilities of supercomputers. Based on this research and development, we promote large-scale simulation science, aiming at the ultimate realization of a helical numerical test reactor, which will be based on an integrated predictive model for plasma behavior over the whole machine range.



Simulation of the hydrogen diffusion behavior inside the divertor material receiving heat flux and particles from plasma.



Among the innumerable celestial bodies in our universe, the Earth appears unique in that it is filled with a variety of living organisms. Over the course of 4 billion years of evolution, animals and plants have acquired diverse forms as well as astonishing abilities, and continue to survive on this remarkable planet through the propagation of their offspring. The National Institute for Basic Biology promotes research to find the basic principles common to many creatures, and the mechanisms that enable diversity and allow life to adapt to changing environments.

Various organisms to be studied at NIBB

## Topics of Research

### 01 Promotion of Trans-Scale Biology

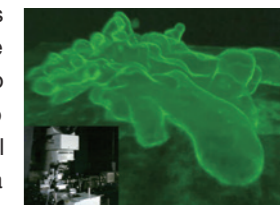
The phenomena exhibited by living organisms appear as the sum of complex networks at every scale, from genes to populations, and therefore, a trans-scale analysis is necessary to understand the essential nature of biological systems. However, conventional analysis, which relies solely on human intelligence to integrate diverse data across multiple levels of spatiotemporal scales has limitations. NIBB established the Trans-Scale Biology Center in April 2022, and to promote "Trans-Scale Biology". We challenge ourselves to expand our understanding of biological systems by integrating vast amounts of data, such as trans-omics and bioimaging, across multiple scales, through the introduction of AI-based data analysis.



Trans-Scale Biology Center

### 02 Promotion of integrated bioimaging

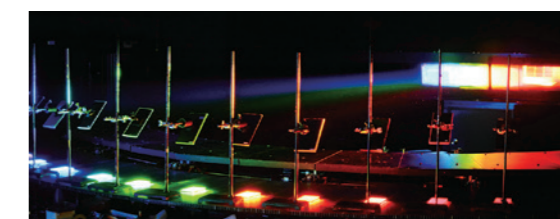
At NIBB, we advance observation technologies and light manipulation technologies via the use of cutting-edge microscopes such as light sheet fluorescence microscopes, multiphoton excitation fluorescence microscopes, and IR-LEGO, as well as develop new technologies for image processing and statistical processing to analyze acquired images. We also conduct activities to support experimental design, image acquisition, and data analysis in an integrated manner for researchers through collaborative research.



Amoeba's movement captured by light sheet fluorescence microscopy

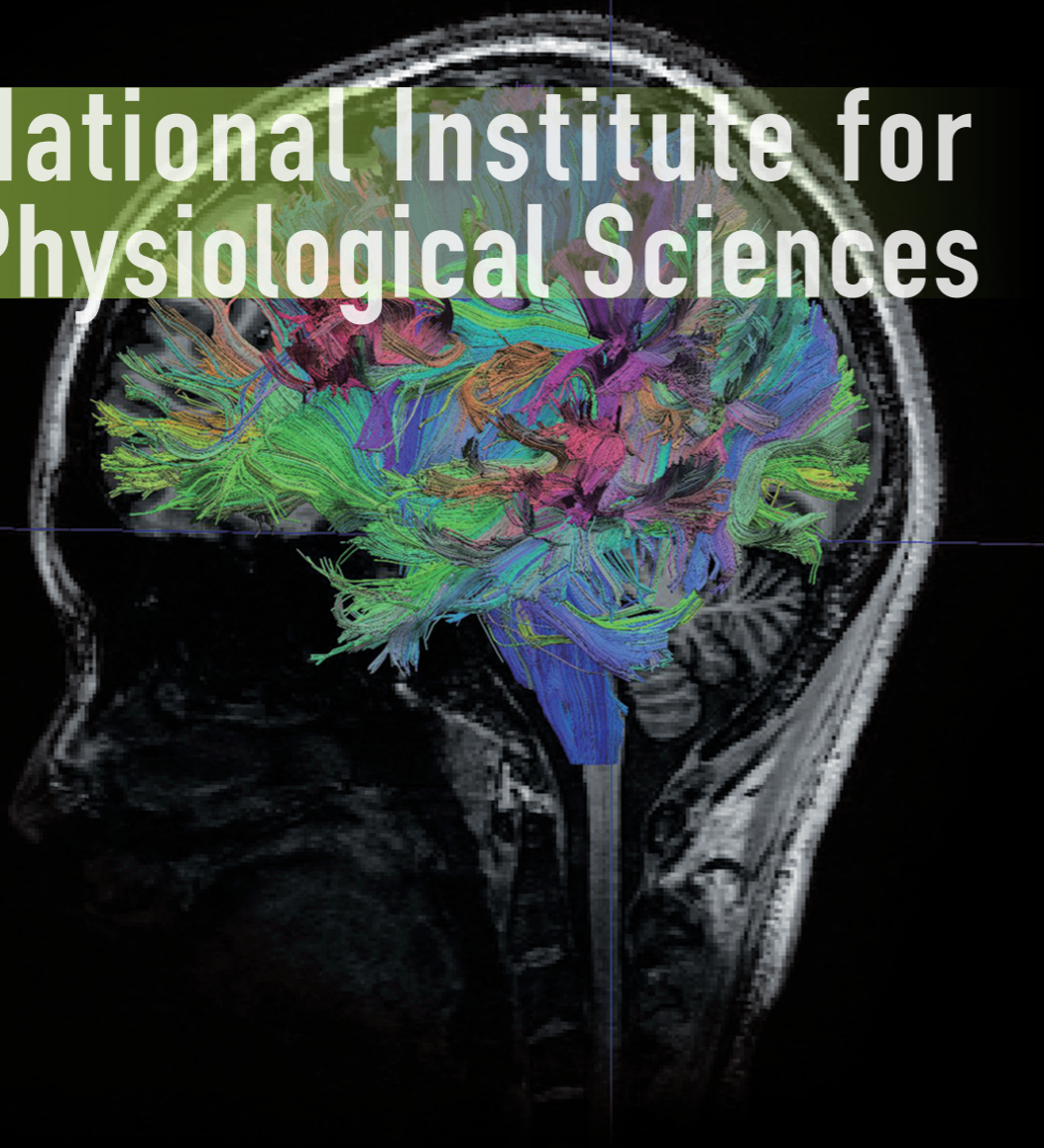
### 03 Exploring the relationship between light and living organisms using the Okazaki Large Spectrograph

The Okazaki Large Spectrograph projects a wavelength spectrum ranging from 250 nm (ultraviolet) to 1,000 nm (infrared) onto its 10 m focal curve with an intensity of monochromatic light at each wavelength which is more than twice as much as that of the corresponding monochromatic component of tropical sunlight at noon. The spectrograph is designed for action spectra analyses of various light-controlled biological processes.



Okazaki Large Spectrograph

# National Institute for Physiological Sciences

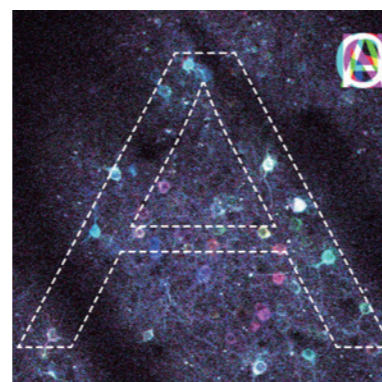


Bundles of nerve fibers in the human brain.

## Topics of Research

### 01 Two-Photon Holographic Microscopy for Cell Measurement and Manipulation

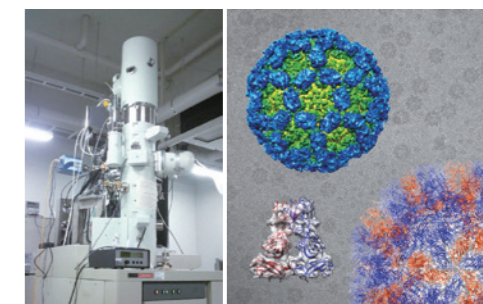
Microscope developed by combining digital holographic technology with two-photon in vivo microscopy. It is possible to irradiate lasers in any shape and form. Combining this with optogenetic methods, cell activity can be measured and manipulated in living animals. This has led to identify the pain cells in inflammatory pain models, the characteristics of neural circuits during chronic pain from pattern stimulation, and changes in the functional connection strength of local neural circuits (Okada et al., Sci. Adv., 2021).



Example of induced cellular activity in the form of letters in living mice.  
(Quan et al., Opt. Lett., 2018)

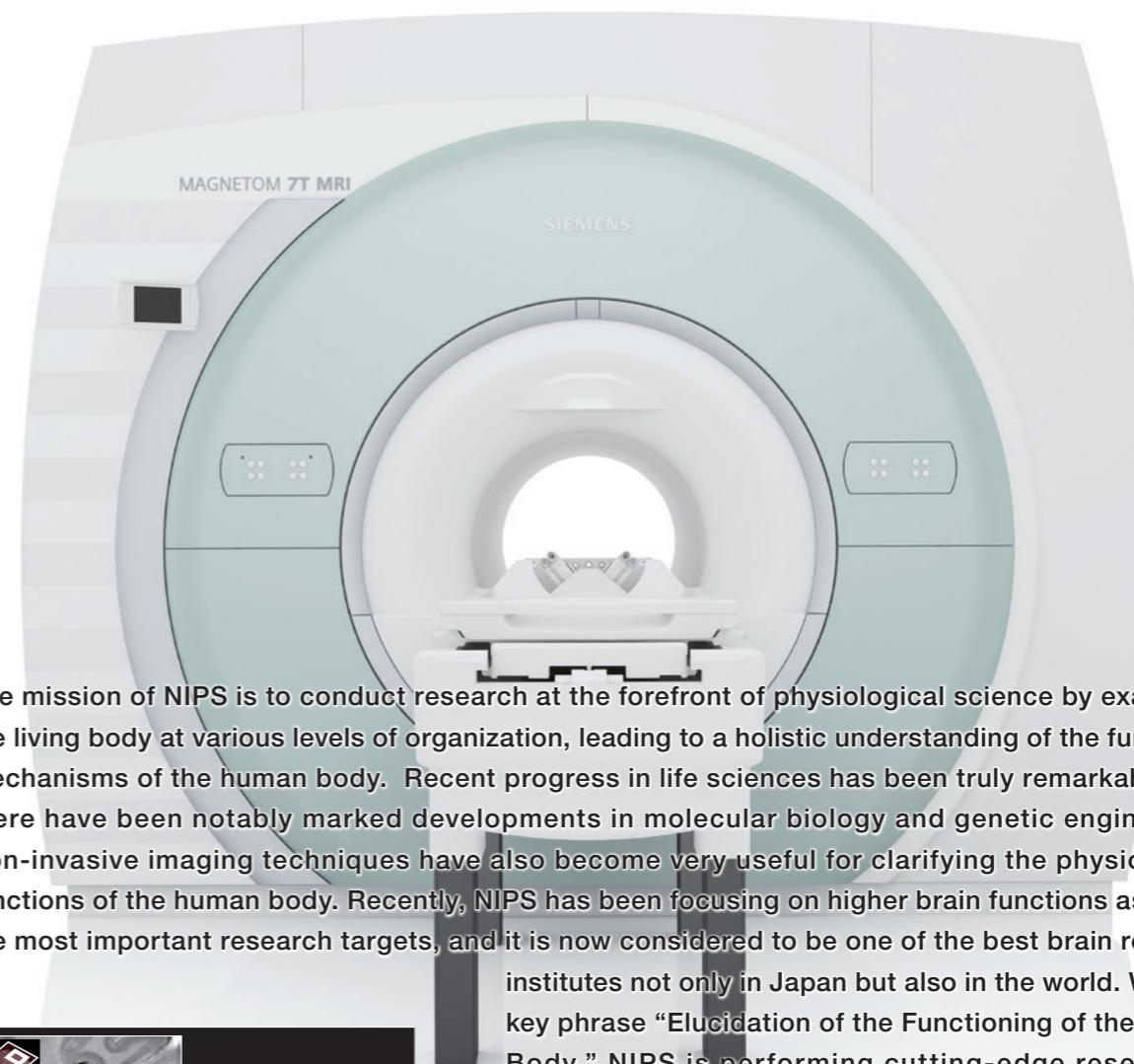
### 02 Phase Contrast Electron Cryomicroscope

Phase contrast electron cryomicroscopy is an electron microscope developed for observing close-to-life-state biological samples with a combination of rapid freezing and ice embedding sample preparation methods. Biological specimens up to 200 nm thicknesses can be observed with high-resolution and high-contrast. Ultrastructure analyses of protein molecules, viruses, bacteria, cultured cells and frozen tissue sections are performed with this microscopic system.



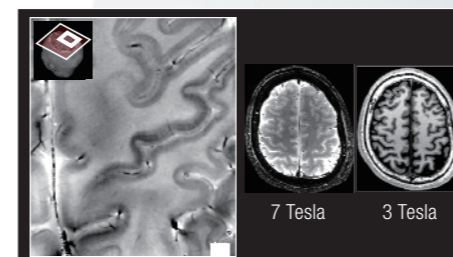
Phase Contrast Electron Cryomicroscope and image of Saporin capsid.

Ultra-high-field 7-Tesla  
Magnetic Resonance Imaging (MRI) system.



The mission of NIPS is to conduct research at the forefront of physiological science by examining the living body at various levels of organization, leading to a holistic understanding of the functional mechanisms of the human body. Recent progress in life sciences has been truly remarkable, and there have been notably marked developments in molecular biology and genetic engineering. Non-invasive imaging techniques have also become very useful for clarifying the physiological functions of the human body. Recently, NIPS has been focusing on higher brain functions as one of the most important research targets, and it is now considered to be one of the best brain research

institutes not only in Japan but also in the world. With the key phrase “Elucidation of the Functioning of the Human Body,” NIPS is performing cutting-edge research in multiple fields, involving not only physiology but also biochemistry, molecular biology, morphology, cognitive science, information science, and medical engineering. NIPS offers its facilities and expert staff to domestic and foreign scientists for collaborative studies.



Cross-sectional view of human brain imaged with 7T MRI.  
Vessels and nerves are depicted in units of 100 micrometers.

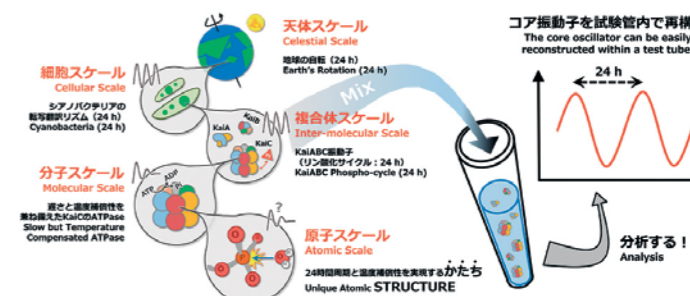
Molecular science is a field of science that aims at elucidating the essentials of intermolecular interactions and chemical reactions in which molecules change their shapes from both theoretical and experimental standpoints. The Institute for Molecular Science continues to provide opportunities of joint researches, in which the most advanced technology and instruments are accessible, for the researchers all over the world. To update our system continuously, we have established the Research Center of Integrative Molecular Systems and the Center for Mesoscopic Sciences, in addition to the four core departments of Theoretical and Computational, Photo, Materials, Life and Coordination-Complex Molecular Sciences. Collaborating with the 72 national university corporations all over Japan, we organize the Inter-University Network for Common Utilization of Research Equipments. In the network, researchers in universities, public research institutes and private enterprises can share the research equipment in participating institutions at reasonable cost.

The UVSOR synchrotron facility.

## Topics of Research

### 01 Creating novel molecular systems with analyzing logic which connects “molecules” and “molecular systems”

The Research Center of Integrative Molecular Systems (CIMoS) is dedicated to the important and interdisciplinary subject of “how the characteristics of each molecule are integrated into excellent functions of the molecular systems with higher-order structures.” We learn the interlayer logic that links “individuals” and “assemblies” from life systems. We then aim at elucidating the principle of how the molecular systems develop their functions such as energy conversion, material conversion and life activities by exchanging energy or information in a concerted manner. CIMoS has a mission to be a base of common utilization of facilities and joint researches to create “molecular systems having flexible, robust and excellent functions.” With the mission, CIMoS contributes to the society and advancement of science.



Cyanobacterial Circadian Clock System

### 02 Capturing the behavior of molecules with light

The unique functions of molecules are realized in such a condition as a variety of molecules, not as single molecules, exist with the manner that molecular characteristics and macroscopic features of assemblies interact with each other. The Center for Mesoscopic Sciences has been founded on April 2017. In the center, novel mesoscopic measurement methods have been developed and applied to various systems. This is indispensable in understanding, controlling and developing the functions in the mesoscopic space-time domain in which microscopic and macroscopic natures interact with each other. We work to aim at providing foundations of basic researches on theoretical analysis, development of light sources and novel measurement methods and their applications.

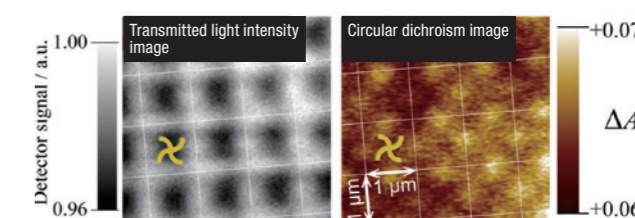
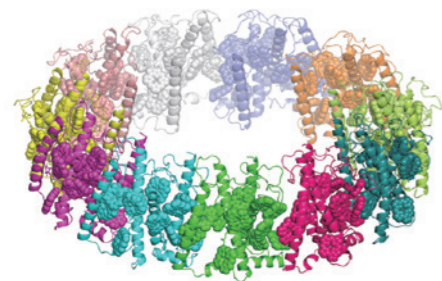


Image of chiral gold nano-structured samples by a newly developed high-precision circular dichroism microscope. (Achieving the apparent resolution over the diffraction limit.)



## Astrobiology Center (ABC)

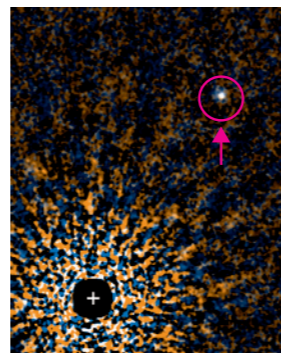
As a result of developments in extrasolar planet observations, astrobiology research to explore “life in the Universe” and uncover its mysteries has become a pressing subject. Astrobiology Center (ABC), established in 2015, advances this field by combining disciplines, promotes research into extrasolar planets and life both outside and within the Solar System, and develops observational instruments for these purposes.



Structure of the protein complex of an Antarctic alga to perform oxygenic photosynthesis using infrared.



Instrument for habitable exoplanet search, Infrared Doppler spectrometer IRD.

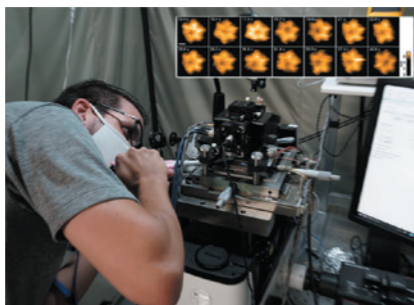


Direct image of a super-Jupiter exoplanet GJ504b (right).



## Exploratory Research Center on Life and Living Systems (ExCELLS)

What is life? The Exploratory Research Center on Life and Living Systems (ExCELLS) was established in April 2018 to address this fundamental question. ExCELLS aims to achieve an integrative understanding of living systems by observing biological entities (“Observe”), deciphering the hidden information (“Read”), and creating living systems (“Create”) utilizing state-of-the-art equipment and novel constructive approaches. Moreover, ExCELLS promotes collaborative, interdisciplinary research involving investigators who explore organisms living in extreme environments based on “Observe, Read, and Create” approach to explore the design principles of living systems.

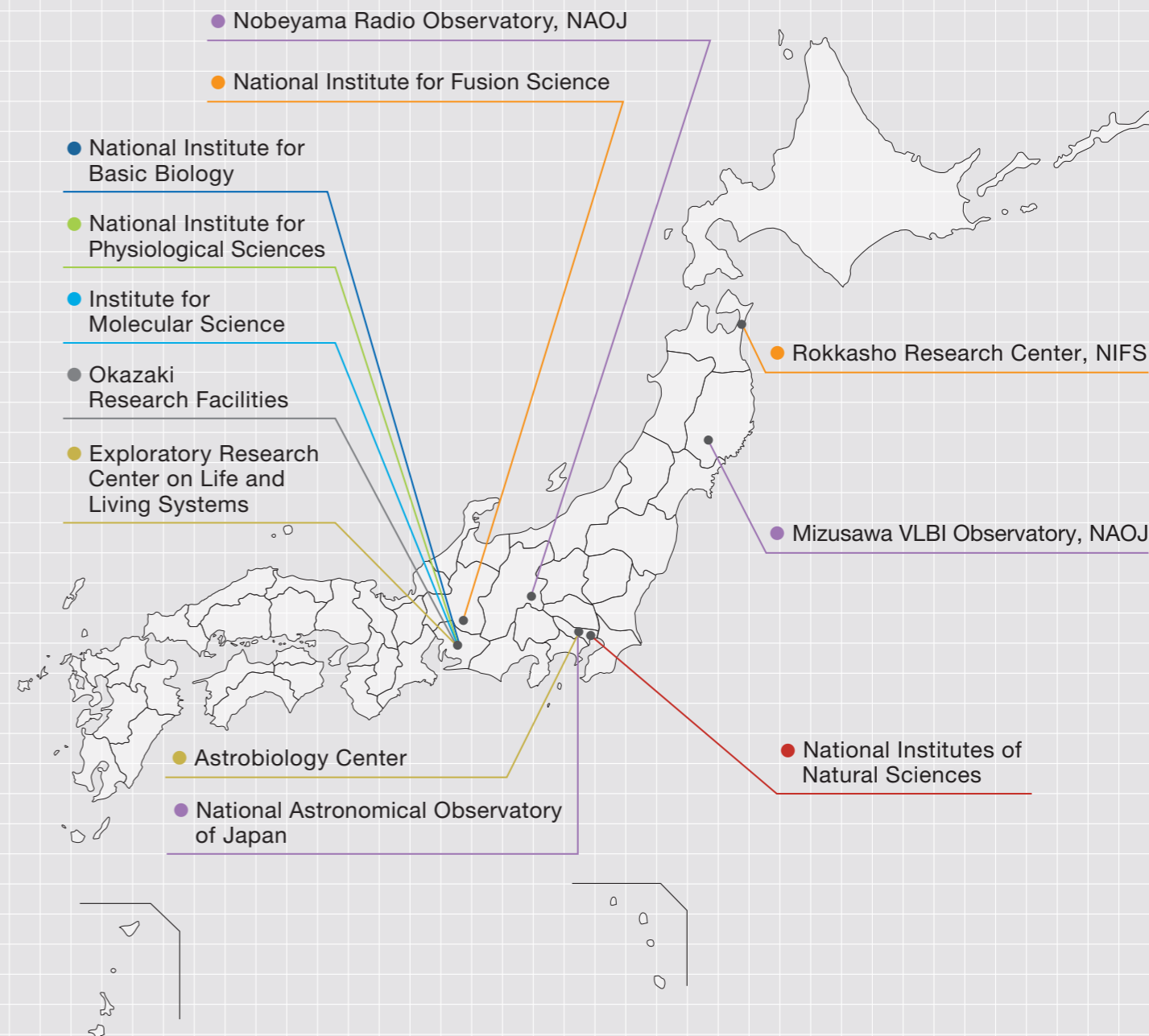


By using high-speed AFM (atomic force microscopy) combined with optical microscopy, we can visualize the dynamics of various biomolecules from proteins to cells. Combination with optical microscopy is also possible.



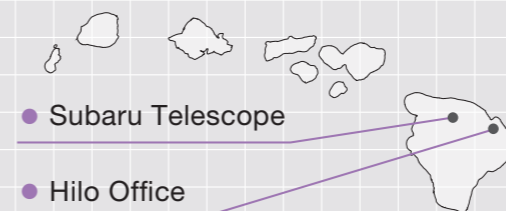
Tardigrade image with electron microscope

## Location



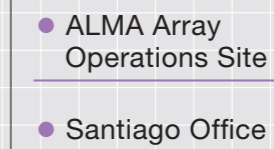
### Hawaii

Subaru Telescope, NAOJ



### Chile

NAOJ Chile Observatory

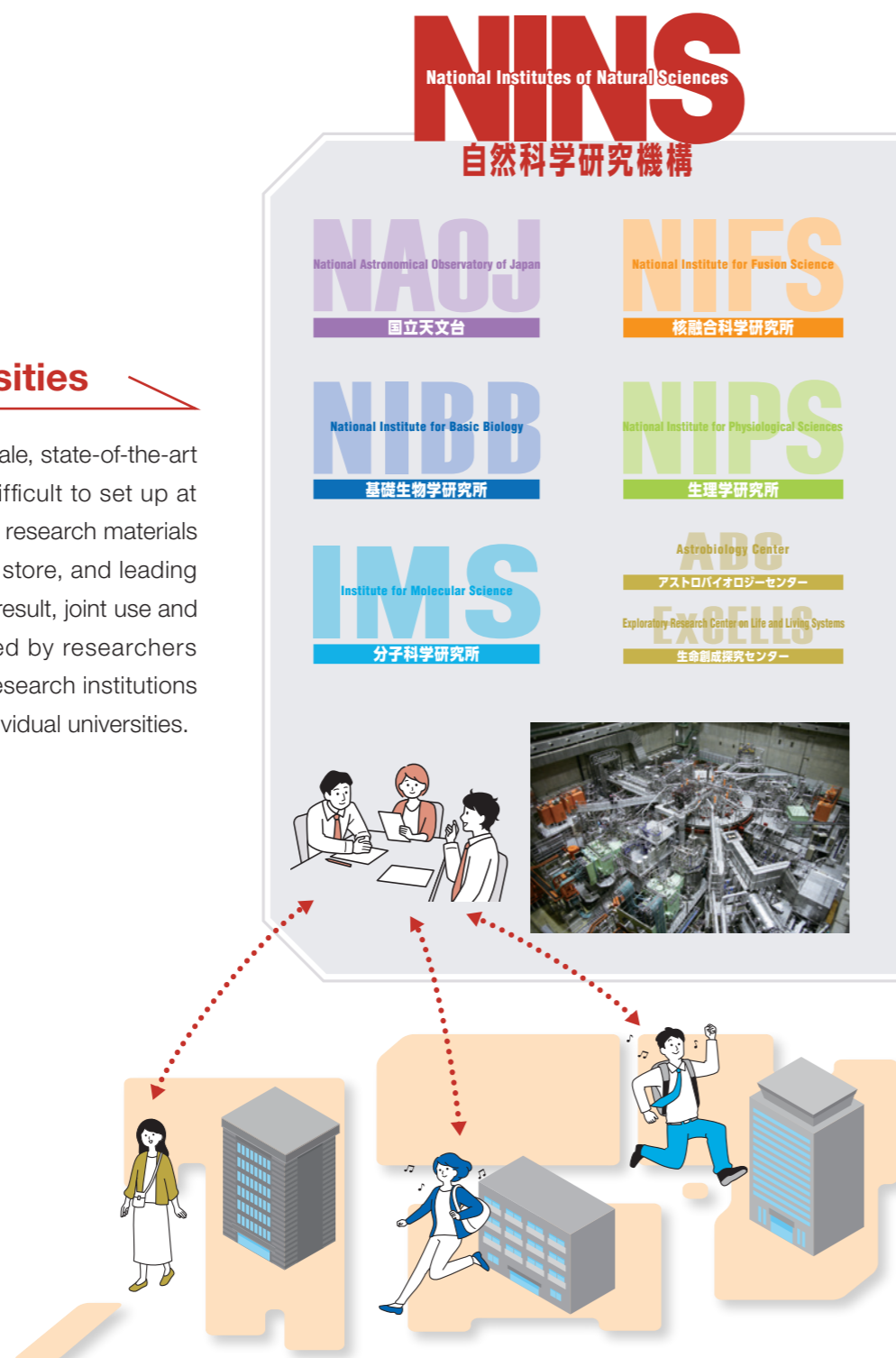


# Collaborative Research

NINS contributes to strengthening the research capabilities of Japanese universities as one of the inter-university research institutes. In order to contribute to strengthening the research capacity of Japanese universities, as an inter-university research institute, NINS is developing three types of collaborative researches while taking advantage of the characteristics of their academic field, as below.

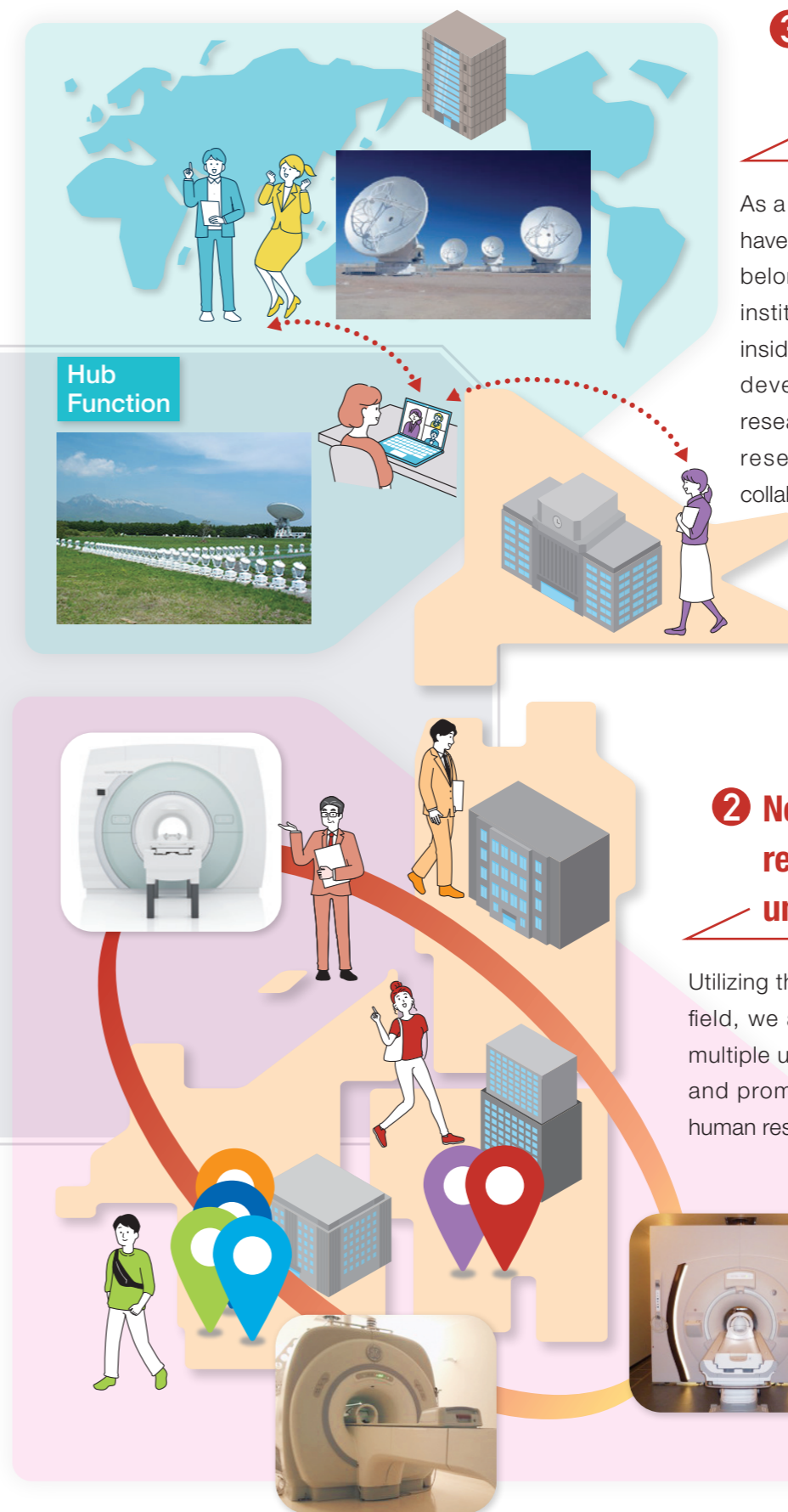
## ① Joint use and joint research across universities

We are consolidating large-scale, state-of-the-art research facilities that are difficult to set up at each university and gathering research materials that are difficult to collect or store, and leading cutting-edge research. As a result, joint use and joint research are conducted by researchers from other universities and research institutions going beyond the limits of individual universities.



## ③ International collaborative research

As a base for international research, we have become a hub to connect persons belonging to universities and research institutions, regardless of whether it is inside or outside of Japan. And we are developing active exchange among researchers by promoting international research projects and international collaborative research.



## ② Network type collaborative research to contribute to universities directly

Utilizing the characteristics of each research field, we are building networks created by multiple universities and research institutes, and promoting collaborative research and human resource development.

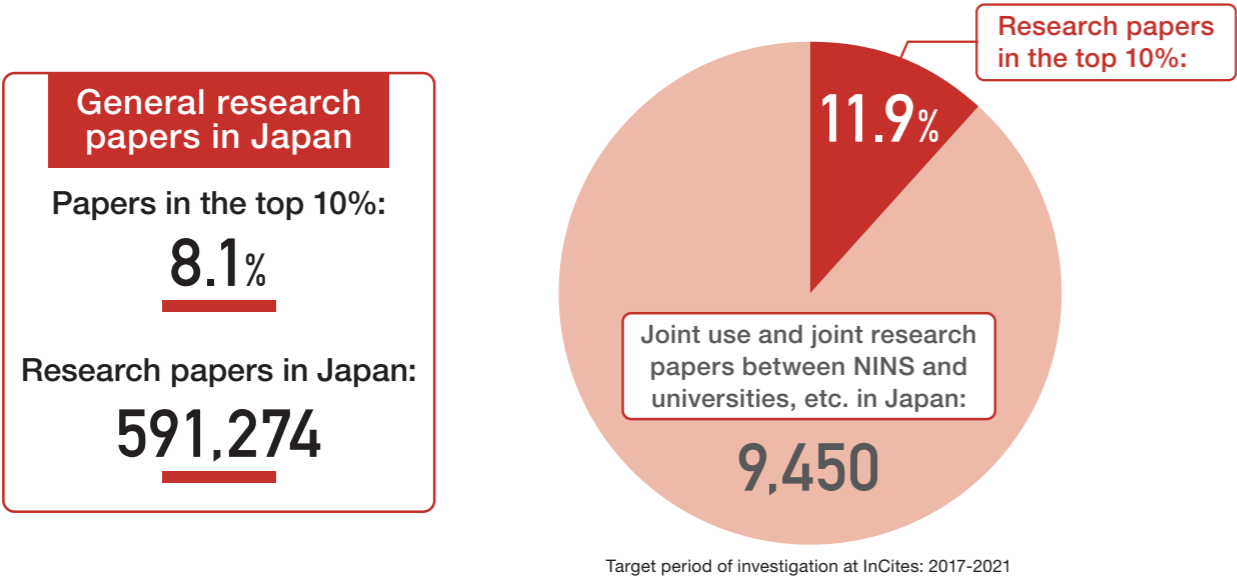
# What NINS aims for

## Relationship with Universities through Joint Use and Joint Research

NINS actively accepts researchers from universities nationwide, and is promoting joint research. Moreover, we provide graduate school education as SOKENDAI (The Graduate University for Advanced Studies), and regardless of national, private and public universities, we accept graduate students from other universities as "special inter-university researchers" to instruct research. Supporting research activities of researchers belonging to other universities through these systems will result in strengthening the research capacity of universities in Japan.

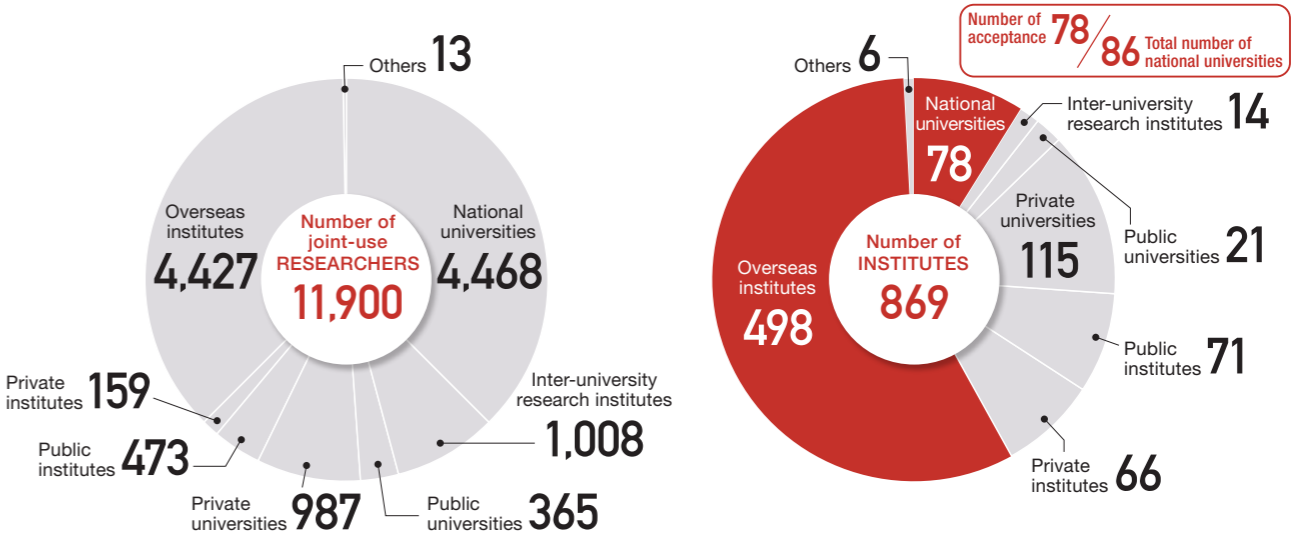
### Visualize the contribution to universities

In order to visualize the contribution to other universities and research institutions, we are analyzing the number of citations of research papers resulting from joint use and joint research. From the results of the collaborative research of NINS and other universities over the past five years, the proportion of articles, which were cited in articles with high impact falling within the top 10% of all research papers was 11.9%. This ratio is higher than that of all the articles published from Japan (8.3%) adopted in the papers located in the top 10% of the world's papers. It means that we are contributing to a certain extent to the strengthening of the research capacity of universities in Japan.



## Achievements of Collaborative Research (FY 2021)

NINS accepts collaborative researchers from national, public, and private universities and research institutions regardless of national, private, and public universities. In particular, researchers from national universities accounted for 90%, and recently, researchers from public, private and overseas universities and research institutions are increasing.

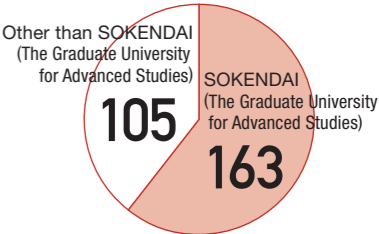


### Number of researchers accepted by each research institute (FY 2021)

Name of research institute	Total researchers	Number of international researchers	Number of institutes
National Astronomical Observatory of Japan	<b>5,743</b>	<b>4,201</b>	<b>524</b>
National Institute for Fusion Science	<b>1,572</b>	<b>251</b>	<b>262</b>
National Institute for Basic Biology	<b>425</b>	<b>13</b>	<b>93</b>
National Institute for Physiological Sciences	<b>650</b>	<b>49</b>	<b>128</b>
Institute for Molecular Science	<b>3,110</b>	<b>266</b>	<b>177</b>
Center, Etc.	<b>400</b>	<b>19</b>	<b>131</b>

### Graduate Education

NINS conducts postgraduate education as the foundation of SOKENDAI (The Graduate University for Advanced Studies). In addition, as a special inter-university researcher, we accept graduate students from national, public, and private universities nationwide.



# What NINS aims for

## Relationship with Universities through Joint Use and Joint Research

NINS accepts a wide range of researchers from public and private universities as well as national universities nationwide and promotes joint use and joint research. As a result of joint use and joint research, a great deal of findings has been published from each university.

- The number of research papers covers the total from 2017 to 2021 and it is counted based on the research papers reported by joint users and joint researchers and research papers from NINS researchers which were searched by InCites, a research analysis tool of Clarivate Analytics.
- \*For institutes with no registration on InCites, research papers are searched and counted with Scopus, a database of peer-reviewed literature by Elsevier.

### Number of Researchers and Articles

University	Researchers (FY 2021)	Papers (2017–2021)
The University of Tokyo	669	2,039
Kyoto University	437	961
Nagoya University	436	1,064
OSAKA UNIVERSITY	369	656
TOHOKU UNIVERSITY	294	535
KYUSHU UNIVERSITY	193	405
Hokkaido University	175	285
Tokyo Institute of Technology	127	345
University of Tsukuba	119	285
Hiroshima University	113	296
Kobe University	105	158
Chiba University	90	130
Nagoya Institute of Technology	84	30
SOKENDAI (The Graduate University for Advanced Studies)	79	2,090
Shizuoka University	77	87
YAMAGATA UNIVERSITY	69	48
Okayama University	58	62
Gifu University	58	24
University of Toyama	50	361
Ibaraki University	48	79
Kagoshima University	42	182
GUNMA UNIVERSITY	42	29
Kyoto Institute of Technology	41	29
NARA INSTITUTE of SCIENCE and TECHNOLOGY	40	47
Ehime University	39	194
Niigata University	39	83
UNIVERSITY OF FUKUI	37	42
Hirosaki University	33	69
Tokushima University	28	51
Nara Women's University	27	36
YOKOHAMA National University	27	23
The University of Electro-Communications	26	109
YAMAGUCHI UNIVERSITY	25	61
SHINSHU UNIVERSITY	25	77
Tottori University	22	27
Kanazawa University	18	82
Aichi University of Education	17	12
Toyohashi University of Technology	17	15
Kumamoto University	17	64

University	Researchers (FY 2021)	Papers (2017–2021)
Saga University	17	7
Mie University	17	11
UTSUNOMIYA UNIVERSITY	16	35
Nagaoka University of Technology	14	41
Ochanomizu University	13	18
Japan Advanced Institute of Science and Technology	13	19
Saitama University	11	77
OITA UNIVERSITY	10	22
Kitami Institute of Technology	10	46
University of Miyazaki	10	17
University of the Ryukyus	10	52
Kochi University	10	39
Shimane University	10	37
Miyagi University of Education	9	6
UNIVERSITY OF YAMANASHI	9	34
MURORAN INSTITUTE OF TECHNOLOGY	8	4
Kyushu Institute of Technology	8	18
Tokyo University of Agriculture and Technology	7	56
Asahikawa Medical University	7	6
Nagasaki University	6	16
Shiga University of Medical Science	4	18
Osaka Kyoiku University	4	7
Kagawa University	3	32
Joetsu University of Education	3	21
Fukushima University	3	7
Iwate University	3	9
Tokyo Gakugei University	2	44
Akita University	2	7
NARA UNIVERSITY OF EDUCATION	2	3
Tokyo Medical and Dental University	2	21
HITOTSUBASHI UNIVERSITY	1	19
Shiga University	1	3
Tsukuba University of Technology	1	3
Hokkaido University Of Education	1	9*
Naruto University of Education	1	—
Kyoto University of Education	1	2
University of Teacher Education Fukuoka	1	—
Hamamatsu University School of Medicine	1	25
Wakayama University	1	1

### Number of Researchers and Articles

University	Researchers (FY 2021)	Papers (2017–2021)
Osaka Prefecture University	118	220**
NAGOYA CITY UNIVERSITY	62	151
Kyoto Prefectural University	43	9
Tokyo Metropolitan University	33	30
UNIVERSITY OF HYOGO	24	93
Yokohama City University	20	34
University of Shizuoka	11	10

\*\* Number of research papers of Osaka Metropolitan University

University	Researchers (FY 2021)	Papers (2017–2021)
Gifu Pharmaceutical University	11	1
Osaka City University	10	220**
Nara Medical University	8	7
Prefectural University of Hiroshima	5	—
FUKUSHIMA MEDICAL UNIVERSITY	4	27
Sanyo-Onoda City University	3	5*
Kyoto Prefectural University of Medicine	3	24

University	Researchers (FY 2021)	Papers (2017–2021)
WAKAYAMA MEDICAL UNIVERSITY	2	7
HIROSHIMA CITY UNIVERSITY	2	—
Sapporo Medical University	2	3
Akita Prefectural University	1	11
Niigata College of Nursing	1	1*
FUTURE UNIVERSITY HAKODATE	1	—
Kyoto City University of Arts	1	—

### Number of Researchers and Articles

University	Researchers (FY 2021)	Papers (2017–2021)
Keio University	83	136
Waseda University	68	99
Tokyo University of Science	67	82
Ritsumeikan University	52	33
CHUBU UNIVERSITY	48	78
Meijo University	45	13
Nihon University	44	125
Kwansei Gakuin University	41	64
Rikkyo University	30	71
Tokyo Denki University	24	7
KITASATO UNIVERSITY	23	31
Tokai University	20	52
Gakushuin University	20	19
Hosei University	18	63
Doshisha University	18	43
Toho University	15	60
Japan Women's University	15	19
Jichi Medical University	15	44
AOYAMA GAKUIN UNIVERSITY	14	41
University of Occupational and Environmental Health	12	10
Saitama Institute of Technology	12	1
Osaka Institute of Technology	11	53
Fukuoka University	11	87
Meiji University	11	21
FUJITA HEALTH UNIVERSITY	11	45
Konan University	10	97
Kogakuin University	9	66
KINDAI UNIVERSITY	9	63
Teikyo University	9	16
Chuo University	9	30
Tamagawa University	8	16*
Juntendo University	7	24
Aichi Institute of Technology	7	—
Graduate School for the Creation of New Photonics Industries	6	18*
Sophia University	6	32
International University of Health and Welfare	6	2
Nagahama Institute of Bio-Science and Technology	6	16*
KYOTO SANGYO UNIVERSITY	5	140

University	Researchers (FY 2021)	Papers (2017–2021)
Chiba Institute of Technology	5	49
Toyo University	5	15
Health Sciences University of Hokkaido	5	—
Meiji University of Integrative Medicine	5	—
Toyota Technological Institute	5	13
Okayama University of Science	4	39
Kurume University	4	20
Kanagawa University	4	14
Okinawa Institute of Science and Technology Graduate University	4	19
The Jikei University School of Medicine	4	—
Hoshi University	4	3
Osaka Medical and Pharmaceutical University	4	—
Ryukoku University	4	41
Daido University	3	3
The Open University of Japan	3	63*
Meisei University	3	38
Tokyo City University	3	19
Setsunan University	3	9
Hokkaido University of Science	3	4
Fukuoka Institute of Technology	3	6
Tokyo Women's Medical University	3	6
Iwate Medical University	3	17
Aichi Medical University	3	24
Hyogo Medical University	3	13
Showa University	3	8
Kanagawa Institute of Technology	3	2
Toyohashi Sozo University	3	—
Aomori University	3	—
Kyoto Women's University	2	6
Otsuma Women's University	2	13*
Shibaura Institute of Technology	2	15
Seikei University	2	2
Tokyo University of Pharmacy and Life Sciences	2	11
Hiroshima Institute of Technology	2	4
Kansai University	2	9
Osaka Institute of Technology	2	32
Fukui University of Technology	2	10*
Nippon Institute of Technology	2	—

University	Researchers (FY 2021)	Papers (2017–2021)
Aichi Gakusen University	2	—
Asahi University	2	—
Tohoku Fukushi University	2	—
Shonan University of Medical Sciences	2	—
Teikyo Heisei University	2	—
Tokyo University Of Agriculture	2	8
Komazawa University	1	2*
Seisa University	1	—
Hokkaido Information University	1	—
Kanto Gakuin University	1	2
Shikoku Gakuin University	1	5*
Kagawa Nutrition University	1	—
Japan Healthcare University	1	—
Ashikaga University	1	5*
Gifu University of Medical Science	1	—
Tokushima Bunri University	1	9
Tokyo University of Technology	1	19
Hokkai-Gakuen University	1	2
Kobe Pharmaceutical University	1	2
Niigata Institute of Technology	1	—
Hachinohe Institute of Technology	1	1
Daito Bunka University	1	—
Nihon Pharmaceutical University	1	2*
Azabu University	1	1
Chukyo University	1	1
University of Human Arts and Sciences	1	—
Musashino University	1	—
Mukogawa Women's University	1	1
Kawasaki Medical School	1	6
Kyushu Sangyo University	1	4*
Saitama Medical University	1	7
Shizuoka Institute of Science and Technology	1	1*
Tohoku Medical and Pharmaceutical University	1	—
Hokuriku University	1	—
Nagoya Bunri University	1	—
Kyoto Pharmaceutical University	1	9
Dokkyo Medical University	1	6

# What NINS aims for

## Relationship with Universities through Joint Use and Joint Research (International Collaborative Research)

NINS is carrying out the following four large international projects in the Promoting Large Scientific Frontier Projects and Scientific Research Infrastructure Projects of the Ministry of Education, Culture, Sports, Science and Technology. Maintaining and managing these state-of-the-art devices not only provides a base for research activities but also leads academic research around the world and functions as an international base.

### Large-scale international projects



#### Subaru Telescope

Large Optical Infrared Telescope. It can observe the universe with super high vision and super high resolution.



#### ALMA Telescope

Large Interferometer. It is operated by the National Astronomical Observatory of Japan (NAOJ) as an international project.



#### TMT Project

Thirty-meter class Optical Infrared Telescope.



#### Large Helical Device

The National Institute for Fusion Science (NIFS) leads the field of study of ultra-high temperature plasma in the world.

### Project related numerical data (FY 2022)

Project	Total Users	Foreign Users	Institutes	Countries
Subaru Telescope	366	130	53	14
ALMA Telescope	3,418	2,997**	351	40
Large Helical Device	610	181	112	22

\*\*Including Japanese researchers who are affiliated with overseas institutes

## Management of the Research University Consortium

NINS carries out a variety of activities to contribute to improving the research capabilities of universities. As part of this effort, we serve as the executive organization for the Research University Consortium (RUC), an organization of universities actively working to strengthen their research capabilities. RUC is currently comprised of 41 universities, and through Task Force (TF) activities, symposiums, and its website, RUC disseminates, shares, and discusses a variety of information, including good practices, on various common issues among universities.

### Specific activities

#### ① TF on evidence-based cross-disciplinary research collaboration

The aim is to collect, share, and analyze the necessary related information and evidence in order to understand the characteristics of each university's research capabilities from a multifaceted perspective toward promoting interdisciplinary and interorganizational collaboration. In order to strengthen research capabilities through collaboration across fields and institutes, we will organize issues and conduct the necessary investigations (evidence collection) and analysis.

#### ② TF to strengthen research infrastructure through inter-university collaboration

Universities and inter-university research institutes will work together to discuss strengthening research infrastructure in order to strengthen research capabilities through inter-university collaboration. We will also collaborate with NINS and inter-university facility network projects.

#### ③ Liaison meeting

Promote information sharing on specific topics such as pressing issues.

(Example topics: research capability analysis, international information dissemination, academic information distribution, etc.)

#### ④ MIRAI-DX

MIRAI-DX

MIRAI-DX is a DX platform that transcends the boundaries of fields and institutes through the collaboration of university research administrators (URAs). We will use MIRAI-DX to promote collaboration across fields and institutes. Seven universities and institutes (CORE 7), which play a central role, are considering the operation of the platform.

### Symposium

All universities participating in the Research University Consortium converge and hold the symposium once a year. They discuss common issues about measures and systems on research capability enhancement which confront all RUC members, including sharing leading initiatives and best practices in a cross sectoral manner.



#### Members (41 universities and institutes)

Hokkaido University
Tohoku University
University of Tsukuba
Chiba University
The University of Tokyo
Tokyo Medical and Dental University
Tokyo University of Agriculture and Technology
Tokyo Institute of Technology
The University of Electro-Communications
Hitotsubashi University
Yokohama National University
Niigata University
University of Toyama
Kanazawa University
University of Fukui
Shinshu University
Nagoya University
Nagoya Institute of Technology
Toyohashi University of Technology
Kyoto University
Osaka University
Kobe University
Okayama University
Hiroshima University
Yamaguchi University
Tokushima University
Ehime University
Kyushu University
Kyushu Institute of Technology
Nagasaki University
Kumamoto University
Kagoshima University
Japan Advanced Institute of Science and Technology
Nara Institute of Science and Technology
Tokyo Metropolitan University
Waseda University
Keio University
National Institutes for the Humanities
National Institutes of Natural Sciences
High Energy Accelerator Research Organization
Research Organization of Information and Systems



# What NINS aims for

## Open Mix Lab (OML) Project

### Providing a place to open up new academic fields

NINS has started the Open Mix Lab (OML) project in FY 2023.

The OML project has been conceived as a research platform to promote interdisciplinary and multidisciplinary research that span organizations, sectors, and academic disciplines and expected to generate advanced research results through a variety of research projects as well as provide a venue to open up new academic fields.

### How the OML project works

The OML project has been broadly divided into open recruitment research programs and facility development. The OML open recruitment research programs have been launched by integrating and reorganizing the open recruitment programs that had been implemented by NINS. There are five types of OML open recruitment research programs, as shown below, and you can choose the type that best suits the progress and scale of your research project.

- ① Research co-creation type**   **② Young researcher support type**   **③ Theme setting type**  
**④ Research start-up support type**   **⑤ Industry-academia collaboration researcher support type**

\*The open recruitment for FY 2023 has ended in all types.

A feature of the OML open recruitment research programs, which was not found in conventional open recruitment programs in NINS, is that it has a "theme setting type," in which research projects based on a specific theme are openly recruited. We plan to continue to set new themes every year and conduct calls for proposals, but from next year onwards we plan to build a system to gather opinions within NINS and reflect them in theme setting.

Regarding facility development, which is a pillar of the OML project along with the open recruitment research programs, we are currently making arrangements to proceed with the development of the first OML facility at the National Institutes of Natural Sciences Yamate Campus (Okazaki City). It is planned to be established as a base for researchers both inside and outside NINS to conduct interdisciplinary research and problem-solving research collaboration.



### OML open recruitment research program menu

#### ① Research co-creation type

Targeted are researchers affiliated with domestic research institutes, including NINS. This is a project to support innovative research through interorganizational collaboration, carried out in cooperation with employees.

#### ② Young researcher support type

Targeted are young researchers affiliated with NINS. This is a project to support innovative research through interorganizational collaboration, carried out in cooperation with researchers affiliated with domestic research institutes.

#### ③ Theme setting type

Targeted are researchers affiliated with domestic research institutes and private companies, including NINS. This is a project that utilizes cross-appointments and other means to establish a place for practical joint research at NINS and promote exchanges, while collaborating with NINS employees to implement the project. This project supports innovative research related to themes set by NINS.

#### Themes for FY 2023 — FY 2024

**Theme 1** : Analysis technology development and application using light in all wavelength regions  
(Utilization of wavelength regions that have not been used much in the past)

**Theme 2** : Basic research and development that contributes to GX  
(storage batteries, hydrogen, bio-manufacturing)

#### ④ Research start-up support type

Targeted are researchers affiliated with domestic research institutes, including NINS. This is a project to support start-up research, workshops, and preliminary studies to launch innovative research through interorganizational collaboration in cooperation with NINS employees.

#### ⑤ Industry-academia collaboration researcher support type

Targeted are researchers affiliated with NINS. This is a project to support feasibility studies aimed at solving social issues and industrial applications.

For specific support scale and application requirements, please refer to the recruitment guidelines posted on the NINS' website.

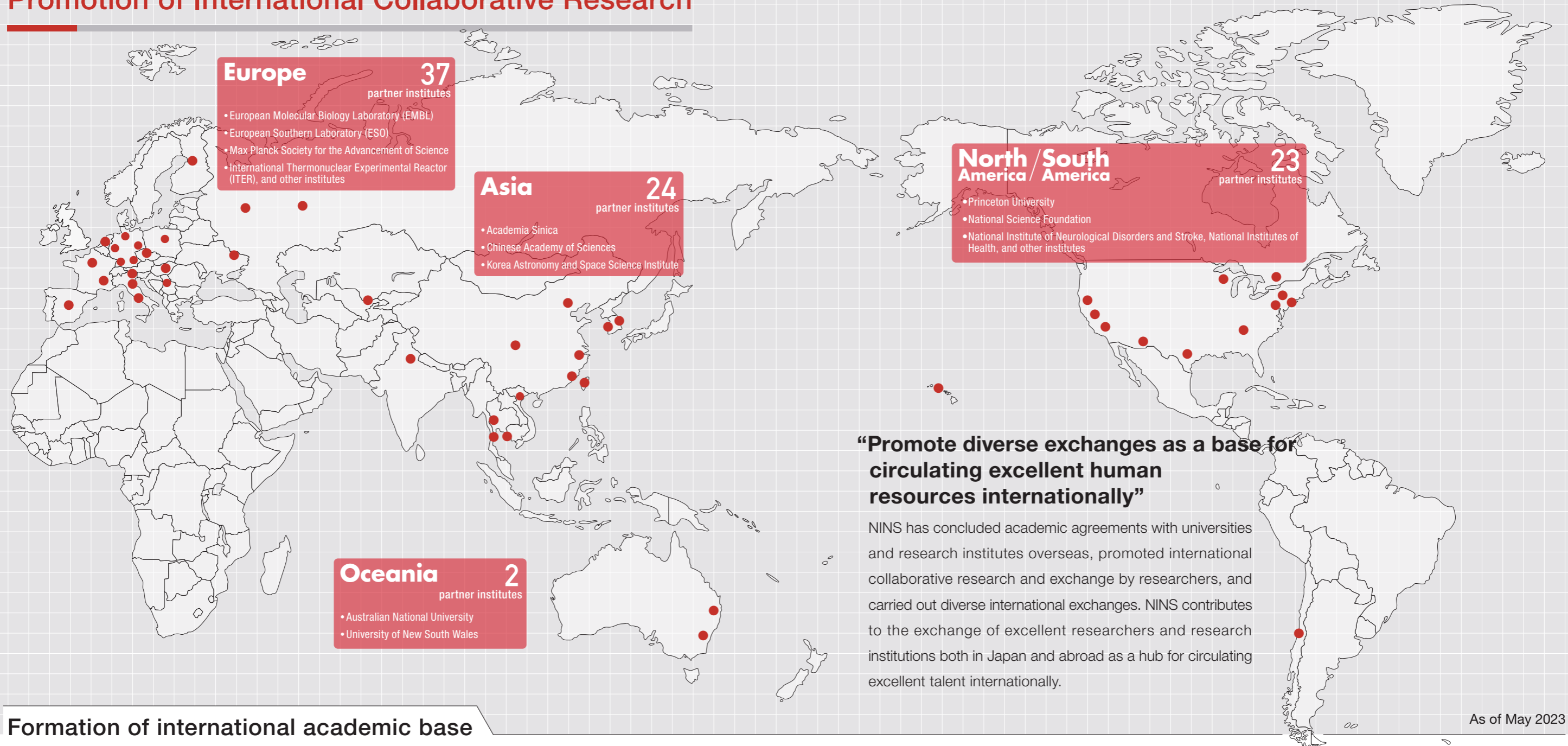
#### Contact information

Research Support Section, Research Cooperation Division,  
Administrative Bureau, NINS  
TEL.03-5425-1318 Email.nins-jr@nins.jp <https://www.nins.jp/en/collabo/oml.html>



# What NINS aims for

## Promotion of International Collaborative Research



## Formation of international academic base

### ■ Collaboration with Princeton University and research institutes affiliated with the Max Planck Society

NINS and Princeton University (USA) have entered into an academic exchange agreement since 2010, and have engaged in a variety of exchanges, including joint research in the fields of plasma astrophysics and quantitative/imaging biology, support for educational activities, and mutual participation in conferences and symposiums. Furthermore, based on an agreement with NINS, we are promoting research exchanges mainly in the fields of plasma physics and astrophysics with research institutes affiliated with the Max Planck Society (Germany). In both cases, in order to strengthen the framework for promoting international joint projects, researchers hired through international recruitment are placed locally with the support of URAs in charge of international collaboration.

### ■ International Collaboration with the European Molecular Biology Laboratory (EMBL)

EMBL is a European-led international research institution funded and operated by 19 countries with headquarters in Heidelberg, Germany. Based on the academic agreement concluded in 2005 (re-extended in 2019) between NINS and EMBL, NINS has adopted exchanges on 3 fronts such as academic exchanges, personnel exchanges, and technical exchanges. For NINS, joint research is being promoted mainly by the National Institute for Basic Biology (NIBB) that is in charge of the area of research nearest to EMBL.

# What NINS aims for

## NINS Collaborative Innovation

### Collaborative Innovation Set Out by NINS

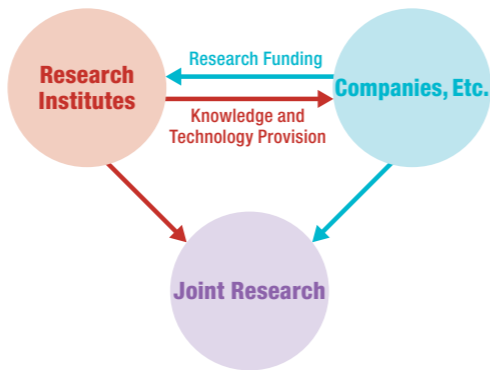
The National Institutes of Natural Sciences (NINS) is one of the inter-university research institute corporations that plays a central role in academic research for researchers belonging to national, public, and private universities and research institutes nationwide. Each university has state-of-the-art research facilities and equipment that are difficult to maintain and manage, intellectual infrastructure such as a huge amount of academic materials, and human resources with the knowledge necessary to use these and we provide researchers nationwide with opportunities for joint research and new field development.

Since its founding, NINS has contributed to the development of academic research in Japan by conducting these leading and effective joint research activities and has fulfilled its mission as an inter-university research institute. NINS now wants to meet the research needs of everyone who is responsible for industries in Japan, with our accumulated history and achievements.



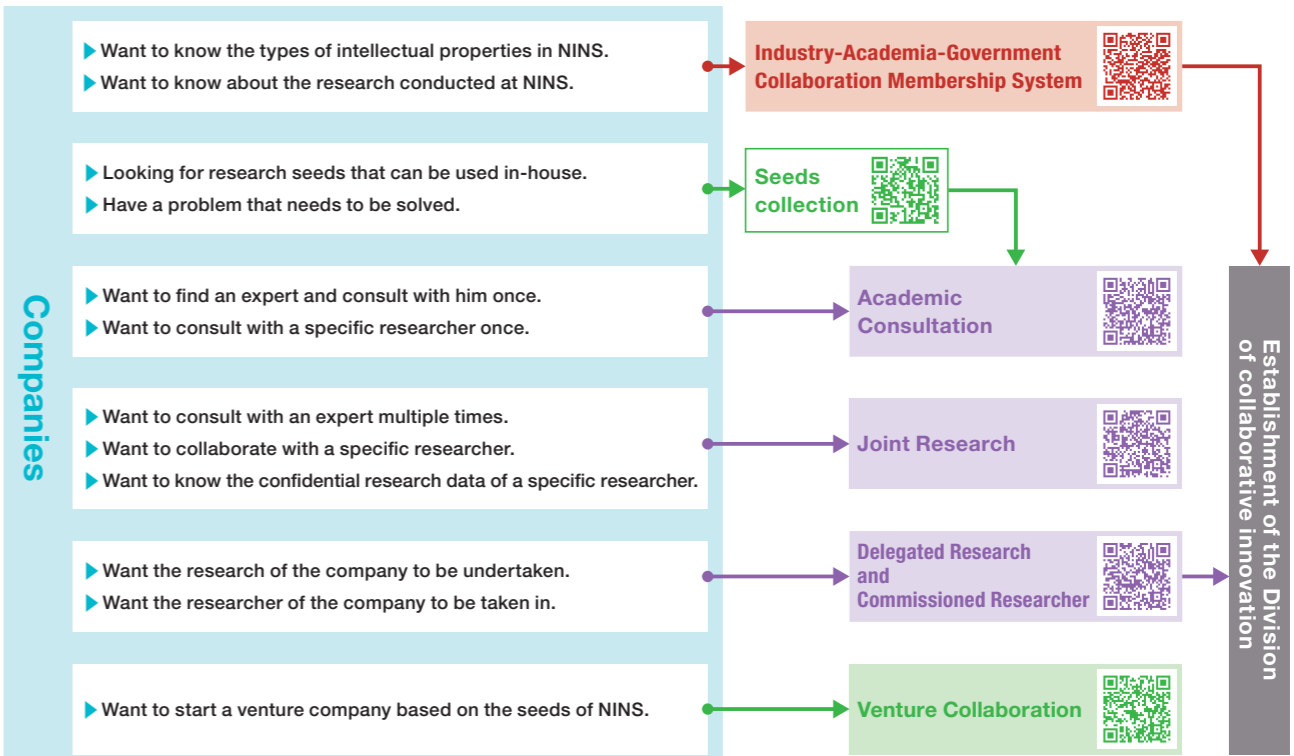
### Mechanism of Collaborative Innovation

We will utilize the results of academic research conducted by NINS in the industrial world and carry out research and development to meet the needs of industries. NINS promotes collaborative innovation based on contracts for academic consultation, joint research, delegated research, etc. We also operate the NINS industry-academia-government collaboration membership system for the purpose of fostering networks with industries. Refer to the NINS collaborative innovation system for more information.



### NINS Collaborative Innovation System

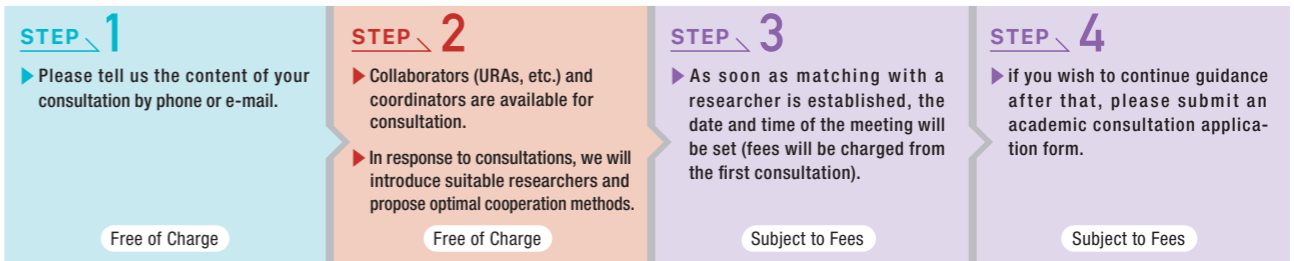
NINS promotes collaborative innovation based on contracts for academic consultation, joint research, delegated research, etc. We also operate the NINS industry-academia-government collaboration membership system for the purpose of fostering networks with industries.



\*Please consult with the Collaborative Innovation Desk regarding use of the license and intellectual property and the use of facilities and joint equipment of the institutes.

### Acceptance process of collaborative innovation

If you wish to collaborate with NINS, please contact the researcher in charge or the Collaborative Innovation Desk in advance. Upon request, we will guide you through procedures such as academic consultation, collaborative and delegated research contracts.



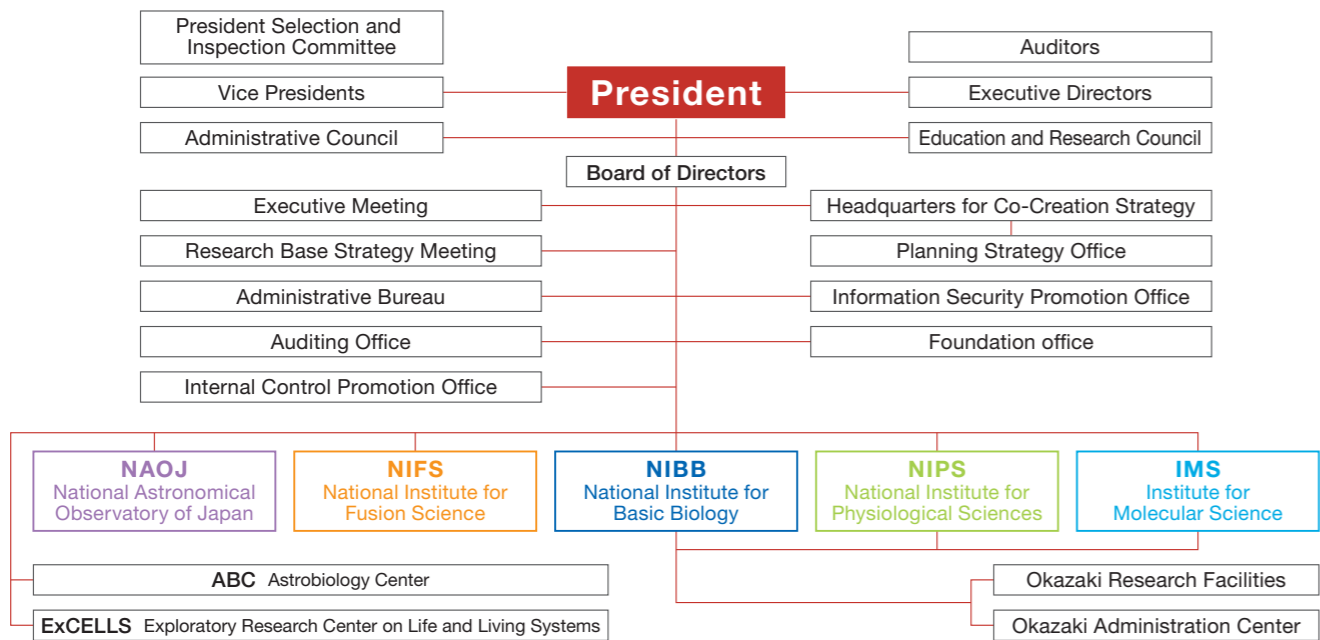
**For Inquiries**

Research Support Section, Research Cooperation Division,  
NINS (Collaborative Innovation Administrator)  
TEL.03-5425-1318 Email.nins-sangaku@nins.jp <https://innovation.nins.jp/en/>

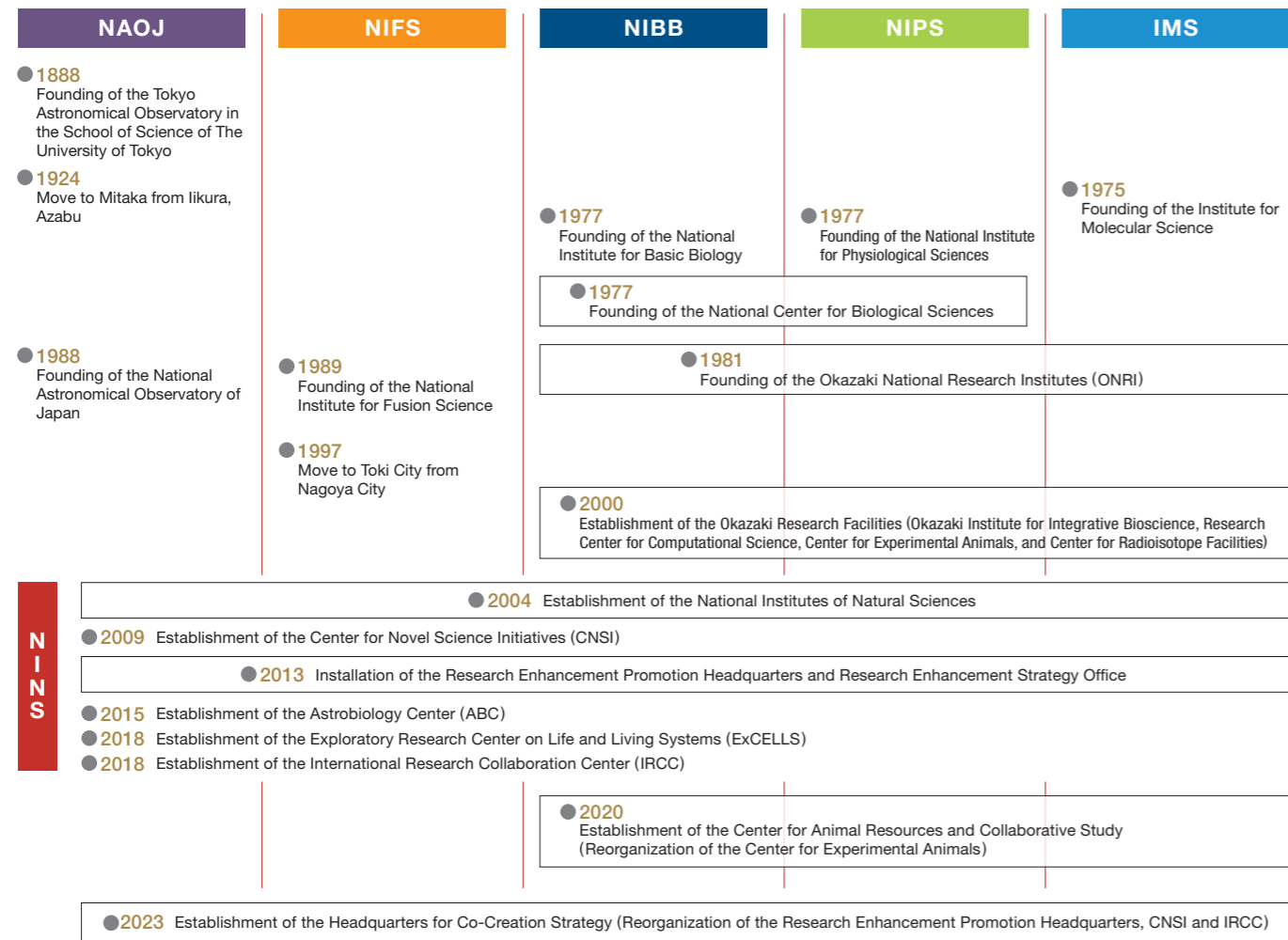


Organization chart

As of April 2023



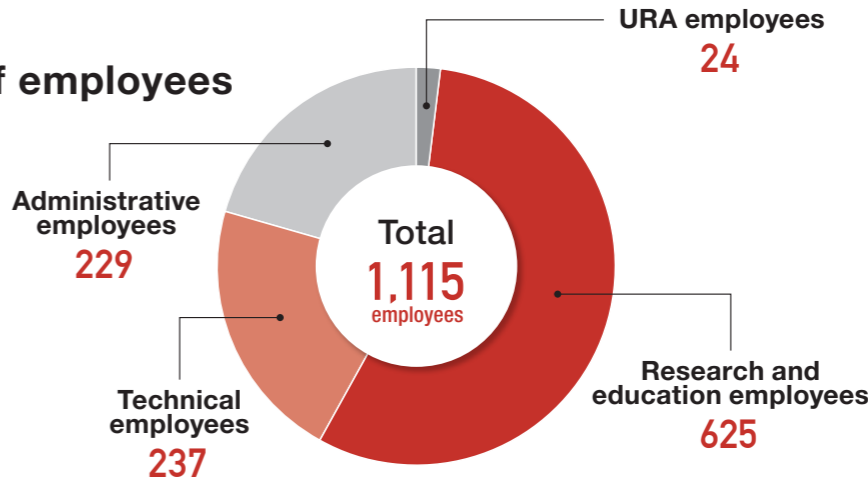
History



Data

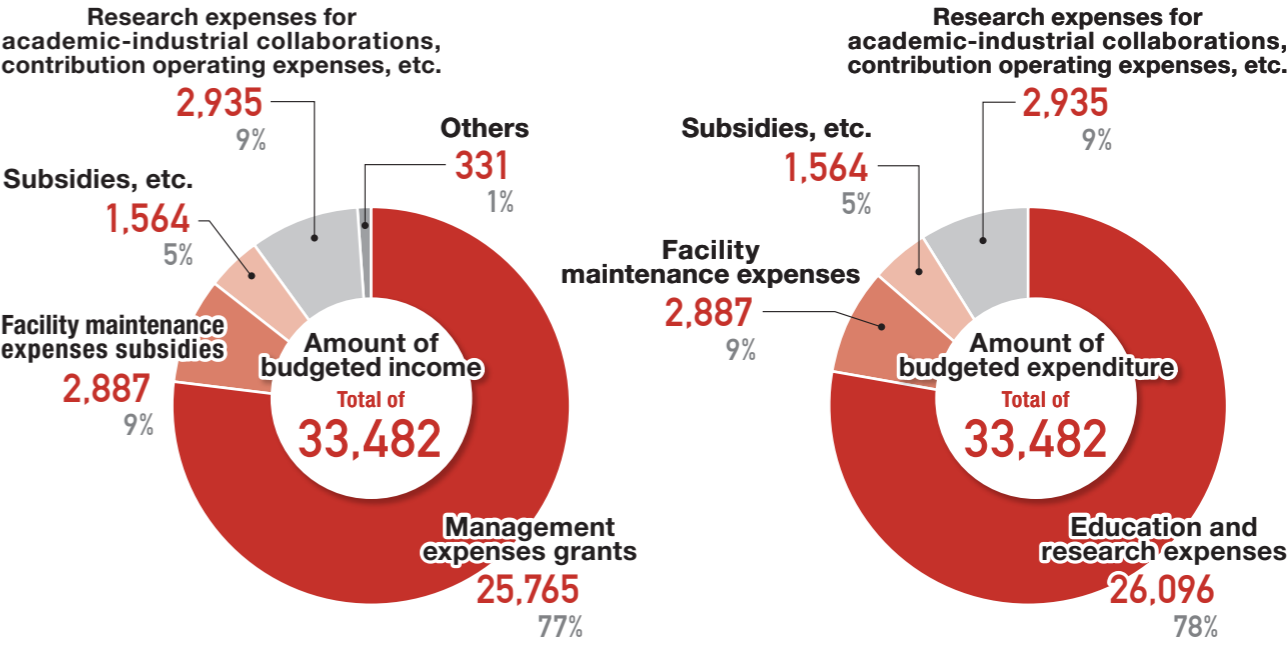
Number of employees

As of April 1, 2023



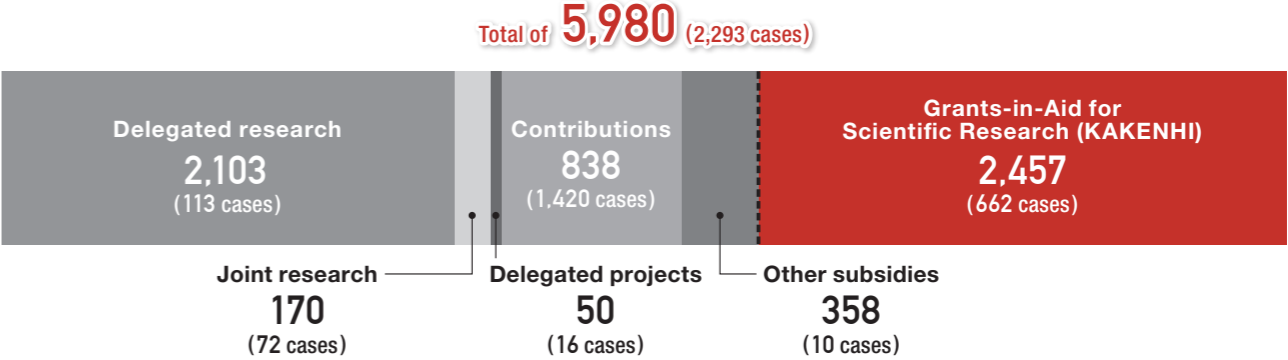
Income and expenses (Budget)

[Annual Budget for FY 2023 (Unit: million JPY)]



Breakdown of external funds

[Annual Budget for FY 2022 (Unit: million JPY)]



\*Any discrepancies are due to rounding.

As of April 2023

President

Name	Job Title
Maki KAWAI	President

Executive Directors / Vice Presidents

Name	Job Title
Goro WATANABE	Executive Director and Secretary General
Keiji IMOTO	Executive Director and Director of Headquarters for Co-Creation Strategy
Teruo FURUYA	Executive Director
Saku TSUNETA	Executive Director, Vice President and Director General of NAOJ
Kiyokazu AGATA	Executive Director, Vice President and Director General of NIBB
Hideaki TAKAYANAGI	Executive Director
Zensyo YOSHIDA	Vice President and Director General of NIFS
Junichi NABEKURA	Vice President and Director General of NIPS
Yoshihito WATANABE	Vice President and Director General of IMS

Auditors

Name	Job Title
Yuichi OGAWA	Auditor
Hiromasa NINOMIYA	Auditor

Nobel Prize and Monument of Professor Emeritus Yoshinori OHSUMI

NINS Professor Emeritus Yoshinori Ohsumi, the Honorary Professor of NINS, won a Nobel Prize in Physiology or Medicine in 2016 for his findings on “autophagy” including research lasting 13 years in the National Institute for Basic Biology (NIBB). As a memorial of his achievement, the monument is installed in NIBB in the motif of "autophagy in yeast cells".



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U R L <https://www.nins.jp/en/>



National Astronomical Observatory of Japan

2-21-1 Osawa, Mitaka, Tokyo  
181-8588, Japan  
Phone +81-422-34-3600  
F A X +81-422-34-3690  
U R L <https://www.nao.ac.jp/en/>



National Institute for Fusion Science

322-6 Oroshi-cho, Toki, Gifu  
509-5292, Japan  
Phone +81-572-58-2222  
F A X +81-572-58-2601  
U R L <https://www.nifs.ac.jp/en/>



Astrobiology Center

2-21-1 Osawa, Mitaka, Tokyo  
181-8588, Japan  
Phone +81-422-34-4072  
E-mail [abc-pub@abc-nins.jp](mailto:abc-pub@abc-nins.jp)  
U R L <https://www.abc-nins.jp/en/>



National Institute for Basic Biology

38 Nishigonaka, Myodaiji, Okazaki, Aichi  
444-8585, Japan  
Phone +81-564-55-7652  
F A X +81-564-53-7400  
U R L <https://www.nibb.ac.jp/en/>



National Institute for Physiological Sciences

38 Nishigonaka, Myodaiji, Okazaki, Aichi  
444-8585, Japan  
Phone +81-564-55-7700  
F A X +81-564-52-7913  
U R L <https://www.nips.ac.jp/eng/>



Institute for Molecular Science

38 Nishigonaka, Myodaiji, Okazaki, Aichi  
444-8585, Japan  
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U R L <https://www.ims.ac.jp/en/>



Exploratory Research Center on Life and Living Systems

5-1 Higashiyama, Myodaiji, Okazaki, Aichi  
444-8787, Japan  
E-mail [info@excells.orion.ac.jp](mailto:info@excells.orion.ac.jp)  
U R L <https://www.excells.orion.ac.jp/en/>



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