



Chapter IV

A Limitless Future



1. Kanazawa University Connected with the World (I)

Expanding Links with the World

Professor Miyashita Takaharu, of the School of Humanities, has been leading the Restoration Project of Mural Paintings in the Basilica di Santa Croce, which is one of the most notable international cooperation projects run by humanities faculty at Kanazawa University. The Basilica of Santa Croce, Florence, Italy, contains a 26 m tall fresco called *Legend of the True Cross*, and Professor Miyashita, along with the Laboratory of Restoration in Florence (Opificio delle Pietre Dure di Firenze), worked to restore these images. The project started in 2004, and has contributed to advancing research on Italian Renaissance frescoes. In 2010, Professor Miyashita was granted the Award of the Golden Lily (Giglio d'Oro) by the Italian Government.

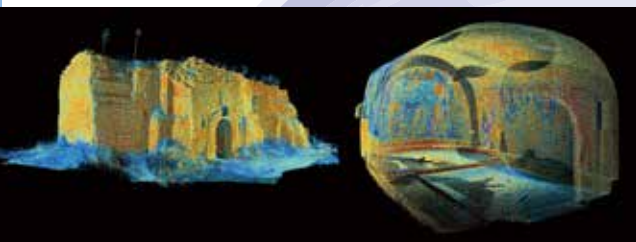


Signing the Japan-Italy Joint Research Project Agreement (2004)





Professor Miyashita photographing work progress



The church in 3D



Cripta bizantina di San Leonardo, Massafra



Surveys using the latest equipment

Starting in 2010, Professor Miyashita's project has developed into the Japan-Italy Joint Research Project on Fresco Diagnostic Surveys. The University has created the Research Center of Italian Mural Paintings, and, through a combined Arts and Sciences research team, is carrying out a systematic, scientific survey of frescoes in the cave churches of southern Italy to record and preserve them.

To continue and expand on Professor Miyashita's research, the College of Humanities and Social Sciences created the Center for Cultural Resource Studies. The Center deals with the tangible and intangible cultural resources of humanity, shedding light on their academic value, and at the same time, assessing their social, economic, and educational value, and research and developing methods to actively preserve them. The key research areas include not only paintings, sculptures, architecture, ruins, and archeological materials as cultural heritage, but customs, systems, faiths, technologies, languages, and other traditional or intangible cultures.

Research confined to the ivory tower is now a thing of the past at the university.



Festival of ethnic minority, Qinghai, China



Bas-reliefs in a Hindu temple, India



International students in class

2. Kanazawa University Connected with the World (II) International Student Exchanges

Kanazawa University, aiming to be a stronghold of intellect in East Asia, has exchange agreements with a total of 145 universities and research institutes in 31 countries (as of 2011, including departmental agreements).

Kanazawa University currently welcomes around 500 international students from 36 different countries or regions. International students, whether full- or part-time, studying at the graduate schools or colleges take lectures in line with their interests, take part in research activities, and also take courses on Japanese language offered by the International Student Center. The International Student Center also provides its own programs that include the special one-year Kanazawa University Student Exchange Program (KUSEP), the Japanese Language and Culture Program, and the Semester Program. In lectures such as Joint Classes, international students and Japanese students learn in the same classrooms and both work together to improve themselves.

Japanese students are also sent abroad to study. Kanazawa University sends about fifty students a year to study at partner institutions for periods of between six and twelve months. In addition, the university has a range of short-term courses for students from sister schools in countries like the United States, Germany, and China (nine schools in seven countries as of 2010), which around a hundred students a year take part in. Starting in the 2009 academic year, links with local businesses have led to business training trips to China, and an Overseas Internship system was also started in the 2010 academic year.

Inside the university, the International Exchange Lounge and VOTAK (Volunteer Tutors' Association of Kanazawa University), and other student exchange groups are active in providing opportunities for exchange with international students. These exchanges are also a great chance for Japanese students to learn more about the outside world.



Exchanging opinions on the corporate study tour



International students in the Hyakumangoku Parade



International House

3. A University Open to the Region

As an institute of higher learning, a university is required to play a role in returning its education and research results to the wider community, and making the latest research readily understandable to laypersons. Kanazawa University's Center for Regional Collaboration acts as the central point of contact between the university and the region, but other methods include developing new technologies which are utilized in new products, and writing books and guides for as many people as possible to read. The university's research results include many that are on large enough scales to contribute not just to the local region, but the world, and humanity, as a whole.



Kanazawa Nishi-cho Education and Training Center (Satellite Plaza)



Lifetime learning class



Extension lecture at pharmacological botanical garden



Satellite Plaza



Public lecture on frescos



Model trains exhibit at Satellite Plaza



University-Region Collaboration Active Forum, held by the University Consortium Ishikawa



Kanazawa University Festival



Open Campus

One of the missions of a university is to pass onto the public, in easily-understood ways, this sort of global-oriented research, rather than just the research and technical developments that are closely connected to society, and to explain about the long history of humanity. To that end, the university provides a number of venues, including the Medicinal Herb Study Group, which uses the expansive botanical gardens at Kakuma, and the Kanazawa University Satellite Plaza downtown near the Omicho Market for extension lectures. The Open Campus, held each summer, and the Igakuten (Exhibition held by medical students) and University Festival, held each autumn, are opportunities for both intending applicants and the general public to learn more about the university.

The University Library also offers a book loan service to the general public via public libraries in the prefecture, in addition of course to welcoming users directly. Links with the University Consortium Ishikawa under the name “Downtown Lectures” offer classes at the Shii-noki Cultural Complex in the central city, where university faculty members give extension lectures on a range of specialist themes, helping the university to coexist with regional society.

4. Towards the Creation of Groundbreaking Innovation



Opening the Organization of Frontier Science and Innovation (2012)

Japan is still recovering and rebuilding from the Great East Japan Earthquake that struck on March 11, 2011. With the major changes in peoples' expectations towards science and technology, Kanazawa University merged its Frontier Science Organization, designed to promote research support, with its Center for Innovation, which promoted industry-academia-government collaboration, to form the Organization of Frontier Science and Innovation (OFSI) on April 1, 2012.

The Frontier Science Organization was established at Kanazawa University in April 2007 in order to develop its characteristic prioritized research programs into a world-class education and research base, and a lot of resources were concentrated into five prioritized research programs in the university. With the addition of a tenure track system* based on global staff recruitment designed to train young researchers, the training of

specialist research support staff called Program Officers, and the acquisition of large-scale funding, it has been able to produce some impressive results.

The Center for Innovation, on the other hand, was founded with four departments in April 2008 to handle industry-academia-government collaboration, and was active in promoting joint research between industry and academia, returning the seeds and patents of the university to society at large, and fostering university-based venture corporations.



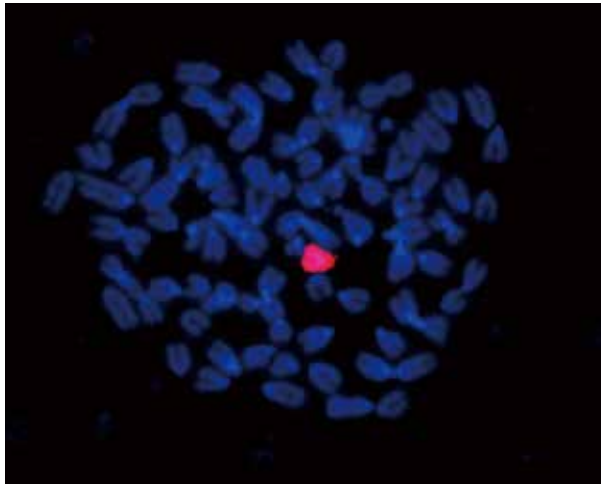
Venture Business Laboratory



Balloon measurements at Noto Super Site

The new OFSI has set up an administration department formed from the five support groups, which include the Research Strategy, Planning and Coordination Group in addition to the research departments in order to inherit and expand the functions of these two organizations. National universities are required to provide innovations that can solve a range of global issues, including the environment, energy, food, and disease, so the OFSI works to support and promote the creation of innovations that draw on the features of Kanazawa University.

*Tenure-track system: Young researchers are hired on a term-limited basis to build up their experience as independent researchers, and are then provided with permanent positions after passing rigorous screening. The photos on this page present some of this research.



Human chromosomes inserted into mouse cells



Atomic Force Microscope which can see molecular structures



Wild model mouse (L) and obese model mouse (R)

5. Creating Revolutionary Brain Science – COE (I)

As part of the Ministry of Education's "21st Century Centers of Excellence (COE) Program," the "Innovative Brain Science for Development, Learning and Memory" program was launched in summer 2004, wrapping up in March 2009. In this COE, a total of 24 people belonging to the three graduate schools of Medicine, Socio-Environmental Studies (later known as "Human and Socio-Environment Studies"), and Natural Science to tackle world-leading research into brain functions and global-class education. This allowed the fusion of research between different fields, education for graduate students at an international level, and provided a platform for the ethical education required for brain research.

This COE considered "children's developmental disorders of learning, sociability, and behavior such as autism" as functional disorders of the mind (brain), explored their mechanisms, and proposed, as they stated, "a method to develop the brain and overcome these disorders". The most important result from this research was the discovery that a molecule known as CD38 was needed when the oxytocin molecule required for the social recognition and memory of others was secreted. The paper which described the role of this molecule and proposed its relationship with social recognition disorders such as autism was published in the prestigious journal *Nature*. A large number of papers related to the causes of developmental disorders have also been carried in international journals.

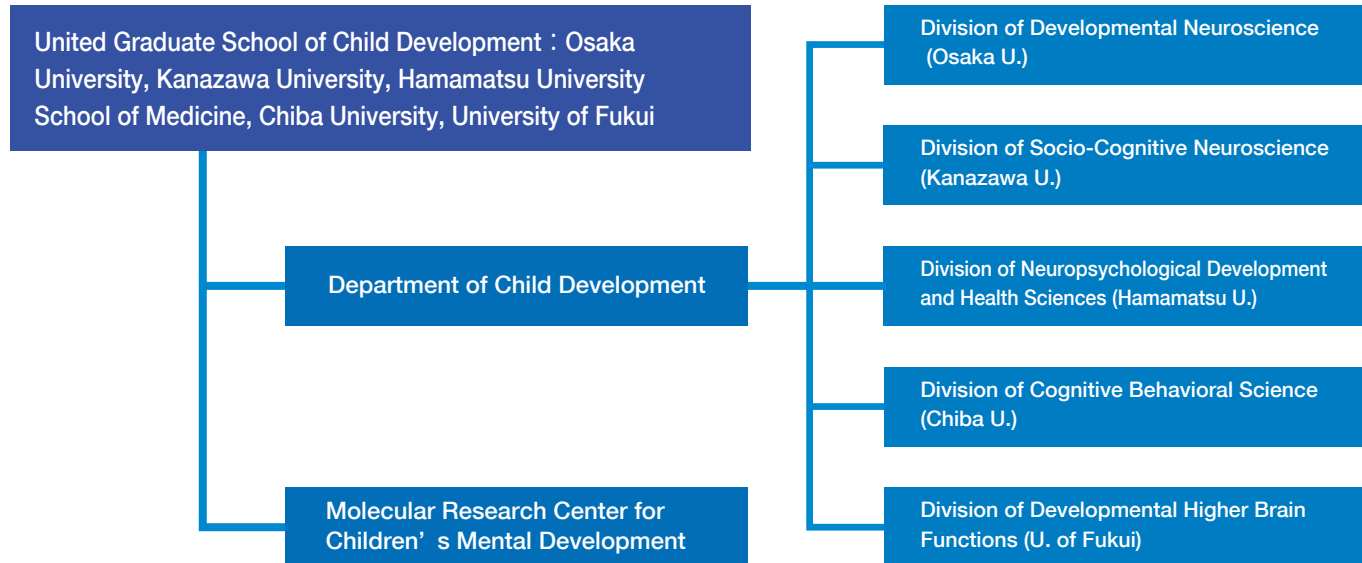


Research Center for Child Mental Development established



Japan-Korea Joint Symposium to discuss latest medical advances (2007)

United Graduate School organization



Of particular note is the creation of two new organizations within the university in line with the mission of the COE project. One is the Research Center for Child Mental Health Development, founded in October 2007. This was linked with centers at Osaka and Hamamatsu universities in April 2008. The other is the April 2009 formation of the Kanazawa School of the United Graduate School of Child Development formed between Osaka University, Kanazawa University, and Hamamatsu University School of Medicine. Chiba University and the University of Fukui joined in April 2012, creating a unified graduate school of five universities.



Second Kanazawa University Summit for Child Mental Development (2012)



6. Frontiers of Pan-Japan Sea Research – COE (II)



Measurement at COE Wajima Station

“Environmental Monitoring and Prediction of Long- and Short-Term Dynamics of Pan-Japan Sea Area” was selected by the Ministry of Education for its “21st Century Centers of Excellence (COE) Program.” This project was carried out over five years from 2002 to 2006. The Japan Sea has narrow channels at both ends, making it an enclosed area that is very vulnerable to pollution from things like oil tanker accidents. In addition, the rapid industrial development of China in particular has increased the burning of fossil fuels, producing large amounts of carbon dioxide and hazardous substances, which are considered major factors of environmental variations on the global scale. Kanazawa University has been positioned as a base for joint research with foreign research institutes, and more than twenty teaching staff and around a hundred doctoral researchers and graduate students are working on education and research related to the atmospheric environment, environmental radiation, land water and climate changes, the crust, the paleocean, water and soil environments, and the biosphere.

The results of this research have not only shown the generation of yellow sand and polycyclic aromatic hydrocarbons from burning fuels, measurements at the Noto Peninsula have shown their long-distance transportation, and their effects on allergies such as asthma, endocrine disruption, or on reactive oxygen species production. The Low Level Radioactivity Laboratory (the Ogoya Underground Laboratory) in Nomi City, Ishikawa Prefecture, was used to measure ultra-low level radiation to produce world-leading research results related to pollutants and transportation. In addition, a great deal of results were gained regarding long-term changes over tens of millions of years from the crust, sediment, fossils, and so on from the Japan Sea region.

Many researchers gathered here from both Japan and overseas for the annual international symposiums, and the end results were published in 2006 as *Past, Present and Future Environments of Pan-Japan Sea Region*. The networks with countries around the Sea of Japan rim created at this time should provide an important driving source for future education and research on the region.



Study tour to Lake Baikal



Survey ship, Lake Baikal



International Symposium on "Environmental Monitoring and Prediction of Long and Short-Term Dynamics of Pan-Japan Sea Area" (2003)

7. Tomorrow's Kanazawa University



President Nakamura speaking at Five Asian University Presidents' Forum in Kanazawa (2011)

Back in 1855, 150 years ago, when the famous French bacteriologist Louis Pasteur (1822-1895) was appointed professor and dean of the Faculty of Sciences at the University of Lille, the Minister of Education at the time wrote the following in a letter to the Rector of the University.

Pasteur must guard against being carried away by his love for science, and he must not forget that the teaching of the faculties, whilst keeping up with scientific theory, should, in order to produce useful and far-reaching results, appropriate to itself the special applications suitable to the real wants of the surrounding country.*

A university exists for the sake of society, and the nucleus of its activities is *the succession and creation of knowledge*. The real activities carried out for this succession and creation of knowledge are education and research; thus, through these actions of education and research, a university exists for the sake of society. The meaning of "for the sake of society" differs in each age, but it is clear that, even a century and a half ago, more direct contributions to society were being demanded, and the balance between *education and research as intrinsic value*, and *education and research as instrumental value* developed over time while being pulled in one direction or the other by the requirements of the era.

In 21st century Japan, the concept of “for the sake of society” is swinging over to the training of people who can be of use to society the moment they graduate, and to research of more direct use for society, that leads to innovation. When I consider how things were 150 years ago and how they are now, it leads me to believe that universities will continue to develop while repeating similar phenomena, and that even a century and a half from now, universities will be working to balance between *intrinsic value* and *instrumental value*.

I would like to see the following for Kanazawa University 150 years from now. Even in a time when we are freed of hardship and can have enough food, clothing and housing, we, human beings will not find fulfillment in just love, play and other daily activities. We will find satisfaction in intelligent activities and *the creation of knowledge*. Tomorrow’s Kanazawa University will become a place where people get together and work to achieve satisfaction through *the succession and creation of knowledge*. In that world, it is indeed being this sort of place that is what makes a university *for the sake of society*.

* Introduction to Biocatalysis Using Enzymes and Microorganisms, S. M. Roberts et al., Cambridge University Press, 1995.



President Nakamura using stereomicroscope (Florence)