

Spring 2017

# LITTERÆ POPULI

A news magazine presented by Hokkaido University



## Recent News from Hokkaido University



### Litterae Populi

Litterae Populi is a bi-annual magazine with the latest news about Hokkaido University. Its name is Latin for "letters of the poplar trees."

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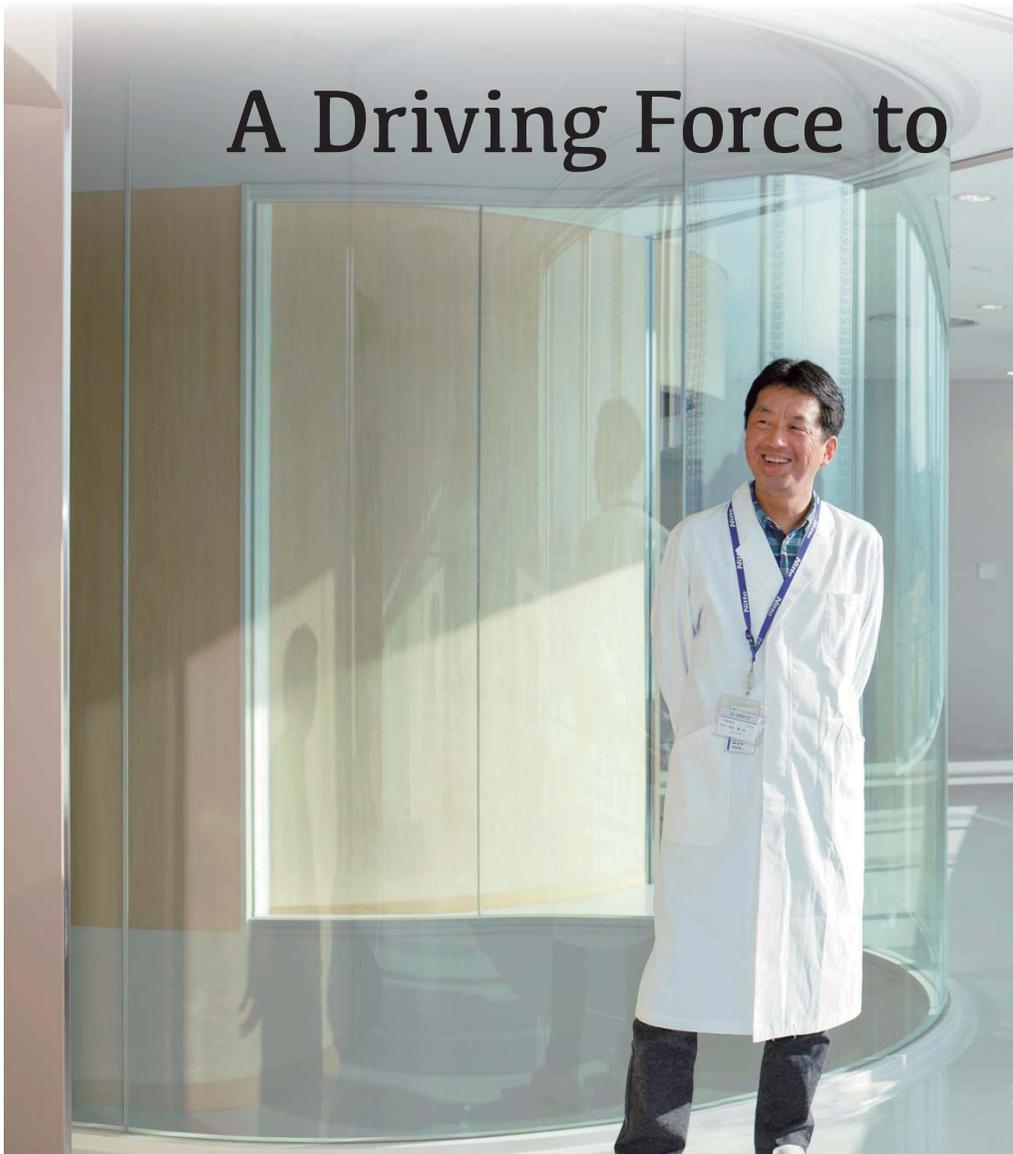
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## Feature: Casting

Hokkaido University has a long history dating back to the opening of Sapporo Agricultural College. The educational philosophies of our predecessors have been passed down from generation to generation, casting light on the people who have followed in their footsteps.

Using the theme of "to cast," this special feature highlights three stories in line with the university's philosophies.

# A Driving Force to



# Change Society



Feature:  
**Casting**

Creating new industries and the Global Facility Center

Today, universities not only create new things and goods in collaboration with companies but also seek to implement their research for the good of society. They also share common goals to create new innovations.

The Global Research Center for Food & Medical Innovation has attracted as many as nine companies and organizations. Staying true to the words of "under one roof," laboratories from Hokkaido University and companies conduct collaborative research on the same floor and cooperate to resolve social issues.

# Developing the new frontier through organizational collaborations



Among the industry creation courses, the Department of Molecular Therapeutics was established in the Institute for the Promotion of Business-Regional Collaboration at Hokkaido University in 2014. The department cooperated closely with Nitro Denko Corporation, a partner company to advance research on the same floor of the Global Research Center for Food & Medical Innovation. As the therapeutic agent for hepatic cirrhosis they developed is in the clinical trial stage, they are now working on the research and development of novel nucleic acid medicine to cure intractable diseases.



The relationship between academia and industry has changed over the past few years. Universities have engaged in numerous collaboration projects with companies, and most of them were those between individual researchers and laboratories of companies. Now, however, more and more large-scale organized collaboration projects are being conducted between universities and companies.

Individual-based collaborations allow researchers to receive a fund of two million yen or less on average to conduct research on a specific theme in their laboratories. Such collaboration is surely a valuable foothold for product and

technology development, but there is a significant hurdle to overcome before the product and technology are put into practical use in society. In this type of collaboration, some researchers are exhausted by all of the necessary paperwork and reports.

On the other hand, organized collaborative research shows potential as a new type of collaboration. Organized collaboration begins when Hokkaido University and companies share a common vision to resolve social issues. The university comprehensively plans research work by assigning a specific laboratory to a certain research field,

the health conditions of mothers and children. Mothers can consult with nurses they know through the app. Places where mothers can try diets and exercises that suit them are established in the community formed in Iwamizawa, thereby enabling them to use the acquired knowledge in their day-to-day lives. By knowing the condition of their health, local residents take notice of issues on their own and begin to take action. Universities have the immense power needed to be a driving force in society.

Hokkaido University launched the Institute for the Promotion of Business-Regional Collaboration when it began collaborating with organizations. In individual-based collaborations, each department or faculty makes a contract based on its own rules, which can be complicated for companies to understand. In organizational collaborations, the Institute for the Promotion of Business-Regional Collaboration serves as the window for contracts and adopts integrated rules, which are clear and popular for companies. The Institute for the Promotion of Business-Regional Collaboration is helping brand the university's research.

One of the characteristics of Hokkaido University's organizational collaborations is equal partnership. Equal partnership refers to a stance in which Hokkaido University and companies have a 50:50 relationship when it comes to jointly advancing research, and it is dependent on how well Hokkaido University and companies are able to share the same concept. Comprehensive production management is also required so the leaders of organizations can join their hands to push projects forward. The Research Development Section (URA Station) plays a significant role in planning concepts related to academia-industry collaborations. The URA also addresses problems in modern society by creating the blueprint in which to tackle them. Although equal partnership is yet the norm for other universities, Hokkaido University has already provided more than 10 industry creation courses and worked towards their social implementation.

## Significance of universities

What direction should universities be heading toward? Universities must consider their functions in society and change social structures. How can universities present a grand design and develop it within society? This is the sort of question universities need to answer. Kazushige Kawabata, an executive and vice president in charge of research, says that universities should be evaluated by society and their significance should be determined by society.

Using local social implementation as a model, and expanding to include domestic and international affairs, Hokkaido University is steadily making progress in contributing to the resolution of global issues.

or a specific person to a team to resolve a certain issue, thereby changing the industrial structure. Vast amounts of funds are provided, often 10 to 100 times larger than those undertaking an individual-based collaboration.

## Unique initiatives of Hokkaido University

Industry can create goods on its own. What can universities contribute by joining together with industry? One of the functions of a university is its ability to create a community. In addition, it can put research results into practical use in society and see how society will change as a result. An initiative by the Innovative Food & Healthcare MASTER, a research and development program, can be cited as an example. The Innovative Food & Healthcare MASTER facilitates the social implementation of research results in Iwamizawa. For example, a smartphone app is used to record

# Global Facility Center

With the “fostering of technical experts,” “recycling” and “industry-academia collaboration” as its key aims, the Global Facility Center (GFC) was established in 2016 to expand the Equipment Management Center, and is comprised of five divisions: Open Facility, Reuse & Recycle, Instrumental Analysis, Prototype Machining Solution and International Affairs.

Hokkaido University possesses cutting-edge research equipment and machines that can be used in various fields. In the past, some were scrapped upon completion of the research projects in which they had been used despite the fact that many of them were still in operable condition. The Open Facility Division offers large machines for use as common equipment. Researchers learn how to operate these cutting-edge machines in preparatory training sessions before using them in experiments. After registering, shared equipment can be used for a fee (according to how long they use the machine for), and this fee partially covers operation and maintenance costs.

On the other hand, unused small and mid-sized machines are distributed throughout the university. The Reuse &

Recycle Division is responsible for their distribution. Those who are interested can take possession of machines registered with the Equipment Market on the university website after paying a transfer fee. This system is helpful when attempting to pursue new research initiatives because the machines are less expensive than new ones.

One of Hokkaido University’s assets is advanced instrumental analysis techniques. The Instrumental Analysis Division started out as the Instrumental Analysis Center in 1979, and has since then honed its analytical techniques while changing its organizational structure. At the request of the researchers, professional analysts study samples to generate data. The researchers sometimes analyze the results together with the analysts, possibly providing clues for new research. The Prototype Machining Solution Division uses machine engineering, thinning and glass work skills to create one-of-a-kind detailed processed products in response to requests from inside the university and elsewhere. This division, with its accumulated expertise and finely tuned skills, contributes to the development of research as a reliable partner.

The shared equipment initiative began inside the university, and its expansion to overseas universities and research institutions is expected to lead to further development. The International Affairs Division is striving to develop a global network for shared equipment and expand this initiative, which can be utilized for the development of in-person exchanges and international collaboration.

Versatile shared equipment may be used in ways that depart from the norm. Isotope microscopes were once primarily used for research on ore, but now more than half of all users are bio-related researchers. Unexpected uses indicate the direction of equipment development and can lead to new industry-academia collaboration. Hiroshi Amitsuka, director of GFC, expresses his hope saying he wants to strengthen industry-academia collaboration and create innovation through the utilization of shared equipment. This HU-led equipment and technology utilization system supports research.



The Instrumental Analysis Division, which has a long history dating back to the days of the Instrumental Analysis Center, focuses on chemical analysis and the research and development of analytical techniques based on their accumulated skills.



A five-story pagoda measuring five centimeters in height created by cutting brass using a wire electric discharge machine. This is an artistic sample created by the Machining Solution Division.



# Proud to inherit history



Above: Main museum building, Botanic Gardens, showing remarkable symmetry and a fine design.

Left: Model Dairy Farm conveying the passage of time with serene beauty despite its urban location.

## Important Cultural Properties

A closer look at the surroundings and history of Hokkaido University's buildings reveals its future potential.



Sapporo Agricultural College – the predecessor of Hokkaido University – began building farm facilities for research and education of students in 1877. The relocation of the Farm to its current Kita 18-jo location began in 1909, leading to the creation of the Model Dairy Farm and additional buildings. Meanwhile, Sapporo Agricultural College incorporated the Sapporo Museum (built in 1882) and added new buildings to form the Botanic Gardens.

Nine buildings of the Farm (Farm Office, Bull Barn, Milking Cow Barn, Model Dairy Barn - Stable with Calving Pens, Cowpens and Horse Stalls, Corn Barn - Grain Storage Barn, Threshing, Hulling and Cleaning Room, Cart Scaling Place, Food Processing Plant and Milk Processing Plant) were collectively designated as the Hokkaido University School of Agriculture Model Dairy Farm and registered as an "Important Cultural Property" in 1969. Four buildings from the Botanic Gardens (Main

Museum, Ex-Administrative Office, Museum Storeroom and Gate House) were also designated as the Hokkaido University School of Agriculture Botanic Gardens/Museum and registered as an Important Cultural Property. No other university in Japan owns as many important cultural properties as Hokkaido University.

### Blending in well with the plethora of grass on the campus.

Professor Emeritus Seiji Kondo has known the Model Dairy Farm since his school days, and views it as part of Hokkaido University's origins. William Smith Clark – the first vice-principal of Hokkaido University – worked to bring Western-style dairy farming to Hokkaido: growing grass to feed horses and utilizing horsepower; allowing cows to graze, be milked and making dairy products such as cheese and butter; and feeding pigs skim milk and whey (by-products of dairy farming) to produce meat

and meat products. The Farm of Sapporo Agricultural College was established as a facility embodying what is known today as sustainable farming. The relocated Model Dairy Farm incorporates a tower silo for efficient fermentation and storage of grass for dairy cattle, and various measures have been taken to secure winter feed and promote nutrition management for domestic animals.

The concept of allowing cows to graze to enable milking, however, has remained unchanged. This farming model has produced outstanding results at the Model Dairy Farm in its role as an Important Cultural Property.

Professor Emeritus Kondo stresses the importance of nature and the Important Cultural Property. Plots of grass in the center of Sapporo may resemble that of an empty lot or idle land. However, the grass at the Model Dairy Farm belongs to farming facilities where dairy and livestock products have been produced for nearly 150 years. In addition to the buildings designated as Important Cultural Properties, it is necessary to also pay attention to the historical importance of the grass. The vast grassy areas and old buildings of the Model Dairy Farm are an irreplaceably integral part of Hokkaido's history.

### A unique research environment with a rich history

Taking a panoramic perspective of the campus as a whole, rather than focusing on its Important Cultural Properties alone, highlights the university's unique status among Japanese universities. Takeo Ozawa – the head of the Historic Property Utilization Task Force and a professor in the Faculty of Engineering – stresses its rich history.

Between the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, many

buildings were designated as Important Cultural Properties; however, the Sapporo Campus also incorporates other buildings registered as "Tangible Cultural Properties." Furthermore, other numerous and notable modern architectural structures were built around 1930 and during the post-war period. In this way, buildings from individual periods spanning approximately 150 years sit together in the same area, creating a visible history. The buried cultural properties on campus represent layers of a long history, reflecting cultures from the distant past and a natural environment full of rivers, animals, plants and people. The grounds highlight an organic ecosystem incorporating the previous natural environment and today's developed farmland conditions. The Sapporo Campus and the Botanic Gardens truly capture the extent of local space and time.

Professor Ozawa believes that highlighting cutting-edge research conducted within an environment cultivated in rich history will raise Hokkaido University's unique profile on a global scale. And as such, these Important Cultural Properties are expected to expand the university's inherent potential.



# A Moment of Shining Creativity

The Hokkaido University Campus is full of potential and possibilities. A number of events organized by students throughout the year leads to the rediscovery of the appeal of Hokkaido University.

Ginkgo Avenue is a 380-meter-long section stretching east to west from the Kita 13 Gate, attracting many visitors from inside the university and elsewhere when the leaves of 70 ginkgo trees turn color to create a golden tunnel between late October and early November. This is one of the spots of natural beauty in which Hokkaido University takes pride in.

Konyousai (Kon'yōsai, meaning "the golden-leaf festival") has been selected five consecutive years since 2012 for the

Feature:  
**Casting**  
**Hokudai GENKI Project**

Hokudai (the nickname of Hokkaido University) GENKI Project as an event offering a variety of activities including the nighttime illumination of the golden Ginkgo Avenue and craft workshops for children.

This event, which started with the illumination of just some of the trees, has expanded with each passing year, and all of the trees have been illuminated since 2015. In 2016, the event attracted as many as 30,000 people over the two-day period. The number of visitors from overseas has been



Fantastic nighttime illumination of the ginkgo trees.



Members of CLARK THEATER 2016 clad in matching parkas.

Group photo of the Hokudai Café Project. The pose represents the "c" in "café."

Members of Konyousai were student volunteers who enjoy operating festivals.

Laid-back Japanese atmosphere. Welcome to Japanese Tea Café.

## Shining golden ginkgo trees - Hokkaido University Konyousai -

Hiroki Yoneoka, the representative of the 5<sup>th</sup> Konyousai project and a student of the Department of Forest Science, School of Agriculture, commented that Konyousai is intended to show visitors the natural beauty of Hokkaido University, including Ginkgo Avenue and Poplar Avenue, and to promote exchanges between Hokkaido University students and local residents. According to Yoneoka, who specializes in forests, ginkgo trees in Hokkaido are shorter and broader than those in Honshu (the main island of Japan), and these characteristics make each ginkgo tree look powerful, thereby providing spectacular views during the floodlit Ginkgo Avenue.

The 2016 Konyousai project team met once a week regardless of the season to proceed with their activities. Immediately after the event, they began talking about plans and preparing for the next year. They take pride in the fact that Konyousai contributes to the promotion of Hokkaido University.

Yoneoka expressed enthusiasm for continuation of the event in the future, saying they want to make the event a festival that gives due consideration to people from overseas because around 20% of Konyousai visitors are from outside Japan. He also added that they hope to collaborate with other Hokkaido GENKI Projects regarding future approaches. The representative of the 6<sup>th</sup> Konyousai project has already been decided, and preparations for the 2017 Hokudai GENKI Project are well under way.

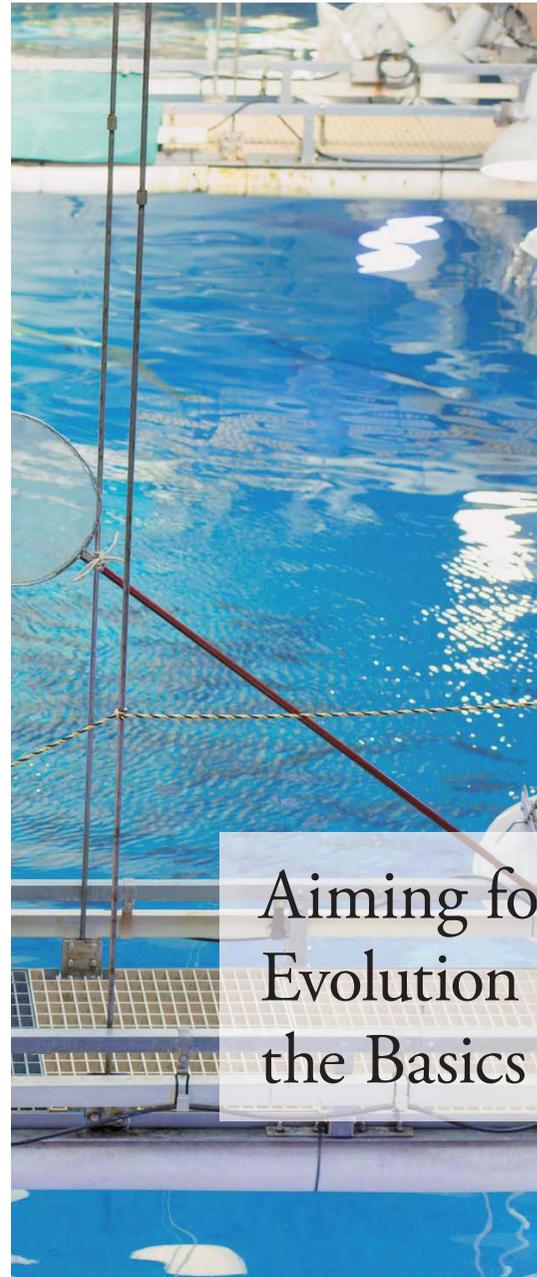
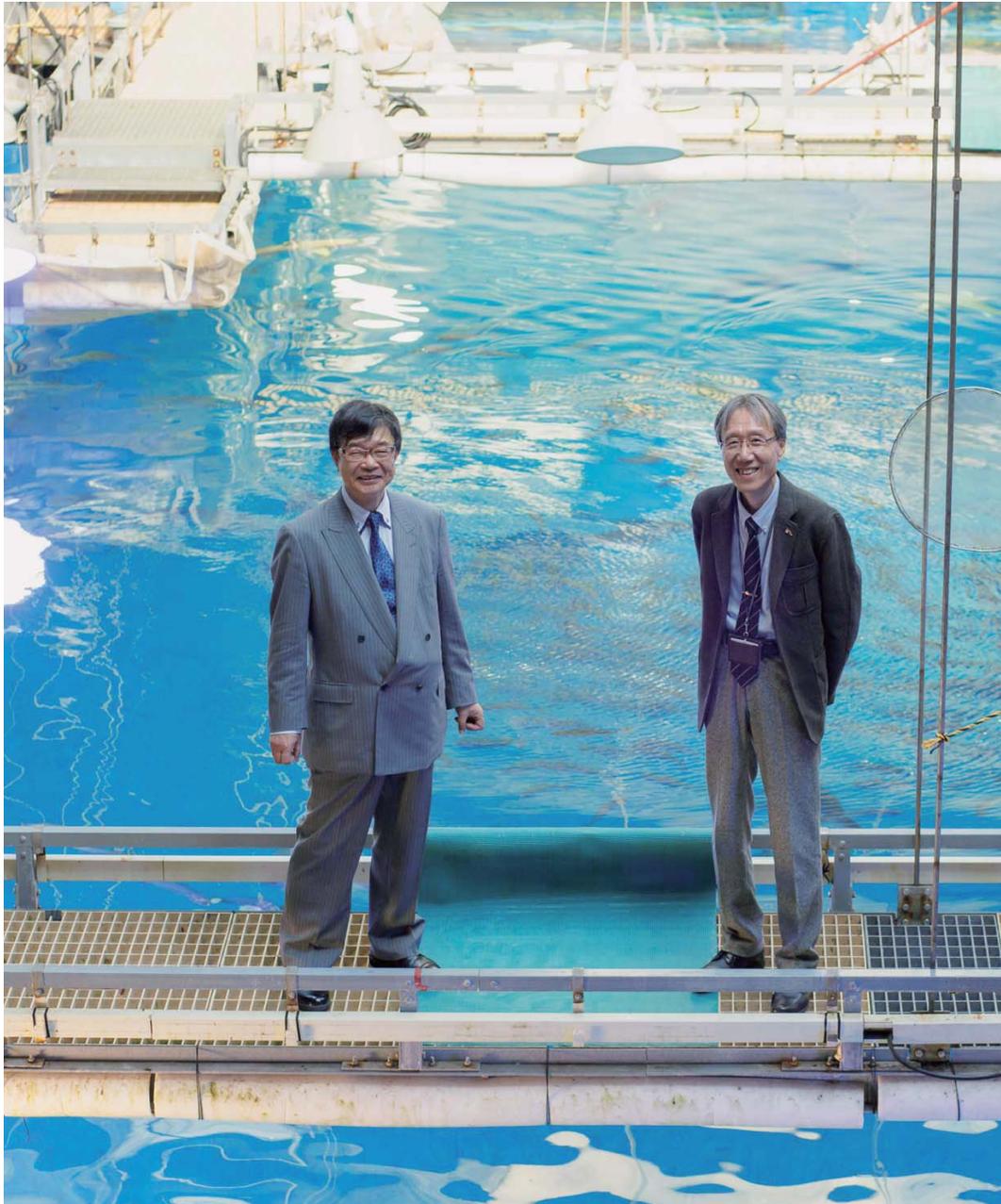
Students can freely speak their minds and implement their ideas to create shining projects and keep the Hokudai GENKI Project going.



Hiroki Yoneoka, the fifth representative of the Konyousai project, says "The best part was the nighttime illumination. When the countdown reached zero, the tunnel of ginkgo trees was lit up and people around me shouted with joy. It was a thrilling experience."

increasing steadily, making the event a great opportunity to promote the appeal of Hokkaido University to the world.

The Hokudai GENKI Project began in 2001 with the aim of making Hokkaido University more lively through voluntary and creative student activities. Any Hokkaido University student may apply to participate in the project, and groups or individuals whose ideas are adopted are eligible to receive the financial support they need to carry out their activities. As of last year, a total of 304 projects have been adopted over the course of 16 years. Among them, projects such as Konyousai, CLARK THEATER (a film festival held at the Clark Memorial Student Center) and the Hokudai Café Project (a café serving as a seasonal communication space on campus) were continuously adopted for several years and eventually established as annual events.



## An Inquisitive Mind and Frontier Spirit

Guest

# Kiyonori Nishida

Aquarium Director, Osaka Aquarium Kaiyukan

Osaka Aquarium Kaiyukan, located in the city of Osaka, is one of the world's largest aquariums. This aquarium, which is popular with both Japanese and overseas visitors, has continued to develop based on its mission and in response to societal needs. Dr. Kiyonori Nishida, director of the aquarium, spoke to us about his days at the School of Fisheries Science, his experience transporting a whale shark in opening Osaka Aquarium Kaiyukan and creative approaches to aquarium exhibits; he then gives some words of advice to current students.

Aiming for Sustainable Evolution while Sticking to the Basics

Photograph taken at the Pacific Ocean tank in which a whale shark swims.

## Pursuing his childhood dream at the School of Fisheries Science

**Takashi Mikami:** Osaka Aquarium Kaiyukan remains crowded with visitors to this day. Could you please tell me why you wanted to attend Hokkaido University and aspired to study at its School of Fisheries Sciences?

**Kiyonori Nishida:** My aspirations date back to my elementary school days. I loved living creatures and reading books by Masanori Hata, also known as Mutsugoro. Since Mr. Hata filmed documentaries about living creatures, I joined a club for adults in which I filmed living creatures and shot footage of antlion larvae emerging from pupae. When I was a second-year high school student, I watched the movie *Jaws*, and was shocked at how amazing sharks are. The movie depicted a researcher who recorded and filmed sharks despite the danger they posed. This is how I first learned about research as a career path. I wanted to study sharks, so I looked into it and found out there was a shark researcher at Hokkaido University. This led me to apply for admission to the university and study under Professor Kazuhiro Nakaya.

**Dr. Mikami:** So, you were already interested in studying sharks when you took your entrance examinations. What kinds of activities did you engage in during your university days?

**Dr. Nishida:** I got certified in scuba diving and started the Salmon scuba diving club when I was at the School of Fisheries Sciences. I hear that the club has now been promoted to "King Salmon". (*laughs*) The scuba diving experience I gained through this club was quite helpful when I joined Osaka Aquarium Kaiyukan and dove into the Arctic Ocean. My research focus was on manta rays and stingrays. In those days, the university had fewer samples of these types of fish that inhabit the southern sea. I started by collecting samples for research. Few rays are caught because they cannot be sold by fishermen. On the other hand, rays and sharks are popular and therefore exhibited at many aquariums. I visited numerous aquariums to ask for any rays that happened to die. This is how I collected and researched rays.

## Efforts prior to the opening of Osaka Aquarium Kaiyukan

**Dr. Mikami:** Please tell me how you got your job at Osaka Aquarium Kaiyukan.

**Dr. Nishida:** As I visited aquariums, I got close to their staff members and became interested in a job engaged in the study of fish, which is something I love. However, aquariums do not recruit staff members every year. When I had completed preparations for my dissertation, Dr. Senzo Uchida, the director of an aquarium in Okinawa, asked me if I was

interested in a job with a new, one-of-a-kind, large-scale aquarium to be built in Osaka. I heard that a whale shark would be kept as the main attraction and applied for the position immediately. It took a year and a half before Osaka Aquarium Kaiyukan opened.

**Dr. Mikami:** Sharks play a big role in the continuation of your story, don't they? The main attraction at Osaka Aquarium Kaiyukan is a whale shark, but I can imagine it was incredibly difficult to bring a gigantic creature like that to Osaka.

**Dr. Nishida:** Yes. We planned to catch a whale shark near



Your quest in an unknown world has produced significant results, hasn't it?

—Takashi Mikami

Okinawa and transport it to Osaka. The opening date was scheduled for July 20<sup>th</sup>, 1990, and a whale shark measuring approximately four meters and 30 centimeters in length was caught in a fisherman's fixed net after the Golden Week holidays in May of the same year. We got the whale shark used to being fed by humans in a live-box offshore, and then loaded a shipping cask with the whale shark in it onto a ferry at a port near Naha on July 11<sup>th</sup>, nine days prior to the opening of the aquarium, before transporting it to Osaka.

**Dr. Mikami:** Did the transport of the whale shark go smoothly?



I love creatures and wanted to study sharks, so I applied for Hokkaido University.

—Kiyonori Nishida

regained its color. We wore wet suits and took turns continuing this process for 42 hours on the vehicle deck. When we finally arrived at the aquarium and saw the whale shark swimming in the water tank, we felt a great sense of relief. We may have actually set a record for long-distance transport of a whale shark.

**Dr. Mikami:** You must have felt a constant sense of tension since it was a living creature. What other living creatures did you raise aside from the whale shark?

**Dr. Nishida:** I first took care of penguins at Osaka Aquarium Kaiyukan. I was sent to study at Sea World in the U.S. for a month. I thought I could be involved with sharks in some way, but ended up being told to study

how to raise penguins. At aquariums, you have to handle totally unfamiliar creatures, too. This experience led to the success of artificial breeding of rockhopper penguins today. The number of rockhopper penguins in the natural world has been decreasing along with the number of aquariums that raise rockhopper penguins. The know-how related to artificial rearing of such creatures has led to results that are helpful for ex-situ conservation.

**Dr. Mikami:** Your quest in an unknown world has produced significant results, hasn't it? Hokkaido University has long pursued its four basic philosophies of Frontier Spirit, Global Perspectives, All-round Education, and Practical Learning. Frontier Spirit refers to the unshakable spirit of taking on the challenges of the times and paving the way for the future. We provide education that enables students to broaden their perspectives, nurture creativity and cultivate a desire to explore the unknown world.

**Dr. Nishida:** I believe my frontier spirit was cultivated during my time at Hokkaido University.

## A museum that goes beyond the exhibition of living creatures

**Dr. Mikami:** Will you please explain to me the concept of Osaka Aquarium Kaiyukan?

**Dr. Nishida:** Osaka Aquarium Kaiyukan is comprised of 14 large areas representing two rings – the Ring of Fire surrounding the Pacific Ocean and the Ring of Life, where numerous creatures live – with the concept of the Gaia hypothesis that the Earth and the organisms living on it form one living system. The tanks representing individual regions around the Pacific Ocean are arranged in a clockwise manner. These tanks include Japan Forest, the Aleutian Islands, Monterey Bay, the Gulf of Panama, Ecuador, Antarctica, and the Australian Great Barrier Reef. It begins with Japan Forest, which is a land area, to represent the cycle of water; rain on land flows into the river and then into the sea. In addition to the concept of going around the Pacific Ocean, rockhopper penguins are also exhibited under the theme of the Arctic pole, the Maldives and the Falkland Islands.

**Dr. Mikami:** Could you please tell me about the creative approaches used for these aquarium exhibits?

**Dr. Nishida:** I have recently begun to strongly sense that visitors not only want to see creatures through acrylic glass but also "experience" them. This is why we created an experience area in March 2013. With the hope of allowing visitors to feel the cold of the habitat and experience the smells and calls of creatures while watching rockhopper penguins and ringed seals, who inhabit cold areas, the exhibition space is designed to have artificial snow and allow visitors to feel closer to creatures through acrylic glass for which the lower end is set at waist height.

**Dr. Mikami:** The key to its popularity is “experience,” isn’t it?

**Dr. Nishida:** Since I specialized in systematics, I tell young staff members working for Osaka Aquarium Kaiyukan to aim for sustainable evolution; that is, evolution that adapts to changes in the environment. We strive to be a museum that senses societal needs and continues to evolve while sticking to aquarium basics. This is because we will be unable to survive if we don’t take new approaches.

**Dr. Mikami:** NIFREL, a museum produced by Osaka Aquarium Kaiyukan, is an extension of the evolution of aquariums and Osaka Aquarium Kaiyukan, isn’t it?

**Dr. Nishida:** Yes. We created a museum that goes beyond aquarium, zoo and art museum genres in 2015. The name NIFREL comes from “kansei ni fururu” (a Japanese phrase meaning “getting in touch with sensitivity”). Visitors can experience creatures in the water or on land and the beauty of nature in the museum through the exhibition theme of “connections between diverse life forms and individualities.” The museum is

comprised of Abilities, Shapes, Colors, Waterside, Behavior and Biodiversity zones, as well as an exhibition zone by artists.

**Dr. Mikami:** It goes far beyond a conventional aquarium, doesn’t it?

**Dr. Nishida:** I don’t refer to NIFREL as an aquarium. Hoping to transcend the concept of an aquarium people think of as a facility for housing aquatic creatures, we set our sights on creating an installation exhibition that exhibits the space itself to deepen the visitor experience. Having said that, however, the main characters are the creatures themselves. There is no point if it is difficult for visitors to see the creatures, and we keep in mind the basic idea of ensuring no stress is put on the creatures. We hope visitors will not only be impressed and amazed but also remember what they see. In addition, we want adults to feel the sense of wonder they did as children.

**Dr. Mikami:** People remember impressive experiences. Hokkaido University officially launched the Hokkaido Summer Institute in 2016. This is an educational program in which top researchers gather at Hokkaido University during the summer to

teach classes on various subjects, including global environment problems and biopharmaceuticals, to students from all over the world. Many classes also include practical training and field work, and some classes are taught in Biei and Shiretoko, where students can experience nature, as well as in Sapporo. Experience adds depth to knowledge and cultivates rich sensitivity.

**Dr. Nishida:** Field studies were popular at Hokkaido University even when I was a student there. There are even better educational opportunities available there now, aren’t there?

### A message to young people aspiring to work at an aquarium – the importance of cultivating sensitivity and communication skills

**Dr. Mikami:** I hear that you give on-the-job training, aquarium training and lectures to high school, university and vocational school students, and teach Aquariology to many students at the School of Fisheries Sciences at Hokkaido University.

**Dr. Nishida:** Yes, I teach with Mr. Kazutoshi Arai, who used to work at Kamogawa Sea World, Dr. Keiichi

Sato from Okinawa Churaumi Aquarium and Mr. Kyohei Miyake from Otaru Aquarium. All of us hail from the same laboratory at the School of Fisheries Sciences. It is important to provide practical training at various types of local aquariums, and to cultivate sensitivity through training and lectures. In reality, you cannot carry out your duties simply because you love what you do. Work should be carried out in a team environment, and an aquarium cannot last long without support from its visitors. I teach students about the importance of interpersonal connections during my lectures at Hokkaido University. It is my hope that these students will become individuals capable of cherishing sensitivity, communicating well and informing people of bad news without hurting them.

**Dr. Mikami:** Those are all important qualities. We would like to provide classes that place emphasis on sensitivity to develop the students’ communication skills that can be used to build trusting relationships. Thank you very much for speaking with me today.

We provide classes that place emphasis on sensitivity to develop the students’ communication skills that can be used to build trusting relationships.

–Takashi Mikami

### Takashi Mikami

Executive and Vice President, Hokkaido University

Takashi Mikami was born in Hokkaido in 1949. He has a doctorate in engineering, specializing in civil engineering. He received his bachelor’s and master’s degrees in civil engineering at Hokkaido University, and was then hired by Hokkaido University’s School of Engineering as an Assistant Professor in 1974. In 1994, he became a Professor before eventually becoming the President of the School of Engineering and Graduate School of Engineering in 2006. He assumed his current position as Executive and Vice President of Hokkaido University in 2011. His motto is “go with the flow,” and his hobby is gardening.



We strive to sense societal needs and take new approaches.

–Kiyonori Nishida

### Kiyonori Nishida

Aquarium Director, Osaka Aquarium Kaiyukan

Born in Osaka Prefecture in 1958. Doctor of Fisheries Science. Earned a Master’s degree and Doctoral degree at the Graduate School of Fisheries Science at Hokkaido University. Entered Osaka Water Front Development Co., Ltd. (now Kaiyukan Co., Ltd.) in 1989. Assumed his present post in 2007. Chairman of the Universal Education Committee and Representative Director of the Kinki Block of the Japanese Association of Zoos and Aquariums.

# Refining Biogeoscience



Exploring the Arctic terrestrial ecosystem and global warming using stable isotopes

**Atsuko Sugimoto**  
Professor, Arctic Research Center

Doctor of Science. Specializes in biogeoscience. Completed a doctoral degree in the Graduate School of Science at Nagoya University. Became a professor of the Graduate School of Environmental Science at Hokkaido University in 2003 after working as a fellow at the Mitsubishi Chemical Life Science Institute, and as an instructor and associate professor at Kyoto University's Center for Ecological Research. Assumed her present post in 2016. Won the Outstanding Award of the Hokkaido University President Awards in 2016.



Professor Sugimoto's dynamic personality prompts students to mark her birthday every year.

## Global warming and Eastern Siberia

In the natural world, certain chemical elements share identical qualities other than slightly differing masses. These are referred to as isotopes, and those that are stable over time are called stable isotopes. The ratio of stable isotopes in water and other forms of matter highlights a variety of information on variables such as the origins of atmospheric water vapor and ground water. Using isotope ratio mass spectrometry, Professor Atsuko Sugimoto of the Arctic Research Center studies the taiga and tundra of Russia to help clarify the current situation and effects of global warming.

Professor Sugimoto is particularly interested in Earth System Science. Her PhD thesis at Nagoya University surrounded clarifying the process behind snow particle formation and snowfall through isotope analysis. Her adviser's former teacher was Dr. Ukichiro Nakaya, who is known for his view that snowflakes are letters sent from heaven. As a student, Professor Sugimoto collected snow on the roof of the Institute of Low Temperature Science at Hokkaido University and researched snow particle formation in association with oxygen/hydrogen isotope ratios. With focus on the fact that heavier isotopes enter cloud particles from water vapor with slightly more ease, her work clarified that precipitation particles with a lower isotope ratio created in high-altitude cloud fall in inland areas.

Carbon absorption and water evaporation (transpiration) affect areas all over the globe and repeatedly occur over the vast taiga and tundra of Russia's Eastern Siberian area. This activity, which is a major element of the Earth's system, is affected by global warming.

Eastern Siberia is covered by a vast layer of permafrost which normally experiences surface melting in the summertime. However, due to global warming there is a possibility that this melting has been steadily increasing. This in turn leads to further decomposition of organic matter, which causes increased emissions of methane and carbon dioxide. The taiga had been absorbing massive amounts of carbon dioxide, but vegetation there has grown poorly in recent years. A slight increase in the carbon isotope ratio of tree rings indicates a drier taiga environment, which is also considered to be a result of global warming.

July and August are dry in the taiga of Eastern Siberia's already arid climate. Trees can survive the dry season thanks to water from melted ice in the ground, but the recent abnormal climate has been associated with spells of heavy rain and snow, inundating forests that should be dry and killing trees there. "This has had a significant effect on the



A field notebook with detailed entries. The page displays some soil.

ecosystem and water circulation in permafrost," explains Professor Sugimoto.

Massive amounts of carbon dioxide are emitted in everyday life. Unlike Antarctica, the Arctic area is home to many societies, and this gives rise to various issues. To advance Arctic research from the perspectives of both natural and social sciences, Professor Sugimoto particularly encourages interacting with individuals in the latter field. In this way she is able to channel her passion into education based on the importance of bringing together students with natural and social science backgrounds and supporting theories coming from both perspectives.

## Emphasis on field research

Professor Sugimoto has consistently placed importance on field research since her days as a student, and promotes the importance of seeing, feeling and intuitively understanding what happens in the world. One of the many issues in field research involves battling mosquitoes which infest the Arctic in summer and affect the researchers when they are sampling and dining. For example, while drinking soup, you may have to scoop out mosquitoes with a spoon. Professor Sugimoto says that she sometimes ends up ingesting them no matter how fast she scoops. Fearlessness is important in field research.

Students keen on undergoing field studies gather to learn with Professor Sugimoto. They are a precious asset in collecting samples and providing a helping hand. Professor Sugimoto conveys to the students the importance of addressing not only the issues occurring in the Arctic, but also those affecting the everyday life of the people living there. Through her research on the Arctic, she hopes to positively impact the entire globe. "I want to know the Earth," she states.

## Relaxation

### A passion for hill climbing

One of Professor Sugimoto's wishes is to climb Hokkaido's Mt. Yoteizan because she has never been there. "I love going to places

I've never gone to before. It's so exciting!" she says. Her fieldwork spirit is clear in day-to-day activities.



Alumni Interview

# A Passion for Space



## Keisuke Iwaya

President, Iwaya Giken Co., Ltd.

| School of Engineering Graduate |

Keisuke Iwaya has taken photographs of space using balloons since his university days, and is now a leading expert in the field in Japan. Mr. Iwaya, who has become known through the media, talked to us about how he began to photograph space and memories of his school days.

### How long have you been passionate about space?

Probably as long as I can remember. As a child I read a picture book called *Space Station*. I loved it so much that its pictures remain with me even as an adult. I was inspired by the presence of a different, wider world, and developed a strong passion for it. I was more interested in technology

than going to space, and wanted to apply technology that makes the impossible possible, like Doc in *Back to the Future* – my favorite movie.

### So you began balloon space photography at university?

I wanted to invent things at university to be like Doc. I made submissions to idea competitions and was lucky enough to win some of them, but winning prizes alone didn't make me an inventor. When I had to decide whether to go on to higher education or get a job, I didn't want to choose either so I intentionally repeated a year to become a fifth-year student. (laughs) During summer vacation in my fifth

year, I was watching the news and saw some balloon-based space photos taken by a university student in the USA. I never knew this was possible, so it really struck me.

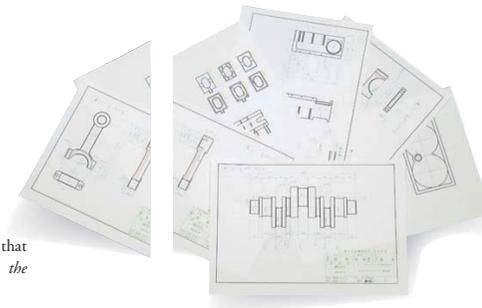
### Was that the start of your challenge?

I didn't know much, but I thought it might be interesting if I could achieve something. Photographing space using balloons involves a bunch of stuff I'm into, like space, machinery and creativity. This prompted me to try balloon space photography. I put down my ideas on paper and developed experiments using everyday things in consideration of safety. I did the experiments again and again and flew a balloon in October of that year. I used a helium balloon on a string. The following year I graduated from the university and succeeded in photographing space for the first time when I launched the 11th balloon in September. However, only 1 of the 15,000 pictures taken showed anything that looked like space.

### Conveying a spirit of challenge

#### How does balloon space photography work?

A packaged camera is attached to a helium-filled balloon, and the ensemble is flown into the upper atmosphere to take around 20,000 pictures at a time. The balloon expands significantly due to atmospheric pressure differences, and eventually bursts. A parachute opens as the unit and its camera fall into the sea. Their location is detected via radio waves, and the camera is retrieved by a fishing boat. The temperature at altitude is around minus 70°C. A device to activate the camera's battery is mounted on the unit, which weighs around 4 kg. As the fall of such a heavy object represents a hazard, the unit is designed to fall offshore for subsequent retrieval.



School-day drawings. He belonged to the Laboratory of Space Systems, known for its development of the CAMUI rocket. His graduate thesis was on private-sector space exploration (written before the commencement of balloon space photography).



Ways to conduct space photography are open to the public to motivate people to challenge themselves.

### What activities are you currently engaged in?

I work as part of a team to launch space photography units twice a year at the request of certain enterprises. To date, close to 90 units have been launched. I also work on continued improvement of these units. The pictures we've gotten so far have come closer to the ideal, and we can now even see cloud shadows on the sea. I'd really like to capture a decent sunrise again, which would start with the selection of the right equipment.

Today there are more opportunities to hold workshops for children at the Science Center, write picture books and give presentations. I hope to use my experience to benefit society and pass on our passions to the next generation. My ultimate objective is to implement exciting projects that will help people fulfill their ambitions.

### A message to those following in your footsteps

There's no shortage of time and opportunity for university students to do what they want. You are strong, so you should push yourselves. As you pursue your activities, you'll meet lots of people who can help and advise you. It's best to start small and consider the optimal timing for taking on challenges. You learn a lot by just doing things. Regardless of the consequences, this approach will provide valuable experience for your future. Let us support one another as we take on our challenges!



Lego Earth he uses for his lectures. He designed and made it himself so kids can, in a way, touch space.



Photograph taken via balloon space photography showing the beauty of space.

### PROFILE

Born in Fukushima Prefecture in 1986. Graduated from the School of Engineering at Hokkaido University in 2012. Flew the first experimental balloon in 2011. Became the first photographer in the world to capture the first sunrise of the year from 30 km above land in 2014. Succeeded in using a digital single-lens reflex camera to photograph space for the first time in Japan in the same year. Established Iwaya Giken in 2016. Won numerous awards including those from the City of Sapporo and the Hokkaido Bureau of Economy, Trade and Industry. Wrote a book titled *Uchu o Toritai, Fusen de* (lit. "Let's shoot the universe using a balloon").

## Hokkaido University Ambassador and Partner System begins



Group photo taken at the Appointment Ceremony of the Hokkaido University Ambassador and Partner System in South Korea and the Kickoff Ceremony for the Korea Yeonhyeongcho Association of Hokkaido University held in Seoul in April 2016.

In 2014, Hokkaido University launched the Hokkaido Universal Campus Initiative (HUCI), a ten-year strategy to transform the university into one capable of contributing to the resolution of global issues. One of the pillars of the reform plans of the HUCI is to enhance the university's capacity for international public relations. To this end, efforts are being made to expand and enhance the Hokkaido University Community. Fine-tuned handling tailored to the individual situations of countries and regions is required to raise awareness of the university around the world and build a global network. To do so, a unilateral approach from Hokkaido to overseas countries as well as a system that allows for flexible handling to suit the local situation is indispensable. The Hokkaido University Ambassador and Partner System was thus established in the 2016 academic year.

This system is intended to seek out graduates and people involved in the university who reside overseas and ask them to support and cooperate with the university to expand and enhance the global Hokkaido University community. It also aims to widen the circle of Hokkaido University supporters in other countries and regions by appointing leading supporters as Ambassadors and supporters who actively engage in activities and assist Ambassadors as Partners. It is hoped that Ambassadors will build local networks and develop local internship sites, and that Partners will assist Ambassadors, disseminate information concerning Hokkaido University in local languages via social media, and help with on-site school briefings and other events. They are also expected to assist local students who wish to study at Hokkaido University, Hokkaido University students who wish to study overseas, and visitors from Hokkaido University.

In selecting Ambassadors and Partners, information on candidates is collected with the assistance of organizations involved with the university, such as departments/faculties, overseas offices and alumni associations. Recommendations from within the university are also accepted. Eventually, the President of Hokkaido University will appoint Ambassadors and Partners from the selected candidates. Plans are slated to appoint 300 Partners and 30 Ambassadors (10% of Partners) by 2023 so that Partners will be in all countries and regions where Hokkaido University alumni reside.

Around the same time as the launch of the system, three Ambassadors and 30 Partners were appointed in an official ceremony in Seoul, South Korea.

1. Tokoshie no Sachi (Eternal Happiness), the alma mater of Sapporo Agricultural College, was sung at the end of the ceremony. All participants sang together with their arms around each other, creating an enjoyable atmosphere.
2. Badges with the Hokkaido University logo have been created for the Ambassadors and Partners (gold for Ambassadors, silver for Partners).
3. Card cases for Ambassadors have also been prepared.
4. The building where the Hokkaido University office in Seoul is located. Efforts are being made here to develop the university's community in South Korea.



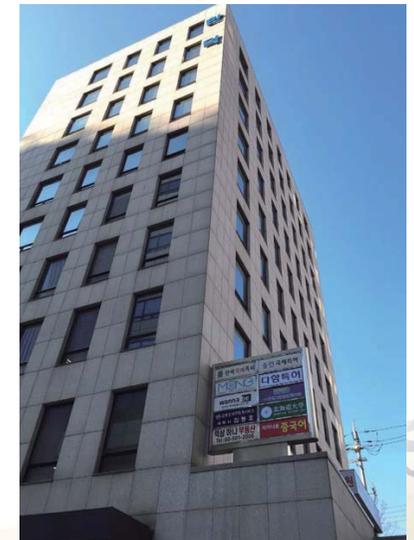
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### Toward the Further Development of Asia's Final Frontier

Dr. Pho Kaung, Rector of the University of Yangon, and Dr. Kyaw Naing, Pro-Rector of the Yangon University of Distance Education, are active as Hokkaido University Ambassadors in Yangon, the former capital city of Myanmar, which is under a remarkable construction boom and phenomenal development.



Group photo at the Hokkaido University Ambassador appointment ceremony at the University of Yangon.

Dr. Pho Kaung (Received a PhD in Science [Physics] at Hokkaido University in 1995)

I am honored to have been selected as a Hokkaido University Ambassador. The University of Yangon is my first alma mater, while Hokkaido University is my second. During my four years at Hokkaido University, I would walk along Popular Avenue with my friends and sit on the grass near the brook reading books. I would also bury myself in my studies late into the night and assist lectures as a TA. Although I found myself under a tremendous amount of pressure carrying out my research, I was able to achieve satisfying results. I deepened my scholarly interests and acquired knowledge that can be used to contribute to society. This is the most important thing I learned at Hokkaido University.

I now serve as Rector at the University of Yangon, one of the foremost educational institutions in Southeast Asia. Its campus is architecturally important and attracts attention from not only within Myanmar but also elsewhere as a microcosm of unique plants and animals. Fifty years of virtual national isolation battered the University of Yangon, but graduates, university leaders and the national government are uniting to revitalize the university and reclaim its past glory.

The University of Yangon has already participated in research collaborations with Hokkaido University, for example with Hokkaido University's Space Mission Center on the Asian Micro-satellite Consortium (AMC). Faculty members of the University of Yangon have also participated in symposiums held by Hokkaido University. Academic exchanges like these have started, and going forward we will strive to deepen the relationship between our universities and relay the results to our local residents and the entire nation. These and other efforts as Hokkaido University Ambassadors will be recognized accordingly in the future.

Dr. Kyaw Naing (Received a PhD in Science [Chemistry] at Hokkaido University in 1995)

Hokkaido University is my second home as a scholar. It is a great honor to have been selected as a Hokkaido University Ambassador. I spent four years at Hokkaido University, including my days of intensive language study at the International Student Center (today's Center for International Education and Research). While studying the language, I also learned Japanese customs and traditions. I am committed to using the experiences and knowledge I acquired at Hokkaido University for the development of my university in Myanmar.

With the aim of building a Myanmar Hokkaido University alumni network, I have begun making a list of Hokkaido University alumni residing in Myanmar. Based on this list, I plan to invite all alumni to attend a meeting where I would like to study how we can raise awareness of Hokkaido University in Myanmar through activities such as creating brochures. I plan to provide a brief lecture on Hokkaido University to students and faculty members at Yangon University of Distance Education to increase interest in studying at Hokkaido University. Together with Rector Pho of the University of Yangon, I also plan to hold a large-scale event for students and faculty members in the city.

There is also a plan under way to support and facilitate exchanges with Hokkaido University researchers and students who visit Myanmar for research. We will consider providing opportunities for Hokkaido University students to talk with local students and chances for Hokkaido University researchers to attend seminars and group discussions in their research fields with researchers in Myanmar.



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1. The main gate of Yangon University of Distance Education.
2. Dr. Kyaw Naing (right) and Associate Professor Masayuki Takahashi of the Faculty of Science.
3. Dr. Pho Kaung on the University of Yangon campus.
4. Photos from when the two ambassadors studied at Hokkaido University.



3



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# Topics

01



Fellow Akiko Suzuki (right) and the graduates.

## First Graduates of Nitobe College

Nitobe College, a cross-departmental educational program launched in 2013, produced its first batch of graduates in March 2017. There were 15 graduates in total: eight men and seven women.

To complete a degree at Nitobe College, students must earn 15 credits, including an overseas component. From the time they entered the College, the 15 graduates created and implemented plans for their studies at Nitobe College and overseas, maintained the motivation to complete their degree, and made extra efforts to continuously improve themselves. Some of the graduates commented that their experience has helped them consider real-life issues from various perspectives and that they improved their problem-solving abilities, which is one of the objectives of Nitobe College.

One of the characteristics of Nitobe College is that alumni who have received a wealth of international experience

participate in the program as Fellows. Fellows noticed a positive change in student attitudes during interactive training programs and Fellow Seminars. Students who had once been passive began to act voluntarily and work seriously on issues for the sake of their own development. Meanwhile, some Fellows rolled up their sleeves once they felt the increasing need to make an effort to improve themselves.

At first, some students entering Nitobe College are not strongly motivated to study overseas or develop leadership skills. Therefore, Nitobe College is slated to introduce a foundation program in the 2017 academic year aimed at enabling students to intensively learn skills that should be acquired early on, and an honors program in the 2018 academic year that will allow students to reflect on themselves from the end of the foundation program until their graduation to bolster their skills and sharpen their minds.



Group meeting with a Fellow and students of Nitobe College.

02

## Exploration of the Arctic Ocean by Oshoromaru V

Oshoromaru V, which was completed in July 2014, is used as a training ship for the School of Fisheries Sciences for boarding training, ocean training and exercises as a part of the university's curriculum as well as a part of joint training among universities nationwide; it is referred to as an "ocean campus" where students can learn and think while out on the open sea. Oshoromaru V is also used for fishing and ocean training as well as for summer school programs of overseas universities, providing opportunities for students from Japan and elsewhere to cultivate a Frontier Spirit.

In recent years, there has been a significant decrease in sea ice in the Arctic Ocean. This is expected to cause a drastic change in the earth's ecosystem. Oshoromaru V conducted a one-month hydrographic observation of the subarctic sea area in the 2016 academic year, and is scheduled to explore the area from the Bering Sea to the entrance of the Arctic Ocean in the 2017 academic year and the Arctic Ocean in summer 2018. As an ice-resistant trawl-boat, which is a rarity in the world, Oshoromaru V investigates ocean fluctuations and the resulting effects on the ecosystem in the Arctic Ocean. Numerous results are expected to be derived from the detailed data that the ship will collect.



Oshoromaru V sets sail

## Spring – The Time When Flowers of Hope Begin to Bloom

Photographer: Akihito Yamamoto



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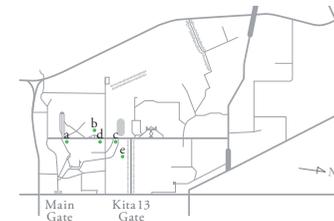


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Although the wind remains cold, the sun has grown brighter since the beginning of spring. People always wait impatiently for spring. This feeling of impatience is especially strong for people living in Hokkaido, where winters are long and harsh.

The names of those who passed the first-term entrance exams for Hokkaido University were released on March 8<sup>th</sup>, 2017. Successful applicants were continuously tossed into the air in celebration by sports club members in front of the Institute for the Advancement of Higher Education. Kohei Tsubaki, who took the physics-focused screening of Faculty-free Admission (Science-oriented), showed a willingness to study, saying he was interested in programming and hoped to study artificial intelligence. Hiroki Kato, who took the biology-focused screening, visualized his college life, saying he wanted to make many friends from outside Hokkaido. The campus was full of smiling faces on the day the door to Hokkaido University was opened.

Cherry blossoms will soon bloom, and the fresh green season will arrive. Spring is right around the corner, and this brings happiness along with it.



- a . Furukawa Hall
- b . The Hokkaido University Museum
- c . Sakusuyukotoni River
- d . School of Education
- e . School of Pharmaceutical Sciences and Pharmacy

