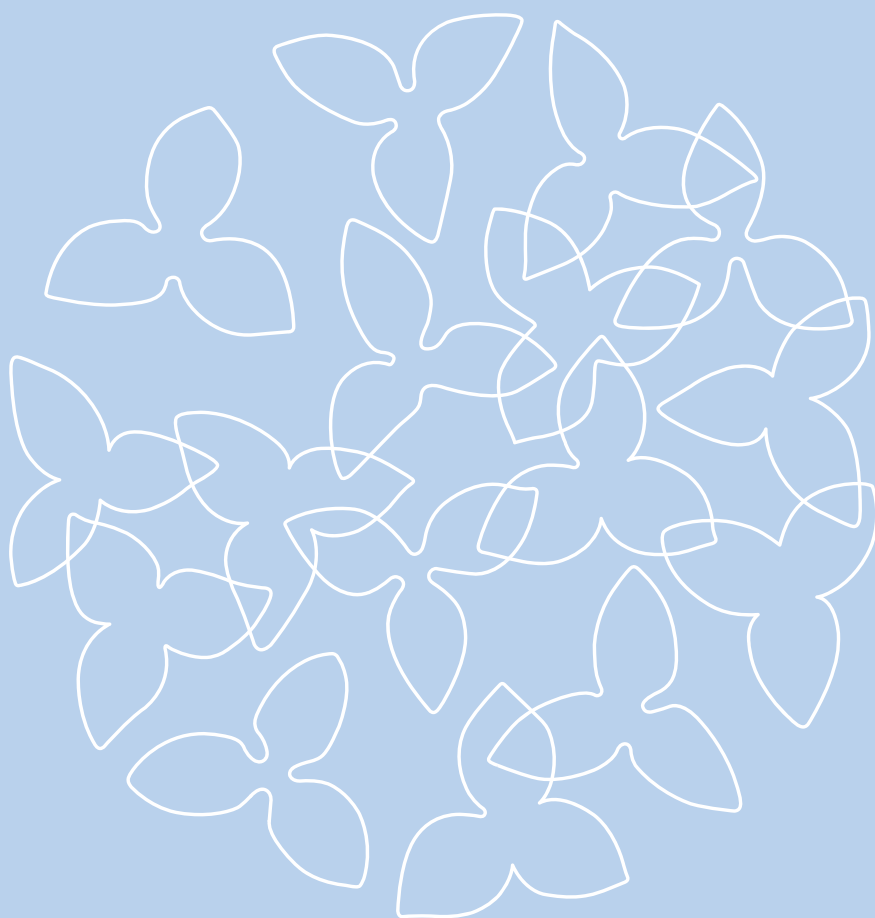




# Hokkaido University Financial Report

# 2021

(Abridged version in English)





# Aiming for the realization of an unparalleled university

I am pleased to present the Hokkaido University Financial Report 2021.

I hope this report will help you learn about activities we are developing at the University as a starting point for intellectual accumulation to achieve social change in Japan and the world.

The current administration, established in October 2020, is making every effort to promote education, research, and social collaboration.

This report introduces the four visions that will lead us towards the 150th anniversary of the University's founding in 2026.



寶金 清博

**Kiyohiro HOUKIN**

20th President of Hokkaido University

Born in 1954, originally from Sapporo, Doctor of Medicine. President Houkin graduated from the Hokkaido University School of Medicine in 1979 and has worked as a neurosurgeon at Hokkaido University Hospital and private hospitals. He was appointed the Director of Hokkaido University Hospital in 2013 and has held his current position since October 2020.



# VISION 1 An unparalleled university

Looking back on the history and development of the University clarifies unique aspects that set it apart from other major universities. The first is unparalleled education, which began with the introduction of classes taught in English by teachers from overseas, as well as American-style all-round education and liberal arts, at the time of its founding in the early Meiji era.

The second is an unparalleled campus. Hokkaido University, which was a small agricultural college at the time it opened, has now evolved into one of the largest campuses

in the world. In addition to the large campus grounds in a big city, one of the world's most extensive research forests and marine research facilities add diversity to Hokkaido University's assets, making it an unparalleled university.

Having inherited such a legacy created by our predecessors, we aim to continue improving as we near the 150th anniversary of the University's founding, and to serve as a public institution that is respected by society as an unparalleled university.



Agricultural College at the time of its opening on August 14, 1876

## 1. Unparalleled education



W.S. Clark, the first vice-president, in 1876



American faculty members in 1879



Opening of Nitobe College in 2013

\*Nitobe College: A new interdisciplinary special education program that opened in 2013 for undergraduate students and in 2015 for graduate students.

## 2. Unparalleled campus



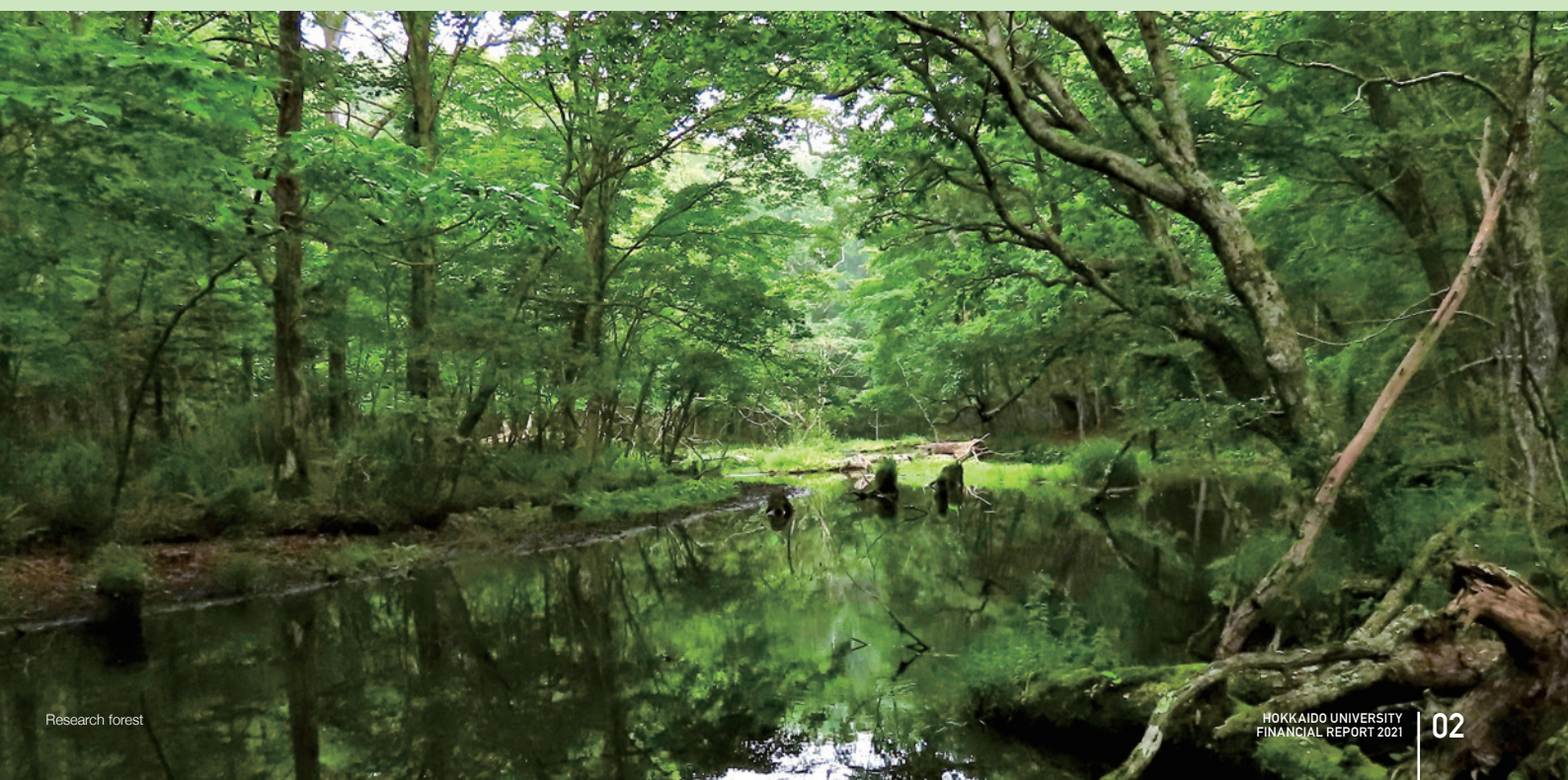
Sapporo Campus



Hakodate Campus



Marine station



Research forest



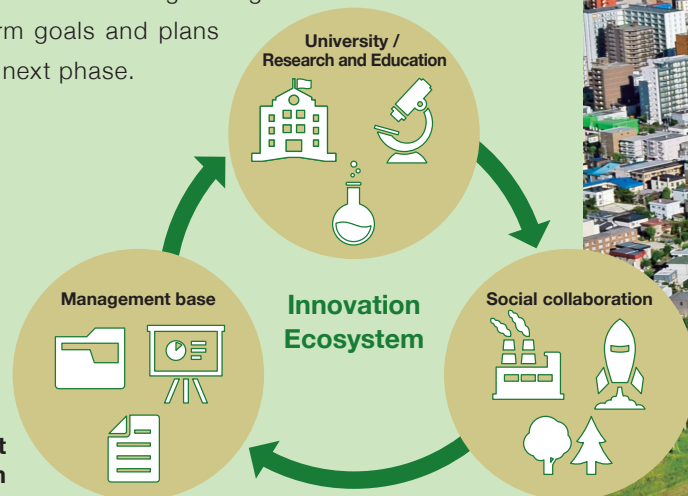
## 2 VISION

### The starting point of innovation

There are two essential requirements to link education and research to social collaboration, and to contribute to solving regional and global issues. These are, 1) excellent education and research, and 2) construction of an ecosystem (autonomous and sustainable mechanism) to make them the starting point of

innovation. To achieve this, we have created six portfolios centered on the Future Strategy Headquarters, and while constantly updating these, we are building strong mid-term goals and plans for the next phase.

University as the starting point of innovation ecosystem



## 3 VISION

### Six portfolios

The six portfolios are as follows. Each is based on the perspectives of the Environment, Society, and Governance (ESG).

#### 1 Hokkaido University as a reliable partner G

To ensure the reliability of the University's governance, we are completing measures to strengthen the audit function, the evaluation system of the president's performance, data-driven management based on institutional research (IR), and the function of the administrative council, as well as to establish a dialogue system with stakeholders.

#### 2 Future Strategy Headquarters to lead Hokkaido University G

The Future Strategy Headquarters, which is a highly agile planning organization to deal with issues that cannot be solved by the regular systems alone, will lead and accelerate reforms.

#### 3 Dynamic Hokkaido University G

*Institutional and work-style reforms*

We will introduce bold institutional reforms, such as the introduction of a new annual salary system, the design of a performance-based

#### 4 Hokkaido University as an autonomous ecosystem S

*Strengthening of the treasury*

We aim to establish an autonomous and self-propelled ecosystem within the University by strengthening management income (idle asset management, venture capital, university bonds), personnel who will enhance industry-academia collaboration, the functions of the Tokyo Office, industry-academia collaboration with overseas institutes, and the financial base.

#### 5 Collaborative efforts by Hokkaido University through expansion, spreading, and connections S

Hokkaido University will reform its organization to contribute to the region and the world through education, research, entrepreneurship, and collaborations.

#### 6 Hokkaido University that contributes to the resolution of global issues E

Hokkaido University particularly excels in field research involving oceans and forests as well as environmental research, thereby contributing to the realization of a carbon-free society against climate change, a global issue.

E Environment  
S Society  
G Governance





## VISION 4

### Academia supporting SDGs and decarbonization

The primary reason Hokkaido University is able to achieve the status of an unparalleled university is its vast campus, including the

Sapporo Campus, research facilities, and research forests. To increase the value of the beautiful green campus, where seasonal changes are clearly visible, we propose that SDGs and decarbonization are applied to all facilities in conjunction with the Campus Master Plan\*.

\*Campus Master Plan was formulated and updated in 1996, 2006 and 2018, outlining campus space utilization, to realize the new vision of Hokkaido University.

# “Shining a Light from Hokkaido Upon the World”

## Contribution to society and the resolution of global issues as an unparalleled university



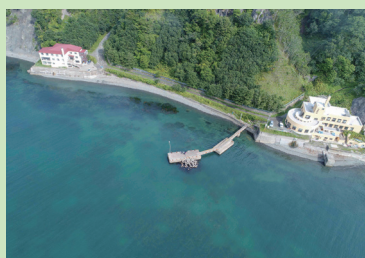
Sapporo Experimental Farm



Shizunai Livestock Farm



Training ship *Oshoro Maru V*



Akkeshi Marine Station



Muroan Marine Station



# The History of Hokkaido University: Accumulation of Knowledge and Creativity

## Development toward the 150th anniversary

Hokkaido University was established as Sapporo Agricultural College in 1876, promoted to Tohoku Imperial University Agricultural College, then recognised as Hokkaido Imperial University, and finally as Hokkaido University in 1947. Under the frontier spirit, a legacy of the will of Dr. William S. Clark, Hokkaido University leads the world as a core university in Japan and continues to pioneer new eras.

# 1876

### Established as Sapporo Agricultural College

William S. Clark, then president of Massachusetts Agricultural College, was appointed as the first vice-president of Sapporo Agricultural College. The Sapporo Agricultural College opening ceremony was held on August 14, 1876 (the University's anniversary).



Sapporo Agricultural College on the opening day

● Transitions of Hokkaido University

Meiji Era  
(1868 – 1912)

● Facilities, research institutes, and events

# 1900

### Kanzo Uchimura publishes *Seisho no Kenkyu* (Bible Studies)

Uchimura entered Sapporo Agricultural College in 1877, the second year that the College accepted students. After studying abroad in the United States, he worked as a teacher and newspaper reporter before publishing *Seisho no Kenkyu*, the first Bible magazine in Japan. He advocated pacifism and argued against war.

# 1920

### Inazo Nitobe becomes Under-Secretary General of the League of Nations

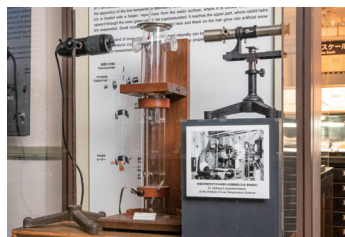
Nitobe graduated from Sapporo Agricultural College in the second class with Kanzo Uchimura. He converted to Christianity while attending the College, studied English literature at the University of Tokyo, and then studied in the United States. He published *Bushido (The Soul of Japan)* in 1900.

Taisho Era  
(1912 – 1926)

Showa Era  
(1926 – 1989)

# 1936

### Dr. Ukichiro Nakaya makes the world's first artificial snow crystal



Double glass tube artificial snow-making equipment. This is exhibited along with other materials in the Hokkaido University Museum.

# 1943

### Catalysis Research Institute established

Founded in 1943 as the world's first research institute bearing the name "catalysis." Reorganized into the Catalysis Research Center in 1989. In 2010, it was certified as a joint-use research center by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and serves researchers engaged in catalyst research in Japan. It was reorganized as the Institute for Catalysis in 2015.

# 1947

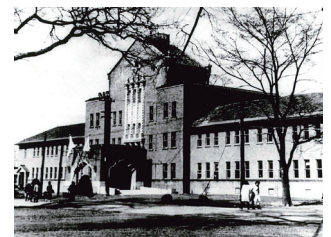
### As Hokkaido University

Hokkaido Imperial University became Hokkaido University. In 1949, the National School Establishment Law was promulgated and enforced, and Hokkaido University was re-established based on a new system (Departments of Law, Education, Science, Medicine, Engineering, Agriculture, and Fisheries).

# 1941

### Institute of Low Temperature Science established

This institute was established to conduct basic and applied research on phenomena in cold regions and under low-temperature conditions.



Institute of Low Temperature Science at the time of its establishment





The history of the university is available on the university website above.

# 1978

## Slavic Research Center established

Established in Hokkaido, which has a close relationship with Russia (Soviet Union) and other Slavic regions, as a base for Japanese Slavic research. Renamed the Slavic-Eurasian Research Center in 2014

# 2004

## Hokkaido University incorporated as a National University Corporation

# 2021

145th Anniversary

# 2026

150th Anniversary

Heisei Era  
(1989 – 2019)

Reiwa Era  
(2019 -)

# 2003

## Hokkaido University Hospital established

The Hospital was established to respond to high demands of the community and society, providing excellent medical care and human resource development. Created by the integration of the hospitals attached to the School of Medicine and School of Dental Medicine, respectively.



Hokkaido University Hospital

# 2005

## Research Center for Zoonosis Control established

Reorganized into the International Institute for Zoonosis Control in 2021, and is also active as an international research base for COVID-19.

# 2007

## Center for Ainu and Indigenous Studies established

As the only research institute specializing in indigenous studies in Japan, this center promotes cutting-edge, practical education and research in cooperation with the Ainu and other indigenous Peoples.

# 2021

## Dr. Benjamin List, ICRéDD Principal Investigator and Specially Appointed Professor, receives Nobel Prize in Chemistry

One of two Nobel Laureates in Chemistry, awarded for the development of asymmetric organocatalysis, which was achieved through research on new reactions using organic catalysts. It is expected that this tool will enhance the efficient development of everything from new drugs to molecules that will enhance the efficiency of solar cells.



# 2018



## Institute for Chemical Reaction Design and Discovery (ICRéDD) established

Established by the World Premier International Research Center Initiative (WPI), a project of the Ministry of Education, Culture, Sports, Science and Technology.

# 2010

## University Professor and Professor Emeritus Akira Suzuki receives the Nobel Prize in Chemistry

One of three Nobel Laureates in Chemistry, awarded for the development of the Suzuki-Miyaura coupling, which greatly contributed to the development and mass production of pharmaceuticals, liquid crystals, organic electroluminescent compounds, and many more.



Kamuynomi (prayer to God) at the opening ceremony



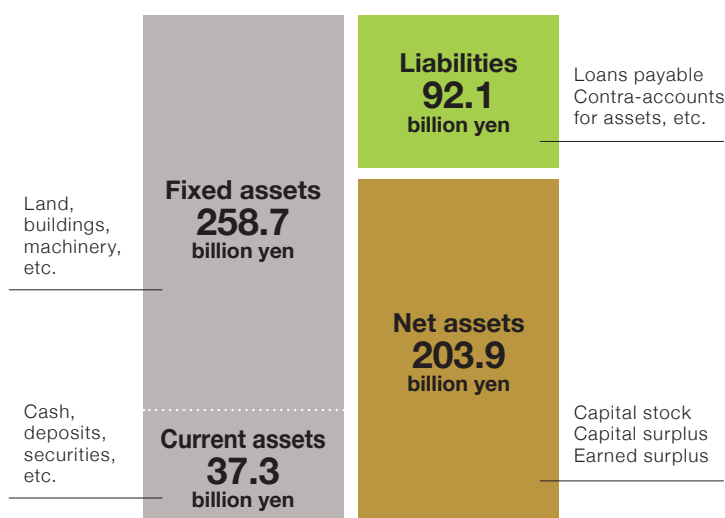
# FY 2020 Financial Highlights and the Frontier Foundation

## Financial statements

National university corporations prepare annual financial statements, clarify the financial and operational status, and submit these to the Minister of Education, Culture, Sports, Science and Technology for approval. The outline of the main financial statements for FY 2020 is as follows.

### Balance sheet (B/S)

University assets, etc.  
on the closing date (March 31)

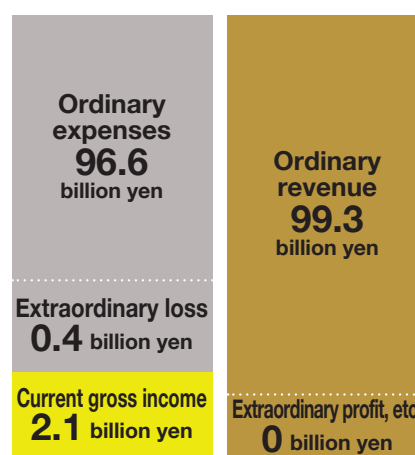


#### Topics

In FY 2020, assets increased by 5.5 billion yen due to an increase in tools, equipment, and fixtures, including renewal of hospital equipment.

### Profit-and-loss statement (P/L)

Operation status of the university  
in one business year (April 1 to March 31)



Gross income for FY 2020 is 2.1 billion yen. However...

#### Documents regarding profit appropriation Current gross income: 2.1 billion yen

**Reserves: 0.9 billion yen**

Profit that is unsupported by cash and generated by accounting treatment peculiar to national university corporations

**Reserves for specific purposes: 1.2 billion yen**

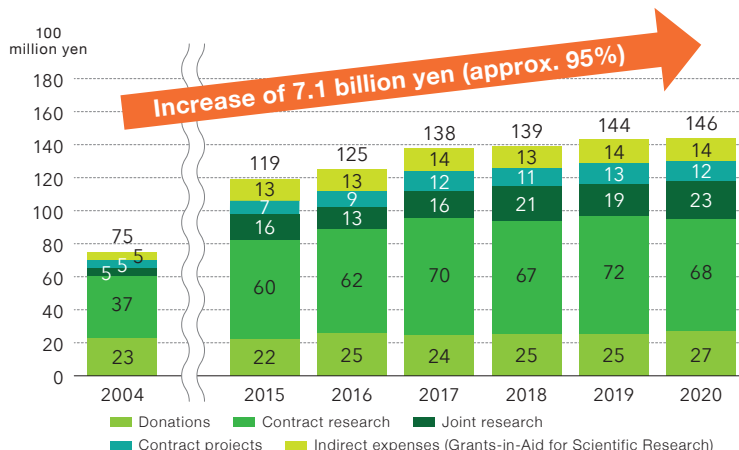
Profit that can be used to finance the next fiscal year's business with the approval of the Minister of Education, Culture, Sports, Science and Technology

## Changes in external funding income

To expand the business of national universities, it is important to obtain external funds from private companies to conduct research.

At Hokkaido University, efforts are made to increase the acquisition of external funds, for example by holding briefing sessions where researchers make presentations on research seeds to companies.

\* The amount of money for each fiscal year is that received during the year and does not match the external funding income in the financial report including the amount carried forward from the previous fiscal year.







## Breakdown of the statement of accounts for revenue and expenditure

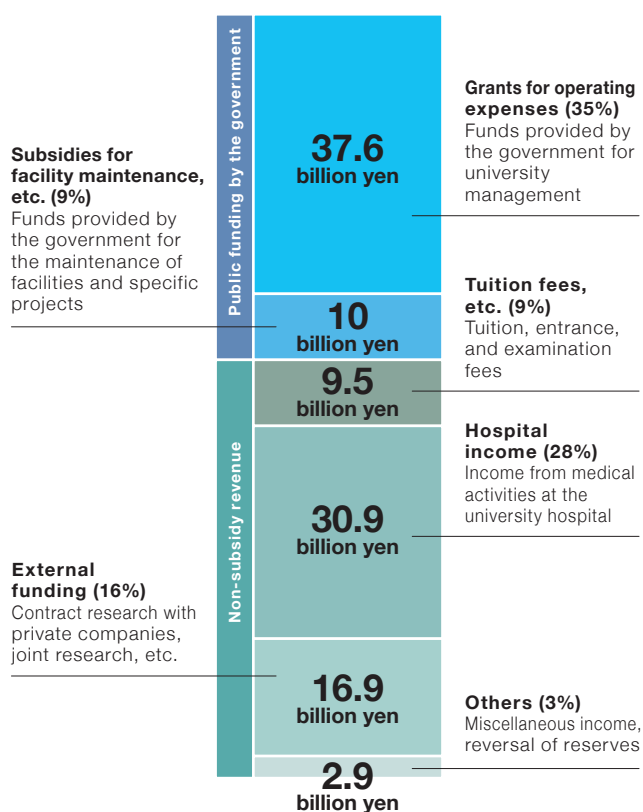
This statement shows the amount of money credited to Hokkaido University and what it was used for, based on a financial report (cash basis) prepared based on the same standards as those of the national government.

It does not match the profit-and-loss statement (accrual basis), which is the result of accounting treatment peculiar to national university corporations.

Approximately speaking, half of the operating funds is covered by the government funds and the other half by non-subsidy revenue; approximately half of the expenditure is personnel expenses.

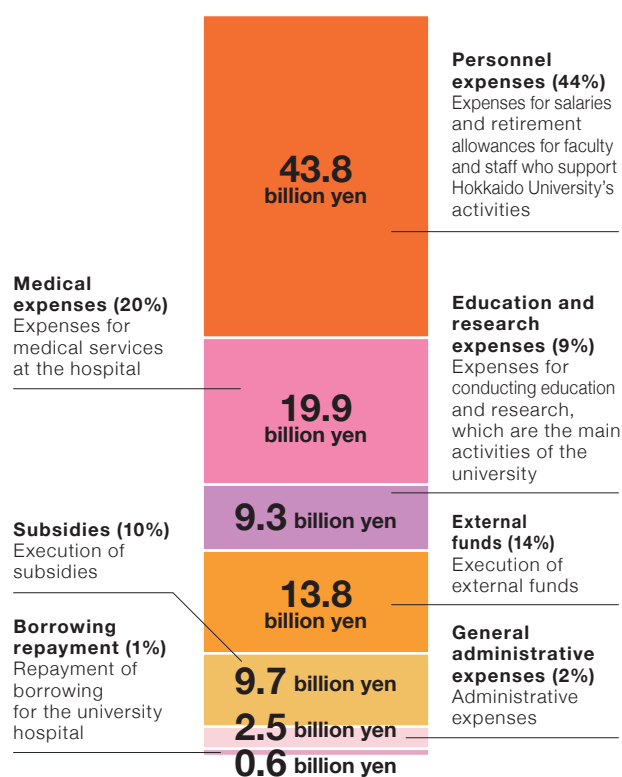
### Breakdown of revenue

Revenue: **108.1 billion yen**



### Breakdown of expenditure

Expenditure: **100 billion yen**



## Initiatives of the Hokkaido University Frontier Foundation

As the situation surrounding national universities becomes more severe, such as the reduction of subsidies for operating expenses, Hokkaido University needs your support to continue operating the university independently and to make a bigger contribution to society.

### Student support "Nitobe School Scholarship"

The foundation provided a non-repayable benefit-type scholarship with the aim of encouraging students of the Nitobe College Honors Program for Graduate Students to further develop their advanced expertise and their ability to utilize it.

#### Voice of gratitude

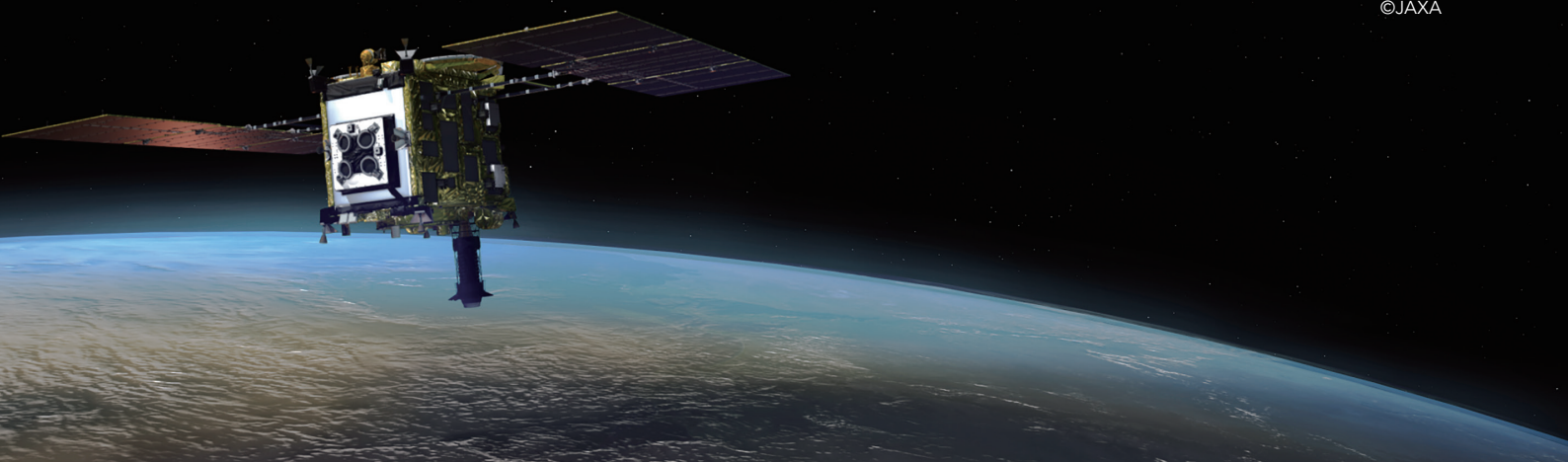
I would thank frontier foundation sponsors for supporting international student with scholarship. The amount of money is very motivating. It helped me not only with the research activities but also enhanced my confidence. (DENGRI, Abhinav)

**\* The scholarship has been awarded to 21 students of the Nitobe College Honors Program for Graduate Students (4.2 million yen)**



English page  
introducing the  
Hokkaido University  
Frontier Foundation





01

## Hokkaido University leads Sample Return Projects – From Hayabusa 2 to MMX

17 PARTNERSHIPS FOR THE GOALS



Samples of the asteroid Ryugu brought back by Hayabusa 2 arrived at the university on June 21, 2021, and the team led by Professor Hisayoshi Yurimoto started the initial analysis. Professor Kiyoshi Kuramoto is also participating in the next sample return project, MMX. The University is playing an increasingly important role in the field of space science.

### Analysis of stones from Ryugu using an isotope microscope

#### Sample return attracts worldwide attention

Retrieving samples from an extraterrestrial celestial body or outer space and bringing them back to Earth is called “sample return.” This enables detailed analyses that are impossible only through remote sensing observations using satellites and “on-site observations” using landers. In recent years, interest in sample return has increased in planetary research in Japan and overseas.

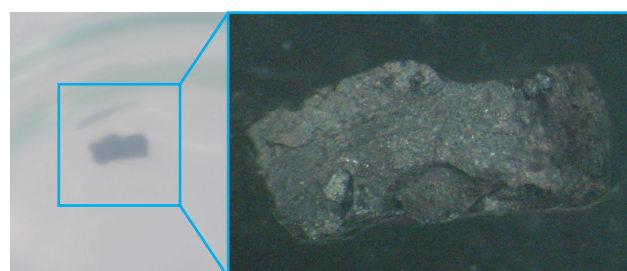
Ryugu is an older asteroid than Itokawa, from which samples have been brought back by the original Hayabusa in 2010. Ryugu is expected to provide information around the birth of solar system (approximately 4.6 billion years ago) and to be rich in water and organic matter.

#### Elucidating the origin of the solar system

Professor Yurimoto’s laboratory spent approximately 30 years developing a huge device called an “isotope microscope” that can discover presolar substances in meteorites. It is the world’s first device that can visualize the distribution of different types of isotopes at micro level.

In 2002, Professor Yurimoto’s team analyzed meteorites using this microscope and discovered fine parti-

cles that were formed before the formation of the solar system. He is also instrumental in many other achievements, such as the sample analysis from Itokawa in 2011 which revealed that ordinary chondrites originated from an asteroid.



A part of the Ryugu samples that arrived at the University. The size is about 2 to 3 mm.



Isotope microscope



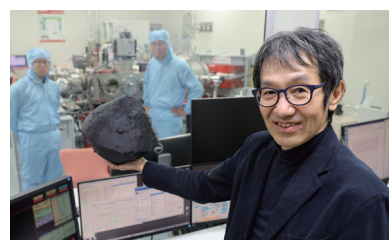


From 2016 to 2020, he also served as the head of the Astromaterials Science Research Group of the Japan Aerospace Exploration Agency (JAXA). He plays an active role in Japan's sample return projects as one of the leaders.

With the participation of 109 universities and research institutes from 14 countries, the initial analysis of Ryugu samples has been conducted by research teams in six different fields since June 2021. Professor Yurimoto leads one of these, namely, the chemical analysis team.

"Using the isotope microscope, I would be happy if

we could find a new substance that human being never encountered before," says Professor Yurimoto. The initial analysis will take about a year, after which various studies will be conducted through open international calls for participants.



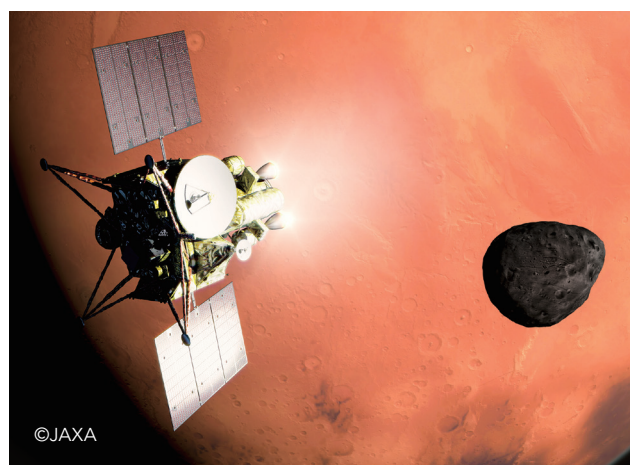
**Hisayoshi YURIMOTO**  
Professor,  
Faculty of Science

## Taking on the challenge of a sample return mission from Phobos, a Martian moon

### Toward the MMX launch in 2024

JAXA is now proceeding with the MMX (Martian Moons eXploration) mission to launch a probe in September 2024. The probe will land on the Martian moon Phobos, collect samples, and return in 2029. Professor Kuramoto is the principal investigator of this world's first-of-its-kind mission.

He participated as chairman in the concept formulation stage in 2015. Currently, he is discussing the details of the mission with researchers in Japan and overseas.



An artist's impression of the MMX probe. To enter the Martian sphere with strong gravity and to return to Earth, it will be equipped with a large-capacity propulsion system that is unprecedented in Japanese spacecraft.



**Kiyoshi KURAMOTO**  
Professor,  
Faculty of Science  
Specially Appointed Professor,  
Institute of Space and  
Astronautical Science (JAXA)

### Capture or collision, and what can be seen beyond

MMX is expected to unravel the mystery of how the Martian moons were created. There are two main theories about the formation of the Martian moons: the capture theory that asteroids were captured as a result of the attraction of Mars; and the giant collision theory that another celestial body collided with Mars causing accumulation of released substances. This controversy has continued for over 50 years. MMX will not only settle the debate but also provide many clues on how the Earth, which is very similar to Mars, was formed and evolved.

It will be MMX's mission to bring the first empirical data on the supply process of water, atmosphere, and organic matter — which form the source of life — and on the formation of the different planets. Many things to look forward to from these leading researchers.





## 02

# Making Hokkaido a Genuine Wine-Producing Region

9 INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



As a region where grapes, sake rice, and barley are produced, the terroir (character of the land) of Hokkaido is now attracting attention. At the Laboratory of Applied Mycology (today's Laboratory of Applied Molecular Microbiology), where a hygienic natto manufacturing method was developed in the Taisho era (1912 – 1926), Professor Teruo Sone, the sixth professor of the laboratory, is taking the lead to establish a technical support base for Hokkaido wines.

### The effects of microbes on the taste of wine

Professor Sone, who is the sixth professor of the Laboratory of Applied Mycology, which was renamed to the Laboratory of Applied Molecular Microbiology in 2016, is performing vintage research.

He says, “Even if the same variety of grapes is used, wine flavors differ according to the winery and the field, and that is caused by microbial difference. Soil microbes affect the nutrients to be absorbed by the plants, and the microbes on plants have the function of suppressing diseases and molds. It would be great if we could unravel the secret of the complex and rich taste of wine based on the various functions of the various microorganisms.”

### Creating a new trend of Hokkaido wine

In April 2021, the Laboratory for Nouvelle Vague of Hokkaido Wines was established as an endowed course for research and human resource development intended to improve the quality of Hokkaido wines.

Professor Sone, who is responsible for the course, has



**Teruo SONE**  
Professor,  
Research Faculty  
of Agriculture

revealed plans to provide specialized lectures where people working at wineries can obtain credits, and to develop food education events that connect Hokkaido wine and local specialties in collaboration with local companies. He says, “To make Hokkaido a genuine wine-producing region, Hokkaido University will serve as the basis of the wisdom and passion for the industry-academia-government collaborations.”

To create a new trend of Hokkaido wine, the laboratory has taken a powerful step toward the establishment of the Hokkaido Wine Education and Research Center (tentative name) in 2023.



Opening ceremony of the laboratory in July 2021



## Spirit of practical learning gleaned from natto bacteria

Professor Jun Hanzawa, who established the Laboratory of Applied Mycology in the Taisho era, made a huge contribution to the food industry as a researcher who developed a hygienic natto manufacturing method using purely cultured natto bacteria.

Since then, the laboratory has been conducting research on a wide range of microorganisms, including pathogens attached to rice plant, to help improve people's lives.



Building of the Laboratory of Applied Mycology (1916)

### COLUMN

## Natto bacteria – a result of the spirit of practical learning

Natto is now recognized as an excellent fermented food produced in Japan, but until the Meiji era (1868 – 1912), it was considered an unstable product because its production relied on natural fermentation by natto bacteria attached to rice straws, mixed with other miscellaneous bacteria.

Professor Hanzawa devised a manufacturing method that mixes purely cultured natto bacteria with boiled soybeans, and ferment them in a thinly cut wooden container. This container also had a bactericidal effect, was inexpensive, hygienic, and lightweight, making it convenient to manufacture and sell.

In 1918, he introduced this new manufacturing method as the “Hanzawa-style improved natto manufacturing method.” It set a precedent for today’s biotechnology. He also established a company that sold the developed natto bacteria to secure operating funds for the newly opened laboratory, being a pioneer of today’s venture businesses. The following year, Professor Hanzawa published the magazine *Natto*, to disseminate the method, which formed the foundation of the present day natto manufacturing.

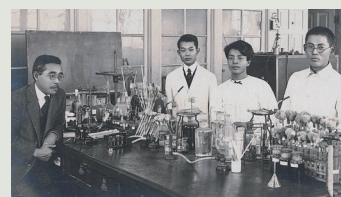


Covers of the magazine, *Natto* (first, second, and third issues from the left)



Jun  
HANZAWA

- |      |   |
|------|---|
| 1879 | Born in Shiroishi-mura, Sapporo-gun (today's Shiroishi-ku, Sapporo)       |
| 1901 | Graduated from Sapporo Agricultural College (today's Hokkaido University) |
| 1902 | Appointed as an assistant professor at Sapporo Agricultural College       |
| 1911 | Studied abroad for three years, among others, at the Institut Pasteur     |
| 1915 | Established the Laboratory of Applied Mycology                            |
| 1919 | Professor, Hokkaido Imperial University (today's Hokkaido University)     |
| 1941 | Retired from Hokkaido Imperial University. Professor Emeritus             |
| 1972 | Died at the age of 93   |



Professor Hanzawa in the laboratory (far left)

Photos: Collection of Hokkaido University Archives





## To Control the Pandemic

Hokkaido University was one of the first to engage in advanced COVID-19 research in fields such as medicine, pharmacy, engineering, and chemistry, and the results have greatly contributed to the control of the COVID-19 pandemic around the world.

### Development of a PCR test using saliva and spread of a new safe and simple COVID-19 testing method

#### Establishment of safe and simple PCR testing

The group of Professor Takanori Teshima of the Faculty of Medicine, Hokkaido University, and other researchers started research on saliva-based PCR testing in April 2020, ahead of other researchers in Japan, and showed that saliva samples may provide comparable test accuracy as swabs. As a result, the Ministry of Health, Labour and Welfare approved PCR testing using saliva.

#### Demonstration of the possibility to detect infected people from asymptomatic individuals by saliva PCR testing

The accuracy of saliva PCR testing on asymptomatic individuals was not clear. The research group of Professor Teshima and his group compared the diagnostic accuracy between saliva and swabs of asymptomatic individuals by conducting the world's largest study of approximately 2,000 cases. As a result, saliva showed almost the same accuracy as swabs, which clarified the reliability of saliva PCR tests.



**Takanori  
TESHIMA**  
Professor,  
Faculty of Medicine

#### Attempts to speed up the saliva test

The next challenge was to reduce the test time. The research group of Professor Teshima examined the accuracy of saliva testing by various testing methods that can provide results in a short time through industry-academia joint research, and made it possible to select various testing methods depending on various aspects.

Hokkaido University Hospital was the first in Japan to start a pre-hospital saliva PCR test. Since safe and simple saliva collection can be recommended as a standard method for screening tests for asymptomatic individuals, it has been adopted for airport quarantine and pre-boarding tests. This is a great social contribution that brought about a social change allowing the general public to easily undergo tests.

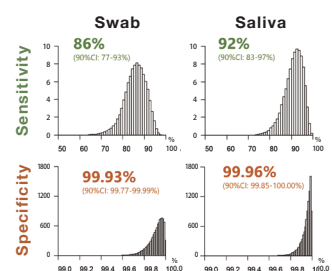


Saliva collection cup  
Photo courtesy: Professor Teshima, Hokkaido University

The accuracy of saliva is almost the same as that of swabs

#### Asymptomatic individuals

- Airport quarantine cohort
- Close contact cohort



# First detection of SARS-CoV-2 RNA in wastewater, and proposal and demonstration of the concept of wastewater-based epidemiology



## Understanding the actual infection prevalence by detecting viruses in wastewater

Wastewater-based epidemiology is a research field where markers including viruses in wastewater are detected to estimate the epidemic situation and evaluate the health status of people based on the data. Associate Professor Kitajima considered that the wastewater-based epidemiology can be applied to SARS-CoV-2 because there are precedent cases of norovirus and poliovirus, and in April 2020, he published the world's first review article on SARS-CoV-2 in wastewater in collaboration with overseas researchers.

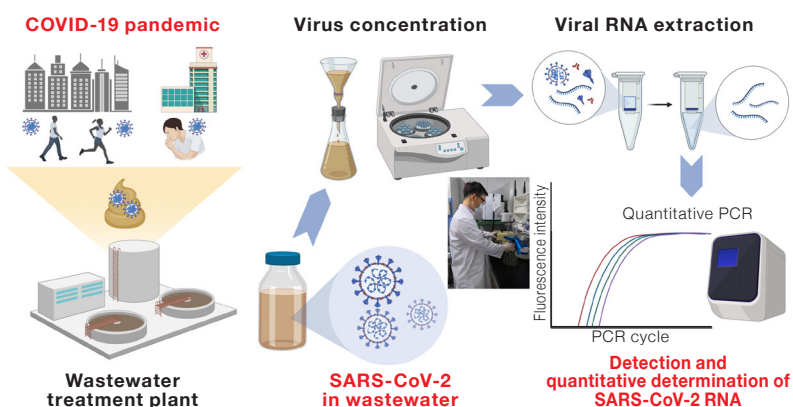
## Expectations of the early detection of infection prevalence by wastewater-based epidemiology

Associate Professor Kitajima's group collects samples from wastewater treat-

ment plants in Sapporo and carries out quantitative measurements of SARS-CoV-2 RNA in wastewater. As a result, it was confirmed that the wastewater-based epidemiology may help to understand the epidemic situation. Through joint research with Tohoku University, the group constructed a mathematical model to estimate the number of infected people based on the concentration of SARS-CoV-2 RNA in wastewater.

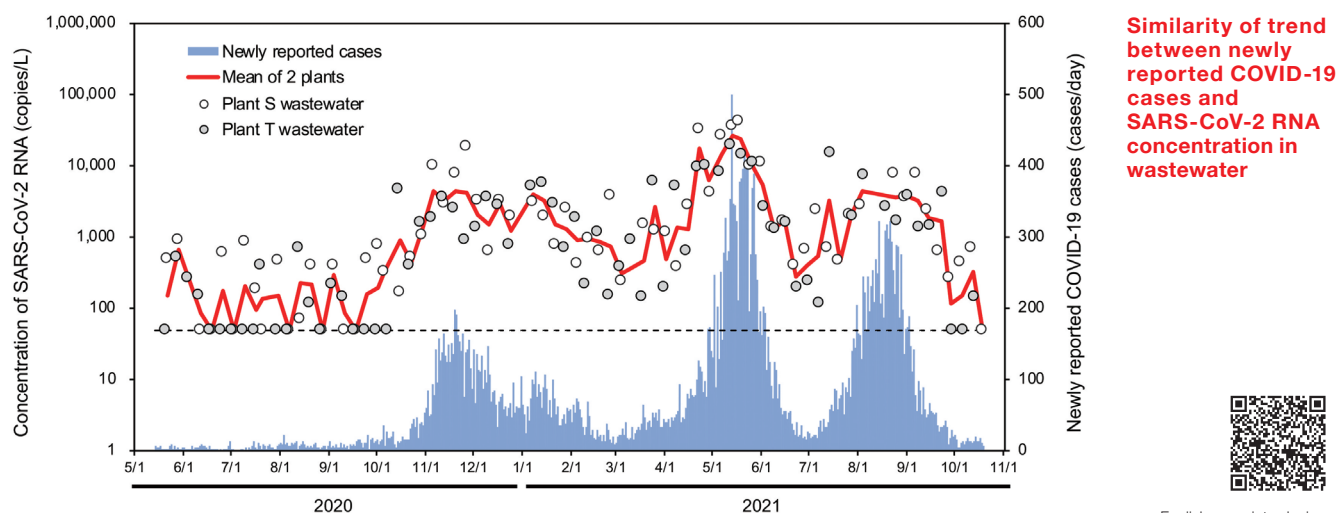
Based on these research results, the group will promote the social implementation of wastewater-based epidemiology in the future to quickly detect not only SARS-CoV-2 but also unknown viruses and new infectious diseases, and aims to establish wastewater-based epidemiology as a social infrastructure that is useful for infection prevention measures.

### ● Flow of wastewater-based epidemiology



### ● Demonstration experiment through government-academia collaboration in Sapporo

Success in quantitative measurements of SARS-CoV-2 RNA in wastewater over a long period of time using a highly sensitive detection method (developed by Hokkaido University and Shionogi)



English page introducing  
COVID-19 research

<https://www.global.hokudai.ac.jp/research-and-education/covid-19-research-at-hokkaido-university/>





04

3 GOOD HEALTH  
AND WELL-BEING



## International Institute for Zoonosis Control To Overcome Zoonoses by a Preemptive Measures

As a world-class research center, the International Institute for Zoonosis Control predicts the next pandemics of infectious diseases and conducts researches to overcome those pandemics through a “Preemptive Measures”

### Experts from various fields gather to study zoonoses

The International Institute for Zoonosis Control is a core center focusing on zoonoses. Based on a strong sense of crisis about the state of zoonoses and the delay in related research in Japan and overseas, the institute was established as the Research Center for Zoonosis Control on April 1, 2005 to drastically strengthen research and education for zoonosis control. It is unique since experts in microbiology, virology, immunology, pathology, and information science based on medicine, veterinary medicine, pharmacy, engineering, and science are collaborating and creating new fields, research and education.

The Research Center for Zoonosis Control has been conducting global surveillance of microorganisms in domestic animals, wild animals, and insects, clarifying their transmission route, infection mechanisms, and host immune responses, and predicting new outbreaks with the intention of overcoming zoonoses through a “Preemptive Measures” of preparing preventive, diagnostic, and therapeutic methods.

### Global surveillance of pathogens and creating innovations

In April 2021, the Research Center for Zoonosis Control was reorganized into the International Institute for Zoonosis Control, and the existing knowledge and

### Hokkaido University's resources are concentrated in 3 units

#### 1) Zoonosis Research Unit (reorganization and expansion of the existing organization)

As a core unit, this unit builds a strong collaborative system with the two other units to accelerate infectious disease research

Establishing countermeasures for future pandemics through “Preemptive Measures”



Resilient promotion of globalization

Bacterial infection  
Viral infection  
Protozoan infection

Development of preemptive measures

Research and development of biopharmaceuticals  
Application of bioinformatics drug discovery  
Identification of risk factors and planning of countermeasures  
Ultra-fine structure analysis of pathogens and drug discovery  
Development of small molecule therapeutic agents

#### 2) International Collaboration Unit (internalization of GI-CoRE)



This unit invites world-class faculty members from overseas to promote international collaboration

Vaccine and drug discovery research  
Pathogen genome  
Pathogen search

#### 3) Veterinary Research Unit (collaboration with five infectious disease laboratories of the Faculty of Veterinary Medicine)



This unit develops research on cross-border infection and applies the results to graduate school education

Surveillance of cross-border infection  
Elucidation of the pathogenic mechanism of prion disease  
Development and practical application of immunotherapy  
Planning of measures against arthropod-borne infection  
Elucidation of the actual condition of parasite infection

Collaboration in the veterinary field

Animal Medical Center

The Promotion Office for International Alliance and the Hokudai Center for Zoonosis Control in Zambia were integrated and restructured into a section intended to enhance international cooperation. The Global Station for Zoonosis Control of the Global Institution for Collaborative Research and Education was reorganized into the International Collaboration Unit comprising three groups. Faculty members from five laboratories studying infectious diseases in the Faculty of Veterinary Medicine were also assigned to concurrently establish the Veterinary Research Unit.



technology concerning zoonoses of Hokkaido University were concentrated in three units. This expansion and restructuring were intended to realize countermeasures for infectious diseases through the development of preventive, diagnostic, and therapeutic methods for zoonoses.

## From basic research to the development of COVID-19 treatments

The institute has high-level containment, Biosafety Level-3 (BSL-3), laboratories and is conducting animal infection experiments on SARS-CoV-2, which is the causative virus of COVID-19. In addition to basic research on the cell infection mechanism and pathoge-

nicity of SARS-CoV-2 and the immune response of living organisms caused by viral infections, extraction of viral genomic RNA and proteins, and analysis of the genome sequence and the protein structure are conducted. Many joint studies are being conducted by sharing the experimental systems and tools established through a series of studies with other researchers, which is expected to contribute to overcoming COVID-19 and drug discovery.



Animal infection experiments in the BSL-3 laboratory

## COLUMN

## Introduction of cryo-electron microscopy to the BSL-3 laboratory

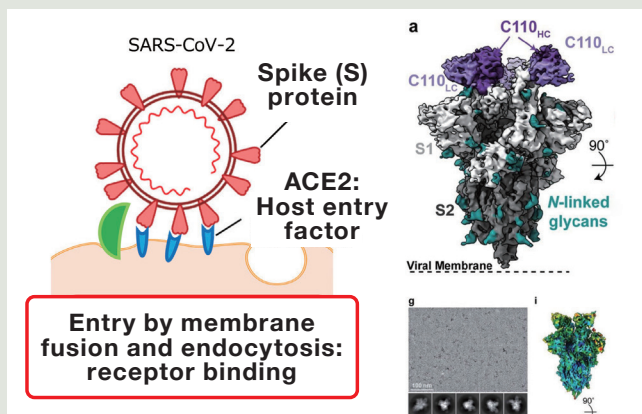
### Analysis of the live SARS-CoV-2 virus

In March 2021, the Zoonosis Research Unit installed the world's highest-performance cryo-electron microscope in the BSL-3 laboratory. It allows researchers to observe pathogens without inactivating them and to rapidly analyze viral structures and complexes with antibodies.

### Expectations of the development of vaccines and therapeutic agents

At the institute, the information obtained by cryo-electron microscopy is used for the development of vaccines and therapeutic agents. Joint development and collaboration with other universities and private companies are also promoted for joint research on a global scale.

#### ● SARS-CoV-2 spike (S) protein



Cryo-transmission  
electron microscopy  
against biohazard  
Thermo Scientific  
Krios G4-BSL3



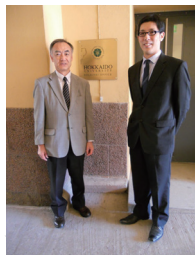


# Bases for Education and Research Activities in the World

Hokkaido University has 11 overseas satellite offices to promote international education and research activities.

It also has 719 agreements with universities and institutes in 71 countries and regions. The number of agreements continues to grow, especially in Asia and Europe.

**Europe Office in Helsinki**  
Established in 2012



Helsinki

**Russia Office in Moscow**  
Established in 2019



Moscow



Lusaka

**Africa Office in Lusaka**  
Established in 2012



**Hokkaido University & VNU University of Science Joint Office**  
Established in 2019



Beijing



Seoul



Hanoi  
Thailand



The Philippines

**Liaison Office in Thailand**  
Established in 2017



Indonesia

**Liaison Office in Indonesia**  
Established in 2017



**Liaison Office in the Philippines**  
Established in 2018





Overseas offices



Liaison offices



International exchange agreements

### China Office in Beijing

Established in 2006



### Liaison Office in Beijing China

Established in 2018



### Korea Office in Seoul

Established in 2011



### North America Office in Portland

Established in 2019



DATA



#### Overseas offices

Number of overseas offices established

4 **7**  
2013 2021



#### Liaison offices

0 **4**  
2013 2021



#### International exchange agreements

Number of international exchange agreements

47 **71**  
Countries and regions 2013 2021

326 **719**  
Agreements 2013 2021

#### Main business at overseas offices

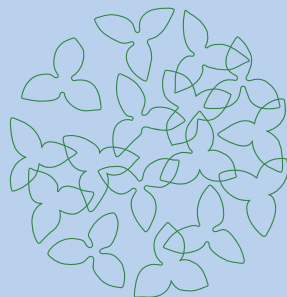
- Collection and provision of information
- Public relations for entrance examinations
- Support for international students dispatched from the university
- Implementation of interviews and tests related to admission to graduate schools
- Support for academic exchanges and collaboration with universities
- Support for student job hunting
- Support for industry-academia-government collaboration activities
- Support for education and research activities and international cooperation activities
- Cooperation with alumni



English page of  
Hokkaido University  
International Relations

<https://www.global.hokudai.ac.jp/global/>






## HOKKAIDO UNIVERSITY

The Trillium flower is symbolic of Hokkaido University and used as its official logo. In this design, the flower symbolizes “human” by combining intelligence, individuality, and diversity. The overlapping elegant lines of the flowers represent human relationships and knowledge. The flowers’ silhouettes reflect academic and contemporary values, suitable for Hokkaido University.

## Hokkaido University Financial Report 2021 (Abridged version in English)

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Published by: Finance Management Section, Budget Division,  
Finance Department, Hokkaido University  
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Published: December 2021

This English financial report is also available on the website.  
 <https://www.global.hokudai.ac.jp/about/publications/financial-report/>

